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THE
ALPINE JOURNAL.

MAY 1868.

TRAVELLING IN NORWAY. By JOHN R. CAMPBELL.
1868.

I.

OF all months July is the pleasantest for travellers in Norway ; generally having a greater number of fine warm days in it than any other. June and August are also good ; although early in June the weather is frequently chilly, and towards the middle of August it often breaks or remains long unsettled. After August the days draw in rapidly ; nevertheless, tourists may remain without inconvenience from the climate another month or more. Sportsmen continually do so for the shooting. June and July have, naturally, an advantage in length of daylight over all the other months. In the North, during this period, there is no real night ; and even in Christiania, throughout the latter half of June, one may read by twilight at 12 P.M. By landing, therefore, at Bergen about the 1st of June, you have at least three good months before you to spend in a voyage up the Arctic coast, in exploring the more remarkable of those silver *Fjorde* which run deep into the country, and in visiting portions of that wild web of mountains, which, with hardly an interval of plain, extends over the whole of the kingdom.

It need scarcely be said that a country so large, whose picturesque localities, besides being numerous, are so widely separated ; where railways are yet in their infancy, and through whose mountain-glens the traveller must, therefore, proceed either on foot or by *Karjol*, cannot thoroughly be ' done ' in one season. Three months, however, enable a traveller

to take a glance up the wonderful north coast, and afterwards, landing at *Molde* or *Thronhjem*,* to follow an overland route southwards, which shall embrace some of the grandest scenes; or, if less ambitious, his whole time may well be devoted to an examination of certain districts—say those of the *Nordfjord* and *Jostedalsfeld*.

I have spent four pleasant summers in Norway and still remain a stranger to several of the grandest glens. Let me honestly admit, however, I am but a lazy man on a tour, often spending weeks in a neighbourhood which pleases me, where most that is remarkable might be seen by more energetic travellers in a couple of days. My idea is that much of the charm of Norway is derived from intercourse with the people themselves.

There are several routes from England to Norway, and a traveller, in selecting one, must consult his pocket, the time at his disposal, and his *seaworthiness*, i.e. capability of enduring a voyage. Some people suffer so much on board ship that they would willingly journey a roundabout way rather than chance a gale at sea. Storms on the North Sea are generally of shorter duration and perhaps less violent in summer than later in the year; but you are never safe from them, go when you will. Now the most direct way, as well as the cheapest, is by steamer from Hull or London to *Christiansand*. Messrs. Wilson and Sons' steamers leave Hull every Friday, and one may reckon on reaching *Christiansand* in less than 48 hours, except the weather is very bad. I once made the passage in something under 38 with their 'Scandinavian.' The 'North Star' from London, I believe, performs the voyage once a fortnight, in a time little exceeding that from Hull. At *Christiansand* (where there is nothing to see) all these steamers make a few hours' stoppage before proceeding on to *Christiania*—thereby making the whole voyage from England to *Christiania* one of three days. The course after leaving *Christiansand* being for the most part under the lee of islands and up the *Christianiafjord*, the water is comparatively smooth on this last day of the voyage. The first-class fare from Hull to *Christiania* is 4*l.* exclusive of provisions. A return-ticket available for the whole season costs 6*l.* I believe the 'North Star' company charge about the same. I speak of course of what *has been*; another year

* The English call this town (the ancient capital of Norway) *Drontheim*. I prefer, however, giving it the Norwegian appellation; and shall generally, in the following pages, write all proper names as they appear in *Norsk*.

fares and times of departure may be changed. In 1867 Messrs. Wilson ran the 'Scandinavian' to Bergen, and I went with her in about 50 hours from Hull. Boats belonging to another company, also run from Hull to Bergen, but in returning take Amsterdam on their way. Norway is well provided with excellent steamers all along the coast; so that anyone landing at Christiansand has not long to wait—seldom more than a day—for a boat to the North. The coast route, however, between Christiansand and Thronhjem is hardly remarkable for scenery.

A somewhat circuitous, but very interesting, route is the following:—Through Belgium and Germany to Hamburg; thence (*viâ* rail through Jutland) to Copenhagen; across the narrow strip of sea to Sweden, and up that country (nearly all the way by rail) to Christiania. This gives one an opportunity of spending a few days in the Danish capital, where in the shape of museums, Thorwaldsen's sculptures, &c. there is a vast deal to see. The environs are very pretty, especially one or two royal parks, splendidly wooded with beech. By a short *détour* Stockholm, too, may be visited on the way. It is the most charmingly situated capital north of the Mediterranean, and, including excursions in the neighbourhood, will occupy the traveller a week. That beautiful series of lakes linked together by short artificial channels, the *Göta Canal*, which, like a belt of water, joins the North Sea with the Baltic, may be included in the route. The scenery traversed by it is charming here and there, but never grand, the country being too flat. The lakes are most irregular in shape, studded with wooded islands, and bedded in an undulating country, which is almost a continued forest of birch and fir. Little cultivation is visible; at intervals you pass a log house painted red, and now and then a village in a clearing; but these are few and far between. The celebrated falls of *Tröllhæta* (close to a point on the canal) are mere rapids, and the traveller need waste no time over them, as they cannot be compared with, I might almost say, a hundred in the sister land. Sweden, however, deserves a summer to itself; there is so much to interest one both in country and town. The ironworks and mines are, perhaps, the most remarkable features of the country, and well worth the inspection of all whose taste lies that way. During a summer I spent there nothing struck me more than the hospitality of the Swedes. I landed without introductions and had no means of returning civilities, and yet in no part of the world have I met with disinterested kindness so great.

Next with regard to luggage. In every mountain country you meet two classes of travellers: first, those who, prepared to walk and rough it, seek out nature in her seclusion by glacier and peak; and secondly 'roadsters,' if such I may term that numerous and respectable flock, who, following each other along some hackneyed route, content themselves with what grandeur of scenery the king's highway affords. Now it is only the first class who can thoroughly explore Norway; and for them a knapsack must suffice, or all events, such light baggage as a man can carry on his back. However, a vast deal may be done by leaving your heavy portmanteau at a roadside inn; making circular walking tours through the surrounding district; and then posting on to some other central point. A good many passes are traversable by ponies; and a pony will carry a portmanteau across his back; or two smaller packages (generally enclosed in nets made of birch twig) slung one on each side; but the whole weight for a day's journey ought not to exceed 100 lbs. As to the roadster, he can drag about much more. Should his own karjol be insufficient to hold all his luggage, he can hire two vehicles, or send a portion forward in a cart.

English circular notes can be changed at the principal towns. The Norwegian currency is tolerably simple. A *Specie Daler* being about 4s. 6d., a *Mark* or *Ort* is the fifth part of this, and is divided into 24 *Skilling*. It is a good thing to have the greater part of your money in 1 Daler notes; those of larger value are often difficult to change. When posting you are called upon for minute payments all day long; hence a leather bag of small coin is very handy; 12 *Skilling* pieces are the best.

I may here observe that passports are not required, and that the Norwegian custom-house seldom gives any trouble. Of course there are articles you pay duty on; for instance, jam, which some travellers have been known to bring; but the ordinary luggage of a tourist contains nothing liable to a tax. There are good shops in the chief towns where most wants can be supplied. If you require water-colours, or fishing-tackle, you had better purchase them before leaving home; but capital 'birdseye' is sold at about one-third the English price.

Danish being a language understood by few who visit Norway, the profession of travelling interpreter has sprung up. A *Tolk*, as he is called, can generally be hired at Christiania or Bergen to accompany a party on their tour. He is a travelling mouthpiece, and often a great bore. Where there are ladies, a 'willing' *tolk* may save much trouble; but he ought thoroughly to understand before you engage him that he

is to act as servant in case of need. However, *à propos* of ladies in Norway, few of them will enjoy struggling through the wilder parts of the country; the absence of comfort is too great, save for the 'very fast.' If they *will* go, let them keep to the main routes; it is a mistake when they attempt more. Men usually manage to make their way without a talk, who is a being altogether different from a Swiss guide. He costs more than anyone of the party, for you have to pay for his horses, his board, and to give him a daler a day besides. The somewhat scant vocabulary in Murray (with sundry additions picked up on the road) is all that is essential to enable one to blunder along. Still, ignorance of the language is productive of constant inconvenience. Language is the key to travelling; it enables one to ask questions. Without it one learns only by observation—few people, even along the grand routes, speaking any but their mother tongue. The usual inability of Englishmen to converse, many of whom know little beyond the two words 'Hest strax!' (meaning 'Horse immediately!'), is almost a joke throughout the land.

Now Danish (or *Norsk*) is the easiest Continental language we English can learn. This comes partly from the simplicity of its grammar, but principally from the affinity Danish words have with our own; and I cannot do better than advise those who purpose travelling in Norway, and have time, to study Danish—say for a couple of months, under a master—previous to commencing their tour.

As no doubt most of my readers are aware, the modern language of Norway is identical with Danish in *print*; both Danes and Norwegians using the same dictionary and grammar. A few remarks on its construction, as distinguishing it from other tongues, although necessarily incomplete, may not be out of place here. The peculiarities in the construction are *principally* confined to two; namely, the position of the definite article, and the formation of the passive voice. The definite article (where there is no adjective) is placed after, and joined on to, the noun. In form, however, it is the same as the indefinite; being *en* for the *common* gender (which includes masculine and feminine); *et* for the neuter; and, when used for the definite, *ne* for the plural of both genders. *En Dal*, for instance, means *a valley*; *Dalen*, *the valley*; *et Fjeld*, *a mountain*; *Fjeddet*, *the mountain*. *Øer* is the plural of *Ø*, signifying *island*; and adding the syllable *ne* to it, you get *Øerne*, *the islands*. A verb is changed from active to passive by the addition of an *s* to the infinitive. Thus *hade* is to hate; *hades*, to be hated; 'jeg hader,' I hate; 'jeg hades,' I am hated.

The pronunciation of the language is different in Norway and Denmark. The vowels *a*, *e*, *i*, *o*, *æ*, and *ö* (which last is properly *o* with a stroke through it), have, in both countries, nearly the same sounds as in German; *y* corresponds to the French *u*; and *aa* (*å* in Swedish) is pronounced like *a* in our word 'ball.' The consonants, also, are *generally* the same as in German; but there are exceptions to this, as in the case of *g* followed by *e*, *i*, *y*, *æ*, or *ö*. I may further mention that a *d* following another consonant is nearly mute. Thus, *Fjord* is pronounced *Fee-or*. Now Norsk differs from Danish, principally in the sound of *sk*, when those two letters precede any one of the vowels *e*, *i*, *y*, *æ*, and *ö*. In the former language *k* sounds like *h* (as in Swedish), while in the latter it takes a complicated sound, which it would be difficult, in a few words, to explain. As an example, *Thee-shee* (tea-spoon), a Norwegian pronounces 'Tay shay;' *Skib* (ship) he calls 'sheeb;' whilst a Dane sounds the word almost like 'sk'yeeb.' I have dwelt rather on this subject as the majority of grammars are by Danes; and therefore the pronunciation taught by them is essentially Danish, no notice being taken of the Norsk.

Although Danish is the language of the educated, and is generally understood by all, the peasantry speak dialects (*Bondesprog*) among themselves, varying with the locality, but all of them retaining more or less of the *old Norsk*, the ancient language of Norway, of which Icelandic is a remnant. Many words used by the peasants are Swedish rather than Danish. Thus they say *honom* (him), *Vecka* (week), instead of *ham* and *Uge*, the corresponding words in the latter tongue. Hence it is difficult for a Dane to understand the peasantry in many parts of Norway.

The resemblance between our Cumberland, or rather Lake district dialect, and the Scandinavian languages is singularly striking. Below are a few examples. In the left column I have given Cumberland words, and in the right their *equivalents* in Norsk (save where otherwise stated); all words on the same line having the same meaning. The Cumberland terms I have spelt as they are pronounced.

<i>Barn</i> , a child	<i>Barn</i>
<i>Bane</i> , straight or short	<i>Been</i> (straight)
<i>Beck</i> , a stream	<i>Bek</i>
<i>Brant</i> , or <i>Brunt</i> , steep	<i>Brat</i>
<i>Cleg</i> , a fly that bites horses	<i>Kleg</i>
<i>Fell</i> , a mountain	{ <i>Fjeld</i> (means a mountain, or a block of mountains)
<i>Force</i> , a waterfall	<i>Fors</i> (Old Norsk) and <i>Fos</i> (modern word)
<i>Gang</i> , to go	<i>Gange</i> (old word, the modern is <i>gaae</i>)

Gill, a mountain stream hemmed in by rocks	} Geil (Old Norsk, a cleft, or <i>Schlucht</i> in German).
He-am, or <i>Yahm</i> , home	Hjem
Holm, a small island	Holm
How, a little hill in a valley	Haugr (?) (Old Norsk)
Ken, to know, be acquainted with	Kenna (Old Norsk), <i>Kjende</i> (modern)
Kilt, part of a Highland costume	Kyllt (Old Norsk, meaning shirt)
Lal, or <i>Lahl</i> (some write it <i>Lile</i>), little	Lille
Lake, a romp or play	Læk (Swedish), <i>Leik</i> (Norsk)
Late, to seek	Leita (Icelandic), <i>Leta</i> (Swedish)
Mere, a lake, a water	Myre (meaning a marsh)
Midden, or <i>Middin</i> , a dunghill	Mödding
Roan-tree, mountain ash	Rön
Scar, escarpment or range of rocks	{ Skar (signifying a col or indentation in the mountain-top)
Sow, a (ewe) sheep	Søy or Söi
Tarn, a small mountain lake	Tjern

Many of the above are purely Norwegian words, unknown in Denmark. Nowhere in England is our Scandinavian blood so little intermixed with that of other races as in Cumberland and Westmoreland. It shows itself, not only in the dialect, but also in the physiognomy of the people, and in some of their old customs, as, for example, that of firing guns over a house on the occasion of a wedding.

With the exception of the excellent steamers which run along the coast, those plying on the principal fjorde and lakes, and some short bits of railway (mostly leading from Christiania), there are no public conveyances in Norway. The roads and banks of the fjorde are portioned out into stages or *Skyds*, averaging in length from 1 to 1½ Norwegian miles—a Norwegian mile being about 7 English.* At the end of every skyds there is a post-house or *Station*, usually a farm-house, which supplies the place of an inn, and you hire a horse and trap (or a boat, as the case may be) from one such station to the next. The roads are wonderfully good along the main lines. They are kept in repair by the owners of the land through which they pass; each proprietor being bound by law to attend to a length marked out by posts. The common vehicles for hire at the stations are *Karjoler* and *Stolkjærrer*. The first is a sort of low gig holding one. It is mounted on long shafts, from which is derived the spring, the weight being supported between the axle-tree behind you and the horse's neck. Your portmanteau is lashed to a board or frame over the axle-tree, and perched upon this is a man, boy or sometimes little girl, who, after leaving you at the next station, drives back the horse. There is hardly any sort of carriage so easy as a karjol. Not so the *stolkjærrer* (or 'seat cart'), which is apt to shake one

* Except where otherwise stated, I shall give distances in *English* miles.

to bits. This latter, the national carriage of the country, holds two, and is nothing but a tray on two low wheels, having a seat placed across wooden arms, which branch back from the shafts, to which their lower ends are fixed. The tray is a capital receptacle for luggage; but this ought always to be secured with a cord. I have driven hundreds of miles in these little carts, and often wish I had one in England. They are certainly not so comfortable (especially over rough ground) as a karjol; but it must be borne in mind, that to see Norway a man must rough it (save on the beaten track); and one who cannot jolt in a cart, sup on porridge, and sleep with a flea, had better never go there. He will enjoy himself more on the Rhine.

Many tourists engage karjols at Christiania, and keep them until they return there; the advantage in doing so being that your luggage has not to be shifted at each station. I once was foolish enough to buy a new one, which I afterwards sold at a loss of about 2*l*. Men bound on mountain expeditions ought never to encumber themselves with such lumber, for it can only be taken along a road or in a boat; and at the foot of the first mountain pass you must leave it or send it home. Stolkjærrer are to be had at nearly every road station; karjols less frequently—only on the great lines.

Without going fully into the scale of charges for horses and boats, I may mention that you pay by distance, and that the prices are all fixed by law. Stations are of two kinds, *fast* and *tilsigelse*. At fast stations the postmaster (*Skydsskaffer*) is bound to keep a certain number of horses for the public service, and which are supposed to be ready at hand when the traveller arrives. On most of the main routes now the stations are fast. On the other hand, the *tilsigelse* station master need possess few horses of his own; the farmers living within a certain radius being bound to supply the stage in turn. So that landing at one of these latter stations you must not grumble should you have two hours to wait—the only horse you are entitled to, possibly being fetched from a distance of $3\frac{1}{2}$ English miles! I am painting about the worst case, for I have seldom had long to wait myself. Some people when they journey send a *Forbud* on before. This messenger (often their talk) orders the relays to be ready at the time they expect to arrive. Where the party is numerous this may be all very well. It greatly depends on the road. Thus between Christiania and Thronhjøm, where the stations are nearly all fast, and each furnishes twelve horses or more, by starting early in the morning one need not fear delay. But there cannot be a greater mistake than travelling in a swarm. A party ought not to exceed two or three;

many of the smaller stations possessing but one decent room. My plan has been to travel quite alone.

A horse taken from a fast station costs 36 skilling a *Norwegian* mile; a karjol 6 sk., stolkjærre, 4 sk. Two travellers in a stolkjærre is termed a *halvanden* (i.e. 'one-and-a-half') skyds, and horse and cart together are then charged half a daler a mile. From tilsigelse stations horses are only 24 sk. a mile, vehicles the same as from the 'fast.' Here, however, the skydsskaffer is paid 4 sk. per horse for the stage (independent of its length). In addition to these authorized charges, the boy who accompanies you expects a trifle for himself. The English generally give 6 sk. a mile—this is called *Drikkepenge* or drink-money. Thus it will be seen a horse and karjol cost about 2*d.* or 3*d.* an *English* mile according as they are hired from a tilsigelse station or from a fast ditto.

Boating is charged according to the number of oars. There are also the two kinds of stations, as before described in reference to land. From fast stations two men and a boat come to 2 marks 8 skilling a Norsk mile. With three pulling the fare is 3 m. 12 sk. From tilsigelse stations a boat and two men cost 2 m., with three men 3 m. At these latter stations (not the 'fast') you pay 2 sk. per rower (*Tilsigelse* to the station master) for the whole stage.

There is an annual publication called the *Lomme-Reiseroute*, or pocket route-book. It is the 'Bradshaw' of Norway, and can be bought at any of the towns. It contains all the laws of posting and boats, with tables for calculating the charges at a glance. All the principal roads are laid down with the distances between each station and the next. The best sleeping-places are indicated; the game laws are explained, and, besides all this, there is a syllabus of mountain tours. Mr. Bennet, a most useful English gentleman resident in Christiania (who furnishes karjols, arranges with tolks, &c.), publishes a book on the same plan as this in English, and the traveller will do well to procure either one or the other. As to the larger guide-books, I like Murray. There may be little inaccuracies here and there owing to changes in stations, &c. since its publication, and it would be well were there a new and completely revised edition, but, as it is, it is not so bad. Of travelling maps the *Veikart* by *Waligorski og Wergeland* is the best. New maps on a large scale are gradually appearing—sheets of which might be serviceable to anyone confining himself to certain districts.

About 10*s.* a day ought to cover a man's expenses—supposing him not always driving about in a karjol. A pedestrian

would not spend more than half this; indeed Mr. Williams in his 'Norway with a Knapsack,' seems to have got along much cheaper. I think, however, he roughed unnecessarily. To read his book one would think he delighted in misery. If you travel for pleasure, drive where there is a road. The expense of living is trifling compared to what it costs in most other countries, but the charges at different stations vary very considerably. From 2s. to 4s. a day may be reckoned an average—exclusive of the capital bottled beer (*Bairisk Öl*, at about 5d. a quart). The *cuisine* is of the simplest, seldom comprising fresh meat, save on the principal roads. In the towns the charges are much greater than what I have mentioned. In some of the favourite hotels an extra price is put on for the English—at least so it is said. However this may be, the cost of living at one or two I could mention is quite absurd, taking into account the actual money's worth of what you get. The English, by their lavish expenditure, are fast spoiling the country both for themselves and for other travellers. This is not merely *my* opinion, but that of all Norwegians with whom I have conversed on the subject.

The Norwegian horse, or rather pony—for few of them stand fourteen hands, and they are generally much smaller—is an animal one can hardly praise too well. In no country that I am acquainted with, save Iceland, are these little animals, as a class, so good. The traveller must not take for examples some of the sorry specimens he may be wearied with on a highway journey, as that from Christiania to Thronhjøm. Even along that road there are many fine goers, albeit in the summer they run 40 to 50 miles a day. Horses in Norway are not worked under four years old, hence most of them are good-legged and surefooted, if wanting in other respects. Few get any corn, and indeed they are often brought in straight from the fell and yoked to a *karjol* or cart. With this they jog along over hill and dale, willingly doing six or seven miles an hour, or, if the road is very level, ten. But the constant succession of hills, many of them very long, prevent one's going the speed such ponies would accomplish on a flat. A good pony costs generally from 10*l.* to 15*l.*, but prices of course are uncertain; one of the best I ever drove had been bought for about 2*l.* She was fourteen years old when I drove her; but that is nothing in the way of antiquity; often you get one, a veteran of twenty, and still good. During four summers in Norway I have driven many score, and I never saw one exhibit temper, nor have I ever had one down. There are horse fairs during the summer at Thronhjøm: also one close to *Holmen*,

a station in *Gudbrandsdalen*, and perhaps in other parts of the country.

English tourists are acquiring an unenviable notoriety among the people for furious driving. Norwegians are exceedingly fond of their horses, which are brought up from 'foalhood' in friendship (if I may so term it) with the family to whom they belong, and therefore have no fear of man, and are generally unused to the whip. You rarely see a Norwegian flog his horse. He urges it forward with a peculiar kissing sound of the mouth, and checks or stops it—even at full trot down hill—not by tugging at the reins, which would be useless with many ponies, owing to their having hard mouths—but by a singular kind of 'bur-r-r!' made by vibrating the lips. In fact, if you wish to know what kindness *versus* brutality will do in the rearing of horses, go to Norway. I would earnestly recommend those who travel by *karjol* to humour the feelings of a nation in this respect; in short, to drive the horses as if they were their own property. Every pony has his pace, and you seldom gain a quarter of an hour on the seven or ten mile stage whether you let him go that pace or distress him (and his owner) by pushing him beyond it. I have seen young Englishmen tear along as if they were tired of life and did not mind how soon they lost it by a good smash. It is true the ponies are celebrated for rattling fast down hill, but there is a limit to the speed, or you are liable to come to grief. Norwegians are never in a hurry; and persons subject to that state of mind will be in misery the whole way,—the troubles they endure not creating the slightest sympathy in the lookers-on. You have to wait for horses, boatmen, the steamer, and frequently for something to eat.

When driving, it is prudent to keep an eye on the harness, always inspecting it at every change. I have had a rein come loose from the bit whilst trotting down hill with a weak pony and a heavy cart. I stopped the little animal by making the usual 'bur-r-r!' There are no traces, the collar being attached to the shafts by iron loops projecting from it, which pass through slots in the latter near the points. Pegs are put through the loops (outside the shafts) to secure them, and these often shake out on the road, if carelessly fixed.

II.

THERE are few towns inland, and you travel hundreds of miles without passing through what may be called a village. The mass of the population, which altogether is but half that of London, consists of either farmers or people connected with fishing. They live in isolated dwellings dotted along the main valleys, or bordering a fjord. Here and there a group of two or three farms may be seen. The country generally is wooded (where the slope is not too steep) to a considerable height, save about farm-houses, where there is more or less cultivated land. Spruce fir is the reigning tree in the south, although beech, oak, birch, and other kinds, are locally common. Above *Lillehammer* spruce gives place to Scotch fir (*Furutra*), which is the prevailing timber over the larger part of Norway. Far up in the north there is little growth but birch and alder; neither do we find any but the latter trees in the high glens throughout the land. Birch, alder, and aspen are cut during the summer, made up into faggots, and dried in the sun. These are given to cattle in winter, which eat the leaves, thereby economising the consumption of hay. The higher valleys for the most part remain uncultivated. They furnish pasturage for cattle. The majority of them are uninhabited (save in summer), and any road through them is a mere track.

The houses all over Norway (except in the large towns) are built of logs. Wood is found cheaper and easier to work than stone. Besides, stone walls require mortar, and the country contains little limestone. Indeed I have seen none. The fir-baulks, forming the walls, are laid horizontally, piled one upon another, the interstices being caulked with moss. They are notched into those forming a contiguous side, at the angle. The roof is covered with sod in the poorer dwellings and out-houses; and often you see a tree shooting up from the housetop. The better class of houses have tiles or slate on the roof; for they have excellent slate in some districts. I noticed a remarkable formation of it on the Christiania and Thronthjem road. Most houses are two-storied, and internally fitted up plain. Of course the style varies with the wealth and taste of the inhabitants, but you seldom see anything like the luxury found in an ordinary English gentleman's house.

A *Gaard*, or farm establishment, consists of so many detached buildings, that, viewed from a distance, it has the appearance of a village. The living house, stables, cow-house, houses for sheep and goats during the winter, barns and store-room, form its component parts. But, besides these, there are

lodgings for dependents, cottages occupied by tenants, and, sometimes, a schoolroom for children of the neighbourhood,—all included in the *gaard*.

The Norwegians, as a nation, live on very simple food. Among the peasantry, who are a wonderfully healthy race—equal, if not superior, to the English in stature—porridge (*Gröd*), generally made of barley or rye meal, sour milk and *Fladbröd*, which resembles our oat cake, make up the staff of life. Numerous as cows and sheep are, fresh meat is, in country places, a treat. People only kill in the autumn, and then most of the carcass is salted and dried; forming what is termed *Spegekjød* (smoked meat), and is eaten without further cookery. The mutton done in this way tastes like mutton ham, hard as leather, but not unpalatable; indeed, I rather like it when out on the fells. Of course in the towns, living is on a better scale; so also, at the large stations, where you often get salmon and trout. Good coffee is common, even in the dirtiest hovel; so are eggs.

Out of the beaten track there are naturally few stations or public accommodation of any sort. By beaten track I mean a post road or steamer route along a fjord. When travelling in such places the custom is to ask for lodging at the best-looking farm. The people give you what they have, and, except the house belongs to a gentleman, you pay a trifle when you go away; 2 marks are generally ample, should your hosts refuse to name a charge.

Except during a famine arising from failure of crops, &c., great wealth and extreme poverty are alike uncommon among the peasant class. There are, however, a portion of the population, who, from age or other causes, require support; and instead of being incarcerated in workhouses, these poor people are told off to the different farms, there to be fostered at the expense of the owners of the soil. The 'family pauper,' often a very old man, with long white hair, is sometimes a conspicuous feature in the domestic economy of a *gaard*.

The quantity of land under cultivation is seldom great. Some farms may have forty acres, but commonly they have less; a patch of potatoes, and an acre or two of barley, being frequently all that is planted about a *gaard*. Throughout the western half of Norway, barley is the commonest grain, and next to that rye. Other districts produce oats; but wheat is comparatively little grown. The Norwegians are not good husbandmen, although government sends agricultural instructors through different parts of the country every year. Each instructor (or *Agernomer*) takes a certain district, and visits all

the farms in it in succession. He, himself, receives his education in a school of farming, of which there are several. The shallowness of the soil over a great part of the country is an obstacle to good crops; and then there is a want of capital to work with. A system of irrigation, which might be applied in other countries, wherever there is a running stream above a slope, is the following. Water is conducted from a rill or burn, sometimes a distance of two miles, in a line of troughs formed of pine trunks grooved out. These are placed with a slight incline, the thin end of one overlapping the thick end of the next below; the whole being supported on props or projecting crags, and thus carried along the mountain side above the fields. The stream can be discharged at any point, or diverted into another similar channel. Where it is wanted during the long periods of dry weather which often occur, it is allowed to escape into a hole, and from this is pitched, with a wooden scoop, over the crop below. After tossing a sufficiency over the land within reach, another pool farther on is dug, and the stream led into it (either from another part of the trough or by a gutter), and the operation is repeated.

The principal part of a man's property lies in pasture land and wood; and cutting and securing the scanty hay, even from every insignificant green strip, perilously situated high up among the crags, is the grand business of the summer, at which everyone assists. It often requires all their energies to procure fodder enough for that dreary winter time when the cattle are all housed and the country is under snow. The mode of haymaking is curious: a kind of tall railing, formed of upright posts to which four or five cross pieces are lashed with birch twig—and I may remark they use birch in a hundred cases where we should employ rope—is erected in the field, or on the fell, and they dry the grass by hanging it over and packing it between the rails. A large hayfield contains several such constructions, looking like so many green screens. Again, corn is never built into what we call *stooks*. Generally the sheaves are placed one above another, with a tall upright pole passed through the whole. Possibly, there may be some advantages in these systems; as both hay and corn have good ventilation, and are out of the reach of flood.

In addition to land in the valley, every *gaard* has a large tract of mountain pasture, with a cheese-making establishment on it, called a *Sæter*. The cows and goats are driven to this in summer, and remain there two or three months, tended by people (chiefly girls) from the valley farm. The *sæter* buildings are one-storied huts, each containing two rooms. The

outer apartment, which is fitted up with a hearth, a table, and a coarse bed, is the living room; the inner one is the dairy, containing the cheeses and implements used in their manufacture. A sæter is frequently three or four Norwegian miles from its gaard. Often two or three, belonging to different proprietors, form a group in a mountain hollow; sometimes you see them by the shore of a tarn. Of the various kinds of cheeses made one is *gammel Ost*. The name signifies 'old cheese.' A good one reminds one of Stilton in the very last stage of decay. *Myse Ost*, another kind, is made from whey, and has a sweetish flavour. It is the colour of Windsor soap, and nearly the shape of a brick.

Cattle run very small, seldom bigger than our black Scotch, but of a different breed; the land, it is said, not yielding grass enough for animals of a larger growth. Sheep also are diminutive; a man might easily carry two in his arms.

After being milked of a morning at the sæter, the cows graze about on the fell. Often they are driven to a distant part of it, and then left to take care of themselves. In some districts, at least, they return towards evening alone. I once saw thirty cows, unaccompanied by either boy or dog, wending their way to *Bævertun sæter* on the *Sognefjeld*. They had been by themselves all the day, and were then coming home to be milked. They travelled at least seven English miles through a craggy glen, following each other in a string; and in one place I saw them cross a brawling glacier river, when the water was up to their shoulders.

At stations in the less frequented parts of Norway, the traveller is treated rather as a guest than as a lodger. He is expected to join the family circle, especially at meals, and may often meet very friendly society, supposing him to speak a little Norsk. The young ladies are musical, and now and then understand English. There is nothing of the loneliness a stranger feels at an English country hotel. The Norwegians are a ceremonious people in matters of politeness; so are the Swedes, even to a greater extent, whilst we English are perhaps nationally the reverse. It is, however, as well to conform to custom, if one cares to inspire friendly feelings towards oneself in a foreign land. Thus, Norwegians are most scrupulous about taking off the hat; they doff it in saluting, and always when they enter a house or shop; and should you meet a man on the road he generally says, '*God Dag*' ('good day') or '*Godt mødt*' ('well met'), and stops to have a chat. At your departure from an inn the host (and all his family sometimes) wish you a '*lykkelig Reise*' ('happy journey'); and should you return by water, you are

greeted on the shore with '*velkommen til Land*' ('welcome to land!') Again, after the simplest repast everyone replaces his chair, and all in succession shake hands with the hostess, saying, '*Tak for Maden*' ('thanks for the meal'). She generally answers, '*Vel bekommet,*' and there is a shaking, or rather squeezing, of hands all round. These, and many other observances, trifling as they appear, show, in my opinion, the natural politeness and good feeling characteristic of the nation.

Norway is divided into eighteen *Amters*, each under an *Amtmand*, who corresponds in position to our lord-lieutenant, except that he is of ten times the use. The *Amtmand* actually governs a portion of the country, being immediately under the king. Inferior to him in rank are two classes of civil functionaries, the *Foged* and the *Sörenskriver*. There are a great number of each, appointed to certain districts. The *Sörenskriver* is a district judge, civil and criminal combined. He is a paid officer,—amateur justice in the shape of country magistrates being unknown. The execution of the law devolves upon the *Foged*, who may be likened to a sheriff. Next to these come the *Lehsmænd*, of whom every parish contains one or more. These act as police, auctioneers, and have a variety of duties besides.

The army, at least the greater portion of it (exclusive of artillery) is a kind of militia. Like as in our militia, the men serve only during a portion of the year; the number of weeks per annum depending on length of service; being greatest for recruits. With few exceptions, all young men are bound to serve. Each corps is recruited from a particular district, where the captain resides, who receives pay from government all the year round, and a *gaard* to live in. The men are paid only during the time they are out for drill.

A Norwegian parish (*Præstegjeld*) is frequently large in area; generally containing, besides the parish church (near which is the *Præstegaard*, or 'manse'), one or more other churches (*Annex Kirke*), often twelve or fourteen English miles apart, and the clergyman gives a Sunday to each in turn. Often, however, the weather prevents his attendance at an annex, the journey to which may be several miles over a stormy sea.

There being hardly any country towns, articles of daily use are supplied by general dealers, called *Landhandler* (country dealers), who are often the leading people in a place. Many of them are rather superior in education to the farmers around. Most of the large stations have a *Jandhandel*, or shop of this kind.

Few people are without employment, either in farming or

fishing; and, with the exception of the government officials, clergy, officers of the army, and country merchants, society consists of but one class, namely, that of the *Bonde*, or peasant. Of course there are different grades of it, from the rich proprietor to the labourer on his estate; but class feeling, which to the extent we carry it in England becomes almost a social curse, is in Norway much less severe. There is a national pride, free from arrogance, among the natives which gives them a manliness of character, so to speak, superior to that possessed by any other nation. They have all our best qualities and few of our worst. To imagine the peasantry less civilized than our own is a mistake. They may not be so advanced in knowledge of farming as those in England, but in general character and education they excel them.

Love of drink is always said to be the Normand's bane; however, judging from what I have seen, there exists less drunkenness among them than we find in the North of England. The sale of spirits, of which those made from potatoes and corn are most common, is now only allowed in the towns and on board steamboats. The latter, unfortunately, act as floating taverns to a great extent, having the privilege of selling brandy, &c., at their numerous stopping places along the coast.

Norwegian honesty is proverbial; and as to highway robbery, it is hardly known. Everyone acquainted with Norway will agree with me that it is a safer country to travel in than our own. There appears to be a general absence of that ruffianism among the working class which forms so disagreeable an element in society elsewhere. I cannot remember meeting half a dozen blackguards during four summer tours. Besides all this—and it is one of Norway's greatest charms—there is an English-like atmosphere of freedom, if I may be allowed the expression, which one never breathes in Germany or France.

That little crime exists may be partly owing to the natural goodness of the people; but there is another reason for it—at least in my opinion—and that is education. Every child learns to read and write. Valleys, where neither church nor roads are found, have each a schoolmaster during several months in the year. He divides his time between several neighbourhoods; first holding a school in one, and, later in the year, removing to another gaard. I ought to mention, that the whole country is Lutheran, with (barring a few Quakers) hardly any dissent. In that religion confirmation is much more rigidly enforced than it is in the English Church; many situations in life requiring that a candidate for them shall have been confirmed. Now the clergy will not perform the

ceremony until a child can read, write, cipher, and understand its catechism. Schooling is therefore almost compulsory. The cost of it is defrayed by the community at large. A man pays the same whether he has six children or none. The tax is, however, a small one.

Most peasant children are taught a little history and every-day science in addition to the subjects I have named. The schools have the most admirable books on general knowledge I ever saw, far better than any used in English parish schools. One, quite worth reading by all, is the '*Læsebog for Folkeskolen og Folkehjemmet*,' i. e. 'Reading-book for the People's School and 'Home.' It is sold in town and country, cheap and strongly bound. The contents, which at the beginning of the book are easy reading and suitable for a child, become more difficult by degrees; and embrace a short history of Norway and other countries, church and Bible history, the elements of natural science, and much more. Another capital school volume is the '*Læsebog i Naturlæren for den Norske Almue*.' This contains natural history, botany, &c., with their applications to every-day life. Of course the subjects are merely sketched, but the amount of information, taken altogether, is immense.

Scandinavia is the birthplace of half our nursery tales, and there are numerous collections of wonderful stories about giants and evil-disposed sorcerers (*Trolde*); '*Norske Folke-Eventyr*,' written by Asbjørnsen and Moe, being one of the most complete.

So many Englishmen flock every summer to Norway for the sole purpose of sport, that a few words on that subject may not be out of place. The game generally met with in greatest abundance are *Ryper*. There are two varieties of them—*Dalryper*, a wood bird, and *Fjeldryper*, found on the mountains. The latter is the Scotch ptarmigan, and is common over the whole land. The peasantry go after these birds in mid-winter, but, being unfurnished with dogs, seldom bring home many brace. Latterly our countrymen have taken to this sport, and some few of them with considerable success. Nothing can be done without dogs, and these must be brought from England. It has often been a question whether our *red* grouse inhabits Norway. I have never seen one myself, and most sportsmen deny their existence; nevertheless one or two gentlemen have assured me this species has been shot. Black game are common on the wooded slopes; capercalze only in certain parts of the country. Woodcocks, although in summer they must be numerous, seem little known to the inhabitants. *Valdsneppe*, or more properly *Rugde*, is the Norwegian name

for this bird. I have seen one now and then fly over me about dusk. Snipe and wild ducks may be plentiful in certain localities. Hares are uncommon. In time it is much to be feared the best ground will be let in the shape of moors; as yet this is rarely the case; men shoot on any mountain they like. No certificates are required, but there are fines for killing game out of season. Ptarmigan, black-game, capercalze, &c., are not permitted to be shot before the 15th of August.

Wild reindeer are found on many of the large mountain plateaux. They may be said to be rare, at least to all intents and purposes, owing to the immense extent of ground they range over, seldom remaining long in one place. I have been often in neighbourhoods celebrated as the resort of deer, but never found a trace of one, save some cast antlers among the stones. They are said to be on the increase. Numbers of English sportsmen try deer-stalking every year, but few, I believe, with even moderate success. The season begins on the 1st of August. In order to follow the sport, a man must be well 'rigged out,' understand the country, and be prepared to live on the fjeld. He may choose a sæter for his habitation, or he may have a tent. The mountains of *Gudbrandsdalen*, the *Sognefjeld*, and parts about *Lom*, are especially famous for reindeer. Red-deer, or an animal resembling them, inhabit some of the islands along the coast.

Bears, wolves, lynxes, and other beasts of prey, are gradually becoming extinct; a premium of 5 specie daler being awarded for every one destroyed. Smaller sums are paid for every eagle and hawk. Bears, however, are still denizens of the forest-clothed precipice in the wilder regions, and numbers of cows fall victims to these huge brown monsters during the autumn. At the same time their wandering habits, their shyness, and the difficulty of following them over the crags, render any *chance* pursuit of them nearly hopeless. One might spend years without a shot. Norwegians living in the neighbourhood where Bruin has slaughtered a cow, go in a body to look for him, and often avenge their loss. No one is afraid of bears in Norway; women and children pass fearlessly through woods, where it is always possible they may come across one; for these animals, when not molested, very rarely attack. Berries *

* Norway is a great country for the hardier kinds of fruit, as apples, cherries, currants, and raspberries. Of wild berries you find strawberries, cranberries, bilberries, and many other varieties, growing in profusion, often singularly intermixed, over crag and moor. Most of them are edible; one, the *Moltebar* (*Rubus chamæmorus*), being capital with cream. This, which I never saw in Scotland, grows on

(especially bilberries) which grow in the greatest luxuriance, carpeting both forest and moor, form the normal food of bears during a great part of the year. They pass the winter months without eating, i. e. from the beginning of November until the following April. During this time they live in holes, often choosing one under the root of a tree, which they never leave; and, what is most singular, the female brings forth her young, generally two or three in number.

Salmon fishing, the sport *par excellence* of our countrymen, is naturally confined to certain rivers; but these are numerous, every fjord being fed by at least one. They differ greatly in the quantity of fish, and the same stream is never two seasons alike in this respect. I believe the majority of them are over-rated, and that most men who go to Norway for the first time, come back disappointed with the fishing. I am only speaking from hearsay, not being a fisherman myself. Neither does the remark apply to rivers such as the *Alten*, where the yearly take is immense. Wherever there are salmon you will find every pool let, and often underlet—many pieces of river being held on leases of twenty years. The standing nets, belonging by *right* to various families whose property borders the shore about the part where the river enters the fjord, take a very large number of fish that would otherwise come up, and thereby reduce the chance of rod-fishing in the pools. When Norway first became *known*, foreigners were allowed to fish wherever they thought fit, almost scotfree. Now it is very different; prices range up to 100*l.* and 200*l.* a year, and the expense of the *Alten* (including purchasing off the nets), is a great deal more. It therefore never answers to journey to Norway merely on the *chance* of getting salmon fishing; you must secure a stream beforehand, or, go where you will, the pools are let.

Now trout is usually spurned by salmon takers, and therefore, trout-fishing may be had. There are many good streams (where salmon are not found), and the people are generally

high marshes, and is shaped somewhat like a raspberry, only of an orange hue. The leaf resembles that of a geranium, and the flower, white with a yellow centre, is seldom more than six or eight inches above the ground.¹

¹ I have often seen and eaten the fruit—yellowish, with fewer and larger lobes than those of the raspberry, flavour rather sickly, and not particularly pleasant without cream—in the Mar Mountains, e.g. on the west side of Glen Calater. The plant is not uncommon on my own land in Strathdearn (Findhorn district), but I have never seen fruit there. It is called 'Averil,' or something like that, in Braemar. (Ed. A. J.)

good-natured enough to let the stranger fish them. The tarns (or mountain lakes) are often full of big trout. Some of these waters above *Gudbrandsdalen* are worth trying; there you find fish 18 lbs. or 20 lbs. weight. I fancy, however, that in most tarns they can only be taken by bait or net, fly being of little use. It comes from what I have said, that a tourist, who likes fishing, ought to bring a *trout* but not a *salmon* rod. Should he be invited to fish salmon, his friend will lend him a rod.

Barring fieldfares (in the summer), magpies, and greybacked crows, the paucity of birds seen during a walk in Norway is remarkable; of singing birds there appears to be almost a dearth.

III.

AND now to come to Norwegian scenery. Everyone has his own idea of what constitutes beauty or grandeur; and on a view that pleases one, another would scarcely bestow a glance. In a country so large, scenery of all kinds may be found, but it is in gorges, where nature looks her sternest, that Norway may be said to excel. Added to this, there is the scenery along the Arctic coast, which is of a different character altogether; and also particular objects (rather than general views), for example, the *Vöringfos*, worth going hundreds of miles to visit.

It may be asked, 'Is the country as fine as Switzerland?' Well, one can hardly compare the two. If grandeur be proportioned to mere height alone, Switzerland must rank first, the loftiest mountain in Norway being under 9,000 ft. The scenery can cope with the Swiss only in the element of form; the precipices being *generally* bolder; and in charming combinations of mountain, wood, and water, Norway can vie with any land. Vertical cliffs of 2,000 ft. or more are rare in most countries, while in Norway such are common. This is probably owing to the hardness of the rocks, a very large portion of them being gneiss, or closely allied to that stone. The remark one author makes of there being a tameness of *skyline*, i.e. an absence of peaks in the upper portion of a chain, although true of a great part of Norway, is not without exceptions. Few ranges in Switzerland can surpass the *Horung-tinder* in boldness of form; neither are the mountains within the Arctic circle subject to this defect. In some respects the country resembles the west part of Scotland, especially in the configuration of coast; the *Fjorde* being what we should term

friths or *sea lochs*; but here everything is on a grander scale. Glencoe is tame compared to *Romsdal*, nor can Loch Duich compete with *Geirangerfjorden*.

The best scenery in Norway is found in patches here and there. These are, in many cases, separated (especially to travellers who follow the road) by intervals comparatively tame. Most of the grand valleys lie west of *Gudbrandsdalen*. If you take a map and draw lines from *Lom* (nearly in the centre of the country) to *Bergen* and *Molde*, the space enclosed by these lines and the coast will be found to contain most of the finest glens. There are nevertheless other districts not included in this triangle worth visiting, as *Thelemarken*, *Hardanger*, *Lysesfjorden*, and the scenery along the Arctic coast.

For the greater portion of its extent, the Norwegian coast is protected from the fury of the ocean by a fringe of islands, which act as breakwaters, especially when they form a close chain. There are myriads of these islands, of all sizes, from a mere projecting reef to territories larger than the Isle of Man. Some have a few inhabitants along the coast, but the majority are barren or only used for pasturage. The voyage from Thronhjelm to *Hammerfest* in weekly mail steamers—most of them comfortable boats, well managed in every respect—usually lasts six days. The grandeur of the coast scenery fairly begins on the second day. To give anything like a complete description of it from this point would require a book; here space only permits me to glance at the main features of the route. One island is perforated by a natural tunnel, said to be of huge dimensions. From the sea it appears like a loophole, showing daylight through a dome of rock. As you approach the Arctic circle, the mountains, hitherto feeble in outline, terminate in steep, torn peaks; and the islands become sterner in character—many of them wild precipices rising abruptly from the waves. The bold figure of the '*Hestmand*' (or '*Horseman*,' from its resemblance to a mounted knight) is an island nearly on the Arctic circle, which latitude you cross the second day.

The population in the far north is nearly confined to fishermen living on the coast. Very little cultivation is seen, and there are no roads—all communication being by boat. The interior of the country appears to be an uninhabited tract of mountain, glacier, and lake. Ranges of snowy peaks crown the distant horizon. The temperature along the Arctic coast, owing to the influence of the Gulf-stream, is considerably milder than in many other parts of the world as far north; and there is a general abundance of vegetation, comprising

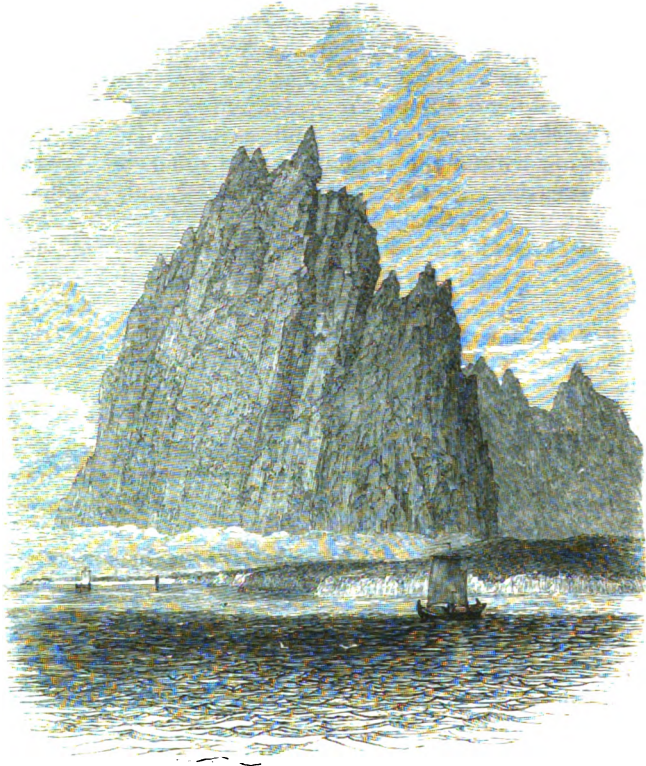
grass, berries, juniper, &c. where the rocks are clothed with soil. After leaving Thronthjem but little forest is observable from the steamer; and as you proceed the quantity diminishes until there is scarcely a tree to be seen.

Mirage in these latitudes produces remarkable effects. Distant islands appear as if floating above the horizon and *doubled*; as you approach them the lower half begins to dip, and gradually to vanish in the sea. In fine weather nothing can be more splendid than the gradation of tints which colour the atmosphere about sunrise and sunset. In the extreme north during winter the aurora borealis must be superb. It is said there that, sometimes, a crackling sound, produced by electric action, accompanies the show.

Soon after leaving the little town of *Bodö* (on the third day), the steamer crosses an open sea, conventionally called the *Vestfjord*, to the *Lofoten* islands. This most remarkable group, appearing from a distance like one continuous land, or, as Murray says, 'a row of shark's teeth,' is a very labyrinth of mountain and sea, the tortuous passages between the islands being in many places mere rivers in breadth. Conceive a block of high land capped by peaks of the wildest form, and the whole submerged to above the plateau, and you have an idea of the scene. The cliffs generally rise precipitously (void of strand or beach) from the wave. They are not altogether barren; herbage and often scraggy birch grow in streaks among the crags. The highest point is said to be *Vaagekallen* (by station *Henningsvær*), of which I have given a rough sketch. This is an inaccessible aiguille between 2,000 and 3,000 feet high. *Svolvær* is one of the most picturesque stopping places in the group. I spent a week there in 1858 at the house of a very pleasant family. The father was a large Landhandler, and one of his daughters a musical genius. This young lady had composed a very pretty waltz for the guitar. The *Lofotenöer* are the seat of the cod fishery in February and March, and the population (confined to the coasts) are all connected with it, and many of them well to do. The *Mælström*, about which so much fiction has been penned, lies between two little *öer* or islands, at the south end of the chain. Here, the fact is, the tide during a high wind produces a sea of broken water, extremely dangerous for small craft. The *Storström* (near *Bodö*) resembles it, and is more dangerous, skippers say.

After quitting the *Lofotenöer*, the coast views become less grand, and a tourist pressed for time might relinquish his progress farther north. *Tromsö*, a town on an island, is a day beyond, but only interesting on account of the *Lapps*. Never having

been farther than *Tromsö*, I will say nothing relative to the voyage on to *Hammerfest* and round the Cape. Portions of it have been described as worth visiting, where glaciers sweep down into the sea.



VAAGEKALLEN—LOFOTEN ISLANDS. (SKETCHED BY J. R. CAMPBELL.)

The Lapps (probably the remnant of some Asiatic race) form a small and generally nomadic sprinkling of humanity in the far north of Norway and Sweden. They are low in stature, and their physiognomy, language, mode of life, as well as their dress, proclaim them a nation most distinct in blood from the present masters of the soil. The Lapp is simply a herdsman, reindeer constituting his flock. His whole property consists of these animals, which, in one way or other, supply nearly all his simple wants. During life the deer serves him as horse and cow, and after death he eats the flesh and makes clothing of the skin. As the reindeer are instinctively migratory, the

Lapp is compelled to be so too. They pass the long winter in the interior, and the hot weather near the sea. I cannot account for this fact, further than by supposing climate may be one cause; in summer it is coolest by the seashore; there are also fewer flies and mosquitoes—terrible enemies of the deer. It is said the same herd, and, consequently, also their owners, always return to the same ground they have grazed on before. In some cases they cross over to an island, where the channel is narrow enough for them to swim, the Lapps following in boats.

On the mainland, opposite *Tromsö*, there are Lapps every summer for about two months. When I visited the spot, there were four families—the same that came every year. Men and women, children and dogs, all lived in two bee-hive-shaped huts, which stood together by the side of a stream in a valley wooded with birch. They were both of a pattern, and the largest might be 18 ft. wide inside, and 8 ft. high. It was formed of a framework of arched birch stems with horizontal pieces at different heights all round, and shorter branches fitted in between; the exterior was covered with sods, birch bark, and more branches of that tree. A door framed into the side; a few stones for a hearth in the centre; and a hole in the top—serving as chimney and window combined—completed the building. They had an iron pot suspended over the fire, in which reindeer bones were simmering; it was the evening meal. A few wooden bowls, a Staffordshire teacup, some bladders full of deer's milk and muffin-shaped cheeses made from it, were about all the hut contained—barring the inmates. Of these some spoke a little Norsk. One old woman was sewing shoes, or rather those deerskin bags in which Lapps encase their feet; while several boys and dogs were reposing under the wall. On another occasion I saw a woman making fladbröd. The reindeer's milk tastes nearly like cow's cream, and the cheeses are not unpalatable. They are reckoned excellent as lubricants for chilblains and frostbites.

The deer graze during the day, Lapp boys attending them; and as six o'clock in the evening approaches, the boys, assisted by small colley dogs, drive them in to milk. For this purpose there are two circular enclosures, each constructed of a rampart of birch stakes and boughs. Into these the deer are driven, and the openings are closed when all are inside. A boy, armed with a rope, both ends of which he holds, now singles out a doe, and swinging it somewhat like a lasso, catches her at once by her horns. The deer often starts back and then plunges,

but, notwithstanding this, the Lapp retains his hold. Eventually she is brought to a stump and secured to it, a hitch being first made round her muzzle with the rope. A woman then goes up and milks her. The quantity of milk is very small for the size of the beast.

The Lapps only travel in sledges when snow is on the ground; in summer the deer are laden with goods secured over the back, when on a journey, and their owners walk.

Besides Norwegians and Lapps there are a few *Quains* scattered over the North. These Quains are what we were taught to call 'Finlanders' at school. They belong, in fact, to the ancient race of Finland. They have their own language, *Quensk*, are taller than the Lapps, and of more settled habits. Many have homesteads, and they usually live by fishing. The Norwegians call a Lapp a *Landfin*, and a Quain a *Sjöfin* (i. e. 'Sea-fin'); an absurd system of designation, as the races are quite distinct.

The summer at *Tromsö* is too short to ripen grain. The people, nevertheless, plant barley, which is cut green and given as fodder to the cattle. I would here observe to those of my readers who wish to learn more about Norwegian farming, that no work contains so good an account of it as that by Mr. Laing. '*Laing's Residence in Norway*' describes, also, the social and political institutions; it gives his experience of life among the people, and is the best book of the kind I have read.

Those who desire to see the *midnight sun* should commence their tour by a voyage to the North. About the *Lofotenöer* there are some two weeks during which the sun does not set. A month might be spent among these islands and the mountains farther north. There is a continuous line of shore stations, where accommodation may be had; but to do the thing luxuriously it would be best to have a yacht.

IV.

ON the return voyage one may land at Thronhjøm, and thence pursue the overland route to *Molde*, which I once did; or continue the journey to *Molde* by sea. The country between the two towns is quite inferior to districts I shall presently describe. At Thronhjøm the cathedral is worth a visit; there is little else. The Norwegians have a custom of bringing fresh flowers every summer week to adorn the graves of those they held dear in life; and many graves have pretty flower-beds over

them, beautifully kept. Thronthjem churchyard furnishes the best examples I have seen.

Supposing you to land at Molde, you are within half a day (by steamer) of *Romsdal*, one of the grandest defiles in the kingdom. It is unnecessary to drive more than twelve English miles up it; after that the wonders diminish, and the rest of the road to Christiania becomes comparatively tame. I may here remark that the Christiania road from Thronthjem is about the poorest route in Norway. The only moderately fine bits on it are south of the *Dovrefeld* and the descent to *Laurgaard* station. It is the highway of the English; but those who traverse it, if they see no other portions of the country, must receive but false impressions of what Norway really contains. The valley it runs through, *Gudbrandsdalen*, is inferior to much we have near home. The journey from Thronthjem to Christiania requires four or five days.

However, to return to *Romsdal*: the grandest feature is the 'horn.' *Romsdalshorn*, rising from a slippery wall of rock, terminates in a tower-shaped peak some 4,000 feet above the valley. There is a tradition of the summit having once been reached by two men. Both are now dead. Since then no attempt has been successful. Hardly less terrible in appearance are the weird pinnacles called *Trolldinderne*, on the opposite side of the dale. From the hill behind Molde you have a wonderful view of the *Romsdal* fells.

From Molde, by fjord and road, or from *Romsdal* (in which latter case you cross the mountains to the west), the traveller cannot do better than proceed viâ *Sundelven* fjord and *Hellesylt* station, to that nucleus of grand scenery the upper portion of the *Nordfjord*,—three days direct. There are capital little steamers on all these, as well as on the *Sogne*, *Hardanger*, and other principal fjorde. Most of them run at least once a week, calling at the chief stations along the shore. Time-tables, issued every summer, give the days of sailing, &c.

Excepting *Gudvangen* and *Lysefjorden* probably nothing in Norway can rival in savage grandeur one branch of the *Sundelven*. This is the *Geirangerfjord*, and it can be explored in a day from *Hellesylt*. There is a known pass (for pedestrians) from the east end of this fjord over to Gaard *Mørk* in *Lom*.

Between *Hellesylt* and *Faleide* (both stations, as are nearly all the places I name) several glens are passed on the right; and one of them, just before you reach *Haugen*, lies under the shadow of *Horningdalsrokken*, a peak crowning the finest precipice in Norway. Being the first Englishman who reached

the top, a short account of the ascent may not be out of place. I arrived at *Haugen* the evening of the 27th July, 1866.



HORNINGDALSBRÖKKEN, NORWAY. (SKETCHED BY J. R. CAMPBELL.)

Lars Elias, the station master, gave me some porridge and a bed, and next day we two started about 5½ A.M. in a cart. Our drive was some 3½ miles up the valley to a sæter, where we left the horse and cart, and the rest of the way was on foot. Two miles or so through birch wood brought us to near the head of the glen; eventually getting clear of the forest and on to a green knoll which overlooked a tarn. This water was probably above 1,000 ft. above the sea; and, almost vertically from its margin, rose the peak we had in view—a straight wall of rock between 3,000 ft. and 4,000 ft. high (?). The summit, seen from below, appeared to terminate in a rugged tower;

but it was not so (as I afterwards found), being in reality a ridge, of which we only saw the end. The ascent from where we stood looked uninviting enough; but Lars had been up several times before and never hesitated about the route. We followed a corry, sheltered on the left by this wall of crag, up to a col, or slack, which took us $1\frac{1}{2}$ hours to reach. It was very stiff climbing; and, from the steepness and slippery nature of the ground, the descent of this portion (on our return) was quite as slow. For a long way up there was verdure, including ferns and bilberries, which decked the slopes leading between *Fjeldhammer* (as crags forming terraces across a mountain side are called), but as we approached the col this disappeared. We were now on the upper part of a field of névé, from which flowed a glacier down the reverse side of the fell. Gently rising, now in a direction parallel to the glen, we traversed the névé—the ridge being above us on our left. The snow was just right for walking on, and there was no difficulty in winding round to its junction with the rock at the farther and more accessible end of the ridge. The edge was very narrow, so much so that on one part I adopted the crawling system, like a bear. It sloped up gently to the top, and then continued nearly horizontal for some way. The whole ridge was bare of snow, forming a crest on the mountain like the comb of a cock. We were obliged to follow the edge of it owing to the smoothness of the craggy slope on the left. As to the other side, one might have measured it with a plummet. According to a legend, a very long while ago, a *Trold*, or giant (who resided on the top), used to sit there and fish the tarn below by throwing down a line! A cairn marked the highest point. The view was wonderfully wild. Following the way we had come, we reached *Haugen* by $3\frac{1}{2}$ P.M.

The mountains of Norway occur in great blocks rather than chains; the *Dovrefeld* may serve as an example. Or, more accurately speaking, the long chain running through the country north and south consists, for the most part, of several such blocks linked by lower elevations. Steep slopes lead from the main valleys up to a highland forming the general top. This may be nearly a plateau, but is usually broken into ravines, more or less. Lakes, rivers, and snow-fields diversify the hollows; and the swells and ridges separating these are summits bearing names. For the most part these highlands consist of grassy moors, as is the case with the *Dovre* and *Fille Fjelde*; and wherever it is so, sæters are established. On several fjelde, however (not altogether depending on their height), nearly the whole is a field of névé, perhaps 100 square miles in extent,

broken only by bare crags, and feeding a circle of glaciers which descend into the world below.

Now, the *Nordfjord* terminates at the foot of one such block or fjeld, viz., the *Jostedalsbræ*—*Bræ* or *Iisbræ* properly meaning 'glacier'; and you can best explore the western, which is the grandest, side by taking up your quarters at *Taaning* (a good inn) about $3\frac{1}{2}$ miles from *Faleide* and close to *Visnæs*, where the Bergen steamer calls. You are then close to the head of the fjord, where three splendid valleys begin. Of these *Opstryen*, albeit it contains a fine lake (or *Vand* in Norsk), is the least remarkable. From the upper part of this first valley there are passes to *Hellesylt* and *Lom*, and a glacier route to *Jostedal* (a glen on the *Sognefjord*). The view from a mountain called *Kirkenæbbet*, a short day's excursion from *Taaning*, which ladies may take, is extremely beautiful. *Lodendul*, another of the valleys, is thoroughly Norsk in character. It also holds a water, conducting to a defile called *Næsdal*—a narrow *cul de sac*, grim and gloomy, and barred by a precipitous glacier at the end.

The third valley, that above *Olden* (where there is no inn), is the finest of the three, and requires a day or two to explore. (One can sleep at a farm-house.) *Melkevoldbræ* curdles down the gorge at its head, and there are two other Bræer in ravines on the left; one of them, *Bridalsbræ*, the cleanest glacier I ever saw. Owing to the fjeld having its steeper slopes towards the west, the ice gorges here are short; and the glaciers descend abruptly, torn into a chaos of crevasses. They display little appearance of moraine on the surface, but the terminal débris extends over a considerable length of ground. Many of the lofty summits about here are very bold in outline; one, called *St. Ceciliaskrone*, which I ascended, especially so. It springs from the side of a lake in this valley, and may be some 5,000 feet high. We went up in the afternoon, starting from *Eide*, a gaard in the glen. I and my guides first of all climbed a long, steep corry, leading up to a hollow, down which flowed a glacier, from a col near the top. This we followed without difficulty; and, arrived at the col, had a scramble over a stoney tract to the highest point, the apex of a dome of crags. The rosy light of sunset, flooding the snow mountains on the opposite side of the glen, was as deep as the glow from a furnace; and the dusky abyss which separated us from them seemed but a gun-shot in width. Even at this altitude there was vegetation, but chiefly confined to a black lichen and the 'reindeer flower' (*Rensdyrblomst*, properly called *Ranunculus glacialis*). This latter grows on the highest pinnacles, and is said to be esteemed by reindeer—hence its name.

Leaving the *Nordfjord*, where a week or two might well be spent, two days bring you to *Vadheim*, on the *Sognefjord*. *En route* you have *Bredheimsvand*, a lake singularly stern in character towards its head, and catch glimpses of glaciers crawling over the precipitous heights above *Skei*.

The *Sognefjord*, like many of these larger friths, resembles in plan the skeleton of a tree; and it is not so much along the main channel as in the offshoots, corresponding to branches and twigs, that the grandest scenery is to be found. Many of these are dark narrow lanes of water, bent into reaches which here and there expand to the size of lakes. Wooded precipices rise straight from the deep, and numbers of cataracts roar down on all sides. Many of the falls remind one of the Swiss *Staubbach*—tassels of spray depending from some ledge, and swinging with the breeze thousands of feet above the fjord.

Not only are several of these small branches so fine, but the valleys leading down to them are often quite as remarkable. *Fjærland* and *Jostedal* (with their glaciers), *Fortunsdal*, *Aurdal*, and *Gudvangen*, are the most interesting glens connected with the *Sognefjord*. To see *Jostedal* you land at *Rønnei* (a capital inn near *Marifjæren* station), and it is a day's ride up the glen to the extreme end. In it, and the surrounding neighbourhood, are several large glaciers, generally longer and wider, but less inclined, than those on the *Nordfjord*; but the same tract of *névé* supplies all these ice-streams. *Nigaardsbræ* is one of the largest, which every tourist goes to see; and as there is no station or inn, it is usual to sleep at the clergyman's house. This gentleman receives a certain allowance to enable him to entertain strangers; but the sum is very small compared to the numbers who every summer 'use' his house; and as one can offer no remuneration beyond thanks in broken Norsk, I should advise all my mountaineering friends to put up at some *gaard* instead. Where there are ladies the case is different; and I may add, nothing can exceed the kindness and hospitality of the clergyman and his wife to all who come.

Nigaardsbræ, *Tunbergsdalsbræ*, and other glaciers of the district, are yearly diminishing in size. The first of the above has in front of it a desert, extending a good half mile along the glen; and this is ridged by a series of walls, of ancient terminal moraine. The walls form curved segments, with the concavities towards the ice, running nearly at right angles to the course of the glacier, and separated by zones of level ground, covered with shingle. Most of the stones in the moraines are small and rounded. Another remarkable feature about this glacier is the scraped appearance of the rocks

which flank its base. This extends for 500 feet or more above the present level of the ice, and affords a good indication of the size of the glacier during former periods of its life.

There is an excursion, I once made, from *Rønnei* over the mountains to *Veitestrand*, a strikingly wild valley with two glaciers and a long lake. From this there are passes to *Fjderland*. We returned another way; viz. by boat down the lake, and, then landing, walked by *Hillestad* to *Mariffjæren*. Pink snow is common on the mountains in this district. I have several times seen it.

Fortunsdal (at the end of the *Lyster* branch of this great fjord) lies under a second group or 'block' of highland, the *Sognefjeld*, probably the most remarkable of any in Norway. The *Horungtinder*, its culminating points, form a cluster of peaks; the highest said to be 8,000 ft. above the sea. These 'Tinder' or peaks, are portions of sharp ridges, whose naked and nearly vertical sides are set in a framework of snow. In



HORUNGTINDENE FROM THE PASS. (SKETCHED BY J. R. CAMPBELL.)

wildness of contour some of them might compete with the *Matterhorn*; mostly they are inaccessible, or, at any rate, have never been climbed. The loftiest is one of the *Skagga-stöltinder*, the most easterly row. A glacier divides this from the *Ringstinder*, forming the centre *arête*; and a similar stream of ice lies between the latter and *Dyrhaugstinderne*, towards

the west. This last ridge is connected with a lofty overhanging spire. There is a grassy glen below the glaciers, with sæter on it, traversed by a horsepass leading to *Lom*; and, either from the pass, or from a height called *Klippernaase* above it, you have a wonderful view of the whole.

It is about $6\frac{1}{2}$ Norwegian ($45\frac{1}{2}$ Eng.) miles from *Berge* to *Rödsheim*; the former being the last station on the *Fortun* side, the latter the first in *Lom*. The journey is best broken by sleeping at *Bævertun*, a sæter about 28 English miles from where you start. The scenery during the first day is strikingly wild.

Norway's reputed highest mountain flanks a portion of the route. The *Galdhøpigge* (or 'Pike of Galdhö,' named after a farm at its base) is 8,533 ft. above the sea; or, measured from the stream in *Bæverdalen*, it rises about 6,959 ft. These altitudes are taken from an old survey; a new one is now being made, and many begin to question the correctness of the former. Thus some think that, if properly measured, one of the *Horungtinder* or the *Knudstøltind* (which lies in a wilderness of fjeld between *Bygden* and *Gjenden* lakes) may turn out to be the highest point.

I was staying some time at *Rödsheim* in 1866 (partly on account of bad weather), and after having been twice driven back by clouds, reached the top on August 18, a clear day. I had two guides, as there were glaciers to cross; and although the crevasses might turn out to be trifling, I thought it prudent to take a rope. Starting early in the morning from *Rödsheim*, $1\frac{1}{2}$ hours brought us to *Raubergstøl* (a sæter), mostly by a cow path winding up through a wood. From this we sloped up diagonally on to a broad 'back'—one could hardly term it a ridge. This, at first, is a tract of débris and by far the worst portion of the route. It forms, as it were, the crest of the mountain, leading all the way to the summit, from which it is separated by a deep gap. Gently rising, we gained a tarn in a little more than three hours from the sæter. It lies under a glacier and is shored on the far side by a wall of ice. With its little icebergs it reminded me of the *Märjelen See* in Switzerland. I believe the whole excursion might be considerably shortened by following the valley to *Bæverdalen* church, or to a point beyond it, and from there mounting straight to this tarn. The usual course from the tarn is along a stony tract bordering the east shore; we, unfortunately, chose the glacier on the other side, and found walking very laborious, owing to a thick skin of fresh snow. Our progress was very slow, although at times nearly on a level; the wavy 'back' being above us on our

right, while to our left (below the glacier) was *Visdal*, whence the ascent is also sometimes made. We had two glaciers to traverse, both of them smooth but with narrow crevasses beneath the snow. The first is called the *Styggebræ*, and the other the *Tvæbottenbræ*; they are divided by a ridge, and the latter flows directly from the top. A spur-like ridge, projecting from the steep snow slopes of the highest portion of the mountain, enabled us to reach the summit. This is a plateau of snow with vertical precipices on all sides but one. We had been $6\frac{1}{2}$ hours from the sæter; but had the snow been harder, should have done it in, at least, an hour less. The top commands a view, the wildest I ever saw. In nearly all directions, but especially towards the south, ridges and pinnacles rise one behind another, each mantled with snow, like foamy waves of a colossal sea. Barring one with its lakes and rivers, the valleys appeared as dusky grooves, scarcely distinguishable; not one house was to be seen even with a glass. Nothing was visible but forms of crag and snow; several mountains (the *Glittertind*, in *Visdal*, for one) being spire-like. The panorama was almost a chaos, hundreds of square miles in extent. Still there were some signs of life—a hare had left her track across the top.

Ole Rödshem (of *Rödshem*) is a justly celebrated guide. Professionally a small farmer, he has taught himself English and some German, and, I believe, has a smattering of botany and mineralogy besides. From his station the carriage route to *Lillehammer* begins; you can drive there in from two to three days; thence by steamer and rail on to *Christiania* in one.

To return to the *Sognefjord*. From the village of *Lærdalsören* there is a road *viâ* the *Fillefjeld* and *Valders* to *Christiania*; a journey of four or five days. The approach to the fjeld is good and the scenery of the *Lille Mjössenvand* fine. After this the views grow tame, and it is scarcely an interesting route. But the most remarkable branch of the *Sognefjord* is that leading to *Gudvangen*. This, with *Nærodalen* (the glen beyond), contains scenes of rugged grandeur equal to any in the land. The road from *Gudvangen* runs to *Bergen*, which may be reached in two or three days; it is, however, a good plan to leave it at *Vossevangen* and strike into *Hardanger*—a *détour* which may occupy from four days to a week.

The *Hardangerfjord* has been praised to the skies; but I think the traveller will be disappointed with it, after seeing others I have described. The mountains are high and charmingly wooded, but they have a poverty of outline—the tops

are too flat. Here again is a snowy highland (the *Folge Fond*), some forty miles long. One of its glaciers, the *Buerbræ* near *Odde*, had advanced, I was told when there in 1866, about 2,000 *Alen* (i.e. 1,370 yards) during the preceding twenty years; it was added, that other glaciers from the same source had not grown longer during that time. The truth of the latter part of the statement I doubt, albeit I had it from a native of the place.

The best day's excursion from *Odde* is to *Ringedal* and back. Both the lake and the glen leading to it from the fjord are very fine. A lofty waterfall thunders down into the lake; and another *Fos*, the *Tyssestrænge*, formed by two meeting in their descent, is seen on the right, cased in an amphitheatre of crags. The track to the lake would be hardly traversable in parts, owing to the frequent occurrence of strips of smooth rock which it crosses, were it not for ledges formed of fir stems pinned to them. Along these you walk with ease, and even cows and horses pass. The quantity of such slippery crags (*roches moutonnées*) among the mountains of Norway is remarkable.

But what is of most interest in the *Hardanger* district is the celebrated *Vöringfos*. This lies about fourteen miles above the steamer-station *Vik*. Although the highest in Norway, the descent being estimated at 900 ft., it is questionable whether, as a sight, it equals the *Rjukan* fall. Of the latter you have a front view, while the *Vöring* can hardly be seen but from above. Still the jump of a large stream into a gorge—truly horrible in its grandeur, a mere groove in breadth and 1,000 ft. deep from where you stand—produces an impression no traveller who has seen it can ever forget.

Hardangen is visited by weekly steamers from Bergen, and I believe there are boats also from Stavanger. I have scarcely mentioned the towns of Norway for this reason—they contain hardly anything to see. Christiania is the dullest capital in Europe. A day is quite enough there. Stavanger contains a very old church, interesting to architects at least. At Bergen there is a museum of natural history, &c. worth visiting. Bergen is the prettiest town in the country. The principal part of it is clustered on a rocky promontory projecting into a bay, backed by hills right and left, with a little lake in the rear. Most of the houses are wood and tinted; and, from wherever you view it, the place has a charming effect. It is said to rain at Bergen two hundred days in the year. This is an exaggeration. Doubtless along the west coast the rainfall is considerable, though less, I believe, than in some parts of Scotland. Generally an east wind brings fine weather to the fjorde and

rain in *Gudbrandsdalen* (and other valleys lying east of the main chain); a west wind having exactly the reverse effect—wet along the coast and dry weather inland.

In the early portion of this hasty sketch of Norwegian scenery I incidentally alluded to the *Lysefjord*. There is a small open steamer once or twice a week from Stavanger to *Fossand*, seventeen or eighteen miles. There the fjord begins; a narrow gloomy channel twenty-five miles long—to a great extent hemmed in by towering walls of bare rock. The upper end is the most striking portion; there there are two or three farms, but neither station nor church. So retired is this spot that the clergyman, who lives twenty-nine miles off, only visits it once a year, except when specially sent for. On that occasion he consecrates the graves of any who may have died since his last visit, and who have been buried by their friends in a little sacred enclosure overlooking the lonely glen and fjord. The clergyman also examines the children in their catechism, &c. In other parts of Norway where a regular church exists, the priest devotes several months to the religious instruction of all young people preparing for confirmation; and the answers some of them give to questions in elementary theology would do credit to most adults belonging to the educated classes of our own country. In visiting the *Lysefjord* it is a good plan to leave the steamers at a place called *Høle*, a better station than *Fossand*, and take a boat from there right to the end of the fjord.

The valley which now contains this arm or finger of the sea, as is the case with many other glens, once formed the channel of a glacier. The usual marks, scratches and grooves in the rock, are plainly exhibited here and there along the shore. Nor is this all: there are fragments of ancient moraines on the mountain-sides; one, a Titanic wall, lying some 200 ft. or 300 ft. above *Fossand*, is exceedingly remarkable. Many of the stones it contains are of immense size. I forgot to mention that in *Jostedal* the remains of a lateral moraine stretch horizontally across the western slopes some 1,000 ft. above the river. Along the shore of the *Lysefjord* many beautiful serpentine formations may be observed; also (a mile or two above *Fossand* in a rock forming part of the south shore) a string of so-called 'Jette-gryder' or 'Giants' Kettles.' These geological curiosities are cup-shaped hollows in the rock, probably having been, at some remote period of the world's history, pools in the bed of a mountain-stream, now no longer existing; or, if so, pursuing a widely different course. They are often found far removed from any torrent. Close to *Berge* is a very distinct set; others are passed on the hill above *Hellesylt*, just below the road near the

clergyman's house. In both these latter cases the ancient watercourse is nearly parallel to, but hundreds of feet above, the present stream.

Up the fjorde along the west coast there is very little tide, and the water towards their extremities, owing to the influx of large rivers, is nearly fresh. The smaller branches usually freeze in winter, while the main arteries remain open, or only partially covered with ice. The steamers, for the most part, ply all the year round; in winter getting as far up the fjorde as the ice will permit. They carry the mails to post-offices along their respective routes. Where there is no steam communication, the letter-bags are transported by row-boat or karjol. The posts are slow but sure. In few parts of Norway are there deliveries more than twice a week.

There remains one other important district worthy of notice, and with that I will conclude. *Thelemarken*, in the south of Norway, can be reached from Christiania, either viâ *Drammen* or *Skien* (to which there is a steamer from the capital); and a patient pedestrian may attack it from *Hardanger* direct, by traversing the *Hardangerfjeld*, said to be 156 miles across (?) In *Thelemarken* costume is more displayed than in other parts of Norway, being less confined to women alone. Here the male population adhere to their ancient garb, viz. an extremely short-waisted jacket with bright buttons, breeches, and silver shirt studs, &c. The dress of the women of Norway varies with the locality, and would take pages to describe. It is seldom picturesque. Every man and boy carries a knife, called a *Tollekniv*: it is worn in a sheath strapped round the waist, and used for general purposes. *En passant*, I have never thought it necessary to drag about a revolver, but there are nevertheless some freshmen to the country who do so. When not exhibited as a threat it becomes simply a harmless absurdity; Norway, to a stranger, being a much safer place than London by night. Stories are current of tourists displaying one in order to enforce a 'command,'—a very dangerous game at the best. They were put down as madmen.

In every country a traveller finds some element of discomfort. Norway has its drawbacks, and the principal one is *dirt*. I do not mean to imply that all houses are alike in this respect; a large number are clean and well kept; but, among the poorer people especially, cleanliness is lamentably rare. Possibly in other lands the same class are quite as bad; but where you lodge in hotels you are less liable to suffer from this defect. Here, frequently, there is no escape for you; you must put up in a *flea-hive*, or bivouac out on the fjeld. The amount of

cleanliness varies much with the district, and in this respect *Thelemarken* is far from being the best. A tin can full of insect powder is much more to the purpose in journeying through many parts of Norway than the cart-load of eatables many travellers consider essential on a tour.

There is a singular ancient church at *Hitterdal*, in this district, built of wood. It is covered with scales, and decorated with quaint ornaments and spires. Another of the same class is at *Borgund*, near *Lærdalsören*.

The traveller in *Thelemarken* must not expect the bold mountain forms he has seen farther north; but should he only have a week in Norway he could hardly devote himself to a better district than this. The great attraction of the journey is the magnificent *Rjukanfos*.

This is situated amongst high mountains, distant two days from Christiania, or half a day (eight miles) from the inn at *Dale*. You look from the edge of a cauldron of rocks, some 300 or 400 yards wide, the bottom of which forms the pool; and in front of you tumbles the river, making one plunge of 600 feet. There is a considerable difference of opinion regarding the heights of both this and the *Vöringfos*. I believe the only means taken to compute them has been that of timing the descent of a stone. The dimensions I give are those commonly received as the true ones, but to the spectator they will probably seem to be exaggerated. The view, also, from the side of the ledge or lip, over which the torrent pours, is sublime. This point may be reached either by the track called the *Maristi*, part of which requires caution owing to the smoothness of the crags; or better, by a slightly circuitous way, which latter—having tried both—I certainly prefer. Arrived there, and lying on your chest, you gaze over the brink on to a scene fearfully grand. The river *Maan*—large early in summer owing to the melting of the snows—comes tearing down a rapid leading to the fall. White as milk, from its battle with the crags, onward the water rushes, one might almost say to its doom. From the brink one fierce bound—a leap so appalling it might serve as a symbol of death—amid a roar and crash that shakes the rock, and, it is gone! Columns of spray rebound from the basin, and lofty clouds of vapour reek amongst the crags. When I was there two arcs of rainbow formed a broken bridge across the pool. A mile down the valley, and the river flows in peace. A poet might liken its course to that of a good soul passed through death into a happier world.

LOST ON THE STRAHLECK. By STAFFORD F. STILL and EGERTON W. RUCK.

ON the morning of August 27th last, we started from the Grimsel at 4 o'clock, intending to go over the Strahleck to Grindelwald, having as guides Peter Taugwald the younger of Zermatt, whom we had brought with us, but who had never been in the Oberland before, and Muhlermann of Lauterbrunnen, who stated he had been over the pass three times, and was strongly recommended to us by one of the first Oberland guides. We arrived at the summit of the pass at 11.45, and, the day being very fine, we had a splendid view. Muhlermann complaining of a headache on the way, we considerably recommended him some brandy out of our flask he was carrying; he took a little, and, as we afterwards found, not for the last time. After a short halt, we started from the top, keeping north for about an hour, when we came to a steep snow-slope; this we had descended for a short distance, when Taugwald stopped, and said we could not go any farther in that direction, and asked Muhlermann whether he was sure we were right; and then, to our astonishment, the latter declared he had no idea where we were, but thought we ought to be more to the east. On referring to our map and compass we ascertained that Grindelwald lay more to the north-west, and that our route should be considerably to the left. Muhlermann then admitted that it must be so; so turning to the left, we crossed several very steep snow-slopes and precipitous rocks, down some of which we had to be lowered, until we came in sight of what Muhlermann said was the Mettenberg.

Knowing that there was a path from the top of that mountain to Grindelwald, we decided upon making for it, and after crossing the débris of several avalanches we reached at 5.30 what we then supposed to be the side of the Mettenberg. The fog, which had been increasing for the last hour, now became so thick that we could not see ten yards in front of us, and as Muhlermann seemed to have no idea of the direction in which the path from the summit lay, there was no choice but to stop where we were until the morning; so, as we had our knapsacks with us, we began to put on our dry stockings and shirts, and trowsers, over our knickerbockers, but before we had time to complete our toilet the rain came down in torrents. After hunting about for some time and getting thoroughly drenched, we discovered a hole in the rocks into which we could just put our heads and bodies, our legs being outside.

Here we each ate a mouthful of meat from the little we had fortunately saved out of the day's provisions, and then asked Muhlermann for the brandy flask, expecting to find it nearly full; but, alas! it was almost empty, there being just enough for a sip each; we then smoked our pipes, and afterwards tried to go to sleep. But it was of no use; for though we could keep our bodies pretty warm by tight packing, our feet and legs were quite numbed from the wet and cold, and besides, the hole in the rocks in which we were was very wet, as water was trickling down the back and dropping from the roof. About 1 o'clock we sat up as well as we could, the roof being too low to admit of sitting upright, and smoked another pipe; it was still raining hard. Soon after 4 o'clock we tried to get up, but found it no easy task, our legs were so stiff, and our feet like stones. The mist was still as thick as ever, and the rain had changed to snow; however, we did not feel inclined to stop in our lodgings any longer, so started to try and find a way down. Muhlermann now declared that the summit of the Mettenberg was below us, and some way off, and that we were on what he called the comb of it, from which, after repeated unsuccessful attempts in several directions, extending over nearly seven hours, we found it impossible either to get on to the top of the Mettenberg itself, or descend to Grindelwald (this village, when the fog lifted, we could see several thousand feet below us); so at 11 o'clock we determined to try and retrace our steps to the Grimsel, making up our minds to spend another night out, as we had only eight hours' daylight to do what had taken us twelve hours' hard walking the day before, even if we could find our way, which was very doubtful as heavy snow and rain had fallen, and snow was still falling, which made the rocks very dangerous; however, we thought it was our only chance, so started back.

After we had crossed several snow-slopes and rocks, Taugwald, who had taken the command and had all the work to do, Muhlermann having given up before this and declared that we were 'Alle fertig,' went alone to explore a couloir, by which he thought we might get down on to the Ober Grindelwald Glacier, which lay some way below us to the east. After descending it for a short distance and finding it practicable, he shouted to us to follow as fast as we could, for it seemed probable, after the heavy snow and rain, that we might have an avalanche upon us; however, all got down safely, and then finished the little food remaining, being by this time almost starved. After following the Glacier down for about ten minutes, we were brought to a

complete standstill by the crevasses, and had to retrace our steps and cross to the Wetterhorn side. Here we climbed up some very steep rocks for a short distance, and were fortunate enough to find some niches cut, which are used in the ascent of the Wetterhorn; these we followed, and finally came into the path leading to Grindelwald. Muhlermann now plucked up his courage, and, much to our amusement, continually shouted 'Vorwärts.' At last, at a quarter to 5, we arrived at the village, having been thirty-six and a half hours from the Grimsel.

We cannot speak too highly of Taugwald, for without him we should certainly never have reached Grindelwald; and had we been obliged to carry out our intention of attempting to retrace our steps to the Grimsel, we should in all probability never have arrived there, for we must have spent another night on the rocks, and our strength must by that time have failed us from insufficiency of food and the cold.

[It is hard to understand how any guide—not drunk—could have lost his way in clear weather in descending from the Strahleck to Grindelwald. It seems, however, pretty clear, after talking over the matter with Mr. Still, with the help of Mr. Hinchliff, that Muhlermann must have kept along the west flank of the Schreckhorn so high as to cross the ridge in the depression between the Great and Little Schreckhorns, and so have continued along the Eastern or Upper Glacier side of the mountain in a fruitless and idle search for the top of the Mettenberg; that they spent the night on that side, and in the morning still worked northward in search of an imaginary path, till they were hopelessly stopped by the precipices which front the valley. Turning back, they made their way with great difficulty and danger, still above the Upper Glacier, descending at last probably by much the same route as was taken by Mr. Anderson in his ascent of the Little Schreckhorn (see *Peaks and Passes*, 1st series, p. 240, sqq). Certainly the travellers may be thankful for an escape from very imminent danger. It may be permitted to the Editor to express his own satisfaction in the praise given to young Taugwald, whom, notwithstanding what has been said in respect to the catastrophe on the Matterhorn, he remembers as an able, willing, and pleasant guide.—
ED. A. J.]

NEW EXPEDITIONS AND TOPOGRAPHICAL NOTES FOR THE SUMMER OF 1867.

TYROL, VENETIA, LOMBARDY, AND GRISONS.

The following notes are communicated by Mr. F. F. Tuckett:—

ASCENT OF MONTE CIVITA, OR CIVETTA (10,438 Eng. feet), E. of Alleghe, in the valley of the Cordevole, and between the latter and the Val di Zoldo.—On the 30th May, with my friends, Messrs. F. E. Blackstone, E. Howard, and J. S. Hare, and our guides, Melchior and Jakob Andereg, I proceeded to Pecol, the highest village in the most northerly branch of the Val di Zoldo, where, after accompanying those gentlemen on their way to Caprile as far as the summit of the Passo di Coldai, I rejoined the Andereggs, who had wisely occupied themselves during my absence in reconnoitring the Civetta, and making themselves familiar with the paths through the woods which clothe its lower slopes. In the evening the son of our host (who was, I believe, the Syndic, to whom we had been recommended by Signor Cercena of Forno di Zoldo) arrived, and informed me that he and one or two companions had twice reached the summit of the mountain. Our ascent appears to have been the first made by any traveller; but since my return I have learned that Lieutenant Pezzé, of Caprile, successfully followed in our steps somewhat later in the season.

We left Pecol at 1.30 on the morning of the 31st, and, thanks to the reconnaissance of the previous afternoon, made good progress through the broken and wooded lower ground, and struck a path which took us rapidly up the steeper mountain-side beyond, to the slopes of snow—largely composed of the débris of recent and extensive avalanches—leading to the foot of the rocks. These last were reached in three hours, and here began the only difficulty of the ascent. Though not excessively steep, they are not much weathered; and, as all the snow-discharge of the upper portion of the mountain finds its way over them at various points, one has not only the benefit of its polishing effects, but must run the risk of encountering it at any moment, if the conditions for the production of avalanches exist at the time. In short, for some time after a fresh fall of snow one may be exposed to the chance of considerable, and not easily avoidable, danger for something like an hour. Otherwise there is nothing to stop a fair mountaineer who can trust his head, and does not mind a stiffish scramble.

After passing the steepest portion of the rocks, which lie rather to the left of a direct line between the summit and a spectator at Pecol, there were one or two couloirs to be encountered, and angles to be turned, which the incoherent, treacherous, fresh snow of the previous week rendered unpleasant, especially during the descent; but having reached the less steeply inclined upper slopes, where all difficulty was at an end,

and the probability or consequence of an avalanche was less to be feared, we halted for breakfast at 5.45. The cloud and light effects had been, and still continued, indescribably grand and beautiful; and though the mists surged about in the valleys, and occasionally shot up wreaths and spires which the rising sun transformed into tongues of fire, the sea of peaks stood out clear and sharp in wonderful array.

Starting again at 6.10, we gained the highest swell of the topmost ridge at 7, and found ourselves looking straight down that superb western rocky wall—which for absolute precipitousness has few equals—upon Alleghe and its lake, and far away to the snowy peaks of the Adamello, Presanella, Orteler, Oetzthal, and Tauern groups, most of whose principal summits were easily identifiable. I have rarely seen a more exquisitely beautiful view, the charm of which was enhanced by the combination of every conceivable variety of cloud display in the lower regions with the most satisfactory clearness aloft. All trace of rock was concealed by the snow, and we were consequently unable to erect a cairn, or discover any sign of our reputed predecessor's visit. From below it is not easy to say which is really the highest summit, but above there could be no question that the more northerly and rounded one decidedly overtopped its southern neighbour.

Thinking it prudent to get down early, both to avoid risk from the ever-increasing softness of the snow, and because we had still a good day's work before us, we commenced the descent at 8, and at 9.20 reached the foot of the rocks, but not without a very unpleasantly close encounter with a huge avalanche, which swept down within twenty feet of us just as we were in one of the steepest places, when it was impossible to do anything but hold on patiently, in the hope that the unwelcome intruder would be pleased to keep strictly to the line of country it had selected, and that its only too probable successors would either be like-minded, or restrain their impatience till we could gain a position of safety. Directly it ceased we put on a spurt, got over the exposed bit without a repetition of the performance, and, when fairly out of range, had the pleasure of witnessing a display of unavailing spite in the shape of a vast frozen cascade, which for ten minutes continued to sweep the cliffs from top to bottom.

If we had followed the morning's course to Pecol, we should have reached it in $1\frac{1}{2}$ hour from the rocks, or less than 3 from the summit; but, led away by the temptation of striking out a more direct line in a northerly direction to the Passo di Coldai (generally known locally as the Passo d'Alleghe), we scrambled along the mountain-side across a series of 'graben,' or gullies with precipitous banks, and, after all, had to confess ourselves beaten, and strike straight down into the valley, reaching Pecol in $2\frac{1}{2}$ hours from the rocks, or nearly 4 from the summit.

Setting forth again after a short halt, we reached the Passo di Coldai, or d'Alleghe, in 1 hour, Alleghe itself in $1\frac{1}{2}$ more, and Cencenighe in $1\frac{1}{2}$, whence, reinforced by the addition of Howard, we drove up to Forno di Canali, and put up for the night at an unexpectedly good inn.

The next morning (June 1) we proceeded up the valley to Gares ($1\frac{1}{2}$ hour), and thence by the Val delle Comelle (in 4 hours) to the

Passo della Rosetta*, much of the way through soft snow, which rendered our progress slow. From the col we struck off to the S.E. for the purpose of reconnoitring the Palle di S. Martino, to which has hitherto been assigned the second rank amongst dolomite mountains after the Marmolata. (Marmolata, 11,045 Eng. feet, or 3366·5 mètres, according to Grohmann; Palle di S. Martino, 10,969 feet, or 3343·3 mètres, according to Trinker.) Leaving the comparatively inconspicuous summit of the Cima della Rosetta on our right, we reached in half an hour the crest of an intervening ridge, from which we obtained a wonderful view of the magnificent cliffs of the Palle, but at the same time discovered, to our vexation, that all idea of an ascent in this direction was hopeless. In fact, the summit is guarded on the N., S., and W. by apparently inaccessible precipices, whilst the 'grat' leading up to it from the E. appeared to us to be so serrated as to be quite impassable. It is just possible that on the opposite or S. side snow-slopes or a friendly couloir may facilitate access, and until a near reconnaissance has been made in that direction it would be premature to pronounce a positive opinion. From our point of observation, however, as well as from the Civita, I quite satisfied myself that the highest point of the mass of summits of nearly equal altitude on the N. of the pass—apparently corresponding with the Cimon della Pala of the Lombardo-Venetian map—is loftier than the Palle di S. Martino, and must, if the height assigned to the latter by Trinker be correct, rank next to the Marmolata itself. In Trinker's hypsometrical Tables the Cimon is put at 10,643 Eng. feet, or 3243·9 mètres, and the Palle, as above stated, at 10,969 feet; but my impression is, after sighting them with a level from the Civita, that if the figures were simply transposed the result would not be far from the truth. 531 feet (10,969—10,438) is far too great for the difference between the Civita and Palle, which would be much more closely represented by 205 (10,643—10,438) feet. As seen from Primiero, the Cimon della Pala (the name Cimon is itself intensive) towers up very grandly to the right of the slopes beyond S. Martino di Castrozza, and behind the 'alp' of La Pala, which we traversed in our descent from the Passo della Rosetta. The peak visible from, or at any rate nearest to, S. Martino, is not the highest point, but even it, I believe, is loftier than the Palle di S. Martino—at least so it appeared to me subsequently from the summit of Monte Pavione (Colle di Luna), between Primiero and Feltre.

In a recess between the ridge from which we reconnoitred the Palle and the northern cliffs of the latter is a small glacier displaying blue ice, and descending a short distance in a S.W. direction; and from the same point we had a capital view of another, which streams down to the S.W. from between the Civita and the Cima di Mezzodi, above the S. end of the Lago d'Alleghe. We were unable to examine carefully into the question of the accessibility of the Cimon della Pala from the E., as some intervening spurs concealed the lower portion of the rocks, but it appeared both to Melchior and myself that the chances of a successful attack either on its W. or S. face would be doubtful.

In twenty minutes we regained the col, and finding the snow in

* See *Alpine Journal*, vol. ii. p. 138.

better order on the W. side, whilst the great amount of it facilitated the descent, we dropped rapidly down, reaching S. Martino di Castrozza in $1\frac{1}{4}$ hour, and Primiero in $2\frac{3}{4}$ hours more.

SECOND ASCENT (BY TRAVELLERS) OF THE CIMA TOSA, the highest peak of the Brenta Alta group, first reached by Messrs. Ball and Forster, with Matteo Nicolosi, in 1865 (10,850 Eng. feet, according to Mr. Ball, and 10,771 by the *Kataster* Survey).—Leaving my companions to cross the Bocca di Brenta to Pinzolo with Jakob Anderegg and old Nicolosi of Molveno, Melchior and I, with Bonifazio Nicolosi (whose elder brother Matteo had gone to reside in Botzen), started on the 6th of June for the ascent of the Cima Tosa.

Quitting Molveno at 1.45 A.M., we reached the Andolo Malga at 2.45, and that of Ceda at 4. At 4.45, halted for breakfast on a knoll commanding a fine view of the Cima Tosa, which is flanked on the right (in the direction of the Bocca) by two magnificent spires of dolomite. From this point the snow was continuous and very soft, so that our progress was slow, and we took three hours to the summit. Bonifazio called the second highest peak of the group (the Cima Tosa of the government map of Tyrol) the Cima di Mezzodi. Its height must certainly be much more than 10,324 feet, if that of the true Tosa be 10,771 or upwards, as, after repeated careful observations with a level, I satisfied myself that the difference between the two is at any rate less than 100 feet, and probably does not exceed fifty. This opinion has been invariably confirmed on every occasion that has offered for a comparison of the two peaks as seen from various points in the Lombard and Orteler Alps, and it has sometimes struck me that the figures 10,771 may possibly refer in reality to the peak N. of the Bocca di Brenta, in which case 10,850 feet (as determined by Mr. Ball) would probably represent the height of the true Cima Tosa with considerable accuracy.

From the summit it appeared to us that it might possibly be practicable to descend into the head of the Val di Brenta by a long and steep couloir, the bottom of which I had noticed some way below the Bocca (on the W. side) when I crossed it in 1865; but as there was much fresh snow evidently resting on ice, and probable risk from falling stones, we decided to return the way we came. After erecting a stone man a little below the summit, we commenced the descent at 9.15, passed the couloir in safety, and, keeping away to the left round the bases of the noble aiguilles already alluded to, reached a depression in the eastern bounding ridge, and found ourselves looking into the head of the valley which leads up to the Bocca on the Molveno side of the Pass. Here we dismissed Bonifazio, with whom I was much pleased; and whilst he descended straight towards the Val delle Seghe, Melchior and I doubled back to our left along the E. slopes of the aforesaid aiguilles, and reached the Bocca in $\frac{1}{4}$ hour (at 11.15), without the slightest difficulty.

It may be well to add, that the position of the dotted line S. of the Bocca di Brenta on the map of Tyrol does not correspond with that of the true watershed, and thus gives a very incorrect idea of the topography. The summit ascended by us is situated slightly to the S.W. of

the B of 'Bocca di Brenta,' and the watershed, instead of running S. from the Bocca, turns first nearly due W. as far as the *true* Cima Tosa, then for a short distance to the S.W., and finally S.E. to a point nearly midway between the Bocca and Cima del Ges. Thus the whole northern and eastern portion of the névé and glacier, represented in the map as occupying the head of the valley which runs S. to Orsino and Andogno, is in reality directly connected with the ravine in which the Ceda Malga is situated, and drains into the Lago di Molveno.

FROM MARIA SCHMELZ IN THE MARTELL THAL TO STA. CATARINA, over the two highest summits of the Monte Cevedale or Fürkeli (the Zufall Spitz of the Lombard and Tyrol Maps, 12,348 feet, *Kataster*, or 12,445 according to Lieutenant Payer).—On the 10th of June Melchior and I had crossed from the Baths of Rabbi to the Martell Thal by the Säent Joch, ascending *en route* the Hintere Roth Spitze (11,000 feet?), the view from which may take a high rank amongst mountain panoramas. The upper portion of the valley being as yet uninhabited, we were received and most hospitably entertained at a peasant's house a few minutes below the chapel of Maria Schmelz, and near that inhabited by Janiger, who shares with Pinggera of Sulden the reputation of being the best guide of the Orteler district.

Starting at 2.35 the next morning, we passed the Ober-Martell Alm in $1\frac{3}{4}$ hour, and in $2\frac{1}{2}$ more gained the lower portion of the Langen Ferner by its N. bank. Traversing diagonally the comparatively level portion of the glacier, we took to the slopes beneath the Cevedale, and without any special difficulty gained the side of the mountain which faces towards the Cevedale Pass and Königs Spitze, whose summit, proudly rearing itself behind the highest ridge of the glacier, had for a long time been a most conspicuous object.

We here deposited our packs on the snow, and, striking off to the left, made straight for the *sattel* between the two highest peaks of the Monte Cevedale. The second or more northerly peak was reached at 11.20 in four hours from the foot of the ice, and here a view of indescribable grandeur and extent burst upon us. The air was keen and clear, and Monte Rosa was exquisitely seen, whilst not even a solitary cloud disturbed the perfect purity of the sky. Returning to the *Sattel* to get out of the wind and have some food, we thence gained the highest peak (which I had already ascended last year) at 1.20, and quitted it at 1.30, reaching the Cevedale Pass at 2.30, and at 4.30 getting clear of the snow, after a long and stifling pull through it. An hour and a half's pleasant walk brought us to Sta. Catarina. From the more northerly summit of the Cevedale the Martell Thal is admirably seen, and forms a most exquisite feature in the view which is wanting in that from the highest peak, though the loss is perhaps there compensated for by the superb wall of snow and séracs extending from the Pizzo della Mare to the Tresero. I am inclined to believe that the difference in height between the two peaks of the Cevedale does not exceed thirty feet, but the superior altitude of the more southerly one is indisputable. I still more completely satisfied myself than on my previous visit of the perfect practicability of a pass from the Val della Mare into the Martell Thal,

Sulden Thal, or Val Forno, over the *sattel* between the two highest summits of the Cevedale, and believe that this must be the highest in Tyrol, as it cannot be less than 12,200 Eng. feet.

PASSAGE OF THE TRAFOIER JOCH (10,800 Eng. feet?) FROM VAL DEL ZEBRU TO TRAFOI, between the S. Madatsch Spitze and the Schnee Glocke, with an ascent of the last-named peak (11,200 Eng. feet).—Mr. E. Howard and I, with Melchior and Jakob, strolled down on the afternoon of the 12th June, from Sta. Catarina to S. Gottardo ($1\frac{1}{2}$ hour), and then striking off up the Val del Zebru, halted (2 hours) for the night at the first châteaux above Prato Beghino, where we found very comfortable quarters, and were received with the utmost hospitality. The herdsman pointed out a gap in the great line of cliffs which bounds the lower part of the valley on the right, by which smugglers occasionally pass; and from its position near the termination of the valley, I imagine that the descent on the other side must be effected by one of the smaller lateral ravines which terminate near the lower portion of the Val di Vitelli.

Next morning (June 13), crossing the stream by a broken bridge, the centre of which actually lay in the water, we struck up the N. slopes, towards the right bank of the glacier which descends from the S. side of the Thurwieser Spitze, and then, instead of pursuing a direction which would ultimately have brought us to the Orteler Joch, kept more to the left till we joined the route which the Messrs. Buxton and I had followed in 1864, when descending from the Madatsch Joch to the head of Val del Zebru. A rocky ridge ran down on our left towards the valley, and is connected by a very narrow and inconspicuous snow *sattel*, with the range of the Thurwieser and Trafoier Spitzen, and over this *sattel*, exactly in the N.W. angle of the snow-field, we had passed on the previous occasion. In an evil moment, however, tempted by the idea of making a short cut, and moreover somewhat forgetful of the true topography, we struck off to our left too soon ($2\frac{1}{2}$ easy hours from the châlet), and gained the crest of the above-mentioned ridge only to find that farther progress in that quarter would be very difficult and tedious, if not impossible. There was nothing for it but to console ourselves with breakfast and then turn back, and so, after losing nearly two hours, we found ourselves once more, about 7.45, at the point of divergence. A very short time now sufficed to place us on the *sattel*, from whence we proceeded upwards over gently undulating fields of névé (after traversing longitudinally a steepish slope of snow beneath the Trafoier Spitze) in the direction of the Madatsch Joch, and then, striking up to our right, gained at 9.30 the depression of the Trafoier Joch between the Schnee Glocke of Lieutenant Payer (the Ziegerpalsen Spitze of the older authorities) on the E. and the most southerly and elevated point of the Madatsch ridge on the W. The pass is slightly (perhaps 50 feet) lower than the Madatsch Joch, and, as far as our experience goes, presents no difficulties on either side, whilst the scenery is of the grandest character. Our W. neighbour, the S. Madatsch Spitze, might easily have been bagged; but hoping that in the opposite direction it

would be possible to secure the Trafoier Spitze as well as the Schnee Glocke, we quitted the col at 10.5, passed over a flattened dome of snow but slightly elevated above the general level of the ridge, traversed the crest of a sort of eastern twin Trafoier Joch, and at 10.30 gained the summit of the Schnee Glocke. On a rock a few feet lower on the S. side we found a bottle with the names of Herren Payer and Radinger, and the guides Pinggera and Thoni, and the date September 20, 1866, and thus learned that, if we had been anticipated, the prize of a first ascent had been won by worthy rivals.

We now found that to reach the Trafoier Spitze a considerable descent would first be necessary, and that, in fact, the peak ought to be attacked from a more north-easterly direction; so, as we were anxious to reach Trafoi in good time, we resolved to leave the nut for future cracking, quitted the Schnee Glocke at 11.30, and at 11.50 regained the col. The height of the latter must be close upon 10,800 Eng. feet, whilst that of the Schnee Glocke I should estimate at 11,200 feet, or about the same as the most southerly of the Madatsch Spitzen.

After luncheon we quitted the pass at 12.15, and after a series of glissades, which a more developed state of the crevasses at a later period of the year would probably render impossible, we quitted the ice at 1 for the slopes of the most northerly peak of the Madatsch ridge. Skirting round these to our left, we came upon a path which, however, we subsequently contrived to lose, and were thus involved in a rough and tiresome scramble across gullies and through thickets of that most abominable of all obstacles to progress, the *legföhre*. An hour and a quarter of this sort of thing, followed by a scramble over the huge terminal moraines of the Madatsch Glacier, and a short ascent on the further side, brought us to the Stelvio road, and in three-quarters of an hour more we reached Trafoi, and were warmly greeted by Frau Barbara Ortler.

ASCENT (THE SECOND BY TRAVELLERS) OF THE MONTE DELLA DISGRAZIA (12,074 Eng. feet), from the Foppa Alp in the Val Sasso Bisolo. —Early on the morning of the 16th June, Melchior, Jakob, and I quitted the excellent Hôtel de la Poste at Sondrio, and drove down the Valtelline as far as the solitary inn ($1\frac{3}{4}$ hour), near the village of Masino, just beyond the bridge across the torrent, and in two hours more reached Cattaeggio in Val Masino, opposite the entrance of the Val Sasso Bisolo. Here we dismissed the carriage, and struck up a path to the right, which leads at first through comparatively uninteresting scenery, until, after a somewhat rapid ascent, the valley widens, and a fine level alp is reached, separated from the highest level (Piano di Pietra Rossa) by an unusually lofty 'thalstufe,' where a branch valley comes in on the right from the S. side of the Corno Brucciato.

Climbing the wooded buttress by a winding path on the left side, we reached, in about two hours after leaving Cattaeggio, the beautiful alp of Foppa, most picturesquely situated, and possessing very superior accommodation to any of the *malghe* in the neighbouring Val di Mello. The herdsmen were very civil, and a long afternoon and evening were passed here most enjoyably—principally within, or in the immediate

neighbourhood of, the *malga*, as the weather had unfortunately changed for the worse, and a succession of snowstorms kept sweeping down upon us from the head of the valley. The Disgrazia being invisible till the remaining ascent to the S.W. end of the Piano di Pietra Rossa has been accomplished, we took advantage of a temporary lull to make a reconnaissance, and in about ten minutes came in sight of the mountain, whose summit, however, did not remain clear for many minutes together. Just beyond the edge of the rise are a number of scattered but tolerably substantial small stone huts, or 'baiti,' somewhat after the model of their Lilliputian relations of the Fellaria Alp, though of rather superior construction and dimensions. Any of these would afford fair quarters for the night; but as the cows were at the Foppa alp, and the difference in time was very trifling, we did not hesitate to abide by our first intention.

The next morning was not very favourable, and throughout the day we had to encounter a continuation of the snowstorms of the 16th, which sadly interfered with the distant view, and, coupled with a furious wind, made the ascent of the long arête of the Disgrazia less pleasant than would otherwise have been the case. Notwithstanding the great quantity of fresh snow, which covered up a great portion of the rocks, there was a good deal of hard ice, and a proportionate amount of step-cutting. The snow, masking the splintered rocks, rendered it sometimes difficult to ascertain whether the footing beneath was really solid or merely consisted of a column of air equal in height to the great northern precipice above the Ventina Glacier in Val Malenco. This was especially the case where it is necessary to descend slightly from the point reached (in 1865 or 1866?) by Herr Siber-Gysi and his guides Jäger and Grass of Pontresina, and cross a very attenuated *sattel* to the base of the final peak, which that gentleman considers to be unclimbable in this direction, and therefore coolly suggests that Messrs. Kennedy and Stephen, with Melchior for guide, must have come up in a fog, and have only *imagined* that they had gained the actual summit, whilst in reality standing on the tooth which was, in arctic language, his own 'farthest,' if not on some still lower eminence! Melchior was disposed to be half indignant and half amused at the notion, but was, I think, consoled by the reflection that, after all, 'der armer Herr' had at least to admit that *he*, knowingly and 'ohne Nebel,' had abandoned the prize when so nearly within his grasp, either from want of nerve or judgment, since lack of time could scarcely be in fairness alleged as an excuse for failure when success simply depended on an extra ten minutes' scramble. It is almost superfluous to add that no ground whatever exists for throwing the slightest doubt on the *complete* success of our countrymen, or the correctness of their belief and statement that they reached the highest point of all. They encountered no fog, and would have no difficulty in gaining the summit from the Pioda Sattel in the time stated by Mr. Kennedy.

It was 8.30 A.M. when we reached the actual summit (just 7½ hours, including halts, after leaving the *malga*), and as the space was confined, the distant view unsatisfactory, the temperature low, and the wind

blowing a perfect hurricane, we did not halt longer than was necessary to consign a record of our visit to the cairn erected by Jenni and Flury when (in 1866) they made the ascent alone, after depositing on the arête some distance below, a French gentleman whom they had conducted thus far, but who did not care to go any higher—why, I do not know. Ours was thus the third actual ascent of the highest peak of the mountain, but the second by travellers, since Herr Siber-Gysi, by his own admission, halted at a lower point.

At 8.45 we commenced the descent; at 10 reached the slopes of turf and débris below the glacier; halted till 11 for a hearty luncheon; arrived at the Foppa alp at 11.55; quitted it at 12.5 P.M.; reached Cattaeggio at 1.20, and the inn below Masino at 2.55—5 hours' walk from the summit of the Disgrazia.

PIZ VADRED.—*June 29.*—Messrs. Hartmann and Fitch ascended the Schwartzhorn from Durrenboden with Jenni to inspect Piz Vadred, and found that if the bergschrund, clearly and distinctly visible, should be practicable, the difficulty of the rocks might be surmounted. They slept in Durrenboden on June 30, and left July 1, about 4 o'clock A.M.

They found no difficulty whatever on the Scaletta Glacier, but a dense mist, which made its appearance at 7 o'clock, forced them to wait for more than one hour. When the clouds began to break, soon after 8 o'clock, the mist cleared away as suddenly as it had appeared, and Piz Vadred, with its N. and highest point, stood clear before them. The bergschrund proved to be not difficult, and they took to the rocks at once, after cutting about 30 steps. The climbing was the toughest piece of work they ever experienced, but Jenni and Stiefel, a man from the Dischma-Thal, were excellent. The barometer gave only 500 feet from the bergschrund to the highest point, but it took them more than two hours to arrive there; height, according to aneroid barometer, 10,700 feet. They saw the cairn built by Mr. Freshfield on the more E. peak, about 30 feet below them. The view was very fine, and the descent down the rocks very hard as they were very unsound, affording very unsafe hand and foothold. They arrived in Durrenboden at 4 P.M.

LA CHIARENA.—*July 25.*—Robert Spence Watson, with Alexander Flury, ascended this peak from the Forno Glacier, mistaking it for the 'Tresero,' which, from that glacier, it quite hides. It is much lower, and is generally taken as part of that mountain, although from most points of view it seems quite distinct. Time from the ice-fall on the Forno Glacier to the summit, 1½ hour.

La Chiarena is the saddle-shaped peak to the left of the 'Tresero' as you look up the valley from Sta. Catarina.

'**TUCKETT SPITZE.**'—*July 31.*—The same, accompanied by Mr. H. T. Mennell, left Trafoi at 5 A.M., and quitting the Stelvio road near the first ruined cantoniera, followed a footpath leading towards the Madatsch Glacier. They kept up the centre of the glacier, and after some difficulty with the séracs found themselves at the entrance of the snow

valley leading to the Madatsch Joch. Bearing to the left, they mounted the snow valley leading to the Tuckett Joch, and from its head climbed the Tuckett Spitze. They returned to the head of the Madatsch Glacier, and skirting the Video Spitze, ascended the Nagles Spitze, descending by the Nagles Spitze Glacier to Sta. Maria, which they reached at 2.30 P.M. This excursion (without the ascent of any peak) would make a short and pleasant route alternative to the Stelvio.

The following three expeditions were made by Mr. W. Coolidge, with Francois and Henri Devouassoud :—

CIMA DI TSCHINGEL (10,853').—Made the first ascent July 26th from the Baths of Masino. Leaving at 5.22 A.M. we reached the summit at 10.58 (being delayed by mist), and returned to the Baths at 1.52. Halts 1.45, including 42 minutes spent on the top. The way we took was by the head of the Val Porcellizza, then keeping to the left, the arête is gained after a rather stiff climb, whence it is easy to reach the highest peak.

CIMA DI ROSSO (11,024').—Made first ascent July 30th from the Maloya Inn. Leaving at 2.47 A.M., we proceeded to the head of the Farno Glacier; then turning to the left we went almost in a straight line through some crevasses to a col between the two highest summits. Turning to the right, we struck up over snow slopes, and reached the highest summit at 8.37, about 8 minutes from the col. We reached the Maloya Inn at 1.26 P.M. Halts 1.50, including an hour on the top. The view, which was very fine, extended from the Pointe des Ecrins to the Adamello, including the Bernese Oberland and the Monte Rosa group, Mont Blanc being hidden by the Cima del Largo.

PIZ ST. MICHAEL (10,371').—Made first ascent August 1st. We slept in some châteaux above Tinzen. Leaving them at 3.58 A.M., we proceeded by grass slopes to the base of the southern face of the peak. Thence the ascent was made by couloirs of rock, occasionally taking to the arête which was too sharp and jagged to be followed altogether. About 8 A.M. a stone about a foot square became detached from the rocks above and fell on the rope between F. Devouassoud, who was leading (his brother having gone to reconnoitre in another direction), and myself, dragging Devouassoud off his feet. In his fall he pulled me down, and we rolled for some seconds, until Devouassoud luckily stopped us on the brink of a deep precipice. Our clothes were torn and we were bruised and cut a good deal, and Devouassoud's foot a little sprained; but we arrived at the top at 9.32. Being cloudy the view was not very fine. We arrived at the châteaux on our descent at 4.5 P.M. by another way, much easier than the one by which we ascended. The summit is a level place amid broken rocks. The peak appeared perfectly perpendicular on all sides, except the one by which we ascended. We looked down on the top of the Tinzenhorn, which proves that the Piz St. Michael is the higher of the two. Halts 1.45, including 50 minutes on top.

The following notes are communicated by the Rev. T. G. Bonney :—

'MONTE TOFANA.'—Aug. 10.—This mountain has three peaks, nearly

of the same height. Two of them are near together on a line lying N.E. and S.W., and the third is some distance to the W. of the southernmost of these two, which is also the highest (10,721'). The third peak has several times been ascended; but the other two have only been reached by Herr Grohman. As the highest peak was reported to be inaccessible (owing to snow) I ascended the northernmost peak with a local guide named Angelo Demai, a forester; a capital cragsman and well up in the neighbouring mountains. We left Cortina d'Ampezzo at 4:55 (too late), and made for a gap in the wall of precipices facing that village, at the head of a slope of débris; this brought us into a short glen terminating in precipices above the Ampezzo road; from this we in a few minutes reached a sort of col, from which we looked into a deep mountain valley running a little E. of N., obviously once a glacier basis. Across this rose the twin peaks above a tremendous wall of precipices. We rounded the valley without difficulty, and passed under this wall until we were well beyond the northern peak, for which we were bound, then commenced to climb by the side of a couloir. Thus far all was easy, but the rest of the climb required much care and steadiness. After striking the arête, we turned to the left, and made our way sometimes along it, sometimes over the face of the cliff, first to the right and near the top to the left. There were several beds of ice with a coating of loose snow to be crossed; and the top of the peak was crowned by a snow arête. We reached the summit after about four hours and forty-five minutes' walking (quick). The view, though a little marred by gathering clouds, was magnificent. In the immediate neighbourhood were all the great dolomite peaks, and beyond them in a kind of quadrant from west to north-east were the Tyrol and Carinthian Alps, beginning with the Adamello, Orteler, Oetzthaler, and Stubayer groups, and passing along the Noric Alps to beyond the Gross Glockner; far away, a little to the south of east, rose the Terglou *massif*. The central peak appeared more dangerous to climb than the one we were on, and is so little higher that the view can hardly be better. The western peak, which was about level with us, cannot, I think, command one so good. The descent, hurried by an approaching storm, took three hours and thirty-five minutes. The first part of it to the foot of the precipice often required great care. I recommend this excursion to any experienced climber who visits the Dolomites, and believe that he will find that from Monte Tofana or from the Cristallo (which I am told is a rather more difficult business) the finest panoramic view in the district is to be obtained.

NOTE ON THE PIZ MORTERATSCH.—I ascended this peak on the 17th of July, by a route, part of which is, I think, not generally known. The road up the Roseg valley was followed till it crosses from the right to the left bank of the stream (a short hour from Pontresina). Turning off to the left up the mountain, a steep scramble brought us to a shepherd's hut; the route then lay diagonally up the mountain side, over a wilderness of fallen blocks, across a rocky amphitheatre, and along some easy snow slopes, till a kind of col was reached, in the ridge between the Roseg and Morteratsch valleys, to the S. of the Piz Chalelany. Hence we kept along the snow fields a little on the western

side of the ridge, till we came to the edge of a cliff above the Vadrel Misauna. Descending this easily, we circled round the head of that glacier, and worked up to the shoulder of Piz Tschierva, crossing which we soon joined the usual route, at the foot of the actual cone of the Piz Morteratsch. The great advantage of this course is, that excellent views of the surrounding country are obtained so easily in the excursion. We reached the summit in six hours and fifteen minutes' actual walking from Pontresina.

TÖDI DISTRICT.

July 9.—Messrs. Mansell, Thompson, Spankie, and Sowerby, accompanied by J. M. Trösch and A. Zgräggen, ascended the GROSS SPANORT (10,515 ft.). They left the chalets in the Erstfeld Thal (3,418 ft.), (where a most extortionate charge was made for the night's lodging) at 3.15 A.M. The Ober Fulen See (6,470 ft.) was reached by a path in two hours. The way then lay a little S. of W. to the point marked in the Federal map 2,374 m. From this the Spanorter Joch (9,823 feet) was reached at 9.20, over gently inclined fields of névé, laborious, however, from the fresh snow. The peak seemed most easy of access from this point. A very steep snow-slope led up to a piece of rockwork, troublesome enough, and made worse by the frozen snow which covered every ledge. At the top of these came another snow-slope, followed by another wall of rocks, which was mounted by each in succession, assisted by the rope. From this a few minutes' easy walking sufficed to gain the top at 11.25. This falls away precipitously on all sides but that by which the ascent was made. The view was much obscured by clouds. The actual summit is a rock about eight feet high, projecting on all sides from its base, on which, with some difficulty, they erected a stone man. Left at 12.25, and after passing both difficulties successfully by the aid of the rope, reached the Joch at 1.25. Here they turned nearly due E. to the head of the Gornerer Thal, entering it by a snow-slope which fell away with surprising rapidity from the level surface of the glacier. The snow was left at 3.45, and Amsteg reached at 6.45 by the village of Gurtellen. An aneroid observation gave the difference between the top and Amsteg 8,827 ft., making the height above the sea 10,540 ft., agreeing more nearly than usual with the survey.

July 11.—The same left the hotel in the Maderaner Thal about 5 A.M., and followed the path by the Alp Gnof to the Aelpli Firn. Over this a pass was reached called the KRUKELI (8,760 ft.), between the Gross and Klein Ruchi. A long snow-slope, which afforded some fine glistening, led down into the Brunni Thal. This is enclosed at its head by a magnificent wall of cliff and glacier, formed by the Gross Ruchi and Grosse Windgelle. These rise more than 6,000 feet above the spectator, and the view rivals the famous one from the Wengern Alp. Unterschächen was reached by the Brunni Thal about 1 P.M.

In an ascent of the Orteler made from Sulden, with Pinggera, Reinstadler, and others of that valley, the above party had great reason to

complain of the want of attention, almost amounting to incivility, shown by the guides. They probably are good mountaineers, but they took no pains to ensure the safety of the party, and some of them grumbled when asked to carry the rope. They roped the party in pairs with short ropes—an utterly useless measure—and only put on the long rope under great pressure. Travellers should take care to be provided with their own, and insist on its being used.

BERNESE OBERLAND.

GLETSCHERHORN.—*Aug. 15.*—Mr. Hornby with Chr. Lauener left the Faulberg hut at 2.30, and walked up easy snow-slopes toward the col between the Ebenefluh and Gletscherhorn, which looks down upon the Roththal. Shortly before reaching the col they turned to the right, crossed a bergschrund, and cut steps up an exceedingly steep slope of hard snow towards the last rocks of the Gletscherhorn. These consist of large rocky teeth protruding from a snow-arête, and have to be climbed or turned in succession till the highest point is reached. The last part of the ascent, viz. from the bergschrund to the summit, is all difficult, and requires care, but it is not very long. The top was reached at 7.45, and the Faulberg at 11.30 A.M.

GSPALTENHORN.—*Aug. 21.*—Messrs. Hornby and George, with Chr. Almer and Chr. Lauener, after bivouacking near the head of the Kienthal, reached without difficulty, in about 2½ hours' steep walking, the highest notch in the ridge of the Gspaltenhörner, N.W. of the highest peak, between it and the Büttlassen. The only way thence to the summit, some 800 or 900 feet above, was by cutting steps on the extremely steep ice-slope which forms the face of the mountain towards Mürren—a task which would have cost six or seven hours of hard work. This they thought unreasonable to inflict on the guides, and they therefore abandoned the attempt. The Gspaltenhorn was attempted earlier in the season from the Sefinenthal, by a Swiss gentleman with Lauterbrunnen guides, who succeeded in reaching the second peak, E. of the highest, which latter is absolutely inaccessible from that side, as well as by way of the arête leading towards the Gamchi Lücke. The peak is doubtless accessible by the route above described, but it will entail an expenditure of time and labour entirely disproportioned to its importance, to say nothing of serious danger, as the few rocks which project through the steep ice-slope are so crumbling as to give very precarious footing.

It may also be worth mentioning that two ascents of the Jungfrau from the Wengern Alp have been made, the first by Mr. G. E. Foster, the second by M. von Fellenberg.

MONTE ROSA DISTRICT.

JÄGERHORN, &c.—*July 17.*—Messrs. C. E. Mathews and Morshead, with Christian Almer and A. Maurer, ascended the Pizzo Bianco on the

16th of July to inspect the east face of Monte Rosa, and find, if possible, a route from Macugnaga to the summit. In this they were disappointed, but their attention was called to a slight depression in the ridge of Monte Rosa between the Nord End and a small but interesting peak called the Jägerhorn. They determined to effect a passage from Macugnaga to Zermatt by this route.

Leaving Macugnaga before 2 o'clock on the morning of the 17th, they walked through the fields to the top of the Belvedere, gaining the waterfall at the foot of the old Weiss Thor at 4.25. Walking up the débris to the left, they reached a rocky col overlooking the Filar Glacier at 5.20; crossed this glacier in an oblique direction, and skirting the rocks to its left, and rapidly mounting, they reached the séracs at the very head of the Filar Glacier at 7.20. From this point the rockwork was in many places very severe, but Almer landed them at the summit of the Jägerhorn at 12.30, after 10½ hours of very hard climbing. Descending easily into the little col they had seen from the Pizzo Bianco, they found themselves as nearly as possible at the same height as the Alphubel, or 13,800 feet. The Cima de Jazi was far below. From the summit of the Col, which commands magnificent views of the whole eastern face of Monte Rosa, the party descended easily to the Riffel in about 3½ hours.

LYSKAMM FROM GRESSONAY. — On the 18th the same party crossed the Schwarz Thor, and the same day crossed the Betta Furka to the Lys Glacier, with the intention of ascending the Lyskamm from the side of Gressonay. They slept in a comfortable chalet between the top of the Betta Furka and the Lys Glacier; and leaving the chalet at 2.45 on the 19th, they climbed the rocks to the left; and then, bearing to the right, after two hours' easy climbing, found themselves on a range of rocks overlooking the Glacier of Felik. Here they descended a little, and crossed the basin of the glacier, and again mounting, kept to the right, and straight towards the Lyskamm. At 6.10 they arrived at the open glacier nearly at the foot of the peak, and saw no difficulty between them and the summit. Clouds then began to settle on the mountain, and as a fierce wind was blowing, Almer would not go on; so, cutting steps up the ice-wall on the left, they gained the arête, descended to the top of the Feliks Joch, and arrived at Zermatt at half-past four.

Messrs. Mathews and Morshead were convinced that the best ascent of the Lyskamm was from the side of Gressonay; so, on the following Monday, they left the Riffel exactly at midnight, the night being superb, and the moon nearly full. At a few minutes past 5 they reached the summit of the Feliks Joch, overlooking the Glacier de Lys. Almer cut 307 steps down the south side of the col, and the party regained their track of the previous Friday. Keeping to the right, they reached the base of the final peak, and mounted by the rocks running due south, which form the real Gressonay arête of the Lyskamm. At 10.5 they were on the summit, under a cloudless sky. They descended to the Lys Joch, which they reached at 1.45, arriving at the Riffel at 6, and after a short halt reaching Zermatt soon after 7, after a laborious but delightful excursion. They believe that under favourable

circumstances the ascent of the Lyskamm can be made from the châteaux at the foot of the Lys Glacier in 8 hours at most, and the excursion, which is of the highest order, presents no real difficulties to a well-trained mountaineer.

Note.—Christian Almer, on a subsequent visit to the same region, when his party were prevented by bad weather from making any long expeditions, pointed out the perfect feasibility of ascending the Lyskamm in one day from the inn at the head of the Val d'Ayas, crossing the stony ridge E. of that valley, and so reaching the snow-fields on the Italian side of the Feliks Joch.—H. B. G.

MATTERHORN.—On August 14, Mr. Grove, with the guides Carrel, Bic, and Salomon Meynet, ascended the Matterhorn by the route discovered by those guides in July 1865, of which an account, extracted from the *Feuille d'Aoste*, is given in the *Alpine Journal*, vol. ii. p. 237.

On September 13, a party from Val Tournanche, none of whom had previously been to the summit, one of them a young woman, the daughter of J. B. Carrel, reached the base of the 'dernier mamelon,' from which point previous climbers had taken to the difficult ledge on the W. face known as the corridor. Here all the party halted except Joseph and Pierre Maquignaz, who explored the rocks of the S. arête, and after some time succeeded in discovering a comparatively short and easy route to the summit. In returning they fixed a Manilla cord 15 yards long in the only difficult place of the final ascent. On the 1st of October, Mr. W. Leighton Jordan, who had previously made two attempts on the Swiss side of the Matterhorn, defeated by bad weather, ascended with the brothers Maquignaz to the *cabane*, which is at a height of 4,134 mètres. Starting next morning at 6, they reached the top before 10, and returned after a long halt on the summit in three hours to the *cabane*, whence they took but four hours next morning to descend to Breuil.

MONT COLLON.—July 31.—George Edward Foster, with Hans Baumann of Grindelwald, and Johann Kronig of Zermatt, made the first ascent of the Mont Collon. 'Left the inn at Arolla at 3.45, and crossed the Col de Collon to a point a little beyond where it meets the arête of the mountain, then struck up a series of rock couloirs, which ultimately led us to the arête by which we reached the summit at 10.30. The view was exceedingly fine. As the lower parts of the rocks were very difficult, we contrived to cross the chasm, by which we were turned back last year and descended by that route, which will probably be found the easiest in any future ascent. We returned to the inn about 4.'

Notes and Variations of Old Routes.

ZERMATT TO ALAGNA.—C. C. Tucker, D. W. Freshfield, and T. H. Carson reached the top of the Lys Joch in a thick fog. Having determined to descend to Alagna, they were lucky enough to discover a route which must be considerably shorter and pleasanter than that taken by Mr. F. N. Smith last year. Descending into the Indren Glacier by the same couloir as their predecessors, they struck straight across the *névé* to the rocks which divide it from the Embours Glacier. A practicable gully was soon found, and a series of glissades brought the party into the head

of the Embours Thal. Near some miners' huts a path (marked in Mr. Reilly's map) leads over a brow to the chalets of Sopra in Val d'Ollen, and so to Alagna, which was reached in 4 hours from the Col. Guides, Daniel Balley and P. Michel.

MISCHABEL JOCH.—The same party, with F. Andermatten in place of P. Michel, left Saas for the Mischabel Joch. Owing to the amount of snow and scarcity of crevasses early this season, they were able to take a straight line from half-way up the Langeffuh to the Col (6½ hours). In descending the Weingarten Glacier, they were led by chamois-tracks to the rocks on the left of the ice-fall, at a point where the descent seemed perfectly easy. A short climb led down to the lower glacier, and the Täsch Alp was reached in 2 hours; Zermatt, in 3 hours 45 minutes from the Col. By the discovery of a way down the rocks, the ice-fall of the Weingarten Glacier, the chief difficulty of the pass, is entirely avoided.

SCHWARZ THOR.—Christian Almer, with Messrs. George and Mortimer, found a very short and easy way up this pass from the Val d'Ayas by going a long way to the left from the moraine between the Ayas and Verra Glaciers, ascending very little, and thence doubling back under the Breithorn to the Col, thus forming a gigantic zigzag. The total ascent by this route, in a thick fog, took less than 5 hours.

The same party crossed the Col d'Ollen into the Lys Thal, intending to ascend the Lyskamm—a purpose frustrated by the weather. Having no exact local knowledge, they kept round the spur which forms the E. boundary of the Lys Glacier, instead of crossing the gap in it just opposite the Col d'Ollen, leading direct to Cour de Lys. By this course they reached, in 2½ hours, a chalet colony about half an hour *below* the foot of the Lys Glacier, which gave admirable accommodation. These chalets are nearly an hour below Cour de Lys, and therefore that distance farther from the Lys Joch, but are almost equally well placed for the Feliks Joch or ascent of the Lyskamm, for which the ascent must be made by the right bank of the Lys Glacier.

GRAIAN ALPS.

COL DI TELLECCIO.—July 5.—Mr. C. E. Mathews and Mr. F. Morshead left Cogne, intending to cross the Col di Telleccio, ascending the Tour du Grand St.-Pierre *en route*. The weather was so unsettled that they did not start till nearly six. The first three hours' walking is along the easy hunting-road which leads from Cogne to the foot of the Glacier of Valleiglia, in the valley of that name. Taking to the ice, they reached the summit at 12.15, unfortunately too late to try the Tour, which seemed to them quite practicable from the summit of the Telleccio. The Combe di Telleccio, between the summit of the pass and Locarno, is immensely beautiful, but very laborious, and the accommodation at Locarno as bad as it can be. The travellers took from fourteen to fifteen hours for the expedition, including halts. This pass has, it is believed, been made by Mr. Tuckett, but no record of it has yet been published.

COL DE MONT CORVÉ.—July 8.—They left the Stabilimento at Ceresole

at 2 o'clock, intending to make a new pass from Ceresole to the head of the Val Savaranche. Having walked for four hours, partly along the hunting-path above Ceresole and partly along Alpine pastures and débris, they found themselves at the head of the lateral valley that joins the Val d'Orca below Ceresole. They then gained a little bit of glacier, which is all that is left of the Glacier of Tetre, on the south side of the chain. At 9.30 they gained the ridge, and found themselves overlooking the Val Savaranche, not, however, from what seems the main col from the side of the Val Savaranche, but a col far higher, and immediately on the left of the Paradis. Keeping to the left, down the Glacier of Mont Corvé, they reached Pont at 12.30, after a most delightful excursion, having had the great good fortune to see a magnificent bouquetin on the moraine of the glacier.

It is almost impossible from the side of Ceresole to recognise the three cols which undoubtedly exist between that village and the Val Savaranche. From the N. side, however, they are easily distinguishable. One is between the Paradis and the Cima di Charforon (the col above described); the second is more to the W., between the Cima di Charforon and La Cocagna, and is not yet crossed; the third and most western is between the last-named summit and the Becca di Merlet (crossed this year by Mr. Freshfield's party), which is undoubtedly the shortest passage by glacier from Ceresole to Pont. By the two first cols the traveller reaches the Val Savaranche by the Glacier of Mont Corvé, but the last brings him on to that of Grand Tetre.

TOUR DU GRAND ST. PIERRE (12,069').—*July 14.*—J. H. Backhouse, D. W. Freshfield, C. C. Tucker, and T. H. Carson, with D. Balley, M. Payot, and a Chamouni porter, left Aosta on Tuesday, and walked up to the head of the Combe di Valleiglia (2½ hours above Cogne), where they bivouacked. Next morning they reached the Col di Telleccio in 3½ hours. After a short halt they set to work on the Tour du Grand St. Pierre, which rises immediately W. of the col. Several snow couloirs run up to the northern arête. Choosing the nearest but one to the peak, they mounted partly by the couloir, partly by the rocks on its right, and gained the ridge without any real difficulty. The only access to the final peak seemed to be by the arête. After cutting steps up a steep snowbank, they scrambled up a narrow ridge of smooth granite to the top (2½ hours from the col). The view of the Italian plains was magnificent and unusually clear. The descent of the final rocks proved tiresome, and required both time and care. The return to Cogne occupied six hours.

COL DU GRAND TETRET.—*July 20.*—The same party (without the porter) after crossing the Col de Grancrou and resting a day at Ceresole, started from the Stabilimento delle Acque to attempt to discover a direct pass to Val Savaranche *viâ* the Glacier du Grand Tetre. They ascended the valley as far as the village of Ceresole, where they turned up a faint track which brought them, after a steep pull, to the head of a glen, the stream of which joins the Orco close to the village. In four hours an apparent col was reached; it proved, however, to lead into another branch of the Val d'Orco. The wall of rocks on the

left, over which a way had to be found, looked somewhat formidable, but by descending some 300 feet into the glen beneath, they found a promising point of attack, and gained the true col after a long but not difficult climb (6 hours). The path lies close to the base of the Cocagna, and between that peak and the Becca di Merlet. The descent of the Glacier du Grand Tetre is perfectly simple. After disturbing a herd of thirty-six chamois, and finding the bones and horns of a bouquetin, the party left the glacier for its left bank, and reached Pont in $1\frac{1}{4}$ hour, Val Savaranche in $2\frac{1}{2}$ hours from the col.

MONT BLANC DISTRICT.

COL DE LA TOUR RONDE (12,600 ft.). ASCENT OF LA TOUR RONDE.—*July 22.*—D. W. Freshfield, C. C. Tucker, J. H. Backhouse, and T. H. Carson, with D. Balley and M. Payot, started from Courmayeur to make a new pass connecting the Brenva with the Glacier du Géant.

For $4\frac{1}{2}$ hours their route was the same as that of the party which ascended Mont Blanc from this side. A bluff of rock divides the upper Brenva Glacier into two branches. The eastern one seemed to offer the most direct route. After some trouble with crevasses, the snow-basin at its head was reached. Thence a very long, and in some parts steep, slope of rock and ice had to be climbed before the watershed was gained on the eastern ridge of La Tour Ronde, the top of which was bagged by a further ascent of 200 ft.

From its position this peak commands a view of Mont Blanc, Mont Peteret, and the Brenva, which can scarcely be surpassed for grandeur in the Alps.

Descending the ridge to a point somewhat lower than that at which they had struck it, the party worked down a rock-chimney, and soon got on easy crags, by which the névé of the Glacier du Géant was reached in one hour from the peak. They then crossed to the hut near the Aiguille du Midi (2 hrs. 40 min.), which was found full of snow. There they spent an excessively cold night to no purpose, as weather obliged them to go down next morning to the Montanvert (3 hrs. 45 min.). Fifteen hours' actual walking will probably suffice future travellers by this pass from Courmayeur to Chamouni—nine hours up, six hours down.

GRANDES JORASSES.—*September 9.*—Messrs. George and Mortimer, with Christian Almer and his son, made the second ascent of this mountain, intending to reach the eastern peak, which is slightly higher than that climbed by Mr. Whymper in 1865 with Almer. 'The days being short, we bivouacked on the mountain side, about 9,000 ft. up, and followed Mr. Whymper's route, though encountering far greater difficulties, until some way up the final steep rocky ridge leading up to his peak. Thence we tried to strike across the extremely steep snow-curtain between it and the other peak, but we were in thick mist, kept too much up, and eventually struck the ridge joining the two summits to the left of the only deep gap in it. As it was then 2 p.m., it was hopeless to persevere in our original purpose, so we followed the ridge

to Mr. Whymper's flagstaff, and descended thence. If there be no other way to the highest summit, it will not be easily climbed, for the upper curtain could not safely be traversed unless the snow were in perfect order; but Mr. Whymper's peak can be reached at any time by a competent guide.'

COL DE CHARDONNET.—*September 13.*—The same party took rather a new route, which renders this always grand pass one of the most interesting walks in the Alps. 'Having descended on the head of the Salena Glacier, we struck up sharply to the left, passed through a very narrow gap (the real *Fenêtre de Salena*) on to the head of the Tour Glacier, skirted it to the Col du Tour, and thence descended by the familiar route of the Trient and Orny névé to Orsières. Mr. Reilly's original route led straight to the Trient snowfield, after descending the Salena Glacier some way, passing E. of the point where the ridge dividing the Tour and Trient snowfields articulates into the boundary ridge of the Salena Glacier. Our route therefore showed us, in addition to the other scenery of the pass, the basin of the Tour, and the startling view of the Oberland, &c., obtained on reaching the Col du Tour; and it is not a bit longer, on the testimony of Almer, who had been the other way with Mr. Moore.'

The same pass was taken a few days earlier (Sept. 2), reversely, by Messrs. F. and W. Pollock. They started from the Col de Balme, ascended the glacier up to the Col du Tour, and then turning south reached the Salena, apparently by the same gap, returning to Chamonix by the Col du Chardonnet. Time, exclusive of halts, 10½ hours. Guide, Francois Couette (Baguette).

NOTES AND QUERIES.

Le Club Alpin Suisse a publié en langue allemande, depuis 1864, trois volumes de son annuaire intitulé 'Jahrbuch des schweizerischen Alpenclubs' (chez Georg, libraire, Bâle et Genève).

Malheureusement, le nombre de ceux de nos amis sachant l'Allemand est restreint, et cette excellente publication est restée lettre close, soit pour eux, soit pour les amateurs des Alpes en France et en Italie. Ils apprendront donc avec plaisir, que les sections romandes du Club Suisse viennent d'entreprendre la traduction française du prochain Jahrbuch pour 1868 (le quatrième en Allemand).

Ce volume formera ainsi la première année de l'édition française, et il renfermera les mêmes cartes et les mêmes illustrations que l'édition allemande; c'est aussi M. Georg qui le publiera. Nous espérons que le public voudra bien lui faire un accueil aussi favorable qu'à ses aînés, dont le premier volume est devenu fort rare, et dont deux éditions du second se sont rapidement écoulées.

Voici un court résumé de son contenu, tel qu'il nous est communiqué par le comité de traduction genevois.

<i>Auteurs.</i>	<i>Titres.</i>
MM. Weilenmann . . .	Courses dans le Valais
„ Hoffmann et Merian . .	Pointe de la Salle
„ Hoffmann et Burkhardt	Mont Fort, Mont Pleureur, Mont Gelé et Serpentine

<i>Auteurs.</i>	<i>Titres.</i>
MCM. Beck	Extrait d'un travail sur la photographie alpestre
„ Studer, professeur	Le Ritzlihorn
„ Hauser	Le Pinzerhorn
„ Thioly	Le Dom des Mischabel
„ Zähringer, professeur	Le Canton de Lucerne pendant l'époque glaciaire
„ Lisenlohr	{ Lettre au professeur Delor sur la Théorie de S. de Walthershäusern
„ Landolt	Culture des Alpes et des forêts
„ Théobald	Les glaciers et la végétation
„ Pfeffer	Les cryptogames alpines
„ Szadrowsky	La musique populaire dans les Alpes
„ Gatscher	Étymologie de noms alpins
„ Heim	Les orages dans les Alpes

The 'Bulletino Trimestrale' (Nos. 10 and 11) of the Italian Alpine Club records the death of the curé of Alagna, Giovanni Gnifetti, one of the early explorers of Monte Rosa, and the first person who reached the summit of the Signal Kuppe. His tall figure, and kind and courteous demeanour, will be familiar to, and be regretted by, many visitors of the beautiful valley in which his whole life was spent. For he was born there in April 1801, was appointed curate in 1823, and parish priest in 1834; and it is stated that he never travelled farther than Milan or Novara until the month of his death, which was marked by singular and touching circumstances. It was well known to those of his parishioners who returned home from time to time from the outer world, that Gnifetti's desire to visit foreign cities was only restrained by the narrowness of his means; and in the autumn of 1867 a number of them residing in and about Lyons raised a subscription to enable him to visit the Paris Exhibition. He left his home in his usual good health on the 7th October, and spent the 10th at Lyons among his friends. On the following morning he was taken ill, and died in a few days, in his sixty-seventh year, within sight of the Alps, even to the last.

The same number of the same work relates an Alpine misadventure so extraordinary as to deserve notice, and so incredible as hardly to seem worthy of it. But it is equally out of the question to suppose that the organ of the Italian Alpine Club is itself guilty of a hoax, or that it could be hoaxed in a matter verified by the signature of three Italian gentlemen of station, by a public subscription, and by an official document. This premised, we give the following narrative, greatly condensed from the Italian.

A party of young men, who had been employed on the Fell Railway over Mont Cenis, took their way home, about the middle of October 1866, over the Col du Collarin to the Piedmontese valley of Ala. Near the top, still on the Savoy side, one of them, named Angelo Castagneri, slipped, apparently on the edge of the bergschrund, and disappeared. His companions, instead of returning for help to the village of Averolles, little more than an hour distant, seem to have been possessed with the notion that a man down in a glacier was past help; and crossed the col to Balme, the first village, where Castagneri's parents lived. They took it coolly, for it was a week before anybody went to look for him; and then the father, descending by help of a ladder, found him lying on the wet earth beside a clot of blood, which had flowed from a wound in

his head, and still alive. It took 9 or 10 hours to get him home, using the ladder as a litter; and many days elapsed before he was seen by a medical man, who judged that it was neither possible to transport him down the valley, nor proper to amputate his frozen feet on the spot. So the lower portions of his legs mortified, dropped off, and are buried in the churchyard of Balme.

It was not until July 1867, nine months after the accident, that he was visited by two well-known persons, Count St. Robert, and Professor Gastaldi, of Turin, both of them geologists and Alpine explorers. His limbs were still in the same horrible condition. He was at last conveyed to Turin, and in the hospital there the stumps were healed, apparently without amputation. It is not stated that his hands were frozen, or in any way affected.

Castagneri says that he had no recollection of anything from the time of his fall until he was roused by his father's voice and touch. In that case he lay senseless between eight and nine days, and probably owed his life to his insensibility.

A subscription was made, and the produce deposited in the Cassa del Risparmio of Turin. The official document relating to the investment is given at length, and is signed by

V. Bersesio, Deputy
B. Gastaldi, Professor
G. Valerio, Physician.

The last detail is that some benevolent person had ordered a pair of india-rubber legs for him from New York; and we hope they may be found servicable when they arrive.

RECENT ALPINE PUBLICATIONS.—We have received the following from Mr. TUCKETT:—

German Books.

Durchforschung der Trafoier Alpen, von Lieut. J. Payer. 'Petermann's Mittheilungen.' X. 1866. Gotha: Perthes.

Die Ortler Alpen (Sulden-Gebiet und Monte Cevedale), von Lieut. J. Payer. 'Petermann's Mittheilungen.' Ergänzungsheft. No. 18. 1867. Gotha: Perthes.

Der neuerliche Ausbruch des Suldner Gletschers in Tirol, von K. v. Sonklar, K. K. Major. Wien: Gerold's Sohn. 1857.

Die Tauern, von Dr. A. Prinzinger. Vortrag in den Sitzungen der Gesellschaft für Salzburger Landeskunde vom März und April 1866. Sonder-Abdruck.

Ansicht des Hochjoch-Ferners (Oetz-Thal, Tirol), von J. Engelhardt gezeichnet. Herausgegeben, Eigenthum und Verlag von Franz Senn, Curat in Vent, Oetzthal. Chromolith. 38 x 6 inches.

Ansicht der obern Oetzthaler Gelärge vom Ramolkogel (Anichspitze), von J. Engelhardt gezeichnet. Verlag von F. Senn, Vent, Oetzthal. Chromolith. 38 x 6 inches. (The profit from the sale will be devoted to the improvement of the local roads and paths; and the panoramas (price 5s. each) may be obtained of Messrs. F. E. Blackstone and F. F. Tuckett. Copies may be seen at the Club Rooms.)

Die Höhen-Namen in der Umgegend von Salzburg und Reichenhall. Ein Beitrag zur Orts-, Sprach- und Volkskunde. Vortrag. 8vo. 24 pp. Salzburg: Taube. 1867.

Physiographische Skizzen aus den Pyrenäen (eine orographische Uebersicht des Gebirges). 'Das Ausland.' 1867. Nos. 12, 13, 14.

Wanderstudien aus der Schweiz. Osenbrüggen. Vol. i. 8vo. 1867.

Geologische Aufnahme der Schweiz (Geological Survey of Switzerland). 3. Lieferung: 'Geologische Beschreibung der südöstlichen Gebirge von Graubünden,' von Prof. Theobald; mit 1 Karte und 8 Profil-Tafeln. 1867. (30 frs.) 4. Lieferung:

'Geologische Beschreibung des Aargauer Juras,' von Casimir Moesch; mit 2 Karten und 13 Tafeln, &c. 1867. (35 frs.) 5. Lie'ering: 'Geologische Beschreibung des Pilatus,' von Prof. F. J. Kaufmann; mit 1 Karte und 10 Tafeln. 1867. (20 frs.)

Geologische Uebersichtskarte der Oesterreichischen Monarchie, nach den Aufnahmen der K. K. Geologischen Reichs-Anstalt bearbeitet von Franz Ritter von Hauer. 12 Blätter. 178000. (40 florins.) (The first part (Blatt v.) is already published (1867), and comprises the Austrian Alps W. of the Gross-Glockner.) Wien: Beck.

Canton-Karte von Luzern, 1/25000. Blätter iv. and ix. (i. and x. will complete the work.)

Karte vom Canton Uri, 1/10000. Müllhaupt, Bern.

Modèles de Topographie. 1. 'Éléments de Topographie.' 2. 'Topographische Karte von Thun mit Umgebungen,' 1/25000. Müllhaupt, Bern.

Offizielle General-Karte der Schweiz. 4 Blätter, 1/25000. (NE. sheet ready.)

Die Schweiz, 1/25000. C. Vogel. (Steiler's Hand-Atlas.) Jubelausgabe. Lieferung 2. Perthes, Gotha.

Schaubach: *Die Deutschen Alpen*. Band v. Das südöstliche Tirol und Steiermark, Lungau, Kärnten, Krain, Görz und das Küstenland. Zweite Auflage. Jena: Frommann. 1867. (Vols. ii. iii. and iv. are already published, and vol. i. (introductory), completing the work, is announced for this year.)

Jahrbuch des Oesterreichischen Alpen-Vereines. 3. Band. Mit 11 Beilagen. Vienna, 1867. Carl Gerold's Sohn.

Eine Zimmerreise, von J. N. 'Wanderer,' 7. März 1867. No. 65. Morgenbl. (Describes Lieut. Payer's most recent expeditions.)

Coaz: *Eine Erstigung der Piz Stüs (Stäzzerhorn)*. Chur, 1865.

Deschmann, C.: *Zusammenstellung der bisher gemachten Höhenmessungen in Krain*. Laibach, 1866.

Egli, J. J.: *Die Höhlen des Ebnalpstocks im Canton Appenzell*. Inner-Rhoden, St. Gallen. 1865.

Keil, Fr.: *Topographische Reise- und Gebirgskarte der Umgehung von Salzburg*, 1/25000. Chromolith. Salzburg: Glonner. 1867.

Italian Books.

Bullettino trimestrale del Club Alpino di Torino. Nos. 6, 7, 8, 9. Torino: Cassone & Co. 1866-7.

Sulla Riscavazione dei Bacini Lacustri per opera degli antichi Ghiacciai. Lettera di B. Gastaldi al Presidente della Società Italiana di Scienze Naturali in Milano; con 2 tavole. Milano: Bernardoni. 1865.

I Ghiacciai antichi e moderni. Dissertazione per esame di laurea in Scienze Naturali, presentata e letta all' Università di Bologna da Bar.tti Martino. Torino, 1866.

Carte de l'État-major piémontais, 1/50000. Turin. Sheets 22, Valpellina; 29, La Thuille; and 71, Vinadio. Turin, 1866.

French Books.

Les Alpes suisses, par Eugène Rambert. Deuxième série. Lausanne and Paris, 1866.

Glaciers actuels et Période glaciaire, par M. le Prof. Ch. Martins. 'Revue des deux Mondes,' January 15, February 1, and March 1, 1867.

Courses alpêtres en Suisse et en Savoie, par J. Jullien and L. Gentin. Jullien Frères, Genève.

Le Massif du Mont Blanc. Extrait des Minutes de la Carte de France, par Major W. Hüber. (Bulletin de la Société de Géographie de Paris. October, 1866, pp. 308-331.)

Carte géologique de la Suisse de MM. B. Studer et A. Escher von der Linth. 2^e édition, revue et corrigée d'après les publications récentes et les communications des auteurs et de MM. Gilleron, Jaccard, Kaufmann, Musch, Stoppani, Theobald, par Isidor Bachmann. 4 feuilles, avec registre. 1/25000. Wurster et C^{ie}, Winterthur.

Berthoud, E.: *Sur la Montagne*. Neuchâtel: Delachaud. 1866. 2 vols.

Favre, A.: *Recherches géologiques dans les parties de la Savoie, du Piémont et de la Suisse, etc.* Paris, 1867. 3 vols. 8vo. (with Atlas).

Dollfuss-Ausset: *Matériaux pour l'étude des Glaciers.* Vols. vi.-viii. Paris, 1866-8.

Les Glaciers, par W. Hüber, Major du Génie de la Confédération Suisse. Paris: Challamel Aîné. 1867. (An excellent little book.)

Les grandes Ascensions des Pyrénées d'une mer à l'autre, par le Comte Henri Russell-Killough. Hachette, Paris. Privat, Toulouse. 8vo. (The Count Russell-Killough, the author of this spirited little work, is evidently a good walker, and is known to have travelled very extensively. He appears thoroughly to have explored the Pyrenees, from east to west, or, as he says in his title-page, from one sea to the other; and, frequently, without a guide. His routes are given in a concise and pithy style, and, so far as we have been able to test them, with accuracy. He does not dwell much on scenery, or indulge in descriptive painting, preferring, as he tells us in his preface, less to describe localities than the paths which lead to them. His distances are generally indicated by hours; and, in an expedition, he does not include halts, leaving repose, or meditation, to the powers, or inclination, of the traveller. The sketch maps, twelve in number, must only be relied on as giving a general idea of the line of country; but, with the aid of a compass and a good telescope, a pedestrian might often, we think, find his way, without a guide, from the descriptions in the letter-press. Our author, without professing to be a great geologist, is not unconscious of 'erratic blocks,' and *roches striées*; neither does he entirely disregard the provender or the *coucher*. At Arreau, he recommends THE HÔTEL D'ANGLETERRE, and adds, 'Bien souvent, après une très-forte journée de marche, j'ai fait sans peine plusieurs lieux pour avoir le plaisir d'y dîner et d'y coucher;' and he strongly advises the wayfarer going into Spain to fill his wallet with good things before leaving 'la belle France.' In this recommendation we entirely concur, and our own experience is that, on the south side of the Pyrenees, it is always desirable to carry a knife and fork, and to wash one's plate oneself before eating off it. Although 'Les grandes Ascensions' may not be free from faults, we congratulate the Count, whom we are happy to number amongst the members of the Alpine Club, on having produced a useful and practical book, one which few of our wanderers (in the Pyrenees) will fail to carry in their knapsack.)

English Books.

The Alpine Journal, edited by H. B. George, M.A. Vol. iii. Longmans & Co. 1867.

Guide to the Pyrenees, by C. Packe. New edition, enlarged. Longmans & Co. 1867.

The Alps in 1864. A private Journal by A. W. Moore. Privately printed. 1867.
An Enquiry into the Ancient Routes between Italy and Gaul; with an Examination of the Theory of Hannibal's Passage of the Alps by the Little St. Bernard. 8vo. Map. London: Bell & Daldy. 1867.

The Peaks and Valleys of the Alps, by Elijah Walton; with descriptive text by the Rev. T. G. Bonney. London: Day & Son. 1867.

The Alps of Hannibal, by W. J. Law, M.A., formerly Student of Christ Church, Oxford. London: Macmillan & Co. 1866.

The North-West Peninsula of Iceland: being the Journal of a Tour in Iceland in the Spring and Summer of 1862. By C. W. Shepherd, M.A., F.Z.S. London: Longmans & Co. 1867.

The Knapsack Guide for Travellers in Switzerland. New edition, revised. Murray. 1867.

The Knapsack Guide for Travellers in Tyrol and the Eastern Alps, by Messrs. Gilbert and Churchill. J. Murray. 1867.

Ascent of Mount Hood, Oregon (17,640 ft.?), by the Rev. H. K. Hines. 'Proceedings of the Royal Geographical Society,' vol. xi. No. 2, 1867.

Scientific Guide to Switzerland, by J. R. Morell; with Illustrations. Smith, Elder, & Co. 1867.

Pictures in Tyrol and elsewhere, from a Family Sketch-Book, by the Author of a 'Voyage in Zigzag,' &c. With numerous Illustrations.

THE
ALPINE JOURNAL.

AUGUST 1868.

THE JÄGERHORN AND THE LYSKAMM FROM GRESSONAY.
By C. E. MATHEWS. Read before the Alpine Club,
March 31, 1868.

IN the 'Cornhill Magazine' for the month of November, 1867, there is a paper of very considerable interest and merit, called 'The Regrets of a Mountaineer.'

It is evidently written by a melancholy mountaineering Jaques—by a man who, in the prime of life and with physical powers as yet untouched by time, is debarred by some great cause from following his favourite pursuit. He gazes up longingly at the great summits, but they are divided from him by an impassable gulf; and he draws a pathetic moral from the Paradise of the South Sea Islanders, where, he tells us, the good are for ever sitting at banquet with insatiable appetites in a house with open wickerwork sides, whilst the damned are doomed to look in at the chinks, crawling round the outside, suffering under pangs of hunger equally insatiable. The excited reader devours the pages of the story, anxious to discover what crime the miserable man has committed, what unhappy fate has interposed to cut him off from the sports and pleasures of his youth.

He has, however, committed no crime which demands expiation, has perpetrated no enormity to avenge which a just Nemesis has overtaken him. He has, by an act of voluntary martyrdom, and for reasons which, 'even in his wildest moods, he admits to be more than amply sufficient,' cut himself off from his favourite pastime. *He has been married!*

The writer's views may be sound. Should it be so, my
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protest against them will be of little avail. But I cannot but hope that the time will come when the writer in the 'Cornhill Magazine' will admit that he has misconceived the necessities of matrimony, and will rejoin that band of active mountaineers, whose companionship he still seems to desire so earnestly, and from whom ranks he has given so insufficient a reason for seceding.

Are all the other great sports in which Englishmen indulge to be continued even to a green old age, whilst the noblest of them all—noblest because combining the excitement and spirit of the chase with pleasures purely of an intellectual kind—is to be given up because a man has entered into the holy estate of matrimony?

I protest against this preposterous assumption, and trust that no member of the Club will be led away by the sophistries of the writer in the 'Cornhill Magazine.' The true mountaineer will realise a still greater pleasure in the Alps, when some of their minor glories can be shared by those who have the greatest interest in his welfare. The mountain spirit knows nothing of celibacy. He reveals himself to his true worshippers, regardless of condition, sex, or age. That the inevitable struggle for existence, or the increasing cares and anxieties of life, or the passionate haste for money-getting—that such causes as these should prevent a man, married or unmarried, from continuing the pursuit which I have called the noblest, and which certainly is the least dangerous of English sports—these are the reflections which ought to put the modern Jaques into a melancholy vein, and should form the only true basis for the regrets of a mountaineer.

On Sunday, the 13th of July, 1867, my friend, Mr. F. Morshead, and myself—both of us long debarred from mountaineering, if the views of the writer in the 'Cornhill Magazine' are sound—found ourselves at Zermatt. We had been spending some days in the lovely, but somewhat inhospitable district of the Graian Alps, with an inefficient guide, named Alexander Maurer, and had arrived in the valley of St. Nicholas by the Matterjoch, in the hope of replacing Maurer by a more able guide. We had been disappointed in obtaining the services of Jakob Anderegg, who appeared to have laboured under the impression that the names Moore and Morshead were identical, and had consequently bound himself by a series of promises which he was utterly unable to perform.

We were fortunate in meeting with Messrs. Thursfield, Esson, and Sidgwick, attended by Christian Almer and Melchior Anderegg. Our friends did not meditate very serious exer-

tion, and we suggested to them that it was highly unnecessary for them to retain the services of two such leaders as Christian and Melchior. They were good enough to fall in with our views, and placed Almer at our disposal.

As our friends were going up Monte Rosa the following day, we all left for the Riffel together, and at 2.25 on the morning of the 15th, we left the inn with Almer and Maurer, under a splendid starlight sky, and in less than four hours we were on the top of the Cima de Jazzi.

As we were plodding towards the summit, I noticed a high conical rock jutting out of the ridge between the Cima and the Nord-end, which I had never noticed before, and which Almer told me was the Jägerhorn. It was a very interesting summit, lying considerably to the right of the old Weissthor; in fact, seeming almost to form part of the Nord-end of Monte Rosa.

We thought no more about it, and descending from the Cima to the Weissthor, we arrived at Macugnaga to breakfast, after a delightful excursion of only 8½ hours. The object we had in view was the examination of the eastern face of Monte Rosa, and we desired, if possible, to accomplish the most charming novelty yet left in the Alps, by making a pass from Macugnaga to the Riffel over the summit of the Hochste-spitze of Monte Rosa. Lochmatter (the landlord of the inn) had expressed an opinion that the excursion was practicable, and that the only danger was from avalanches.

We hoped to have made a careful inspection as we crossed the Weissthor, but the basin of the Macugnaga Glacier was so full of clouds that we were disappointed; and so on the morning of the 16th we went up the Pizzo Bianco with our guides, Lochmatter, and a good telescope, and the weather being very fine, we carefully examined the face of the mountain from the Belvidere to the Hochste-spitze. We examined it for upwards of two hours. It was choked up with seracs, and there was an immense cornice adjoining the summit and hanging over the Italian side. Lochmatter's fears were well founded, for during the two hours we were on the Pizzo Bianco six or seven great avalanches fell from the cornice, and raked the only route by which, as far as we could see, the summit could be attained. The wonderful slopes of ice and rock on this side of Monte Rosa, unequalled, as far as I know, for majestic beauty in any part of the Alps, are certainly not inclined at so steep an angle as they appear to be, and I have great hopes that the ascent will yet be made from Macugnaga. But it must, I think, be as late in the year as the end of August or the beginning of September. It was with somewhat heavy hearts that Morshead and myself agreed

that there was no chance for us, and while, like Dean Close's Bible and Prayer Book, we were mutually counteracting and sustaining one another, Lochmatter pointed out to us a rocky pinnacle north of the Nord-end, to which he begged our particular attention. It was the Jägerhorn. From this side the Jägerhorn bears the same relationship to the Nord-end as the Silberhorn to the Jungfrau, except that it appears still more than the Silberhorn does to form part of the main range.

Lochmatter told us that he thought a pass could be made between the Jägerhorn and the Nord-end; that he had climbed nearly to the summit of the former peak in search of chamois; and that if the actual col could be reached from the Italian side, the route to the Riffel would be found perfectly easy, for a little arm of the Gorner Glacier stretched direct to the summit of the col on the western or Swiss side. We instantly determined to try the passage the next day, and Almer made careful notes of the probable route, about which he seemed quite as sanguine as Lochmatter.

A little before 2 on the morning of the 17th, the weather being everything that could be desired, we walked through the fields from Macugnaga up to the top of the Belvidere, and reached some stone chalets by the waterfall at the foot of the old Weissthor, in $2\frac{1}{2}$ hours. Our route then lay over some troublesome débris on the right of the Fillar Glacier, till we came to a small rocky col overlooking it, and here we made a short halt at 5.20. On the left of the Fillar Glacier is a long and steep ridge of rocks which culminates in the Jägerhorn; so we crossed the glacier in an oblique direction, and gained this rocky ridge, by which the shortest way to the summit appeared to lie. Still keeping to the rocks, and rapidly mounting, we reached the seracs at the head of the Fillar Glacier at 7.20; and after some really difficult rock-work halted for a second breakfast at 9.35. We left again at 10, and climbed steadily, always on the ridge, the work being in some places quite severe enough to engross all our care and attention. At half-past 12 Almer, who had led us with his well-known sagacity, landed us safely upon the summit of the Jägerhorn. The ascent took nearly 11 hours, including 1 hour and 10 minutes of halts. There were too many clouds about the higher summits to enable us to get as accurate an idea of height as we desired, but the top of the Jägerhorn appeared to me to be almost the same height as the Alphubel, or 13,800 ft. The Cima de Jazzi was far below us. There is a col about 150 ft. below the horn, and readily accessible from it; to this we descended, and, walking easily, reached the Riffel at half-past 4.

This expedition would be found difficult if made from the Swiss side. The descent of the rocks would be very troublesome, and in some places even dangerous; but if taken from Macugnaga on a fine day, the expedition presents no special features of difficulty, and is one of unusual interest and variety. The ascent from Macugnaga to the summit of the col would take from 10 to 11 hours, under favourable circumstances; and those who may desire to shorten the excursion may do so by sleeping at the châteaux at the foot of the Fillar Glacier.

The next day, leaving the Riffel at 4, we crossed the Schwartz Thor easily to St. Giacomo D'Ayas in 8 hours; and the same evening we took coverlets and other luxuries, and crossed the Betta Furka, intending to sleep somewhere on the rocks at the foot of the Lys Glacier, preparatory to trying an ascent on which we had set our hearts, the Lyskamm, from the side of Gressonay. It is a somewhat melancholy fact that the last and greatest of Alpine peaks has at last been brought into subjection. The exertions of the Alpine Club in Switzerland during the last few years have proved too much for the genius loci. The charm of absolute novelty is gone. Shall we disband our little army of climbers in the absence of other peaks to conquer? Has the time yet arrived for us to kindle again the old enthusiasm upon new altars? Surely those of us who, like the men of Athens, are always in search of some new thing, may yet console ourselves with the reflection that there is one phase of novelty which will find occupation for us for many a year to come—I mean the siege of old mountains from new sides.

Just as we reached the ridge of the Betta Furka, the glorious appearance of the head of the Val de Lys, with the shining walls of the Lyskamm and Monte Rosa towering up into the sky and clothed with the glow of sunset, raised our spirits to the highest pitch, and we felt almost certain of the success of our expedition. We were looking about for a convenient gîte, when Almer thought that by descending a little towards the glacier we might find a châteaux, and consequently more comfortable quarters for the night. He was not disappointed: about 15 minutes below the Betta Furka, descending a gorge to the left, we found a first-rate châteaux, where we were soon holding high festival.

We had brought a porter with us from St. Giacomo d'Ayas, so that our party consisted of five persons. At the châteaux were one berger, and his son and daughter. Our hosts could speak no language but a most remarkable patois, which none of us could understand. Even Maurer, whose only qualification as

a guide consists in his being able to speak very badly most European languages, could make nothing of them; Almer could talk nothing but German; and the porter was deaf and dumb. Notwithstanding these minor difficulties, we agreed upon the necessity of starting very early in the morning, and so, on the promise that we should be roused at 1 A.M., we went to our excellent hay-bed, and notwithstanding the whistling of a marmot, which appeared to live somewhere inside the châlet, we were soon fast asleep. We were roused at half-past 2, an hour and a half later than we had intended, and hurriedly breakfasting, stepped out of the châlet at a quarter before 3, two hours later than we ought to have started. I suppose it is an obvious truism, but I insist upon it here, because it is so often disregarded—that there is nothing, after a good guide, which tends so much to ensure a successful expedition as an early start. How many instances are there in the recollection of all of us, where expeditions have failed to be marked with a white stone, because this one of the first necessities of mountaineering has not been complied with! What cloudy views instead of clear skies; what involuntary bivouacs supperless under the stars; what needless discomfitures; what avoidable misfortunes! Rely upon it, that every half hour's delay after 1 o'clock A.M. adds another and an important possibility to the chances of the failure of any Alpine expedition.

We were in good training, and tried to make up for lost time. We mounted the rocky ridge not far from the Betta Furka, and at first keeping to the left we then turned a little to the right, and after two hours of very easy rock-climbing, we found ourselves on a ridge of rock overlooking the glacier of Felik.

It will be seen on reference to Mr. Reilly's map, that the Felik Glacier is to a great extent parallel with the Lys Glacier; we had not as yet touched the latter, but had climbed by the ridge of rocks which forms the southern boundary of the Felik Glacier, and part of the western boundary of that of the Lys. Here we descended a good many feet and crossed the basin of the Felik Glacier, and gaining the rocks on its eastern side, we halted to breakfast at 5.45, left at 6.10, and soon reached the open basin at the head of the glacier of the Lys. Rapidly crossing the basin and keeping to the right, we halted again at half-past 8, close to the seracs at the foot of the peak of the Lyskamm. Here we met with a serious disappointment. The morning had been magnificent, but very cold; on reaching the head of the glacier we found clouds drifting along the range between the Felik-joch and the Lyskamm, and just as

we halted, a heavy mantle was thrown over the peak itself, on which we had been so long gazing. We waited nearly half an hour, but the weather became worse, and Almer said that any attempt to reach the summit that day would be out of the question. What was to be done? We determined to climb up on to the well-known western arête, and then descend to Zermatt by the Felik-joch. We reached this arête, with a good deal of difficulty, were convinced by the fierce wind that was blowing on the ridge that the ascent was out of the question, and descending to the col, threaded our way through the seracs till we reached the Gorner Glacier, and arrived at Zermatt at half-past 4.

Here we met with our old friends Mr. Stephen and Mr. Hinchliff, giants of former days, whose armour has been laid aside, and who, in the luxurious capital of the Pennine Alps, and in the midst of a charming society, were vainly indulging in 'the regrets of a mountaineer.'

We were a little tired with our five days' excursion, and spent Saturday and Sunday in idleness at Zermatt. Our friends endeavoured to comfort us concerning our failure,

'Looking ancient kindness on our pain.'

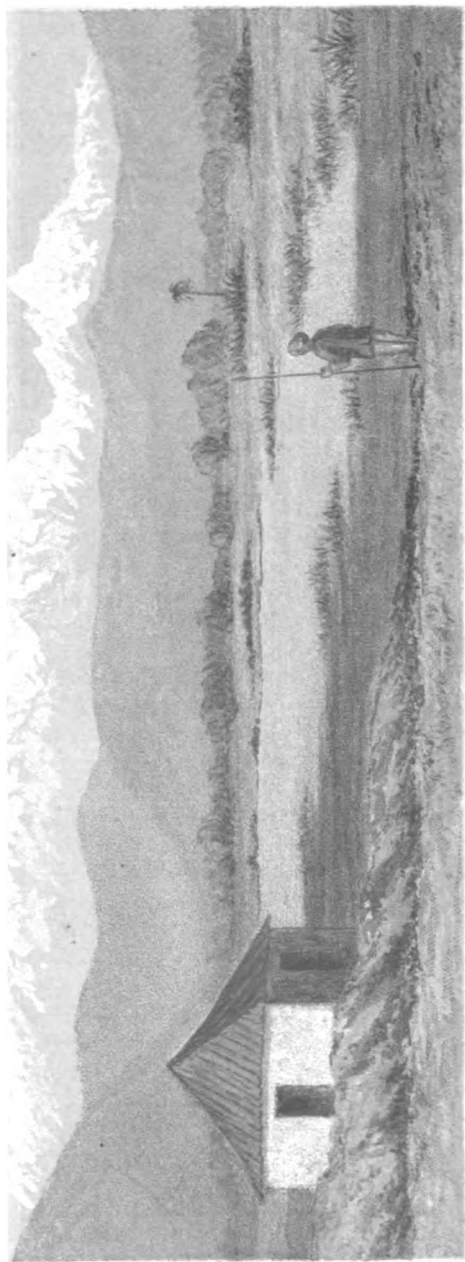
But we had no intention of giving up the Lyskamm without another struggle, and on Sunday evening, the 21st of July, we walked quietly up to the Riffel again, having determined upon another plan of attack. It had seemed to us that by leaving the Riffel very early in the morning we could cross the chain on to the Lys Glacier, ascend the mountain from the south side, descend to the Lys-joch, and get back to Zermatt in a single day.

At a few minutes after midnight on the morning of the 22nd of July we left the Riffel Inn, the sky utterly cloudless, and the moon nearly full. We were determined that in this excursion, at any rate, we would run no risk of failure from want of an early start. We stayed a minute or two on the ridge overlooking the glacier before descending, to admire a scene which beggars all description. There seemed not a particle of vapour in the atmosphere; the ground was white and hard with frost; the majestic glacier rolled solemnly below us, and the stupendous mountain summits from Monte Rosa to the Matterhorn lay like sleeping giants wrapped in glistening folds. We had a long day before us; not knowing how much we had to do, and fearful of losing time, we almost ran across the glacier to the base of the Felik-joch, where we arrived at 2.45. At 5.10, after a magnificent walk through the seracs, we gained the

summit of the col, and looked down on to the Lys Glacier. Our object was to gain in the shortest possible time the spot where we were discomfited on the former expedition. A steep snow wall was between us and the basin of the Lys Glacier. Down this wall Christian Almer cut 307 steps, by which we descended carefully on to the open snow-fields below us. At half-past 7 we halted on our foot-tracks of the previous Friday. A few rather difficult seracs had to be crossed, and then we ascended for an hour or more up a steep snow-slope that seemed to lead to the real summit of the mountain; we then went to the right, and took to the rocks which form part of the southern or Gressonay arête of the Lyskamm. At no part of the ascent had we any real difficulty; the rocks were rather dangerous from being ice-coated, but otherwise were perfectly easy, and at 10.5 we reaped the natural and just reward of our labours. The weather was superb, and the sight of the vast and partially cloud-covered plain of Italy, out of which at an enormous distance the beautiful cone of the Viso towered up in the sunlight, will not be easily effaced from our memory. There was not a breath of air stirring. A friend of ours had intended to ascend Monte Rosa that morning with Peter Perren. We looked across to see if they could be seen, and soon found them toiling up the last snow-slope, where they were soon lost to view amongst the rocks. We stood upright on the summit and shouted wildly to our compatriots on the Hochste-spitze. The distance, as the crow flies, from summit to summit is about two miles. They heard us distinctly, and shouted in return, and we could distinctly recognise Peter Perren's shrill cry, which came faintly borne over the great gulf that separated us from them. We remained on the summit for one hour in a state of absolute enjoyment, and then set out for the Lys-joch. The arête on this side was not in good order, and Maurer, who was sent to the front, was a miserable step-cutter; so it was 2 o'clock before we got on to the upper ridge of the Gorner Glacier, between the Lyskamm and the Ludwigs-Hohe.

From that time (except in one little bit of glacier work, which gave Almer an opportunity of exhibiting to perfection his almost unrivalled powers,) it was all plain sailing. We reached the Riffel without the slightest fatigue soon after 6, and were at dinner at Zermatt between 7 and 8, after a superb excursion, of between 19 and 20 hours.

Now, of course, I cannot recommend climbers to make the ascent of the Lyskamm from the south side, starting from the Riffel. Melchior Anderegg, to whom I had suggested the ex-



THE KINCHINJINGA GROUP, SEEN FROM THE PLAINS.

FROM A SKETCH BY CAPT. F. H. COOPER.

cursion I have described, told me it was a *miserable dumm-heit*, and not to be thought of. Moreover, the many satisfactory circumstances under which our ascent was made would rarely be found in combination. But this is certain, the Lyskamm can be ascended from Gressonay, and Gressonay is the most natural and easy place from which the ascent can be made.

I feel certain that even a second-rate mountaineer, starting from the Cour de Lys, would reach the summit easily in 8 hours; and our party was unanimous in the opinion that the upper basin of the Lys Glacier can be most readily attained by its western lateral moraine.

The ascent from Gressonay combines all the elements of variety, interest, and natural beauty; and I cannot doubt that it will in future form the leading object of ambition to the many tourists who now visit one of the most picturesque and lovely of Italian valleys.

TRIPS IN THE HIMĀLAYAS. By J. R. OLIVER, Captain
Royal Artillery. (*With Plate.*)

ON reading the interesting papers of Messrs. Cheetham and Clement Smith which lately appeared in the *Alpine Journal*, it occurred to me to supplement them by some account of my own experiences in the Himālayas, dwelling more particularly on points regarding which little information has been hitherto afforded in these pages, such as the natural history and physical geography of the country. As it has fallen to my lot to walk, in all, at different times, more than a thousand miles through these mountains, I will commence by giving a sketch of my travels, proceeding more to details afterwards.

Ever since a certain morning in the Mutiny campaigns, when, after a weary night's march, the sunrise disclosed, for the first time, a long line of icy pinnacles, rising above the horizon of the dead-level plain of the north of India, I had felt an insatiable longing for a closer acquaintance with those mysterious-looking peaks. The opportunity came at last. Eighteen months of almost incessant marching and counter-marching, varied only by an occasional engagement, ended in sending me on sick leave to 'the Hills.' I had a tedious journey up country in the height of the hot weather, and a vexatious delay at Umbāla, owing to an informality in the way I had obtained leave. I succeeded, however, in getting

clear off at last, and left Umbāla one morning towards the end of May 1859, with a friend in a cavalry regiment, also on sick leave, who had arranged to join me in my wanderings. Our intention was to push on to the 'interior' as rapidly as possible; both for the sake of escaping the approaching rains which fall heaviest on the southern zone of the mountains, and of having as much time as possible available for exploring the grand scenery of the higher ranges. We meant at the same time to take as much shooting as we could obtain *en passant*, provided always it did not entail loss of time.

Merely halting two days at Simla, where we were generally regarded as little better than lunatics for preferring to spend a five months' leave in roughing it among the mountains to enjoying the delights of a hill station, we pushed on to Kotgurh in the Sutlej valley, some 50 miles from Simla. By this time we had begun to have serious doubts as to whether the money we had brought with us would be sufficient to carry us through, the expenses of porters, &c., proving heavier than we had anticipated; and it was arranged that I should return to Simla for a fresh supply of rupees while my chum J. remained in camp at Kotgurh. This trip entailed more delay than we had reckoned on, and I did not rejoin for a fortnight, during which time I fear J. spent a miserably monotonous life, all alone as he was, and with nothing to do. However, the fortnight came to an end at last, and having effected a junction at a certain prearranged spot in a pine forest above Kotgurh, we fairly started on our wanderings.

Our retinue consisted of a couple of servants from the plains, one of whom acted as cook and the other as head servant in general, a hillman, whose special duty was to look after our dogs and clean the guns, and some eighteen porters, who were usually hired for the day at the villages near which we happened to halt, and whose rate of wages varied from threepence to sixpence, according to the length of the day's march. We carried with us a tolerable-sized cottage tent, a couple of 'charpoys,' or native bedsteads, bedding, washing, and cooking apparatus, some books, and a supply of ammunition. We had also a small quantity of preserved provisions to fall back upon in case of need, a few medicines, and a 'kilta' of potatoes; the kilta being (by the way) exactly similar to the conical basket used in Switzerland.

We followed the well-known route of the new Hindustan and Thibet road as far as it went at that time. This road, for about a hundred miles from Simla, is carried near the summit of a ridge at no great distance from the left bank of the Sutlej.

It is in most parts nearly level, winding in and out round the different spurs and ravines in a most provoking manner. The following list of the heights above the sea of the first eight travellers' bungalows we come to after passing Simla, will show how carefully ascents and descents have been avoided in its construction, the bungalows being built at intervals of about 10 miles:—

Simla, 7,000; Mahāsoo, about 7,000; Theog, 7,192; Mattiāna, 7,700; Nār Kanda, 8,796, Bāghī, 8,591; Kundrāla, about 8,500; Soongri, 8,356; Bowli, 7,709. The road is very narrow and has no parapet. In many places it has been carried round the faces of precipices on wooden galleries; and several fatal accidents have occurred at different times, from horses shying and falling over the side with their riders, or from the galleries becoming rotten and giving way.

A few miles beyond the bungalow of Bowli, the road makes a sudden descent of more than 3,000 ft. to the bottom of a savage rocky gorge through which rushes the Nogri, a foaming torrent, and a tributary of the Sutlej. The rest-house is built by the side of the river, and the constant roar of the water, pent in as the gorge is by almost vertical walls of rock, made it a noisy sleeping place.

The next day's march took us by a series of zigzags up a long steep hill, where we found both the black partridge (*Francolinus Vulgaris*) and the 'chuckore' (*Caccabis Chuckore*) tolerably plentiful, and managed to bag several. We had generally contrived so far to pick up sufficient game on the march to furnish our dinner, but this was the first place at which we had any really fair shooting. At the top of the zigzags we got into thick clouds and drizzling rain, and I have a very indefinite idea of the topography of the rest of our day's march (except that it was uphill all the way), the mist preventing our seeing anything. We reached the rest-house (Dharnī, 9,275) after five hours' walking, tired, wet, and out of humour. It was well that we had bagged some game on the way, as it turned out that the only provisions to be had at the bungalow were honey and flour; and on looking into the travellers' book, I found the following lines had been written by some unfortunate in the volume of 'Remarks':—

'The senses feed upon the prospect fair,
The empty belly feeds on emptier air.'

The truth of the last line I could vouch for, but as for the 'prospect fair,' nothing was to be seen but thick fog and drizzling rain. However, towards evening it cleared up, when

it appeared that the bungalow was built on the summit of a pass, and overlooked a deep valley, with a fine range of snow peaks immediately opposite.

The following day a steep descent through forest brought us to the bottom of the valley, the road then followed its right bank at a considerable height down to the village of Surāhan, where it joins the valley of the Sutlej. At Surāhan was the last of the bungalows, and a few miles beyond it, the new road at that time came to an end. As the real hard work of our trip began at this point, I may as well, before proceeding with it, endeavour to give an idea of the topography of the Himālayas and the general character of their scenery.

These mountains form a belt of some 150 to 200 miles in width, separating the plain of Northern India from the elevated table land of Thibet. On the south side they rise very abruptly. The usual elevation of the first range is 6,000 to 8,000 ft. On ascending it, if the weather be clear, the traveller finds before him a vast sea of mountain ridges and deep gorges, bounded in the extreme distance by a long serrated line of snowy peaks. Under favourable circumstances this panorama is always very fine, but the eye seeks in vain for some level spot to rest on. The bottoms of the valleys are almost invariably out of sight. This is owing to the fact that the hillsides become steeper and steeper as they descend, and the bottoms of the gorges lie between almost vertical walls of rock. As an illustration of this, I may mention that we followed the valley of the Sutlej for more than 100 miles, and only caught sight of the river three or four times, and this was usually when we had to cross it. The summits of the ridges too are very sharp, and I have many a time been compelled to prolong my day's march several miles farther than I had intended for want of a spot of ground sufficiently level to pitch my tent on; and eventually, perhaps, had to halt on the narrow crest of a ridge, where the wind blew *up* into the tent on one side and *down* out of it on the other.

The traveller who expects to find in the Himālayas the beauties of the Alps on a larger scale will be disappointed. In the first place we rarely, if ever, meet with the charming combinations of glittering glacier, sombre pine-forest, and emerald meadow, so common in Switzerland; and lake scenery is almost unknown. Again, it generally happens that the scenery bears much the same character for several marches in succession. Thus we may be for days wending amongst the valleys of the lower ranges where villages abound, and where the hillsides are terraced and covered with cultivation from

base to summit. Or our march may lie for 50 miles at a time through gloomy pine-forests, dotting slopes whose angle of inclination is 45° . Or if we get among the higher ranges, we shall probably find ourselves in a region where nothing is seen for several days' march but rock, snow, and ice.

Another reason why the Himālayas impress us less in proportion to their size than the Alps is, that, in the case of the latter, we may place ourselves in the very heart of their fairest scenery within a few hours of leaving the level country; whereas, in the former, we have many a weary march to make through the lower ranges, the scenery all the while becoming gradually wilder and grander, before we are brought face to face with their full majesty. We thus become, as it were, accustomed to the feelings produced by wild mountain scenery, and it loses much of its proper effect on us. I remember well that on my first trip, parts that I had thought very fine when going seemed tame enough on returning.

To resume our journey. On July 4, we left Surāhan at 6 A.M., and commenced our march up the left bank of the valley of the Sutlej. This valley is a huge gorge, or, more properly speaking, chasm, which cuts right through the whole Himālayas chain, and whose sides rise to an elevation of from 10,000 to 22,000 ft. After two hours' walking we came to an end of the new road and soon felt the difference; the old track being in general nothing more than a sort of Titanic staircase, half natural, half artificial, carried across the different spurs formed by numerous lateral ravines that run down to the Sutlej. A day's march in this part of the country probably begins with a descent of some 2,000 or 3,000 ft. into one of these ravines. At the bottom the heat is sure to be stifling. Then comes a wearisome climb of about an equal height up the opposite side. A mile or two of comparatively level walking may possibly intervene before the next ravine is reached, when the same fatiguing process has to be repeated; and so on till the halting place is reached. On the present occasion we felt the unaccustomed fatigue of this sort of work so severely that we insisted on encamping four miles short of the village of Turanda, our proper halting place, much to the disgust of the porters, who did not at all relish sleeping out in the 'jungle.'

5th.—'Marched to Turanda—5 miles—road horrible—a mere succession of huge steps made of loose blocks of stone. Started at 5.15 and did not get in till 11.' (I have transcribed the above literally from my diary.) Turanda is a very pretty village on the crest of a spur, and we pitched our tent on a

little open glade by the side of an old temple, in a grove of magnificent deodāras. The view up the valley from this spot was very fine.

The following day we reached Nachār after a 6½ hours' march. The road for the first half of the way was a repetition of the day before, only worse if anything. In one place a steep rock had to be descended by a ladder consisting of a trunk of a pine-tree with notches cut in it. Just as we reached Nachār a thunderstorm with heavy rain came on, and continued for the rest of the day and all that night. Next morning the weather was no better, and we were compelled to halt. I don't know any circumstances in which time passes so slowly as in a wet day under canvas.

On the present occasion, however, the tent leaked so much as to give us a little occupation in dodging the dripping, and we had eventually to place our gun-cases under the beds, and lie on them with waterproof sheets over us. The thunderstorm continued till late in the afternoon. A heavy cloud seemed to have taken up its position right overhead, and there it remained, crashing away like the most furious cannonade, till it had quite spent itself in rain.

I may here mention that the mode of life which we found most convenient, and which we adhered to as far as possible, was to rise at daybreak, dress and drink a cup of tea while the tent was being struck, and then start off ahead of the porters. We generally contrived to pick up a few pheasants in the early morning, and after a few miles' walking used to look out for some shady spot near water to halt at for breakfast. A fire was then lighted, and on the arrival of the kiltas, breakfast cooked and eaten. The halt generally occupied about two hours, the porters meanwhile being sent on ahead. By this method we used generally to find our tent ready pitched by the time we arrived at the end of the day's march.

We occasionally availed ourselves of an invitation to sleep in the village temple; the Hillmen or Pahārries, as they are called, though normally Rājput Hindoos, being far less strict in their religion than their brethren of the plains. Their temples are built of wood and are very picturesque. If we happened to arrive late we generally made use of them, as by doing so we saved the delay of striking and packing the tent in the morning; and if one did not object to sleeping in the same room with a hideous grinning idol, they were not such bad quarters. But the dwelling houses we carefully avoided (after once trying them). The floors used to be literally black with fleas, to say nothing of other species of vermin. Nor is

this to be wondered at considering the filthy habits of the Pahāriēs, who *never* wash, or even take off their clothes, except when the rottenness induced by age compels them to get a new suit. In fact, if you ask one of them his age he will tell you, not the number of years he has lived, but the number of suits he has worn out.

The only provisions we were able to procure at the villages were milk, ghee, coarse flour, and occasionally a tough sheep or goat. We generally trusted to our guns for our dinners, and if game happened to be scarce there was always plenty of wild pigeons to fall back upon. We had with us a good supply of brandy and tea, and these we found a great help in washing down coarse food. Wild apricots were very abundant, and the villagers occasionally brought us walnuts and other fruit. The hillsides, when cultivated, are invariably laid out in terraces. The villages are often very picturesque, the houses much resembling Swiss chalets, only that they are more lofty, and are built of blocks of gneiss or mica schist, and roofed with slabs of the same material.

The morning after our wet day in camp the weather had cleared up, and we started at 9. A descent of some two miles brought us to the Sutlej, which had to be crossed by a 'julāh,' or rope bridge, the old wooden lever bridge having lately fallen to pieces. The river here is a very rapid torrent, rushing through a gorge between vertical walls of rock. The 'julāh' consisted of half a dozen ropes hanging in a curve between the two masonry piers of the wooden bridge. Along these ropes ran a cylinder of wood carrying a sort of rope cradle. The person to be passed over sits in the cradle, holding on by the wooden cylinder. On being let go, his own weight takes him to the lowest point of the catenary, from which he is hauled in by a guy rope. The contrivance did not look particularly safe, as everything depended on a very flimsy ring of wood.

On our arrival a number of goats were being passed over, and we had to wait some time for our turn. The heat was very great, so we sat down in the shade of the pier, and amused ourselves by watching the proceedings. Among other things we saw a drove of large Thibet dogs—animals something like English mastiffs—being slung across. The method adopted was to tie them together by the fore legs in bunches of three, and then send them over. The dogs seemed to be quite accustomed to the proceeding, and to take it as a matter of course. On my turn arriving, I found the sensation of being swung across rather pleasant than otherwise. A little beyond the bridge we crossed a ravine, and then ascended by

the usual rock staircase to the crest of a precipitous spur about 1,000 ft. above the river. The road then descended again nearly to its level, and lay close to it for some miles. The bottom of the valley was here a mere narrow gorge, the sides of which completely shut out all view of the snow ranges between which the Sutlej runs; but we had occasionally glimpses of fine snow peaks ahead. This was a very fatiguing day's march, both on account of the heat and of numerous collections of large boulders that we had to find our way over. Towards evening we arrived at the foot of a very long and precipitous ascent, which brought us by 6 o'clock to the village of Chirgāon, where we encamped close to a small waterfall.

Next morning a cooly from Simla overtook us with a bundle of letters and papers, so we made up our minds to take a half-holiday, and do a short march in the evening. Having written and despatched our letters and papers to Simla, we started again about 3. The road ascended for some distance along the side of a bare hill, then passed through a large oak wood, and finally crossed a very deep valley, high up the opposite side of which we took up our quarters for the night in a temple at the village of Meeroo.

Next morning (July 10th) we started after breakfast, and had a glorious day's march, to near the village of Rogi, the scenery every hour increasing in magnificence. Most of our road lay along green pastures with clumps of enormous deodāras, while at the other side of the Sutlej, the group of the Raldung peaks, 21,500 ft. high, formed a very fine background.

We passed to-day the entrance to the Buspa valley, a long straight gorge leading down to the left bank of the Sutlej, and celebrated for its burrel (wild sheep) shooting. We also met with a very acceptable novelty in the shape of a quantity of snow, evidently the remains of an avalanche, filling the bottom of a very hot gorge; we immediately called a halt and indulged in iced brandy and water. I may mention by the way that after entering the higher ranges an hour rarely passed without our hearing the thunder of an avalanche, though we were never fortunate enough to witness one.

The following morning a walk of an hour and a half brought us to the village of Chenee, which is built on a level space of a few acres at a height of 3,000 ft. above the river, and directly opposite the Raldung peaks. Here we took up our quarters in a large ruinous bungalow, which had been built, I believe, by Lord Dalhousie, but not kept up afterwards. The first two miles of the road from Rogi would have been worth walking 150 miles to see. It had been carried by wooden

galleries around the face of a precipice almost overhanging the Sutlej, which runs many thousand feet below. The slopes at the opposite side as far up as the snow line were clothed with dense forest, except in one place, where a stream of water fell in a single leap over a vertical wall of rock some 1,500 ft. high. The peaks were well covered with snow, but only one glacier, and that a very small one, was in sight.

After a day's halt at Chenee we followed the route described by Mr. Clement Smith as far as the Werang Pass (13,200), where we turned off the main road to the village of Asrung high up the Leepee Valley. We were, however, more fortunate than he was, as we had a clear view from the summit of the Pass. The ridge it crosses may be considered as the limit of the rich vegetation of the Indian side of the Himālaya. Beyond it hardly a trace of green was visible. We saw ridge behind ridge of bare steep rocky mountains, slightly sprinkled with snow. Rain rarely falls in Thibet, and from the specimen we saw it did not seem an interesting country to travel in.

On the ascent to the Pass the change in vegetation was well marked, a number of species we had not hitherto seen—azalias, junipers, potentillas, saxifrages, asters, making their appearance. At the summit the rock (mica schist) had been very much disintegrated, leaving a thick deposit of gravel, consisting entirely of large crystals of kyanite. The descent to Asrung lay for some distance over masses of large boulders, probably an ancient moraine.

The Asrung Valley is celebrated for ibex, and we had hoped to meet with some; but on questioning the villagers, we were told that at that time of year they were all high up the mountains where it was almost impossible to follow them, and that, in any case, several days would be required for the expedition. This settled the business. We were now 200 miles from Simla, and private affairs necessitated my being there again by the beginning of August. My friend J.'s leave, too, was drawing to a close; so we had nothing for it but to give up the ibex and make the best of our way back, taking, however, a different route, so as to see as much as possible within the time. Accordingly, after a day's halt, we crossed back into the Sutlej Valley by another high pass, and reached Chenee in two days, having noticed on the way several new species of *Papaveraceæ*, *Geraniaceæ*, and *Primulaceæ*. Some of these, I fancy, have never yet been described, and I regret much to say that the few specimens I collected were subsequently lost.

The route we proposed to take on our way home was as follows:—To cross the Sotlej at Pooree below Chenee, follow it to its junction with the Buspa, and thence cross the great range that lies to the south of the Buspa and Sotlej by the Boorung Pass (15,500). But our servants, on hearing what we had settled, broke out into such dismal lamentations, describing so piteously the fearful hardships they would have to undergo on the pass, that we thought it better to make a compromise and cross the Roopung instead, an equally lofty but easier pass. To reach this we should have to cross a shoulder of the Raldung and drop down to Sungla, a village some distance up the Buspa Valley. Our route thus having been decided on, we left the bungalow at Cheenee at 6 A. M. on the 18th, and, after a descent of 3,000 ft. by a footpath with terraced vineyards on each side, reached the Sotlej at a point about 6,100 ft. above the sea. Here we found a very insecure-looking julah, and halted for breakfast while the ferrymen were being hunted up. The river at this point was about eighty yards wide and very rapid. The ropes of which the julah was made looked so old that I did not like to trust myself to them without first testing their strength, which I did by sending my bedstead across. It had hardly started when the ropes broke, one after another, and the charpoy was with difficulty hauled back by the guy. Having to rig up fresh ropes caused a long delay, and it was noon before everything was safely across. I nearly lost a favourite dog here. On my being slung over he plunged into the water, and was at once carried down by the stream. He managed, however, to reach the opposite bank several hundred yards lower down, and was dragged out in a very exhausted condition.

Our way now lay for three miles along the river bank, and then took us by a long steep climb to the village of Bhārung, which is situated in the forests high up in the mountain sides, where we encamped for the night.

The whole of this part of the Sotlej Valley is called Kunāwur, and is celebrated for its grapes. Vines will not thrive on the inner side of the Himālayas, but here the climate suits them well enough. The vineyards are in terraces, and the vines are trained on horizontal platforms raised a few feet above the ground.

The next day's march was about the longest of our whole trip. We started early and followed a footpath which gradually ascended through forests, at first of pine and deodāra, and afterwards of birch. In one place we had to cross a large

sloping snow-bed. Above the forest we came out into an open alp, which led us to the shoulder of the Raldung range, when we left the Sutlej Valley, and commenced the descent into that of the Buspa. The height of the point we crossed must have been about 12,000 ft., and the pass had the usual groups of stone cairns ornamented with bits of rag.

The descent was very long and steep. In one place the path crossed a sloping piece of rock at the very edge of a vertical precipice 2,000 ft. high, where considerable caution had to be used to avoid slipping over. We did not reach the village of Sungla till late in the afternoon, having had a march of ten hours' good steady walking.

The Buspa Valley runs in nearly a straight line for fifty miles, but is very picturesque. About Sungla it has a flat meadow tract, which appears at one time to have been the bed of a lake, the remains of a rocky barrier appearing lower down. The village is built on a rising ground close to the river, and the valley there is something like that of the Rhone between Leuk and Visp, only much more beautiful.

On the one side the mountains were covered from base to summit with pine-forest, while on the other rose tier above tier of stupendous precipices, culminating in the snow-crowned peaks of the Raldung chain, 21,000 ft. high, but apparently so directly overhead, that as the thunder of their avalanches broke the stillness of the summer air we half expected to see a torrent of snow and ice rush down into the valley and overwhelm the village. It was one of the grandest views conceivable. We looked up at the opposite side of the Raldung to that seen from Chenee. The Roopung chain, which we were about to cross, was invisible, being shut out by pine-covered slopes.

At Sungla it was necessary to hire porters for three days, that being the number of marches to the first village at the other side of the pass. Having laid in a supply of provisions for the natives, we started at 8 o'clock on the following morning, and commenced the ascent by a footpath leading up a ravine opposite the village. The first day's march was rather uninteresting. After climbing for some distance through pine-forests the path emerged on open pastures, up which we trudged steadily, still keeping parallel to the ravine. Patches of snow soon became numerous, and at 4 P.M. we halted and encamped at about the lower limit of perpetual snow, here some 14,000 ft. above the sea. It was decidedly cold, but, in spite of this, my Hindoo bearer from the plains insisted on sticking to the customs of his religion, and sat for two hours

in the open air, cooking his food, with nothing on but the 'dhotee,' or cloth round his loins. Our tent was pitched close to an overhanging rock, which served as a shelter for the natives.

After an early breakfast next morning we struck camp, and at once got on to the snow. The weather was lovely, and, after turning a corner round some rocks, the whole of our route to the Pass lay before us. We had to ascend a sort of large irregular basin filled with snow. Right and left nothing was to be seen but snow slopes and black precipices. The summit of the Pass was at a slight depression in a serrated ridge of rocks. It was a wild desolate-looking scene. But I had not time to think much about it, for I soon found that I had quite enough to do in keeping myself going, the rarefaction of the air beginning to tell upon me. I felt a painful shortness of breath, and before long had to rest every two or three steps. The snow, too, was soft, and this made walking still more fatiguing. However, the top of the Pass began to look very near, and I pushed on alone, J. and the porters being by this time far in the rear. I reached at last the foot of the final slope, consisting of a bank of snow some 50 ft. high and very steep. But by this time I was so thoroughly done up that I felt almost incapable of climbing it without assistance. However, after a short halt, I made a desperate effort, the snow falling away from under me at every step, and, somehow or other, in a few minutes reached the summit, when I threw myself down on the ground, fairly pumped out.

I fear that after this account I shall be looked upon as a very poor walker; but it must be remembered that the Roopung Pass is very nearly, if not quite, as high as the top of Mont Blanc; and that at the time I crossed it I had been very much pulled down by long campaigning in a country where the temperature varied from 80° to 120°, while, through all the previous hot weather, we had generally turned out seven nights in the week at 1 A.M., and marched till 9 or 10 o'clock, after which hour the heat used to be so great as to render going to sleep, if not impossible, highly dangerous—those who indulged in a nap during the daytime running a considerable risk of never awaking again.

I had hoped for a fine view from the top of the Pass, but on reaching it found a mass of clouds rolling up from the Indian side. It was as wild a scene as I ever beheld, and I enjoyed it all the more from being perfectly alone. Not a trace of any living thing was to be seen. Black precipices, masses of snow and rolling clouds, filled up the landscape. I could not make

out anything at all resembling a glacier, the snow appearing to lie, wherever the ground was not too steep, in enormous compact masses. At either side of the Pass the peaks rose to a height of about 18,000 ft.

The passes over the 'Snowy Range' are practicable about four months in the year, and are for that time much used by the Tartar traders, who carry borax and wool to the Indian markets. They suffer much, however, from the rarefaction of the air, and attribute the symptoms to a fabulous poisonous plant, which they believe to grow at great heights. They are also liable to bad attacks of colic in the passes; and knowing this, I had taken the precaution to carry a bottle of laudanum in my pocket. On the porters coming up, I found my shikaree had been already attacked, and he lay in the snow at the top, groaning, and expressing his belief that he was dying. I made him take thirty drops of the laudanum, which relieved him at once. About noon, or two hours after I had reached the top, we commenced the descent down a very steep chimney lined with large loose stones. The fog prevented our seeing far into it. I was leading with one of the porters when down came a perfect avalanche of large stones that had been dislodged by some one above, and we had barely time to jump behind a projecting piece of rock before they swept the place where we had been standing. Not at all relishing this sort of cannonade, I climbed down to the foot of the couloir as fast as I could. Here I found myself at the top of a snow slope of 45°. I hesitated about getting into it, the fog preventing my seeing what was below, but the porter saying it was all right, I climbed down by digging my heels well in at each step. After descending about 200 ft. I found myself in a sort of basin, and waited to see the rest of our party come down. One or two of the porters, attempting to descend with their packs on, lost their footing, and rolled from top to bottom of the slope. The rest unslung their loads and let them come down by the run, following themselves by a glissade on their backs, feet foremost. J. attempted to do the same, but steered badly, and rolled to the bottom in a heap, narrowly escaping cannoning against some sharp rocks that projected through the snow.

A sleety rain had by this time begun to fall, and it was very cold, so taking a porter as guide I walked on ahead, leaving the rest to follow. For some time the fog prevented my seeing anything but the snow slopes we were descending. When the clouds lifted I found myself in the most extraordinary-looking place imaginable. We were standing at the head of a huge horseshoe amphitheatre walled in by vertical precipices. Im-

mediately below us the cliff was in three immense tiers. At the top of the uppermost of these a good-sized river emerged from beneath a mass of snow, and fell over it into a deep circular well in the snow at its foot, to emerge again and fall over the next step, and again in like manner over a third, at the foot of which it disappeared under a mass of snow that filled up the bottom of the amphitheatre. There were thus three fine waterfalls, one over the other. The snow beds between them lay at an angle of 45° , and we had to cross the stream by one of these slopes. We afterwards descended by another long slope to the bottom of the amphitheatre. A mile farther down the valley a little vegetation appeared, and we halted and encamped for the night. The river we had struck proved to be a feeder of the Tonse, one of the affluents of the Jumna.

The next day's march was an easy one. A little below our halting place we entered a glen, the sides of which were covered with birch-wood; the path lying over the snow that filled up the bottom of the gorge, and beneath which the river flowed in a tunnel. Farther on the glen widened, and the birch-woods gave place to rhododendrons and pines; lower down still the sides of the valley consisted of vertical precipices of enormous height, so close together as to leave but a narrow chasm between, something like parts of the Via Mala. Soon after passing this part we emerged from the pine-forest into cultivated slopes, and reached a snug little village called Záké early in the afternoon.

I must hurry over the rest of our journey to Simla. After following the valley for one march more we turned to the right, and spent a whole day in ascending through pine-forests, finishing by having to pass the night under a shelving rock just below the crest of a pass 13,200 ft. high, that leads over a spur of the great range we had just crossed. We had a thunderstorm that night to add to the pleasures of our bivouac, but the next morning was fine, we had a glorious view of the Jumnotree Peaks, and just over the Pass I fired at (and missed) the only woodcock I have ever seen in India. My shikaree tried to console me for the miss by telling me that that sort of bird was not fit to eat!!! From the Pass we descended into a deep valley leading down from the Boorung. After following this for two more marches, a long ascent took us to the Kandrāla Bungalow on the new road, and on the ninth day after leaving Záké we reached Simla. Our trip had been a most prosperous one. In the course of forty days we had walked more than 400 miles, the greater part of which was by the roughest of mountain paths, without meeting with

a single *contretemps* (two wet days excepted), and by the time we reached Simla again both J. and I were thoroughly restored to health.

The great mass of the Himālayan chain is, as far as I have been able to ascertain, composed of metamorphic rocks, principally gneiss. On entering the hills at Kussowlee we found a highly inclined sandstone, which gives place to clay slate as we approach Simla. A few marches beyond this place the clay slate merges into mica schist, and this again into gneiss, with a few trifling alternations of chloritic and other schists. I have met with one or two bosses of granite, but they were of very limited extent, and I believe all the higher ranges to consist chiefly of gneiss. The gradual increase of the metamorphic character of the rocks as we approach the axis of the chain forms a very interesting study for a geologist. In connection with the geology of the Himālayas I may mention the apparent scarcity of glaciers. The climate and conformation of these mountains are less favourable than those of the Alps to the production of glaciers, which, when they do occur, are generally found filling the bottoms of long trough-like valleys for many miles, and at first sight appear to be mere masses of snow. It is worthy of remark that the Hindee word 'barf,' pronounced 'burruf,' 'snow,' is also used to signify ice, the natives having but one word for both, and not seeming to recognise any difference between the two.

Of the certain *sounds* peculiar to Himālayan forests the most remarkable is one said to be the note of a tree-frog. It is only heard at night, and sounds like two strokes upon some ringing sonorous substance. In the still night air it may be heard a long way off, and is repeated at intervals all through the night. Go where you will in these mountains you are certain to hear this melancholy note, and many and many a time, when encamped in the depths of the forest, have I lain awake listening to it.

The animal most often seen in these woods is a very large species of grey baboon, with a black face, called the 'lungoor,' which goes about in troops of from twenty to thirty. Bears, hyænas, and leopards are common. The last, though seldom seen, are very destructive to dogs. In fact one's dogs are sure to be carried off by them sooner or later unless protected by collars with good stout steel spikes. The leopard invariably seizes the dog by the neck, and if he finds he has hold of a mouthful of spikes, he lets him go again and slinks back into the jungle.

Many species both of deer and wild goats are common in

most districts; but as so much has been already written by others on the subject of Himālayan shooting, I will merely observe that during the whole of my first trip the only four-footed game I came across was one wild pig and one or two barking deer. The latter a pretty little animal somewhat resembling a roebuck, whose deep hoarse bark may often be heard in the woods. The fact is that no large game shooting is to be obtained in these mountains without going off the beaten tracks. The route we followed, although in many places a barely perceptible sheep-track a few inches wide, was still trodden by human beings sufficiently often to scare away all wild animals; and time did not admit of our going out of our way to look for game.

Pheasants and partridges of different species we found plenty of. The hoarse croak of the black partridge was heard on every hillside, as also the 'chuck-a-chuck' of the 'chuckore,' or red-legged partridge; and we once or twice met with the beautiful little wood partridge (*Arboricola olivacea*). The 'snow partridge' (*Lerva nivicola*) and the 'snow pheasant' (*Tetraogallus Himalayanus*) are only found about the lower snow line, and we never had a chance of shooting them, though we occasionally heard their call. The different species of the pheasant family found in the Himālayas are well known, and we met with all of them at different times, one species alone excepted; this was the so-called 'Argus' or *Satyra melanocephala*.

Before leaving the subject of natural history, I may mention that the only really pretty native women I ever saw in India were in the villages of Kunāwur; and that polyandry is customary throughout the hills, the usual plan being for the brothers of a family to club together and marry a wife.

I will conclude this paper with a short account of what I saw of the Eastern Himālayas, the war in Bhotan in 1865 having afforded me an opportunity of visiting that part of the country.

Starting from Caragola, on the north bank of the Ganges, a fortnight's marching over swampy plains, which in the rainy season become a vast morass, brought us to the little frontier station of Julpai-goree, where the light column of the force destined to invade Bhotan was being assembled. For the whole march the peaks of Gaurisankur (Mount Everest) and Kinchinjinga, the first and third in height in the world, had been conspicuous objects in our front, and we were now within full view of the lower ranges. On the 1st of December, 1864, the column marched from Julpai-goree, and

two days afterwards entered the deadly belt of forest known as the 'Terrai,' which skirts the foot of the mountains. On the night of the 4th the troops encamped by the side of a stream at the commencement of the ascent of the first range, here from 7,000 ft. to 8,000 ft. high, and everywhere covered with the densest tropical forest. The Fort of Dalinkote, the first object of the campaign, was perched on a spur some 2,500 ft. above our camp. We attacked it on the morning of the 6th, and after a long day's fighting, in the course of which our troops were several times repulsed, it was carried just before nightfall. Our loss on this occasion was severe, and we had to mourn the death of three out of the six artillery officers present with the force, by an accidental explosion of a powder barrel. The fort was built on a sort of tower of rock rising from the crest of a knife-like spur. It was only accessible by one narrow pathway, and the walls were thick and high. In fact, it would have been a difficult place to get into, even if unoccupied. No wonder then that all the attempts of our Sepoys to effect an entrance in the face of a determined resistance on the part of the garrison were in vain. As it was we did not get possession of the place till a lucky 'carcass' had set fire to it and driven out the defenders. The loss we sustained was the more lamentable, inasmuch as it might easily have been avoided. Two eight-inch mortars had been, with great labour and at considerable expense, carried along with the column, and had they been employed to shell the fort, the defenders could not have remained half an hour in the place; but the artillery were not allowed to fire them. It is but due, however, to the Brigadier-General who commanded the column to state that the order forbidding their use did not emanate from him, nor was he, I believe, aware of its having been given.

A few days afterwards a small fort, called Dumsong, situated on the northern slope of the first range, was given up to a detachment of native sappers. As this was the only chance I was likely to obtain of getting a near view of the higher ranges, I applied for a few days' leave, and started for this place along with a small party of Sepoys under an officer destined to form its garrison.

The Eastern Himālayas differ in many respects from the Western. The amount of their annual rain-fall is much greater, and the vegetation, in consequence, different in character and more luxuriant. The ranges nearest the plains are covered from base to summit with a dense growth of different tropical species of trees and underwood. No sign of villages

or cultivation is to be seen, and it is possible to travel for many days through the mountains without meeting with a single break in the forest. Of course, in a country like this, large game of different kinds is very abundant, although the density of the cover makes shooting difficult.

Leaving our camp at Dalimkote at 9.30 A.M., we commenced our march by descending to the bottom of a very beautiful glen. After crossing this, the path—a very narrow one—rapidly ascended, and soon gained the crest of one of the spurs of the first range. Before long a slight opening in the trees showed us the Fort of Dalimkote far below, and we soon began to have a fair notion of the topography of this part of the range. Its crest seemed to run in an irregular serrated line about east and west, throwing out numerous prominent spurs, which descended rapidly towards the plains, and enclosed between them very deep precipitous ravines. Every inch of the mountain side was covered with forest. As we ascended, the vegetation became rather less tropical in its character, the tree ferns and other remarkable species disappearing, and magnolias, together with a gigantic oak, taking their place. After about six hours' walking, we found we had attained the crest of the first ridge, but the thick masses of foliage still prevented our having any view of the higher ranges. The path now kept near the summit of the ridge, and some three miles of tolerably hard walking brought us to the spot where we were to pass the night. It was a little open glade in the forest, known by the name of 'Lābah,' and situated on the watershed of the ridge. Its elevation must be somewhere about 7,500 ft. above the sea. Here we found the Sappers had constructed a sort of hut with boughs of trees, and very glad we were to obtain such shelter, the thermometer having fallen to 47°.

Ever since arriving at Julpai-goree I had been worried by repeated sharp attacks of malaria fever, and by the time we reached Lābah a more than usually violent fit had come on. All night long I lay shivering in that hut, my bones feeling as if they were being smashed by heavy crowbars. Towards morning, however, the fever beginning to abate, I obtained a little sleep, and by breakfast time I was well again for the time being. We were not able, however, to resume our march, as the elephants that were bringing up provisions for the detachment had not yet arrived. About noon we heard that they were within a few miles of Lābah, so, not wishing to be delayed longer than necessary, we took a dozen Sepoys as an escort, and a native who was supposed to know the way, and started

at 2 P.M. As we knew Dumsong to be only some 12 miles distant, we expected to arrive there before dark. The path was plain enough at first, and followed the crest of the ridge. In many places it was only about 12 inches wide, with a precipitous descent on either hand, and yet, so thick were the trees, that we never once had a glimpse of the mountains beyond. It would seem almost incredible that we could make nearly two good days' march along the very crest of a narrow mountain ridge, without ever seeing anything beyond the trees in our immediate neighbourhood; and yet such was the case.

So far we had had no difficulty in finding our way, there being but one path through the jungle. But about 5 in the afternoon we came to a spot where it branched off right and left. Our guide, without any hesitation, took the turn to the left; but before we had gone far my suspicions were aroused by our meeting an armed Bhotea, who, on seeing us, bolted off like a deer into the forest. About a mile farther on, the path began to descend rapidly; so, knowing that Dumsong was situated on an elevated ridge, I cross-questioned our guide, who thereupon admitted that he did not know whereabouts we were. We at once began to retrace our steps, feeling convinced that we were on the wrong track; but it was nearly dark when we regained the place where we had first turned off. We followed the other path as well as we could, but were before long warned of the danger of pushing on in the dark by one of the natives suddenly falling down the hillside. On lighting some dry sticks, we found that the man had rolled about 60 ft. down a very steep slope, and been then stopped by the dense underwood. Fortunately, he was unhurt; but we found that we must remain where we were till the moon rose, the path being very narrow and the slopes very steep. It was nearly 9 o'clock before the moon gave sufficient light to enable us to proceed.

Soon after starting afresh, we came to another spot where the path divided in two. It was quite a toss-up which to take, and, as it happened, we chose the wrong one. We soon found ourselves rapidly descending, the track meanwhile becoming almost impassable. We had now fairly lost our way, and our situation was by no means an enviable one. A small party, without provisions of any kind, buried in dense forests in the heart of an enemy's country. For aught we knew we might, for the last three hours' walking, have been moving farther and farther from Dumsong. We were worn out with long fasting. In fact, few of the Sepoys had tasted food since leaving Dalimkote thirty-six hours before. If we waited till

morning, we should be no wiser than before. If we retraced our steps to Lābah, we should probably find nobody left there. Only one course was open to us. This was to try and reach some Bhotea village. We could hear dogs barking low down in a valley on our right, and determined to follow the sound. We felt that we were running rather a risk, since we were in an enemy's country, where all the inhabitants had arms, and the people of a large village could easily overpower and murder us all, should they be so disposed. However, after a short consultation, our empty stomachs decided us on making for the nearest human dwelling.

We followed the path down the valley, and before long found ourselves suddenly clear of the forest, at the upper end of some green pastures that sloped down towards a village. It was a great relief getting at last from under the trees; and a combination of meadow, forest, and blue mountain, all sleeping in the soft moonlight, formed as fair and peaceful a scene as man could wish to gaze on. But it was no time for enjoying scenery, when a few minutes more would decide whether or not we should have to fight for our lives. One of the natives with us, who knew a little Bhotea, very pluckily volunteered to go to the village and open negotiations. When he had left us, we withdrew the Sepoys just within the forest, and having made them quietly load their muskets, awaited the result in silence. After an anxious interval, our messenger returned, accompanied by three armed Bhoteas, one of whom turned out to be the head man of the village. This individual seemed, on the whole, amicably disposed. He could speak a little broken Hindostāni, and pointed out a footpath which he said would lead us to Dumsong. However, we had had enough of wandering about, and insisted on his going with us to prevent any more mistakes. This he agreed to after some demur. We trudged off again in high spirits, keeping our new friend well surrounded by the Sepoys to prevent his giving us the slip. After half an hour's very steep climbing up a forest-clad hillside, we suddenly found ourselves on the top of a bare grassy spur, and the fort of Dumsong about two hundred yards in our front, while in the distance beyond it the whole magnificent range of the Kinchinjinga Peaks lay glittering in the moonlight. Dismissing the Bhotea with a handsome present of rupees, we joyfully ran on to the fort, and found our servants had arrived some hours before, and had a capital supper ready for us; and very thankful we were for it, for we had breakfasted early in the morning, and it was now past midnight. The

Sepoys, too, had a good feed; and well they deserved it, for I had not heard them utter a single complaint.

Judging from what we saw by moonlight, I had reckoned on having a magnificent view of the snowy ridges next morning; but by the time I awoke the clouds had settled low down on all the hills, and I had to content myself with sketching the fort—a small, strongly-built stone structure, which could have defied mountain artillery, and which, had it been defended, would have formed a formidable obstacle to our troops, as it had but one narrow entrance, and was bristling with loopholes.

I only spent two nights there, and had to return to Dalimkote without seeing Kinchinjinga by daylight. It was a great disappointment to me; for this glorious mass of mountains and glaciers must be a splendid object from such a comparatively near point of view. Before leaving the subject of the mountains, I may mention that the only species of rock I noticed in Bhotan, with the exception of a little mica schist and chlorite schist near Dumsong, was the same eternal gneiss that the Himālayas appear to be mainly composed of.

The rest of the Bhotan campaign is matter of history. After the capture of the stockade of Chamoorchi, which happened shortly afterwards, the work of the light column was finished; and jungle fever having by this time nearly finished me, I said good-bye to the Himālayas, and left, on sick certificate, for England.

The accompanying sketch is an exact copy of one I made on the spot in January 1865, and represents the Sikkim and Bhotān Himālayas as seen from near Julpai-goree. The distance in a direct line to the foot of the first range was about 35 miles. The snow mountains are the Kinchinjinga group. Their highest peak is about 28,100 ft. above the sea, and was till lately believed to be the second highest in the world. It has been found, however, that a peak in the Kara Korām range, north of Kashmir, overtops it by a few feet. As seen from the plains Kinchinjinga is, in my opinion, the most beautiful of all the Himālayan mountains.

ON THE COMTE DE ST. ROBERT'S METHOD OF MEASURING HEIGHTS BY MEANS OF THE BAROMETER. By WILLIAM MATHEWS, Jun., M.A.

(With a Plate of St. Robert's Hypsometrical Sliding Rule.)

'*Barometrical Formula resulting from the Observations made by Mr. James Glaisher.*' Phil. Mag. Feb. 1864.

'*On the Measurement of Heights by the Barometer.*' Phil. Mag. June, 1864.

'*Sur la Mesure des hauteurs à l'aide du baromètre.*' Paris, 1864.

'*Intorno alla Formola barometrica, &c.*' Torino, 1866.

'*Nouvelles Tables hypsométriques.*' Turin, 1867.

'*Table hypsométrique pour déterminer rapidement sur place la différence de niveau de deux stations.*' Turin, 1867.

'*De la résolution de certaines Équations à trois variables par le moyen d'une règle glissante.*' Turin, 1867.

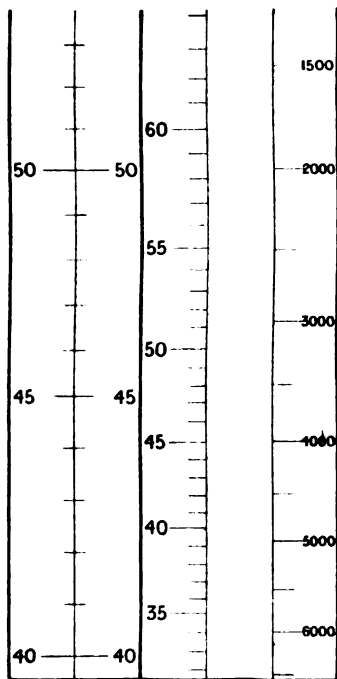
'*Tableau graphique donnant à vue l'altitude d'une station au moyen de la seule observation du baromètre et du thermomètre à cette station.*' Turin, 1867.

IN a previous communication to the *Alpine Journal* (vol. ii. pp. 33-41, 63-67) I gave an explanation of the formula of Laplace, the one generally used in the barometric measurement of heights. I now propose to lay before the members of the Club an account of the remarkable investigations of the Comte Paul de St. Robert of Turin, as contained in the very able memoirs above cited.

Any method whatever that may be employed for the solution of the general problem must depend upon the three following data:—

- (1) The differential equation connecting the height with the density and pressure.
- (2) The relation between the pressure, density, and temperature expressed by the laws of Mariotte and Gay Lussac.
- (3) Some other equation, connecting any two or more of these four quantities, founded either on hypothesis or observation, or both.

It is in the choice of this last equation that so much difference has arisen in the manner of treating the problem. Laplace connected the temperature with the height, and assumed a relation between them involving a decrease of temperature in an accelerated ratio in ascending from the surface of the earth. Such a law of decrease was long held by meteorologists; but it would appear, from the recent balloon observations of Mr. Glaisher, that the contrary is the case, and that the ratio is a



ST.-ROBERT'S HYSOLOGISTA,
or Hypsometrical Sliding Rule. Natural Size.

The Intermediate graduations have been omitted for the sake of clearness.

To illustrate M. Mathews' Paper on the Comte de St. Robert's Method of measuring Heights by means of the Barometer



retarded one. If this be so, Laplace's formula, as was shown in the paper above referred to, would bring out the results too high. In fact, Laplace was obliged, in order to make theory agree with observation, to reduce the barometric coefficient, and to adopt an empirical value of 18,336 mètres, the true theoretical value being 18,404·8 mètres. As the former was obtained from a comparison with a large number of heights measured trigonometrically, it represents an average value. Laplace's formula with the reduced coefficient will therefore err in defect for small differences of height, and in excess for large ones, while for some intermediate magnitude it will be exactly accurate. M. de St. Robert has determined the latter to be 3,000 feet above the sea-level, but it must not be forgotten that it will increase with the height of the lower station.

Instead of connecting the height with the temperature, M. de St. Robert connects it with the density, and founds his theory on the hypothesis that the latter decreases uniformly in ascending from the earth's surface; the densities at any number of points, equidistant from one another in the same vertical, forming a series in arithmetical progression.

Let x be the difference of altitude of two stations, supposed in the same vertical.

p_0, p the pressures at the lower and upper station.

h_0, h the corresponding heights of the barometer, reduced.

ρ_0, ρ the densities of the air.

t_0, t the temperatures expressed in degrees Centigrade, measured from the *absolute zero*, which is $\frac{1}{\alpha}$ or 274° below the freezing point of water, α being the coefficient of dilatation of dry air for one degree Centigrade.

g the accelerating force of gravity, supposed the same at the two stations.

Let the density of dry air at the freezing point of water and a barometric pressure of 760 mm. be the unit of density, H the height of the homogeneous atmosphere under the same conditions, σ the density of mercury.

$$\begin{aligned}\sigma &= 10517\cdot3 \\ H &= 10517\cdot3 \times 760 \text{ mm.} \\ &= 7993\cdot15 \text{ mètres.}\end{aligned}$$

We will now express the three primary relations.

First, since the difference between the pressures at any two points of an aerial column, whose transverse section is a unit of area, is equal to the weight of the intervening portion of the column, that is, to the product of its length, mean density, and

the accelerating force of gravity, we have, denoting the mean density by μ ,

$$p_0 - p = g \mu x,$$

$$\text{or } x = \frac{1}{g} \frac{p_0 - p}{\mu}.$$

Secondly, from the laws of Mariotte and Gay Lussac, the temperatures being measured from the absolute zero,

$$\rho_0 = \frac{1}{a} \frac{1}{gH} \frac{p_0}{t_0} \cdot \rho = \frac{1}{a} \frac{1}{gH} \frac{p}{t}.$$

Thirdly, since, by hypothesis, the density decreases in arithmetical progression,

$$\mu = \frac{\rho_0 + \rho}{2}.$$

By the substitution of this value of μ , the first equation becomes

$$x = \frac{2}{g} \frac{p_0 - p}{\rho_0 + \rho}.$$

Or, expressing the densities in terms of the pressures and temperatures,

$$x = 2 a H \frac{p_0 - p}{\frac{p_0}{t_0} + \frac{p}{t}}$$

$$= 58 \cdot 34 \frac{p_0 - p}{\frac{p_0}{t_0} + \frac{p}{t}}.$$

Replacing the pressures by the lengths of the mercurial columns to which they are proportional, and increasing the coefficient to 58·8 to allow for humidity and diminution of gravity, we have

$$x = 58 \cdot 8 \frac{h_0 - h}{\frac{h_0}{t_0} + \frac{h}{t}} \text{ mètres,}$$

which is St. Robert's equation.

This expression for x is of extreme simplicity, is obtained without the aid of the differential calculus, is very easily remembered, and does not involve logarithmic computation. We have next to consider how far it is trustworthy.

Whether or not any proposed law can be accepted as valid throughout the whole extent of the atmosphere may be easily tested by forming three equations, into which the pressure, density, and absolute temperature at the upper stations each enters to the exclusion of the other two. By putting these

quantities equal to zero we obtain three expressions for the limiting height of the atmosphere, and can observe whether they are consistent with one another, and with the value indicated by the phenomena of twilight and shooting stars, viz. from 40 to 50 miles.*

In the 'Philosophical Magazine' for June, 1864, M. de St. Robert has himself put his formula to this trial, with some rather startling results. But the theory of Laplace, when tested in a similar manner, leads to absurdities scarcely less extravagant; and a law which fails, when pushed to its limit, may nevertheless in practice be very approximately correct. It will therefore be useful to examine the practical working of the new formula for those more moderate elevations with which we are likely, for the present at least, to be concerned, and to compare it under similar circumstances with that of Laplace. For this purpose I propose to calculate by both methods the height of Mont Pourri from the four bases of St. Bernard, Aosta, Geneva, and Turin, from observations made by myself in the year 1862:—

August 5, 1862, Noon.

	Bar. reduced and corrected.	Temp. Cent.	Absolute Temp. Cent.
Mont Pourri . . .	484·87 mm.	3·4	274 = 277·4
St. Bernard . . .	568·32	14·6	288·6
Aosta . . .	707·92	27·7	301·7
Geneva . . .	724·53	25·8	299·8
Turin . . .	735·89	29·1	303·1

The height of Mont Pourri above St. Bernard, according to the formula of St. Robert, is calculated in the following manner:—

$$\begin{aligned}
 h_o &= 568\cdot32 \\
 h &= 484\cdot87 \\
 h_o - h &= 83\cdot45 \\
 58\cdot8 (h_o - h) &= 4906\cdot860 \\
 \frac{h_o}{t_o} &= \frac{568\cdot32}{288\cdot6} = 1\cdot969 \\
 \frac{h}{t} &= \frac{484\cdot87}{277\cdot4} = 1\cdot748 \\
 \frac{h_o}{t_o} + \frac{h}{t} &= 3\cdot717 \\
 x &= \frac{4906\cdot86}{3\cdot717} \\
 &= 1320\cdot1 \text{ m.}
 \end{aligned}$$

* I am indebted to the kindness of Sir John Herschel for an exhaustive criticism of St. Robert's formula from this point of view.

Determining in a similar way the height of the mountain above Aosta, Geneva, and Turin, and making parallel calculations by the tables of Delcros, founded on the formula of Laplace, we obtain the following comparative results:—

	Height of Lower Station.	By Laplace's Formula.	By St. Robert's Formula.	Difference.
St. Bernard . . .	2478·3	1314·7	1320·1	—5·4
Aosta . . .	600·0	3210·7	3203·5	7·2
Geneva . . .	408·0	3395·5	3383·4	12·1
Turin . . .	285·24	3549·2	3535·3	13·9

And for the height of Mont Pourri above the sea-level:—

	By Laplace's Formula.	By St. Robert's Formula.
St. Bernard . . .	3793·0	3798·4
Aosta . . .	3810·7	3803·5
Geneva . . .	3803·5	3791·4
Turin . . .	3834·44	3820·54
Mean . . .	3810·41	3803·46

It is evident from these figures that very considerable reliance may be placed in the formula of St. Robert. It gives, as it ought to do, a mean height somewhat less than the method of Laplace, while the separate results are more closely accordant, the difference between the extreme values being 22·14 m. in the one case as against 41·44 m. in the other.

It is worth remarking that the calculations may be made in English measures just as readily as in metrical. We have only to express h_0 and h in inches and decimals, and to replace the coefficient of 58·8 mètres by 193 feet; the temperatures being measured by the Centigrade thermometer.

Notwithstanding the many advantages of the formula, the numerical calculations involved in it are unpleasantly laborious; and, in order to remedy this defect, its author has constructed the elaborate series of tables entitled 'Nouvelles Tables Hypsométriques.'

If in the original equation

$$x = \frac{2}{g} \frac{p_0 - p}{\rho_0 + \rho}$$

we replace p_0, p by their values $g\sigma h_0, g\sigma h$, it becomes

$$\begin{aligned} x &= \sigma \frac{h_0 - h}{\frac{1}{2}(\rho_0 + \rho)} \\ &= 10517·3 \frac{h_0 - h}{\frac{1}{2}(\rho_0 + \rho)}. \end{aligned}$$

The equation in this form is taken as the basis of the tables, the product 10517·3 ($h_0 - h$) being tabulated for every centi-

mètre. The densities are tabulated in a double entry table for every centimètre from 20 to 80, and every degree Centigrade from -20° to 39° . There are also tables for the corrections due to humidity, latitude, and decrease of gravity.

I have tried these tables, but I cannot say that I am favourably impressed with them. Troublesome interpolations for the determination of the densities are almost always necessary, and, after all, the value of x cannot be obtained without the actual performance of a division.*

It is not surprising, therefore, that M. de St. Robert should have endeavoured to put his equation into a form susceptible of easier numerical calculation. By regarding his theory from another point of view he has adapted it to a different method of procedure, and has deduced from it approximate results of great simplicity and usefulness.

Since, by hypothesis, the density decreases uniformly, the total decrease of density ($\rho_0 - \rho$) due to the height x must be equally distributed over each mètre of elevation. In other words, the decrease of density for each mètre, or the fraction $\frac{\rho_0 - \rho}{x}$, must be a fixed fractional part of the density at the lower station. This law may be expressed by the equation

$$\frac{\rho_0 - \rho}{x} = \frac{\rho_0}{c};$$

whence

$$\rho = \left(1 - \frac{x}{c}\right) \rho_0,$$

where c is a constant quantity.

Or, replacing ρ , ρ_0 by the quantities $\frac{h}{t}$, $\frac{h_0}{t_0}$, to which they are proportional,

$$\frac{h}{t} = \left(1 - \frac{x}{c}\right) \frac{h_0}{t_0}.$$

By determining x from the expression

$$x = 58.8 \frac{h_0 - h}{\frac{h_0}{t_0} + \frac{h}{t}},$$

* To facilitate the calculations required by his formula, M. de St. Robert recommends the following Arithmetical Tables:—

'*La division réduite à une addition.*' Par Picarte. Par's: Mallet, Bachelier; or,

'*Tables de calcul où se trouvent les multiplications et divisions toutes faites.*' Par Crelle. Berlin, 1864.

into which, it will be observed, c does not enter, the value of c may be obtained from the previous equation.

The theory does not require that this quantity should be absolutely constant. It is sufficient that it should be constant for any given time, and for such portions of the same vertical as are included within those atmospheric strata to which our observations are likely to extend. In fact, if we endeavour to ascertain the value of c from a series of observations made at different hours and in various localities, we obtain results differing somewhat from one another, and the determination of the limits within which this quantity ranges is still a desideratum. These limits, however, are sufficiently near to enable us to adopt without serious error the average value of 12,500 mètres determined by M. de St. Robert.

The adoption of a fixed numerical value for c has enabled M. de St. Robert to solve approximately a very useful problem which is constantly occurring in practice. Suppose a mountaineer to be stationed at such a place as Zermatt, the altitude of which is either known, or can be calculated from a series of comparisons, at stated hours, with regular observatory observations. On leaving his head-quarters for a day's excursion, he carries with him his barometer and thermometer, and observes them at a number of points the heights of which he wishes to determine. But how is this to be effected without simultaneous observations at Zermatt? As far as the barometer is concerned, this want may be supplied by reading it at starting and returning, and interpolating intermediate values; but the same course cannot be pursued with the temperature. The mean of the morning and evening temperatures, for example, would be very far from that of mid-day.

The problem which presents itself is, therefore, *To determine the difference of level between two stations, when we know the height of the barometer and the temperature of the air at one of them, and the height of the barometer only at the other.*

From the two equations

$$\frac{h}{t} = \left(1 - \frac{x}{c}\right) \frac{h_0}{t_0}$$

$$x = A \frac{h_0 - h}{\frac{h_0}{t_0} + \frac{h}{t}}, \text{ where } A = 58.8,$$

we can eliminate either of the temperatures.

Substituting in the second the value of $\frac{h_0}{t_0}$ derived from the first, it becomes

$$\begin{aligned}
 x &= A \frac{h_o - h}{\frac{h}{t} \left(1 + \frac{c}{c-x}\right)} \\
 &= A \frac{t}{h} (h_o - h) \frac{c-x}{2c-x} \\
 &= 2z \frac{c-x}{2c-x}, \text{ where } z = \frac{1}{2} A t \left(\frac{h_o}{h} - 1\right);
 \end{aligned}$$

whence $x^2 - 2(c+z)x + 2cz = 0,$

and $x = c + z - \sqrt{c^2 + z^2},$

taking the radical with a negative sign, since x must be less than c .

For any given value of h_o , or, as we may for convenience term it, for any given *Barometric Horizon*, we can, from these expressions, construct a table of double entry, in which the values of x are tabulated for any number of consecutive values of h and t . The most convenient horizon is 760 mm., as most nearly coinciding with the sea-level; and M. de St. Robert presents us, on a single octavo page, with a table constructed for this horizon, in which the pressures are tabulated in a vertical column for every centimètre, and the temperatures in a horizontal one at intervals of 5° , the heights being read off at the intersection of the two columns.

As an example of the application of this table, let us calculate the altitude of Mont Pourri, having given,

$$h = 484.87 \text{ mm.}; \quad t = 3.4^\circ \text{ C.}$$

For 48 cm. and 0° C. we find 3845 m.,
with a diff. of 171 m. for 1 cm., and of 55 m. for 5° C.

Add for 3.4°	$110 \times .34 =$	37
		3882
Deduct for .487 cm.	$171 \times .487 =$	83
Altitude of Mont Pourri		= 3799 m.,

which agrees very nearly with the previous results.

The barometric pressure of 760 mm. may be termed the *Standard Barometric Horizon*, the table being computed from the formulæ,

$$\begin{aligned}
 x &= c + z - \sqrt{c^2 + z^2} \\
 z &= \frac{1}{2} A t \left(\frac{760}{h} - 1\right).
 \end{aligned}$$

A similar table might of course be computed for any other

horizon, but happily this is not necessary. It will be observed that the quantities h_o , h enter as a ratio only into the equation

$$z = \frac{1}{2} A t \left(\frac{h_o}{h} - 1 \right).$$

If, therefore, we take a subsidiary barometric height k , such that $\frac{760}{k} = \frac{h_o}{h}$, or $k = \frac{760}{h_o} h$, the height of the point (h) above (h_o) will be the same as that of the point (k) above the standard horizon. In other words, it is immaterial whether we enter, with the argument h , a table computed to the horizon h_o , or, with the argument k , a table computed to the horizon of 760 mm. The latter may consequently be made to do duty in every possible case.

By this ingenious but simple artifice M. de St. Robert enables observers to obtain any approximate results by the easiest numerical calculations, and therefore to multiply observations to an almost indefinite extent. Suppose, for instance, that the traveller stationed at Zermatt reads his barometer on starting for a day's excursion, and finds the height to be h_o . Dividing 760 by this quantity, he obtains the ratio m , which will probably be constant throughout the day. If h_1, h_2, h_3 be the barometric readings at any number of stations whose heights it is wished to determine, he has only to multiply these by the factor m to obtain k_1, k_2, k_3 , &c., the corresponding quantities referred to the standard horizon, and, with the latter as arguments, the height of each station above the starting point may be at once found from the table. The mercurial barometer might indeed be left behind at Zermatt, and the day's observations made with a carefully compared aneroid, and it is scarcely necessary to point out how very greatly this method of calculation increases the usefulness of the aneroid barometer.

But M. de St. Robert has not contented himself with simplifying calculation; he has invented an instrument which enables us to dispense with it altogether. He has not yet published any description of it, but he has courteously supplied me with full particulars, and permitted me to print them here.

This instrument, a figure of which is annexed (see Plate), is constructed on the principle of the *sliding rule*, and is called by its inventor the *Hypsologista*. I propose to name it the *Hypsometrical sliding rule*, as somewhat more natural to English ears.

It consists of two distinct sets of scales, engraved, for the sake of convenience, upon the same piece of wood. The first set are the two scales marked P, P̄, the initial letter of the

word *Proportion*. These are graduated for every millimètre from 80 to 40 cm., the graduations on the two being exactly similar. One of the scales is fixed, the other moveable.

The second set comprises three scales marked B, T, H, the initial letters of the words *Barometer*, *Thermometer*, *Height*; B and H being fixed, and T moveable. The scale B extends from 75 to 32 cm.; it is graduated for every millimètre from 75 to 65 cm., for every two millimètres from 65 to 60 cm., and for every five millimètres from 60 to 33 cm. The scale H extends from 100 to 6500 mètres, the first division being in the same horizontal line with 75 cm. on scale B; it is graduated for every ten mètres from 100 to 1000, and for every fifty mètres from 1000 to 6500. The slider T extends from 50° to -50° C., and is graduated for every 5°; it carries an arrow as an index.

By means of this instrument the following problems can be solved mechanically:—

First Problem.—Having given the height of the barometer, h, and temperature of the air, t, at any station, to find the altitude of the station above the Standard Horizon.

Rule.—Move the slider T until the division t coincides with h on the scale B; the division of the scale H which is opposite to the arrow-head on the slider is the altitude required.

Second Problem.—Having given the height of the barometer, h, and the temperature of the air, t, at one station, to find its altitude above another station, where the height of the barometer is h_0 .

Rule.—Move the slider P along the fixed scale until the division h_0 is opposite the division 76 cm., which is marked with an asterisk for distinction. The division of the fixed scale which is opposite to h on the slider is the corresponding quantity, k, referred to the Standard Horizon.

Next, move the slider T until the division t coincides with k on scale B; the division of the scale H which is opposite to the arrow-head is the altitude required.

Having described the Hypsologista and the method of using it, I will briefly explain the principle of graduation, premising that, for the sake of convenience, the lengths of the barometric column are supposed to be expressed in centimètres.

The first set of scales, P, P, are employed for the solution of the equation,

$$\frac{76}{k} = \frac{h_0}{h}.$$

These are an ordinary logarithmic sliding rule—that is, a rule

in which the absolute distances between successive divisions are proportional to the logarithms of the numbers which the divisions indicate.

Putting the equation under the more general form,

$$\frac{k_0}{k} = \frac{h_0}{h},$$

taking the logarithm of both sides, and introducing a linear coefficient C, for the purpose of fixing the absolute distances between consecutive divisions of the rule, we have

$$C(\log. k_0 - \log. k) = C(\log. h_0 - \log. h).$$

The two members of this equation being precisely similar, the graduation of the limb and slider must be identical; and if X denote the absolute distance of the division (h) from that of (h_0),

$$X = C(\log. h_0 - \log. h).$$

The value of C is determined by giving to the whole rule a certain fixed length. In order to make the instrument conveniently portable, M. de St. Robert has fixed upon two décimètres as the distance between the extreme divisions of the rule, and as it is graduated from 80 to 40 centimètres,

$$\begin{aligned} 200 \text{ mm.} &= C(\log. 80 - \log. 40) \\ &= C \log. 2; \\ \text{whence} \quad C &= 664.39 \text{ mm.} \end{aligned}$$

The absolute distance in millimètres of any division (h) measured from the first division (80) is therefore given by the equation,

$$X = 664.39(\log. 80 - \log. h)$$

The limb and slider are both graduated from this formula by writing for h successively each of the natural numbers from 79 to 40, and the spaces between consecutive graduations are then divided into ten equal parts.

The second set of scales, B, T, H, are employed for the solution of the equation,

$$\frac{x(2c-x)}{A(c-x)} = (274+t) \left(\frac{76}{h} - 1 \right).$$

In the memoir entitled *De la résolution de certaines Equations à trois variables par le moyen d'une règle glissante*, M. de St. Robert has pointed out that an equation between three variables can always be solved by means of a sliding rule, when it can be put into the form,

$$X = Y + Z,$$

where X, Y, Z are respectively functions of each of the variables only.

By taking the logarithm of each side of the above equation, and introducing a linear coefficient C , it becomes

$$C \log. \frac{x(2c-x)}{A(c-x)} = C \log. (274+t) + C \log. \left(\frac{76}{h}-1\right).$$

And putting

$$X = C \log. \frac{x(2c-x)}{A(c-x)}$$

$$Y = C \log. (274+t)$$

$$Z = C \log. \left(\frac{76}{h}-1\right),$$

we have

$$X = Y + Z,$$

and the condition is therefore fulfilled.

The scales B, T , and H are graduated according to the above expressions for Z, Y, X ; C being taken at 100 mm., which gives to the scales B and H about the same length as P .

By making X, Y , and Z successively equal to 0, we get

$$x = \frac{A}{2} \text{ or } 29.4, \text{ very nearly;}$$

$$t = -273$$

$$h = 38.$$

The values of X, Y , and Z corresponding to the initial division of each scale may be denoted by X_0, Y_0, Z_0 ; and it is preferable to commence the graduation at the initial divisions rather than at the points where X, Y , and Z vanish.

The scale H cannot be commenced at 0 m., because that value of x makes X infinite. It has therefore been commenced at 100 m., and the scale B at 75 cm.

The absolute distance in millimètres, on the scale B , of the division (h), measured from the point (75 cm.), is given by the expression $-(Z_0-Z)$ or $Z-Z_0$.

$$Z = 100 \log. \left(\frac{76}{h}-1\right),$$

$$Z_0 = 100 \log. \left(\frac{76}{75}-1\right),$$

$$Z - Z_0 = 100 \log. 75 \left(\frac{76}{h}-1\right),$$

which is the formula for the graduation of the scale B .

The absolute distance of the division (x) measured from the point (100 m.) is given by the expression $X - X_0$.

$$X = 100 \log. \frac{x(2c-x)}{A(c-x)}$$

$$X_0 = 100 \log. \frac{100(2c-100)}{A(c-100)}$$

$$X - X_0 = 100 \left\{ \log. \frac{c-100}{100(2c-100)} \cdot \frac{x(2c-x)}{c-x} \right\},$$

which is the formula for the graduation of the scale H.

The absolute distance of the division (t), measured from the point ($+50^\circ$), is given by the expression $Y_0 - Y$.

$$Y = 100 \log. (274 + t)$$

$$Y_0 = 100 \log. (274 + 50)$$

$$Y_0 - Y = 100 \log. \frac{274 + 50}{274 + t},$$

which is the formula for the graduation of the scale T.

The position of the arrow is determined in the following manner:—

Since the graduations 75 cm. and 100 m. are in the same horizontal line, the arrow must coincide with that value of t which results from writing those values of h and x in the equation,

$$\frac{x(2c-x)}{A(c-x)} = (274 + t) \left(\frac{76}{h} - 1 \right);$$

$$\text{whence } t = -17.87^\circ.$$

If in the formula for the scale T we substitute this value, we get 10.21 mm.; and if we make $t=0$, we get 7.28 mm. The arrow must therefore be placed at an absolute distance of 2.93 mm. from 0° , on the side of the negative temperatures.

I have, in conclusion, to record my obligation to their eminent author for copies of the various memoirs referred to in this paper, and also for numerous letters in explanation of points of detail in which I was at fault. I am happy to add that Mr. J. Hicks, the well-known optician, of No. 8 Hatton Garden, has undertaken the manufacture of the Hypsologista, and is now ready to supply it.

REVIEW.*

It has been much the fashion of late to deplore that the Alps are becoming exhausted, and it is a mere truism to repeat that few, if any, new expeditions of the first class remain to be made. It is impossible to deny that some of the special interest attaching to excursions in the high Alps, which has presented so strong an attraction to mountaineers during the last twenty years, has now ceased to exist. It is in vain to urge that, apart from the mere gratification of vanity, the charms of the high-level route, or the grandeurs of the Matterhorn, remain unchanged. There is a difference, which is not to be argued away between the active pleasure of exploration and the passive satisfaction of following in the track of others. There are doubtless in the world other Alps to climb. But New Zealand and Japan have not yet been brought within the reach of the long vacation tourist, and even the Caucasus is practically as inaccessible to the majority of travellers.

It seems to us, however, that the old expeditions may yet, for some time to come, be invested with an interest and novelty analogous to that of which we are regretting the loss. There are questions and problems which will present themselves by the way of a higher interest than whether this or that couloir be the most practicable, and discoveries to be made, the attainment of which will even equal the satisfaction of a successful first ascent. The author of the work before us is one of those mountaineers who do not enjoy their excursions the less because they pursue them with a scientific object, and who would derive less gratification from being the first to attain a given summit than from being the first to observe any important fact or phenomenon which might there present itself.

M. Favre's geological researches have extended over nearly thirty years—a period in which the science has made much progress, and undergone some remarkable transformations. The results of his observations are given in great detail in the present work. The first volume, and nearly all the second, are occupied with the description of the plain country around the Lake of Geneva, and the secondary mountain masses between this and the valleys of Chamonix and the Isère. The conclusion of the second volume, and the first half of the third, describes the mass of Mont-Blanc, part of the Tarentaise and Maurienne, and the secondary chain which extends from the Little to the Great St. Bernard on its southern side, which may be regarded as geologically one, though intersected by the valley of the Dora between Courmayeur and Pré St. Didier. The remainder of the third volume is devoted to an examination, in the order of succession, of all the geological formations which are found in the districts already described. In this *résumé* the author is necessarily led to the exposition of his theoretical ideas. The reader will hardly consider the apology which

* *Recherches géologiques dans les parties de la Savoie, du Piémont et de la Suisse voisines du Mont Blanc.* Par Alphonse Favre.

he makes for so doing to have been needed, but will appreciate the justice of the following remarks:—‘Experience has shown me that observations last longer in science than theories, and that we ought not to attach so much importance to these last. This relative position of these two sorts of labours is natural: an observation establishes an unchangeable fact, but the interpretation of that fact may be modified according to the extent to which new light is thrown on the obscure parts of science; and as we only approach the truth by little and little, the fluctuations of theory are far from being terminated.’

M. Favre commences the theoretical portion of his work with an inquiry regarding the nature and origin of granite. It has often been the subject of question whether true granite was to be found in the Alps. Perhaps in this, as in many other disputed questions, the dispute has rather been of words than of facts. The centre of the chain of Mont Blanc consists of Protogine,* a crystalline rock, so named by Professor Jurine of Geneva, who believed it to be primæval (protogonos). Our author states that this designation has remained in science, in spite of the resistance of Aubuisson, Von Buch, and Raumer, the two latter having maintained, with reason, in 1817, that this rock was of a recent period. If not primæval, however, M. Favre holds that the granites and protogines are the oldest rocks which are now to be found on the surface of the earth. These, and nearly all the others with which we are acquainted, are not igneous, but sedimentary. The only true igneous rocks are the lavas and other volcanic formations, and the only true primitive rocks were the igneous rocks of a similar nature, which formed the crust of the earth before the condensation of the water, and of a great part of the gaseous elements which now enter largely into the composition of the materials of the earth's surface.

That the granitic rocks were of igneous origin, and that they were elevated into the nuclei of mountain chains in a pasty or semifluid state, was a doctrine that scarcely any geologists would have ventured a few years ago to call in question. But a change has come over the spirit of our dream. The Neptunists are again in the ascendant, and the Plutonists are nowhere. According to M. Favre (and we may add many other lights of geological science), it is not only probable that granite has originated in the ‘moist way,’ but almost impossible that it can ever have been subjected to a temperature near that of fusion. M. Delesse says, ‘The existence of organic volatile matters in the granitic rocks would alone suffice to demonstrate that they have not been subjected to a high temperature, and that they have not an igneous origin.’ We have already hinted at the difficulty which the same fact throws in the way of other theories. What it suggests is *metamorphism*, but metamorphism is in M. Favre's view even more heretical than igneous origination.

* True granite is, however, found also in the Alps, and even on Mont-Blanc itself. The most important granite known in this district is that of Beaufort, which is, however, porphyritic in structure. It is found also in the valley of Poncellaumont, near Beaufort, and in veins at Valorsine, in the route of the Tête Noire.

But other facts connected with the granitic rocks seem to lead to a similar conclusion. Sir Humphrey Davy had observed the presence in quartz crystals of minute cavities containing a gas or liquid, and it is difficult to understand the formation at a very high temperature of crystals containing such matters. De Saussure, moreover, remarked crystals of quartz which had formed upon and after fibres of amianthus. In a similar manner quartz is often found to envelope minerals that are easily fused, such as the molybdate of lead, gold, copper, sulphuret of antimony, and others, upon which it could not have been crystallised by igneous fusion. In the granites we often see quartz moulded upon felspar, which is much more easily fused, and M. Favre has made the same observations on the crystalline schists. We may lay down as a general rule that the order of formation of the minerals in the crystalline rocks is not that of their solidification, supposing them to have been fused. Quartz crystals are, moreover, found in clay geodes in the sedimentary rocks, which have unquestionably not been exposed to a high temperature. Why should not quartz veins in gneiss have equally an aqueous origin? It is almost overwhelming when M. Favre produces this last piece of evidence against quartz considered as any proof of primæval existence or igneous origin:—‘Lastly, I have picked up at St. Acheul near Amiens, a geode of quartz several centimetres in diameter, composed of crystals very slightly agglutinated together. I found it in the white siliceous sand above the beds of gravel which contain the celebrated flint axes, and I am persuaded that it has been formed in this position, at the expense of the sand, and since the axes have been made and deposited.’

We have already dwelt almost too long upon this point. M. Favre gives reasons to believe also that felspar, mica, and talc must equally have had an aqueous origin. How then have the granitic rocks originated? Their origin, he supposes, goes back to the remotest period of the history of the earth, to the epoch when the water of the globe, in a state of vapour, formed with certain gases an atmosphere of extreme density, and began to condense. Following the authority of M.M. Daubrée and Delesse, he estimates the pressure of such atmosphere at 710 atmospheres, under which water would boil at about 480° C. or 900 Fah. Of course, this would diminish as the aqueous vapour became precipitated and seas were formed, but an immense lapse of time would be required for its reduction to a degree at which animal life could exist. ‘During this epoch the waters flowed in torrents on the surface of the ground, produced mechanical and chemical decompositions, swept away the materials, and necessarily deposited sediments which must have been very different from those formed in the epoch of organised beings. May we not then believe that granite, protogine, and gneiss, the elements of which have all been formed under the influence of water, are aqueous deposits, produced during the first times when the water reacted on the earth?’

The reader will find in this work much interesting matter on the elevation of mountain chains, the origin of valleys, and of the remarkable depressions now occupied by lakes, and other vexed questions of Alpine geology, as well as upon the now generally admitted ancient

extension of the glaciers and transportation of the drift. We regret that our space will not permit us to do justice to the author's views on any of these points, and we can only attempt to touch upon one or two features of interest regarding them. M. Favre regards the elevation of the Alps, and nearly all dislocations on the earth's surface as consequences of the different rate of cooling of the crust and the interior; the former having since a remote period nearly attained a condition of equilibrium, while the latter continued to lose its heat, and consequently to contract in volume. Hence arise the doubling and convolutions of strata which are so remarkable in mountain regions, and which have caused so much difficulty in the identification of the several formations. Hence also the 'fan structure' and apparent reversal of the beds on the flanks of the principal mountain chains, and the fact that the most elevated rocks are also the oldest, and geologically the lowest.

Closely connected with the structure of the mountains is the form and position of the valleys. It is scarcely possible to resist the conclusion that these were, in many cases, compared at least with the mountains, deeper when first formed than at present, and that, so far from their having been entirely excavated by aqueous or glacial erosion, these powerful influences have not only lowered the mountains, but partly filled up, while they have widened, the valleys. 'It appears to me evident,' says M. Favre, 'that the valleys of Savoy and the Valais are connected with the structure of the mountains. They present a remarkable regularity, and are nearly all perpendicular or parallel to the general direction of the Alps.' This fact alone is almost decisive in refutation of the theory attributed to Professor Tyndall, that before the glacial epoch this chain of mountain presented an enormous boss, with a surface more or less united, in which the valleys and the lakes have been excavated by the glaciers.

The question of the origin of the lake depressions is one that has been warmly discussed. MM. Tyndall and Ramsay on the one hand, have attributed them entirely to glacial erosion. Sir Charles Lyell, MM. Studer, Desor, Ball, Omiboni, and our author, have strongly opposed this theory. M. Mostellet, while allowing the previous existence of these cavities, has supposed that they had been filled up by the ancient alluvium before the glacial period, but re-excavated by the action of the ice. The phenomenon which has given rise to these discussions is the existence of extensive beds of pre-glacial alluvium beyond and below the lakes, and the difficulty of accounting for its existence in these localities, supposing the lake basins to have existed, as at present, at the time of their deposit. The answer of M. Favre appears simple and satisfactory. The lake basins at the period when these beds were deposited were filled up, but with ice, not with gravel or solid rock. The materials of the alluvium were carried across them in and upon the ice. Similar deposits of rolled pebbles are found arranged and levelled by the torrents below the termination of most existing glaciers, and this supposition is powerfully confirmed by the fact that in the lower portion of the alluvium, near Geneva, are found many stones which are not water-worn but angular, like those of

glacier moraines. There is, moreover, reason to question whether there is any ground to credit the glaciers with such an erosive power as has been supposed. It was long ago remarked by Charpentier, 'that in 1818 the glacier du Tour, in the valley of Chamounix, had advanced, without excavating, about eighty feet over ground which was gravelly, and uncovered by soil, but at the end of this space it came upon meadows, the soil of which being somewhat marshy was lifted up and overturned.' In the same manner the Glacier des Bossons had advanced, in 1818, nearly across the valley without effecting any excavation of the soil, which is nevertheless easily shifted.

'Consequently,' continues our author, 'glaciers are unable to hollow out their bed in gravelly and moveable soils. I do not think that any actual glacier ploughs up the ground over which it passes in such a manner as to construct before it a moraine drawn from the soil over which it advances. In the hypothesis of the excavation of the Lake of Geneva by a glacier, it would be very extraordinary also that the greatest depth (265 metres, near Meillerie, and 300 metres, a little more to the west) should be at the spot where the bottom is probably of hard limestone, while more to the west, where the soil is of soft molasse, the depth is only 30 to 40 metres. This difference is easily explained in connecting the origin of the lake with that of the mountains. In effect, near Meillerie the beds, being much contorted, and often vertical, it is natural that the greatest depth should be in their neighbourhood, while nearer Geneva, where the beds of molasse descend from the two shores with a slight inclination, there is no reason that the lake should be deep.'

We have said that the former extension of the glaciers, which once excited a lively controversy, may now be said to be generally allowed. There remains, however, a question as to the causes of this extension, and before concluding, we must add a few words on this subject. A similar extension has obtained, at some former period—and that a geologically recent one—not only in most parts of the northern hemisphere, but also in New Zealand in the southern. There is no sufficient evidence, however, of the simultaneousness of these extensions, especially as between the two hemispheres. It may, however, be accepted as probable—though even this has been questioned—that the glacial extension in the Alps and in northern Europe generally, was contemporaneous. This extension has been accounted for by the hypothesis of a general climatal refrigeration; by the supposition of a former greater elevation of the mountains; and lastly, by the somewhat paradoxical theory advanced by Professor Tyndall of increased moisture and precipitation, arising from greater heat in the localities in which the evaporation, which supplied this moisture, took place. M. Favre appears disposed to allow a certain weight to all these suppositions, though he discusses, with something like contempt, theories which would attempt to account for the lower temperature by such a supposition as that of the non-existence at the glacial period of the Isthmus of Panama, and consequently of the Gulf Stream. Such a hypothesis may perhaps savour of presumption; but when we bear in mind that, at the present

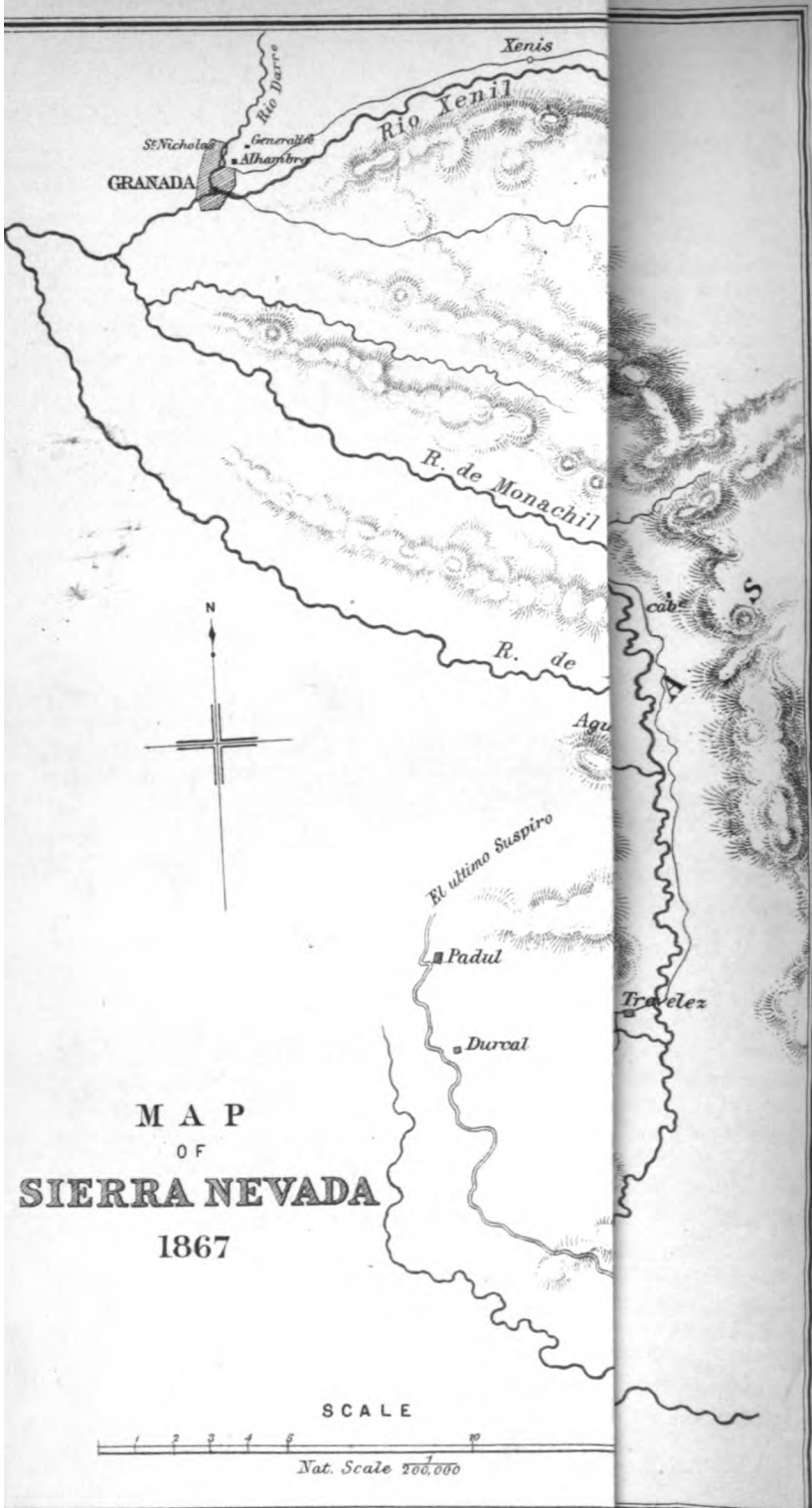
day, enormous icebergs are found floating in the southern ocean, at a latitude corresponding to that of the Alps, it is not unimportant to observe that slight variations in the configuration of land and sea in the northern hemisphere might effect a climatal change more than sufficient to account for the phenomena in question. M. Ch. Martens has shown that a depression of 4° C. (about 7° Fahr.) in the mean temperature at Geneva would bring back the glaciers of Chamounix to the neighbourhood of this town, and M. Dangler, of Zurich, considers that a depression of 5° C. (9° Fahr.) would be sufficient to cause an extension of the Oberland glaciers as far as Soleure.

The theory of M. Escher von der Linth, that the recent elevation of the Desert of Sahara above the sea has exercised an important influence on the climate of the Alps, is one of the same nature. It is well known that the hot south wind called the Föhn, which is believed to take its rise in that region, is at present a most active agent in the repression of the glaciers; but, as M. Favre observes, it is necessary not to lose sight of the fact that their extension at a certain epoch was not confined to the Alps.

That the mountains were higher, independently of any elevation or depression arising from causes acting in the interior of the earth, at the commencement of the glacial epoch than at the present time is sufficiently evident from the mass of matter which has since been removed, and transported to the plains or to the sea, and this fact may be allowed its due weight. But it is not unimportant to remark that in the northern parts of Europe, when the glacial extension appears to have been proportionately as great, there is reason to believe that at its period the land was much lower than it now is.

We approach with some diffidence the theory of Professor Tyndall, advanced as it is by such an authority, and the more so as M. Favre appears disposed to allow it considerable weight. The effect of increased moisture upon the extent of the glaciers involves a complex meteorological problem. If, in consequence, the sky were so constantly clouded as to intercept the greater portion of the sun's rays, it would be not unreasonable to expect a lower temperature to prevail. But one point appears somewhat strangely to have been overlooked. The conversion of a given amount of aqueous vapour into snow or ice, necessarily sets free an amount of heat sufficient to convert a still larger quantity of ice into water—we believe about six times the quantity; but Professor Tyndall could doubtless supply us with more exact data. A greater supply of vapour might therefore increase the rivers, but would probably diminish the glaciers. It has been remarked that the moist years of 1816 and 1817 produced an extension of the glaciers; but it would seem more reasonable to conclude that the greater condensation of these years was caused by the coldness of the season rather than the coldness by the greater condensation. Moreover, the supposition of a colder climate during the glacial epoch is supported by the evidence of the remains of the animals and birds then existing, as has been demonstrated by the researches of M. Lartet and Prof. Milne Edwards, while the hypothesis of greater precipitation is purely arbitrary.

R. C. N.



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SIERRA NEVADA
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THE SIERRA NEVADA. By CHARLES PACKE, Esq.
Read before the Alpine Club, Dec. 10th, 1867.

LIVING among the Pyrenees, one gets, somehow or other, to look upon all the ranges of the adjacent peninsula as an appanage of those mountains; and it was with a feeling something akin to disappointment that I learnt my friend Mr. Ormsby had anticipated a project I had entertained for the last three years, and not only visited, but to a certain extent explored, the Sierra Nevada in the autumn of last year.

I should have been of course glad to have had the company of such an experienced mountaineer, but in lieu of that I had the benefit of his experiences in a paper read before the Alpine Club, of which he was kind enough to send me out the proof-sheets, with other suggestions; some of which I carried out, but to others turned a deaf ear, more especially to one in which he sought to dissuade me from taking my two dogs.

I had never expected that the scenery of the Sierra Nevada was at all equal to the grander parts of the Alps and the Pyrenees; but Mr. Ormsby's description, especially of the Corral de la Veleta, is so glowing, that I began to think that I must have formed an erroneous notion, for I know that habitual travellers in the Alps are slow to find out beauties in other mountains.

Besides, scenery was not my principal object. For many years I have been occupied with the study and collection of the Alpine flora of the Pyrenees, and I wished to observe, as far as I could, what modifications were effected in the flora at similar stations, $5\frac{1}{2}$ degrees farther south. Of course this

observation could not be so complete as I should have liked in one visit, and it was matter of difficulty; but as some of the points of the Sierra are above the snow-line even in that latitude, it appeared to me that the month of July would not be too late for the flora of the higher region. I had not then seen the admirable work of Boissier, so that my researches were quite independent; and if some of my readers are bored with too much enumeration of the plants, I can only regret that my dogs do not possess the art of writing, as they would have produced a more spirited and entertaining description of our excursion, omitting all botany, which is a science they detest.

Gavarnie was fixed upon as our starting-point, partly because it is one of the most beautiful entrances into Spain, and partly because I had decided to take with me Henri Passet of that place, for I by no means agree with those who think that an accurate local knowledge is the *first* or even a principal essential in a guide. What you do require is a willing, active, and bold man, with a good general experience of mountains. All these qualifications Henri eminently possessed, and in addition could speak Spanish fluently—a most useful acquirement.

Our party at starting consisted of my friend Mr. Byles, Henri Passet, and myself, with the two dogs, Ossouë and Azor; the bipeds each carrying a knapsack, and the quadrupeds also taking their share of the luggage, in a species of double sack or *alforja*, which they carried, in turn relieving one another. The dog-sack with its contents weighed 12 lbs., and in it were stowed a number of supernumerary articles, among the most useful of which was a tin canister holding a pound of tea, and among the most useless, a revolver pistol.

It was a glorious morning on the 8th of June when we started; and as we mounted the Port de Gavarnie, the cirque looked so resplendent and beautiful that it seemed, as it were, resolved to leave an impression that no views in the Sierra Nevada might efface. On the Port de Gavarnie, though only 7,481 ft., there was still a considerable quantity of snow on either side, which allowed us some glissades in descending; and the dogs thoroughly enjoyed the snow, as if conscious it was their last for many days. An easy march brought us to Torla, where the well-known mansion of the Marchesa Vio received us. On the morrow we crossed westward over the Col de Sarrable (about 5,300 ft.) to the valley of the Gallego river, which we struck below Viescas. Thence passing by Puente de Faulo and over the Sierra de Mon Repos, whence we had the last view of the Pyrenees, on the afternoon

of the fourth day we reached Huesca, a very dull town, though with some good houses, and 8,000 inhabitants.

From Huesca to Saragossa, Saragossa to Madrid, and Madrid to Menjibar, the nearest station to Granada, the journey, in all 750 kilometres, is by rail; a manner of travelling not the most agreeable, but the country is so monotonous—vineyards about Saragossa, and then the long continuous cornfields of the two Castilles—that one is glad to pass over it as quick as possible.

Below Val de Peñas the geological formation changes from tertiary superior to Silurian, and the aspect of the country improves. A little farther, at Puerta de los Perros, just before reaching S. Helena, the granite crops out, forming the watershed of the Sierra Morena. These mountains are low, about 6,050 ft. at their highest point, but the gorges are exceedingly picturesque. Each little streamlet is overhung with the bright red flowers of the oleander, and a thick tangle of cistus and other flowering shrubs cover the hillsides. Through these it is very difficult walking, and the gum that exudes from many of the plants does not improve the clothes.

There are no trees of any size, and on the highest peak I could not observe any truly Alpine plants; but it was late in the year, as I did not stop for the Sierra Morena till on the way back at the end of July. Anyone wishing to study the botany of that range ought to be there not later than the beginning of May. Though we did not see any, we were told that wolves were very numerous in those mountains, and certainly from such an extent of thick cover it would be difficult to extirpate them.

From the railway station of Menjibar to Granada (121 kilometres), 74 miles, there is an excellent diligence road, very different from anything you can see in the North of Spain. Stones are laid down at every kilometre, with smaller ones at every hundred metres; and at every 5 kilometres there is a cantonier station, or 'Casa de los Peones.' These and the 'Guardas civiles,' an improved and very much more polite edition of the French gendarme, are constantly to be met with upon the road, so that any adventure with brigands is quite out of the question, and can scarcely enter the imagination of the most romantic traveller. Once among the mountains, you meet no one except a few scattered shepherds, and occasionally one of the *acequeros*, men whose business it is to look after, and keep running, the *acequias*, or aqueducts, which irrigate the lower fields and gardens, and without which all cultivation would cease in that arid country.

Mr. Byles had gone round by Cordova, but Henri and I, with the two dogs, made the journey from Menjebar on foot, as I wished to see a little of the botany of the outlying sierras N. of Granada, and to observe the geological formation of the rocks. These, like those immediately south of the Pyrenees, are all of the Triassic system, mostly new red sandstone and marl, interspersed with calcareous rocks in the more abrupt parts.

In the first day's walk to Jaen (27 kilometres), I was much struck with the great diversity of the flora to that at the foot of the Pyrenees. It was really hard to recognise any old friends. Among the new ones huge thistles, red and yellow, and lofty blue boragineous plants (*Echium Pomponium*), were among the most conspicuous. Growing on an old bridge I saw for the first time the wild caper, *Capparis spinosa* (the hyssop of the Holy Land), and the very pretty yellow linum, *Linum Hispanicum*, was common everywhere. At Jaen we slept in the hotel, and the next two nights out in fields by the roadside. Our plan was to enter some roadside posada before nightfall, and after restoring nature with a large mess of soup, consisting of oil, water, and bread, further enriched with eggs when we could get them, to turn out and walk till we felt disposed to rest. I am bound to say that I found this food wholesome, and even palatable when washed down with the strong wine of the country. The wine was white, red, or sometimes a mixture of the two; and we used to pay 6 ochavos (not quite twopence) for a haro; but the haro was here much smaller than that of Aragon. There it is more than a litre, but here it has dwindled to less than an English pint. Our midday meal was exactly the same, but in the morning I always contrived to make a brew of tea. For anyone content with this fare there is no need to carry provisions, as there are plenty of these wayside posadas. The wine is not so good as to need no bush, but there is always one suspended over the door, which remains open not only to man, beast, reptile, and insect, but to the birds of the air; and the interior of the house was generally swarming with swallows, which had their nests, apparently unmolested, among the rafters. I suppose from that climate they never migrate.

Four kilometres beyond Campillo, and 53 from Granada, the road attains its highest point; and from here the Sierra Nevada first comes into view, a heavy mass of mountain, with considerable patches of snow; and the Picacho de la Veleta, apparently the loftiest point, bearing SSE. 500 metres farther a stone marks the passage from the province of Jaen into that of

Granada, but the road winds a good deal about the hills, and you do not see the city of Granada till just before entering it.

Of the Sierra Nevada, as seen from Granada, the lithograph frontispiece in the last volume of the Alpine Journal gives a tolerably exact representation. Viewed from this distance, $19\frac{1}{2}$ miles in a direct line, the ridge looks less rugged and abrupt than it really is, and the summits of the Caballo, the Machos, and even the Veleta, are rather eminences in the main ridge than separate mountains, and compare disadvantageously with the serrated forms of the Pyrenees. The Picacho de Mulhahaçen and the Alcazaba are fine mountains, and more isolated; but the first is almost and the latter entirely out of view from Granada, being hid by the high ridge running N. from the Veleta, the Peñon de San Francisco. Neither Henri Passet nor I saw anything in the aspect of the Sierra to necessitate taking a local guide; indeed on these mountains it is much easier to find the way than to find a guide; so the second morning after our arrival at Granada we set out for the Picacho de la Veleta, from which there is the best reconnaissance of the whole chain. There is a path nearly all the way, used by the *neveros*, who daily during the summer heats bring the snow down on mules to the town of Granada. I understand that an octroi of 20 reals (5 francs) is paid to the town upon every load. The nearest snow-beds are on the flanks of the ridge N. of the Machos peak; but at the end of summer the supplies of snow have to be fetched from the Corral, which is considerably farther. It is never my habit to walk fast; and on this occasion there were plants to be collected and arranged, notes to be made, &c., so that the time we occupied must not be taken as that necessary for the ascent, which I should put at about seven hours of good actual walking.

On June 21st, we started at 5 A.M., and after crossing the river Xenil, took a direction first E. and then ESE. across some *quebradas*, a ravine of new red sandstone forming the last spurs of the Dornajo ridge. Here the wheat-fields were just cut. Among the wild flowers the most noticeable were the *Senecio leucophyllos*, *Marrubium sericeum*, *Trachelium cæruleum*, the *Phlomis lychnitis* and *Phlomis purpurea*, and a very handsome *Centaurea*, *Catananche cærulea*, which I had before seen on the southern flanks of the Pyrenees. After about two hours of continual but gradual ascent, we passed from the red sandstone on to calcareous ridges, and the last-mentioned plants were replaced by the *Cistus ladaniferus*, *Lavandula lanata*, *Lavandula latifolia*, *Salvia Hispanorum*, and *Asperula paniculata*. All these lower ridges are almost destitute of water, but just at the

foot of the Dornajo, 15 minutes below the Col, there is a spring. From this spot there is a view of the old hermitage of San Geronimo, with the village of Guejar beyond on the far side of the Xenil valley. Here is a rich treasure for the botanist, a beautiful feathery boragineous plant, *Echium albicans*, *Convolvulus nitidus*, *Teucrium polium*, and *Teucrium aureum*. On attaining the ridge just E. of the Dornajo, the Picacho de la Veleta comes into view. To reach it from here by the most direct road requires about four hours. The path is carried almost on a level round the head of the gorge, and then mounts gradually by the Peñon de San Francisco, traversing beds of snow and schistose rocks as far as the Col of the Veleta, whence it requires some 40 minutes of very easy ascent to the summit.

Not wishing to run the chance of being caught by night among the snow, and in a region destitute of wood, we continued to skirt the N. flank of the Dornajo, and so descended in the upper part of the Barranco de San Juan. Here we fixed our night quarters under a rock NW. of the Corral at a height of about 7,200 ft. above the sea. On all this part of the mountain there was no lack of fuel. The common juniper and also the *J. sabina* were growing in great profusion, and we soon collected a stock of them which maintained a bright little fire throughout the night. We had no wraps, and were perfectly exposed overhead; but with the aid of our fire we slept very well. In the morning I first attempted to descend into the Corral, but found the rocks too precipitous, and was obliged to content myself by remounting to the Peñon de San Francisco, and so along the upper rocks to the Picacho de la Veleta. At about 8,860 ft. the *Senecio Tournefortii* was very abundant; also the holly fern (*Polystichum lonchitis*). Both these plants in the Pyrenees are found about 2,600 ft. lower, and at 9,186 ft. we came to the first snow.

On gaining the ridge bounding the corral on the W. we found ourselves about 2,000 ft. below the summit of the Veleta, which is seen in the SSE. Here the rocks are all mica-schist passing into gneiss; upon them we found some very good plants, quite new to the botany of the Alps and the Pyrenees. Among the most noticeable were a very beautiful small rose-coloured senecio with glossy leaves, in form resembling the *Homogyne alpina*. This I afterwards ascertained to be the *Senecio Boissieri*. A very beautiful yellow-rayed Anthemis, the *Pyrethum radicans*, the *Alyssum spicatum*, a little thorny shrub with pink blossoms, *Erodium trichomanifolium*, and the *Ptilotrichum purpureum*.

While occupied upon these, my dogs broke away in chase

after some animal, probably a fox, and disappeared for three quarters of an hour. It was a period of great anxiety, as the young dog Azor was as usual charged with the saddle-bags, containing part of our provisions, as well as a paint-box and pistol; and it was almost a miracle that when he did return, after his very rough scamper, though the bags were somewhat the worse, the contents were all safe.

Shortly afterwards we came upon two izards, which were not at all startled, and stood quite close tranquilly looking at us for so long a time, within pistol-shot, that I regretted my weapon was in the bottom of the dog's sack. My dogs were frantic at the sight of animals which they had so often chased in the Pyrenees; and though we held them in with all our might, the izards at last took fright at them and made off. They were not only the tamest, but also the leanest, that I had ever seen—a condition not to be wondered at from the scanty pasturage of these mountains.

We once again saw an izard under the Machos, but we saw nothing of the wild goats (*Capra ægagra*) of which Boissier speaks, and which Mr. Ormsby saw in the Sierra de Gredos. Approaching the summit of the Veleta over gneiss rocks, interspersed with snow-beds, the silvery tufts of a beautiful little mountain artemisia, the *A. Nevadensis*, are seen in great profusion. This plant, very akin to the *A. spicata*, and *A. Mutellina*, the chief ingredient of the Chartreuse liqueur, is even more aromatic. It is much prized by the natives under the name of *Manzanilla real*; and the inhabitants of Granada and Lanjaron drink large quantities under the form of tisane. For delicate stomachs of a less sober temperament it is used to flavour Manzanilla sherry.

The view from the Picacho de la Veleta is certainly very extensive, but after Mr. Ormsby's description, I must own to having been disappointed. The mountains are too uniform and barren. One misses the snow, the forests, and the serrated ridges of the Pyrenees. The sky, too, on looking overhead, seemed to maintain its usual pale-blue tint. Neither on this, or on any other of our ascents, did I once observe that deep black indigo which almost always prevails in the Alps and Pyrenees at heights exceeding 10,000 ft.

From the summit of the Veleta, Granada and the Alhambra are well in view, though distant $19\frac{1}{2}$ miles in a direct line. Over the sea there was a certain amount of haze, and the coast-line was hardly distinguishable. The most striking feature in the panorama is, without doubt, the Picacho de Mulhahaçen, the cairn of which is 2° S. of E. from the

Picacho, and distant as the crow flies 5 kilometres. A little to the left of this, looking over the Corral, the Picacho de Alcazaba, the third highest of the range, is also in view; and beyond, in the N.E., a ruddy glow, even though at midday, seemed to rest upon the mountains of the Sierra Bermeja, or Vermilion Sierra, beneath which winds, though out of view, the verdant river—Rio Verde, so celebrated in Spanish song.

The N. side of the Veleta falls away in an absolutely vertical precipice of 1,900 ft. to the Corral de la Veleta. To descend on this side is impossible. On the E. side, facing Mulhahaçen, there is also a precipice difficult and dangerous, but not absolutely impossible. In fact, my guide, Henri Passet, offered to make his way down, but I did not care to follow him. Anyone wishing to pass from the Veleta to Mulhahaçen should first retrograde towards the col, and then descend a little, skirting the S. side of the ridge that connects the two summits. From the Veleta we might have returned to Granada that evening, but we preferred to camp out below the Dornajo, and so reached Granada early the next morning.

Our second expedition was to explore the Corral, in which I was accompanied by Mr. Byles as well as Passet. After sleeping near its northern extremity, at a height of 6,050 ft. where the dwarf little Alpine oak (*Quercus Tozza*) afforded a good supply of fuel, we proceeded up the gorge, following for the first two hours the path that leads to an iron mine. During this part of the journey my dogs had several engagements with the native dogs, but the victory was never doubtful, notwithstanding the iron-spiked collars with which the latter were defended. The showy flowers of the foxglove and aconite, which were the dominant plants in the lower region, soon disappeared, and were replaced by prickly tufts of the *Arenaria pungens*, the *Plantago nivalis*, and a few spring gentians. The rocks here, as indeed in all the higher parts of the chain, consist of mica-schist, or rather gneiss (for the rock is laminated, and contains felspar), and we picked up some fine specimens of spicular iron, with traces of copper.

At 7,874 ft. we reached the first snowpatch, and at 9,380 ft. we came to the bottom of the glacier, which owes its reputation certainly not to its size, but to its being the only one on the Sierra Nevada, and the most southerly in Europe. It is, however, in every respect a glacier, showing, where the snow is cleared, blue ice, with little longitudinal crevasses some inches in diameter, and miniature moulins; and at the northern base there was formed a very considerable moraine. On this moraine I gathered the *Linaria glacialis*, the *L. organifolia*, and the

Ranunculus glacialis, being the only place where I observed it on these mountains. The upper part of the glacier is steeply inclined, and at the close of summer might require the use of an axe; but the snow was in capital order, and we soon passed from the ice on to the steep shaly rocks, and thence on to the ridge, about 1,000 ft. E. of the Picacho de la Veleta, at a height of 10,958 ft., and consequently 482 ft. below the peak.

From here the Picacho de Mulhahaçen is in view due W. It is a rough up-and-down scramble of 2½ hours to reach the summit, keeping on the south side of the ridge which connects it with the Veleta. About an hour below the Picacho de Mulhahaçen we passed on our right a small circular lake, the Lago de Caldera, whose height Boissier gives at 10,108 ft. This, notwithstanding its exposition due S. and the burning sun, was still on June 29 half frozen. Just beyond this, before mounting the final cone of Mulhahaçen, we had a peep over the ridge upon the four little lakes, which are cradled in the third gorge, on the NW. flank of Mulhahaçen. The largest of these, though of no great size, is known as Laguna Larga. We could not understand how such an insignificant mountain tarn could merit the name, and afterwards made an expedition to the Col of Vacares in the east of the range, expressly to discover this big lake, but could find no other.

I will not pretend to decide between the rival claims of the Veleta and Mulhahaçen as points of view; but I think with Mr. Ormsby that Mulhahaçen is decidedly the grander mountain. However, any member of the Club visiting these parts is quite sure to make the ascent of both, and decide for himself. He will be fortunate indeed if he is able to discover the coast of Africa from either. I suppose it is not physically impossible, but Mr. Ormsby at last gave it up as a bad job; and for ourselves we were not even tempted to strain our eyes and imagination, as in the course of our different ascents it was only twice that we were able to make out the ships upon the sea.

On both those mountains there are phænogamous plants growing actually to the very summit. I do not know how high flowering plants may reach in the Alps; but in the Pyrenees there are only lichens above 10,850 ft., and above 10,200 ft. flowering plants are very rare.

The following plants, that I gathered on Mulhahaçen within a radius of 165 ft. from the summit, were the *Papaver alpinum*, of a deep orange colour, rather less red than that of the Pyrenees, but the same plant; *Artemisia Nevadensis*;

Viola Nevadensis; *Galium Pyrenaicum*; *Saxifraga Grœnlandica*, var. *mista*; *Erigeron alpinum*; *Armeria australis*; *Pyrethrum radicans*; and *Arenaria tetraquetra*. A little lower down three crucifers—the *Ptilotrichum purpureum*; *Lepidium stylatum*; and *Biscutella saxatilis*.

The plants of the Veleta were very nearly the same, with the exception of the *Papaver alpinum*, which in the Sierra Nevada only grows on the W. flank of Mulhahaçen.

The rocks of both mountains are the same—gneiss intermingled with mica-schist.

On the Veleta, the highest-growing flowers that I observed were the *Saxifraga Grœnlandica* and the *Artemisia*, both of these within a yard of the stone cairn; but the saxifrage with an eastern, and the artemisia with a southern aspect, which would make a vast difference in the annual temperature.

From the Picacho de Mulhahaçen we descended to Capilleria—5 hours. We reached it late at night, but were agreeably astonished at the accommodation of the posada. Mr. Ormsby describes it as a most miserable ramshackle auberge. Ramshackle it indeed is, but I suspect this year, in his travels in the Sierra de Gredos, he often had to put up with worse accommodation. It is true we had to sleep upon the floor; but our usual mess of oil-soup was enriched with eggs, to follow which we had excellent boiled ham, and fair wine.

From Capilleria to Lanjaron takes about 4 hours. With the latter place I was not very pleased. There is a comfortable little hotel, the Fonda Granadina, with a most obliging landlady, and excellent fare. The town consists of one long street of ill-built houses, the very worst paved in Europe. Above and below are thick tangled terraces of orange-trees, pomegranates, figs, and prickly pears, with here and there a chamæleon running among their branches; but in the middle hours of the day it is too hot to stir out. My friend Byles saw at the Paris Exhibition a picture of magnificent many-storied houses, designated the Baths of Lanjaron; but that is an imposition. There are only two baths in a little cottage a kilometre west of the town; and water-drinking seems to be depended on as the principal means of cure.

Lanjaron is practically almost, if not quite, as far as Granada from the three highest peaks of the chain; but it is an excellent victualling depôt on the south side, and has the advantage of possessing as its inhabitant Juan Estevez, who certainly may now be considered the most competent, if indeed he is not the only, *local* guide for the Sierra Nevada. From Mr. Ormsby—who by the way seems to have established a considerable repu-

tation all through that country as Don Juan—and of whom he had a most grateful recollection, he learnt a good deal, and more from us during the nine days he was with us. He is an excellent walker, carries a fair weight, and is very willing. The only approach to grumbling that escaped him was on the occasion of our passing the night on the top of the Picacho de la Veleta, which I am bound to say we all felt rather severely. Of course we had not a spark of fire; Juan had his *manteau*, I and Byles each had a dog, but were without other wraps, and we felt the cold so much that I could hardly understand in the morning how the minimum thermometer placed on a rock should mark no lower than $+4^{\circ}$ centigrade; but I suppose it was the contrast to the day temperature that made us so sensitive. Having reached Granada on the 18th of June, we left it on the 18th of July. In the course of this month we ascended the Veleta three times, including one night on the top, Mulhahaçen twice, and the inferior peaks of Alcazaba, the Machos, and the Caballo, once. We also camped out seven nights in different parts, and on both sides of the range.

I have given a short personal narrative of our first two ascents, as both being made without any local guide, or indeed any indication of the route, they go to show, if nothing else, how little difficulty these mountains would present to any members of this Society.

I will conclude with a few remarks on the general features of the range:—1st. As to the heights. I find the heights taken by Boissier, the most painstaking and trustworthy, and also the most recent observer, were calculated only with a single barometer; that is, he had no opportunity of comparing his observations at the upper station with a simultaneous observation at the lower. I cannot, therefore, agree with Mr. Ormsby, that the heights of the Sierra Nevada have been as carefully measured as any mountains in the world.

I carried with me boiling-point thermometers, and Mr. Byles an aneroid; and my measurements from various stations give the heights pretty nearly the same as those given in Mr. Ormsby's paper, but a trifle lower; and after my computations, the figures deduced from the mean of the several observers are not quite so near the truth as those given by Boissier alone:—The Picacho de Mulhahaçen, 3,567 metres = 11,703 ft. . . The Picacho de la Veleta, 3,487 metres = 11,441 ft. . . The 3rd peak is undoubtedly Alcazaba, north-east of the Mulhahaçen, from which it is two kilometres distant, in a direct line. . . Clemente gives the height, I think, rather in excess, 3,461 metres (11,356 ft.).

The 4th and 5th peaks are west of the Veleta; the Machos, nearest to the Col, which I computed at 10,788 ft.; and the Caballo, the westernmost, which looked at from the Veleta seems nearly as high, but is certainly 358 ft. lower than the Machos. Its height is 10,430 ft. In the centre of the chain there are three principal cols: that of the Veleta, just west of the Picacho, which Boissier puts at 3,399 metres (10,826 ft.); that of Vacares, at the extreme east of the chain; and a third col midway between Mulhahaçen and the Veleta, which seems to have been opened on account of the mine in the Barranco del Infierno. The path ascending from this, the central barranco, gains the ridge a little west of the frozen lake of Caldera, and thence is continued across the south spur of Mulhahaçen to Trevelez.

The most striking part of the chain is the centre portion on the north side between Alcazaba and the Veleta. Though in truth one vast cirque, it is split by two central ridges into three narrow gorges (*barrancos*), opening out rather broader in the upper part, but always distinct: the easternmost being the Corral de la Veleta, the next the Barranco del Infierno. They all have their issue at the head of the Xenil valley, where the house of the mine-inspector, Señor Juan Westermayer, affords fair accommodation, most hospitably extended to anyone coming from Granada to explore these parts. This house is situate seven hours from Granada, just after the bend south into the Corral, above the left bank of the stream, at a height of 5,181 ft. Below the miner's house there is a noble view of the Corral, girt in by the three principal peaks. It reminded me very much of the Cirque de Trumouse, as seen from Héas; but in that there is more snow and glacier.

In ascending the Picacho de Mulhahaçen from Granada, this miner's house would be a very convenient halting-place for any party not caring to camp out. The second day there is time to explore the Corral, ascend Mulhahaçen, and descend to Trevelez, which is less than four hours from the summit. Trevelez is at the foot of the south-east buttress of Mulhahaçen, at a height of 5,333 ft., being the highest village in the Alpujarras, and though larger than Capilleria, it affords much worse inn accommodation.

We found absolutely nothing in the posada, and it was only on paying the money beforehand, and sending out purveyors into the village, that at length with great trouble we obtained bread, wine, oil, and a few eggs. Both at Trevelez and at Capilleria, the snow lies deep for several months in the year, and from all appearances the fall is quite as heavy on

the south as on the north side of the Sierra. At places like Trevezes one has the dignity of sleeping under a roof, but that is all. I do not think that you even get as much repose, and certainly miss the enjoyable sensations of sleeping on the mountain side 'sous les étoiles.'

To camp out, however, with any enjoyment, a fire is absolutely necessary; and one of the great drawbacks of the Sierra Nevada is a scarcity of wood of any kind. Three little prickly plants, *Alyssum spicatum*, *Astragalus aristatus*, and *Arenaria pungens*, are the only growth approaching an under-shrub at any height on the south side of the range. Queer stuff to handle for fuel, and still more queer for a bed; but at 8,858 ft. we were obliged to be content with these. On the north side it is different: in most places there is an abundant growth of juniper, both the common and the savin, the last growing rather the lowest; and at one spot especially, just north of the Machos, we passed a most delicious night at 9,301 ft., having a roaring fire of juniper and a luxuriant bed of thyme.

Owing to many discomforts, and especially to the burning sun and wretched accommodation, I do not think that the Sierra Nevada would ever compete with the Alps and Pyrenees, even if nearer home; but this range has one great advantage over all other European mountains. During the months of June and July, and probably also August, that important element of mountaineering, the weather, need never be considered. It is quite sure to be fine both by night and by day. During the seven weeks we were in Spain we only once experienced rain, and that a short shower.

The great drawback is undoubtedly the extreme heat. When the sun rises, he comes up as a real enemy. He is quite sure to take the skin off your face and hands, so it is no use to struggle against him; but take with you a good dog, and you need fear no other enemy.

What one man can do another can, at all events in the way of endurance. It is all a question of habit and imagination. For the future, when I meet my friends (as I sometimes do) complaining of having been roasted in the Pyrenees, I shall recommend to them a course of training in the Sierra Nevada. For myself, I can only say, that on my return to Panticosa I was seized with a shivering fit, which lasted me all through the month of August, and more than that, for by thinking on that 'fantastic summer's heat' I have kept myself warm this dreary December.

AXE *versus* ALPENSTOCK. By the Rev. H. B. GEORGE, M.A.

IT is now nearly three years since anything appeared in the columns of the *Alpine Journal* on the most important topic which a mountaineer preparing for a Swiss tour has to consider—with what sort of weapon he is to arm himself for the coming campaign. The last notice of the subject was a letter from Messrs. Tuckett and Kennedy, stating their views, from which I do not presume to dissent widely, as to the points mechanically important in the construction of an ice axe. But they incidentally stated the opinion, from which I differ *toto celo*, that an axe is unsuitable for a beginner in mountaineering; and it is partly because every year's experience adds to the strength of my convictions on this point, partly because I believe that men are apt to make the fatal mistake of trying to attain several rather inconsistent objects at the same time, and so fail to attain any of them perfectly, that I am anxious once more to call attention to the question. It is a common thing to say that the alpenstock is enough, and therefore best, for the ordinary mountaineer; that the axe is only suitable for those who undertake very ambitious expeditions. If by the ordinary mountaineer is meant the man who is content with the Cima di Jazi, or the Tschingel Pass, I not only admit that an alpenstock is sufficient, but I would go further and say that it does not matter a farthing what one carries on such an expedition; personally I should choose an umbrella, in order to enjoy with the least inconvenience from heat a very delightful walk. But if among ordinary expeditions are included the Strahleck, for instance, and Mont Blanc, easy ascents enough from the point of view of the trained climber, then I maintain an axe to be by far the wisest implement to carry. If one slips on the Mur de la Côte, or the Strahleck wall, of what use is an alpenstock? I admit that such a slip is not common, but at any rate an axe is a safeguard, an alpenstock is none. If one wants to help oneself up a steep slope, an axe-head gives good support with very little exertion—an alpenstock none, unless driven in with far greater labour. On rocks, whether in ascending or descending, the axe is far superior to the alpenstock; for in climbing up rocks the axe-head may be useful as a claw, the alpenstock must be a mere incumbrance; while in descending, besides the possible advantage of serving as a claw to let oneself down, the axe-head gives something firm to hold by, if a man has to plant the pole below, and let

himself down trusting to its support. It is commonly said that the axe-handle is too short for glissading, and the axe-head dangerous in that case in the hands of novices. My answer on the first point is that the grip of the crutch-handle formed by the axe-head is better than an extra foot of length, and that the man who cannot glissade with a five-foot pole (or what is on this principle an equivalent, a four-foot axe) won't do much better with a longer one. Moreover, genuine glissades are very rare things, so that it is bad economy to sacrifice any real advantage for the sake of a little extra convenience when one does meet with them, even if that convenience be real, which I do not believe. The second objection is partly answered already; it is so seldom that a novice gets a glissade, that the chance of his hurting himself or others on one is infinitesimal. Besides, the first thing a novice does if he loses his balance glissading, is to let go his pole; the mountaineer's instinct to retain his grasp of his axe, whatever happens, is not natural, but rather slowly acquired.

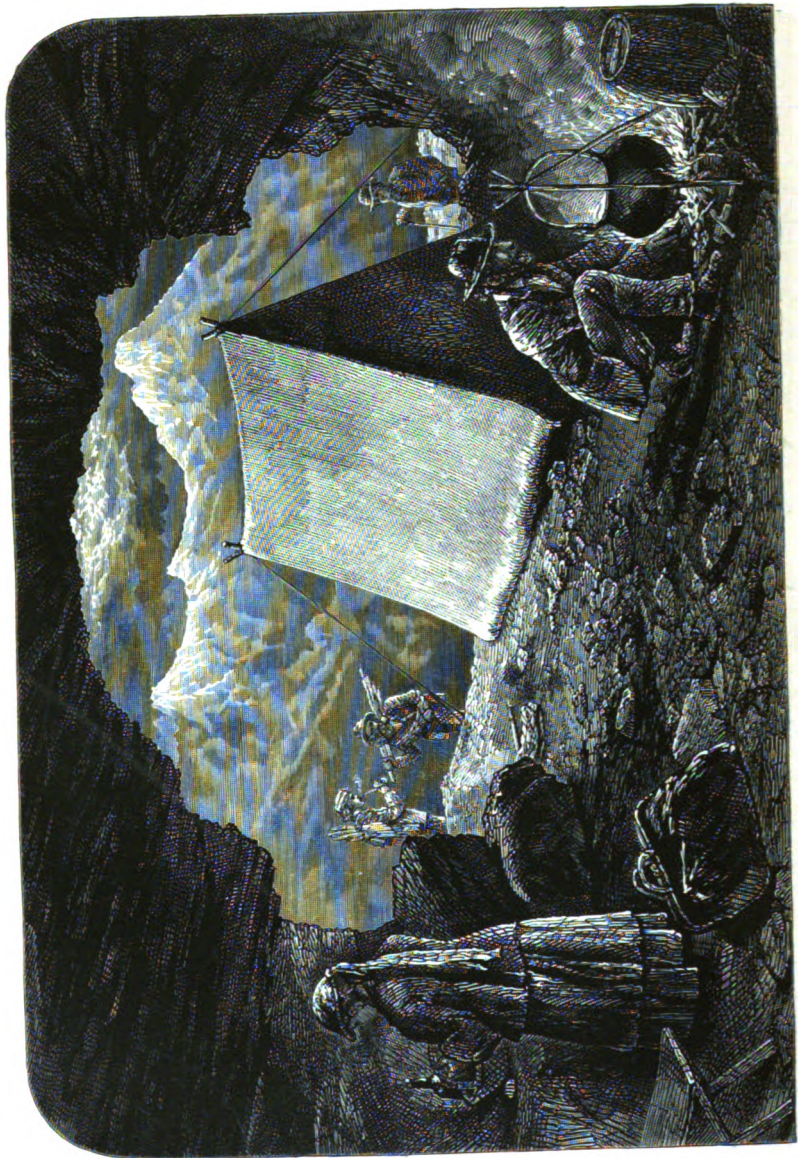
This brings me to the chief question which I am anxious to discuss, namely, whether an axe is good for a novice or not. With a thoroughly clumsy man, there is a considerable chance, I allow, of his making a bad use of an axe, and injuring himself or his neighbour. But he has a fair opportunity of doing mischief with a well-shod alpenstock, unless those who have the misfortune of his company keep a careful watch on his movements, as they are pretty sure to do. And after all, the species is a rare one, thanks to the great variety of athletic pursuits prevalent among young Englishmen. Most men learn how to wield an axe readily enough, probably as fast as they learn to walk in ice-steps. It is not in manual dexterity that a novice falls behind an experienced mountaineer, but rather in mental acquirements which are the growth of time—such as the habit of being constantly on the alert for whatever may happen, the instinctive preparation to meet a jerk, the knowledge how to move so as to gain the maximum of effect with the least effort. And if, as is universally admitted, an axe is a most valuable aid in any emergency to the skilled climber, who is prepared by previous education to meet danger, *à fortiori* the same assistance ought to be in the hands of the novice, who is less able to do without it. For instance, if anyone slips on the most likely place of all for a slip, a slope of snow not hard enough to need step-cutting, but too hard to let the foot sink in, an alpenstock may possibly, by a vigorous and skilful effort, be made to serve as an anchor, but is most probably useless, while an axe-head gives instant and certain hold. The novice who slips, or has

to meet the jerk of a companion's fall, may very possibly make no effective use of his axe, it is true; but with it he has at least a chance, with an alpenstock he is totally helpless. All that has before been said about rock-climbing applies to novices with even greater force; and obviously it is they, who have not yet learned to balance themselves at each step instinctively and without a conscious effort, who especially want the support of constant anchorage in traversing a steep slope, such as an axe alone will readily give.

If authority be worth anything, I can quote frequent cases of good guides giving their own axes, or borrowing those of the more skilful travellers, for the use in awkward places of the less experienced; if personal observation be worth anything, I have seen very clumsy men in the high Alps get on decidedly better with an axe than with an alpenstock.

I have always believed in Mr. Stephen's principle, that one's axe is not *primarily* intended for cutting steps, which is in general the guide's work; and if this be true, greater length than is compatible with the maximum of cutting efficiency is clearly admissible. Exact length every man must decide for himself, according to his fancy or experience. The rough rule commonly given is that the axe ought just to stand under a man's arm, but practice will certainly make a shorter one suffice, and if so, the gain in cutting power is obvious. My own axe is just up to my elbow, or some nine inches shorter than the common rule would prescribe. Shorter than this it cannot wisely be, for a mechanical reason: if the fore-arm slopes *downwards* from the elbow to the axe-head grasped in the hand, when the axe is being used in the ordinary way as a walking-pole, the leverage is very much less than if the arm be horizontal, and so the same work costs a far greater muscular effort. The size and shape of the axe-head are also, as it seems to me, matters in which no important principle of mountaineering craft is involved, however great may be the difference in mechanical efficiency between one shape and another. Personally I do not object to a slight extra weight, or at least believe that it is amply compensated by a gain in length of pick and consequent power for anchorage; but this is no answer to those who take the opposite view, and wish to save themselves every ounce of weight.

I have only one more remark to make, and that is, to bear strong testimony to the value of a ring round the axe-handle, to give something to grip when it is sliding through the hand. The Committee which reported to the Alpine Club in 1864 were the first to suggest this. They recommended a band of



THE TSCHINGEL CAVE.

FROM A SKETCH BY MRH. W. HAWKER.

leather round the pole, about a foot from the spike; a better plan is to have enough of the wood left projecting, in shaving the pole, to form a ring round it, say an eighth of an inch in depth. I have used one ever since it was first recommended, and cannot speak too strongly of its value. It eliminates the single danger that the handle may slip through the hand, while the axe-head holds firm in the snow, and so renders the anchorage of an axe-head, wherever it will bite at all, perfectly trustworthy.

[During a tour in the Alps, made since writing the above, another reason for preferring an axe was forced on my notice. It occasionally happens that one has to go over a steep slope of grass, and here an axe is invaluable. If the grass be long and wet, or short and dry, and it usually is one or the other, the further one goes the more slippery one's boots become; and a fall on short dry grass may lead to a very dangerous slide. But an axe-head pulls one up in ascending, and anchors one in descending or traversing such a slope, where an alpenstock would be of no service whatever.]

A CHAMOIS HUNT IN THE OBERLAND.

By the Rev. W. H. HAWKER.

THE season of 1865 was, as most seasons seem to be in Switzerland, an exceptional one; indeed I have never known two alike. I spent the entire summer there that year, and having taken a house at Interlaken for my family, made that place my headquarters. Unfortunately the clouds did the same, and appeared to have secured permanent lodgings on the surrounding mountains; so that the fine weather, which in other districts of the Alps enabled an unexampled number of mountain-tops to be carried about in the knapsacks and luggage of members of the Club, was wholly wanting in the Oberland.

I had fondly hoped to do a little exploring on the main chain about the head of the Valley of Lauterbrunnen; and so often did I start in that direction at the first break in the clouds, only to be repulsed wet through after a mere botanical scramble, that I too, like Messrs. Hornby and Philpott before their fearful expedition on the Silberhorn, became a sort of standing joke to the inhabitants, whose enquiries Ulrich Lauener ever calmly answered with the quiet chaff that we were practising for the passage of the Tschingel Glacier. This probably was the cause of the same severe object being attributed to those gentlemen. Even that blind nuisance who

makes echoes through a long horn, gave up at last raising his hideous din when he became aware of my approach, regarding me no doubt as a sort of permanent, and to him unprofitable, institution of the place.

The bad weather, however, got tired out at last, for on returning (September 4) from an expedition in the Titlis district, a sharp clear northerly wind promised all that could be wished; the following morning therefore, for nearly the twentieth time, I started for the Tschingel Glacier. Thanks to Whympfer, who let me have one of his tents, I proposed to camp on the moraine above the Tritt, and as we had plenty to carry, I went in for luxury, and took as porter an old hunter, Heinrich Fentz, in addition to Ulrich and Christian Lauener. At the Steinberg chalets we got a supply of milk, and before quitting the trees cut a stock of firewood, a rugged faggot of which falling with other trifles to my lot to carry, incommoded me much on the otherwise easy rocks.

The Laueners were aware of a cave above the Tritt, which they thought might do to camp in, and to it we at once went. As nothing could be more convenient than this cave for any one exploring the district, I wish particularly to call attention to it. Its being a couple of hours nearer the ground than the Steinberg chalets is a great advantage, it is incomparably a more comfortable place to sleep in than those filthy hovels, and by taking with one a supply of desiccated milk for one's matutinal café au lait, one may avoid the détour to the chalets altogether. It is a few minutes to the right of the regular beaten track, is about 18 ft. deep by 15 ft. wide, and 10 ft. high at its mouth; has some convenient ledges to put one's things on, lots of loose slabs with which we made table, seats, and fireplace; some contiguous patches of nettles and monkshood supply means for a luxurious couch, and there is a spring a little below it which runs long after the other rivulets about have been frozen up.

The next morning we started at 4.30, walked to the Petersgrat, and thence ascended the Tschingelhorn, one of the points from which I had long wished to see the view. We at first tried to follow the arête from the Petersgrat, which we found quite as impracticable as it looks from below. As it was we spent a disagreeable hour on it, and were then glad to escape by a couloir on to the glacier; after which we skirted the base of the rocks until we came right underneath our mountain, which on this, the south side, consists of a steep cliff surmounted by a rounded summit of snow. We went straight up this cliff, beginning with a couloir down which a

slight stream was flowing, which whenever I put up an arm in climbing diverted itself into my sleeve and emerged as a bubbling brook at my neck, to my exceeding discomfort. Fortunately a great rock bowling down within a foot or two of us warned us to quit the couloir, so we took to the rocks, which on the whole were good, except at one place, where there were some very large slabs affording but scant footing. Upon a ledge of these nearly 2 in. wide, the Laueners requested me to amuse myself while they performed some singular gymnastics, which I watched with interest, as had they come to grief (which appeared not impossible), I should, I imagine, have been there still. In the end, however, we got to the top at 11.30, having been 3 hours and 20 minutes from the Petersgrat, of which an hour was lost on the arête. The heat was very great; I was therefore not sorry to cut off the top of the mountain, which was pure ice, and eat it to the Queen's health; and this being the first time it had been ascended, we went through the form of making a small cairn as near the top as we could find any rocks. The day was cloudless, and the view, especially of the Nesthorn, Jägihorn, and Bietschhorn, exceedingly grand, and would well repay the trouble of the détour to anyone crossing to or from the Lötschenthal. It took us $1\frac{1}{2}$ hours to descend the cliff, the utmost care being necessary; the Laueners, however, thought that another time it might be more easily ascended by going farther on before ascending the rocks. We reached the Petersgrat at 2.10, and in $1\frac{1}{2}$ hours arrived at our cave.

I had had very little sleep on the previous night, in consequence of a variety of incongruous noises kept up by Fentz, who began by going to sleep with an empty pipe in his mouth, at which he kept sucking so violently that he converted it into a musical instrument of the direst kind: we gained nothing by its falling at last out of his mouth, as he then began to talk and gesticulate in his sleep, and no amount of knocking him on the head with a boot would stop him for more than a few minutes at a time. To-night we took away his pipe and deposited him on a ledge outside the cave, where, if he resumed his antics, he would roll to the glacier below. The cure was perfect, for he remained as still as a mouse till morning. We rather overslept ourselves in consequence; nevertheless at 5.50 we were off again, leaving the tent in the cave for future use, and sending him down to Lauterbrunnen with the luggage.

The state of the glaciers at this season forbade any attempt at exploring the neighbourhood of the Mittaghorn and Grosshorn. I therefore decided on having a look at the country

about the Gamchi Lücke, being led in that direction by an allusion in Mr. Ball's Guide to the possibility of a pass being made from there into the Kienthal, and also by the assertion of the guides that my oft-repeated desire to see some chamois would be gratified here, as, if there was only one left in the Oberland it would be found about the Gamchi Glacier.

My experience of chamois had been hitherto limited to the graven images of the animal produced by those extortionate carvers in wood one meets with at all the low-level places of resort, and the too-frequent sham horns on ladies' alpenstocks; for truth forbids one to include in the category the daily 'gemsbraten' supplied at the hotels on the Wengern Alp and elsewhere to confiding travellers by the contiguous flocks of thriving goats. Moreover, I had seen occasional footprints in the snow, and had now and then come upon a dead one on the ice: this summer I had found three dead ones near the Jungfrau Joch. I therefore hailed with joy the idea of seeing something of the animal in a natural state.

We reached the Gamchi Lücke at 7.40, and I was a little disappointed with the view, and certainly think it scarcely repays one for the trouble of scrambling up the rather awkward slope to get to it, merely to return to the Tschingel Glacier again. Finding the ice-wall too steep and hard to cut our way down, we took to the rocks on our right, and descended as best we could. At one *mauvais pas* we had to crawl along a narrow sloping ledge of red slate, the rocks overhanging so that we were obliged to go on hands and knees, the nearest object below being the glacier at a great depth beneath us. At another place we had to glissade down a very steep couloir of loose stones, till just as we got close to the point where they shot over the precipice we had to spring from them on to a rock which jutted out, and gave a chance of turning a very perpendicular spur. We must have set some hundreds of tons of stones in motion, which poured with deafening roar in a stone 'staubbach' on to the glacier below. In about three-quarters of an hour we got there too, but after zigzagging among the séracs and crevasses for an hour or so, we were glad to quit it again, and get along the moraine until the great mass of the Büttlässen came in our way; round the skirts of this we worked up to the Sefinen Furke; and thence to Mürren, where, after sharing a bottle of champagne between us, we walked down in a little less than an hour to Lauterbrunnen, reaching it in time for a good rest before table d'hôte.

In the course of the day I was able to verify Ulrich's asser-

tion that the Gamchi Glacier was emphatically 'Die Heimath der Gensen,' for we came upon several groups of them: the first, a herd of fifteen, which we saw below us at the foot of a cliff, and whom we greatly surprised by suddenly rolling big stones over at them and shrieking horribly. Finding their retreat up the valley unexpectedly cut off, they were for a few moments much demoralized, but at length took flight across the glacier and up the crags of the Wilde Frau, where they got upon a ledge, from which the guides said there was no exit, and where, had we been armed, we might have followed them and had good sport; indeed with good rifles in experienced hands a great bag might have been made that day.

We subsequently saw a troupe of eight, who retired up the Gspaltenhorn; then seven scurried before us over the Büttlüssen; and our last glance down at the glacier showed us a family party of three at the edge of it, whom I implored the guides not to scare by their usual savage yells; and we left this domestic trio of father, mother, and child in peace. We also found tracks where others had stampeded on our approach without our having chanced to notice them.

The sight of so much game quite decided me to fulfil a long-cherished wish to see something of the mode of hunting the chamois, and I made arrangements with the Laueners for the purpose. In the meantime, as the season does not open in the Canton of Berne until October 1st, I persuaded my wife to accompany me over the Tschingel Glacier to Kandersteg. By sleeping at the Tschingel cave we had plenty of time to make the détour to the Petersgrat, and vary the otherwise rather dull expedition by the exquisite view from that ridge. We were also fortunate two days after in getting a perfectly clear view from the top of the Altels.

A 'permis de chasse' for chamois costs 100 francs, but, fortunately, my house belonged to the Prefêt, who very kindly gave me a certificate for the few days I wished to be out; and accordingly, on Monday, October 2nd, I joined the Laueners at Lauterbrunnen, and taking Henrich Fentz as porter, we went up and slept at Mürren. Starting next morning at 4, we stumbled along by lantern light for an hour or so, and as soon as it was light a dog we had brought was sent down to beat the Scfinenthal to our left; the object being to make sure of not leaving any chamois behind us, for the whole valley having been for some time quiet and free from sheep, there was no knowing how low down the game might not have come.

We had not been long on the Scfinen Alp when Ulrich gave us a sample of his marvellous keenness of vision by pointing

into the distance and saying that there were two 'gems' asleep. Neither Christian nor I could see them at all with the naked eye, even after we had made them well out with a glass. Ulrich went off to stalk them while we lay still and watched, and he was getting on capitally when, unfortunately, our dog went off in hot chase after some animal that took him towards the Gspaltenhorn, whose many precipices, setting all their echoes to work, produced the effect of a thousand hounds in full cry, soon rousing our chamois, who went straight up the Schilthorn and were lost to us.

On arriving at the chalets on the Sefinen Alp we deposited our luggage, breakfasted, and started off for the real work of the day. The guides should have learnt by our recent experience that we were amongst the game, but beyond speaking low, and keeping in the dog, who was a clever well-trained animal, no especial precautions were taken; the rifles were all slung at back (Christian carrying mine as well as his own) to enable us the better to examine the rocks with our glasses, when suddenly we came over a little grassy knoll upon fourteen chamois lying asleep right out in the open within thirty yards of us!

Never were rifles more quickly unslung, and never also did 'gems' get under way with greater celerity. They had got about 150 yards off, when Ulrich and I each had a very fair though fruitless shot at the herd, as it picked its way carefully up the steep moraine on our left, and made for the Büttlüssen.

After watching them out of sight we turned round and looked at each other, and I am bound to confess that after a pause the word 'Dummheit' was uttered with varied but self-convicting emphasis by us all. It being decided to follow them, we clambered up in about an hour to the spot where we had seen the last of them (it did not take them much more than ten minutes), near to a remarkable rock called the 'Gems Kapelle,' beyond which the rocks are very dangerous, so much so, that the Laueners afterwards told me that if the twenty best chasseurs in all Switzerland were picked out, there would probably not be five of the lot who would dare to cross them; indeed the very rock, 'Gems Kapelle,' is so named from the fact that, when the hunter sees a chamois reach it, he exclaims, 'Du bist frei,' and considers that it has gained its sanctuary.

On a pinnacle some distance beyond this rock I was placed with Fentz, and the Laueners followed the herd. According to their account there was a point farther on at which the track

bifurcated: if the chamois had taken the lower, we should have to say good-bye to them, as they could get thence by the head of the Sefinenthal on to the skirts of the Gspaltenhorn; if, however, they had taken the upper track, my *jägers*, as I must now call them, would be able to follow them up until they could get no farther, and then drive them back to me. I could not persuade myself for a moment that our herd, after such a fright, would stop short of the Gspaltenhorn; but there was a chance of there being others on the upper track, where there was a little pasture.

We were all anxious to make up for our owlish stupidity and unreadiness down below; and although I began to warm to the work, and would rather have gone on with the Laueners, not knowing till afterwards of the exceeding danger of the rocks, I felt that their plan was a sensible one. Accordingly they went and I waited; and a dismal time I had of it for some hours, afraid to move hand or foot, and ever on the *qui vive*; as although the chamois would have to come broadside on by me, perched as I was on my pinnacle outside, there was only one spot at which I could shoot with any chance of the game not falling over the precipice. I whiled away a part of the time by watching the graceful movements of a wall creeper (*Tichodroma muraria*), one of the most exquisitely lovely of birds, which fearlessly came fly-hunting within a few feet of my face. As the afternoon wore on, however, it left me. I then cheered myself by fancying that I heard the echoes of a shot or two. At length, perceiving some small stones falling near me I looked up, and saw just above me on the almost sheer precipice, four chamois picking their way, slowly and with the extremest care, along an almost imperceptible ledge. They had no doubt winded me, as I had been troubled by observing that what wind there was blew in that direction, and having enemies behind them were now making a desperate attempt to escape.

It being certain that if I got a shot at this place at all, it would be at close quarters, my rifle had been changed for a double-barrelled smoothbore loaded with slugs. Here, then, was a certainty. I might have picked out the first and third, who in their fall might very probably have overthrown one or both of their companions; but a glance below showed me that there was nothing whatever to prevent their falling many hundred feet to where we could not have got at them; and much as I longed to pull trigger, I could not bring myself to do so stupid and brutal a thing merely for the sake of being able to brag that I had killed right and left at chamois.

I now also remembered that the Laueners had said they did not think there was any outlet up there; so I left Fentz in the track I had been so long watching, with orders to drive back anything that came towards him, and clambered up myself to another pinnacle, whence I could command this new pass at a place where I could fire with some chance of retrieving my game. I had not been very long there, when one of the chamois came back, and peeping at me round the corner, gave a shrill whistle and clattered off before I could fire. This proved the Laueners' surmise to be correct, and I longed for their return that we might follow them up.

But I had still to wait, for the long shadows were melting into twilight before Ulrich's cheery voice was heard, and the welcome cries of 'gems' and 'chamois' soon brought me down stiff and half-frozen from my perch. In about ten minutes the Laueners rejoined us, Ulrich shouldering his game in picturesque fashion. They had found by the tracks that our herd of fourteen had escaped by the lower way, but on ascending the other they came upon a fresh herd of eight, grazing on the scanty pasture. These they drove up the rocks till the poor creatures could get no farther, and actually turned and came bounding right down upon them. They fired and killed two: one they got, but the other, shot through the heart, unfortunately leaped high in the air and went right over the precipice, and must have been dashed to pieces on the glacier below. The four I saw were part of this herd, and had time allowed we should certainly have followed them: this was now, however, out of the question, as we had quite as much as we could do to get our game down the steep rocks on to the open country before it got quite dark. So heavy an animal is a great impediment to speed on rough ground, but we reached the valley at last at about 6 o'clock, and at the stream got a good drink of water, and cleaned the chamois.

Having had very little to eat all day, we were now ready for a good meal, and set about preparing it. The wives of the Laueners, when their husbands go out chamois-hunting—but at no other time—provide them each with a bag full of bread, cut into small squares, and fried with butter, pepper, and salt, like that eaten with pea-soup. A handful or two of this they put into hot water, and it at once made a very palatable sort of broth, quenching the great thirst from which we were all suffering, having had no water since breakfast, as everything was frozen hard, and enabling us to await patiently the proper cooking of the rest of our dinner, the most important *plat* being the chamois 'fry,' of which we made one of the best dishes I ever ate.

The pipes being lighted, we were of course bound to talk the day's work over; and I now learnt how dangerous the rocks had been, Christian saying that on their return he was carrying the dead chamois, but that when they came to the worst part even he, accustomed as he was to rocks, could not carry it over; and he added, with just pride, that he wished I could have seen how nobly Ulrich shouldered it, and walked as upright as a soldier across that fearful place. Ulrich disclaimed all merit, merely remarking somewhat naïvely that he had been more used to carrying chamois; and, indeed, I imagine that few except his poor brother Johann, who lost his life hunting on the Silberhorn, could ever beat him as a *chasseur*. A few yarns followed, and we were just turning in to sleep in some hay that had been left in one of the granges, when up and spoke Fentz, and suddenly volunteered to start off at once in the moonlight, carry the chamois down to Mürren, and bring us back a supply of wine, which we much needed, having brought very little with us. The old man had been curled up asleep under a rock the greater part of the day, and was now as fresh as a 'three-year-old.' So we let him go and turned in, and he got back in time to call us next morning soon after 4.

This time we made for the Sefinen Furke, where we were to lie in wait while Ulrich went off to the right in order to beat the Gross Hundshorn towards us. We had not long parted from him when Fentz, still lively, pointed out a chamois in front of us, and I soon made out two others. We had a long talk after them; Christian trying to get round and drive them towards the Büttlüssen, where I was to try and intercept them; but they winded or heard us, and went right up the Furke. We followed them over it, and leaving Fentz to watch the pass, descended towards the Gamchi to a noted track, where we awaited the result of Ulrich's drive. After a while we heard the dog, and soon two chamois clattered by us, but too far off for the range of our weapons. Ulrich followed, carrying on his shoulders a poor sheep, which had wandered, and was as nearly as possible starved to death. Besides a single chamois or two, and those we saw, he had found a herd of five, which, however, unfortunately went the wrong way.

Our plan now was to work up the Gamchi Thal, Ulrich taking a higher level than we did; if necessary we were to get over the Gamchi Lücke, and sleep in the Tschingel cave; but, to our disgust, we saw two *chasseurs* in the valley below us; we therefore relinquished the idea, and returned for another beat

on the Büttlässen. After a severe climb, I was posted at the spot above the Gems Kapelle where the four chamois had escaped the day before, while the Laueners went farther. Here I waited three hours, nearly frozen to death, till at last the voices of the Laueners reached me from far below; and on joining them, I was rejoiced by finding that they had come upon a couple of chamois, and bagged one of them. So we returned again successful to the Sefinen chalets, and supped once more with hunters' appetites on 'gems leber.'

Next morning rising between five and six, we broke up our camp and strolled down to Mürren; on the way I shot a few Alpine choughs for my collection. After a cup of coffee, we strode joyously and in triumph with our game down to Lauterbrunnen. The place had now a quiet, out-of-season, deserted look about it, but while a substantial breakfast was getting ready, a small crowd, including the Laueners' wives, soon assembled; who, not with echoing guns and cracked alpenhorns, but with kindly greeting, gave us a warm welcome on getting back safe, sound, and successful, from an expedition which had not been unaccompanied by real peril.

After breakfast, we drove down to Interlaken, where finding that my family were all out walking, we had time to erect in the sitting room a trophy of alpenstocks, and hung the two chamois upon them; which greeted their sight as they entered the room on their return, and formed a welcome surprise, as during our absence kind friends, with well-meant croaking, had prophesied that we should certainly get nothing, but probably be all killed ourselves.

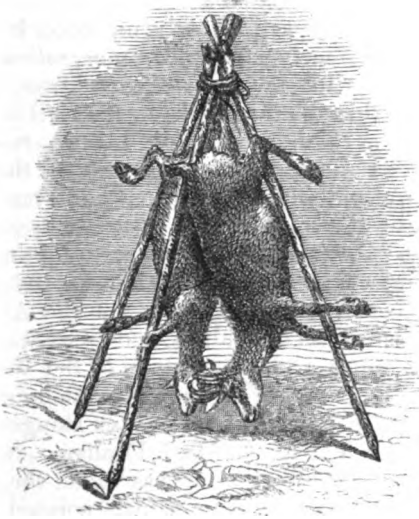
I dare say that to those who have been accustomed to hunt 'big game,' the above account might hardly appear worth recording, and they might be tempted to express themselves much as did some Americans of whom I met a party one day, being *all* carried, five men and three women, in chaises-à-porteurs from Lauterbrunnen to see the Staubbach! On being afterwards asked by some one at table d'hôte, if the view of the fall had repaid them for the severity of the expedition, one of them replied, 'Well, it's fine, but I guess we could put it 'into Niagara with a teaspoon.'

Nevertheless, for my own part, I can say that I found many elements of novelty and excitement in the hunt, as compared with an ordinary Alpine expedition; and I am bound to add, that although it was hard work, I have seldom in my life enjoyed myself more thoroughly than I did in my chamois hunt in the Oberland.

Of the conduct of the two Laueners it is impossible to speak

in too high terms. I had experienced the quality of each of them before as *guides*, but it seemed really necessary to see them out as *hunters*, unshackled by ropes and Alpine gear, and thoroughly excited by the sport, to realise what they really can do. In short, I can only in conclusion add of them words, which will apply equally well to either—

Take him for your guide,
He has often been tried,
And been ever found useful when needed ;
You'll be merry together,
In fair or foul weather,
And you'll shake hands at parting as we did.



NARRATIVE OF ASCENTS OF THE AIGUILLE VERTE AND THE CHARDONNET IN THE YEAR 1865. By ROBERT FOWLER.

WHILE I was descending from Mont Blanc on the 16th of September 1865, accompanied by Michel Balmat as guide, he proposed that I should engage Michel A. Ducroz and himself, and attempt the ascent of the Aiguille Verte. Ducroz had been up this mountain in the month of July in that year, as one of the guides of Messrs. Hudson, Kennedy, and Hodgkinson; accordingly we picked him up, and started on the afternoon of the 16th September, at 4 P.M. We left the Montanvert at 6; and reached the Pierre à Berenger soon after 9—doing the latter part of our way by the light of a lantern. A wall of stones is built round the overhanging sides of the rock, and we found a very comfortable bed of hay in the cave thus formed, as well as some wood left behind by former visitors. A roaring fire and some mulled wine inadequately prepared us for the attacks of a strong north wind, which penetrated through the chinks in the wall of loose stones, and compelled me to lie sleeplessly till we rose at 3 A.M. Nothing was to be gained by starting early, as the day did not dawn before 5 o'clock, and we could not get over much of our route by the light of a lantern. We set out therefore at 4.10, and crossing the glacier of Talèfre went straight up the Jardin, and then, turning a little towards the left, ascended the sloping snow-covered glacier towards the foot of the Aiguille Verte. This glacier presented no difficulties, and as we went over it, we gazed up at the rocks and ice couloirs of the Verte, and laid out our route. We saw before us two couloirs of ice coming down from the arête, called, I believe, Les Rouges, which connects the Aiguille Verte with Les Droites. Between these couloirs, of which that on our left was much the larger, there is a ridge of rock descending from a little pointed aiguille. It appeared to be practicable and free from all danger of falling stones, many of which lay about in the snow near the foot of the great ice couloir and under the rocks of the Verte itself. We agreed that when sufficiently high up to avoid the risk of stones we would cross the great couloir, and continue the ascent up the rocks of the Verte. This plan was afterwards considerably modified for the worse, for our difficulties were decidedly much increased by the change which we made, and at least an hour of extra time was consumed in the ascent. Reaching a comfortable place on the rocks, we stopped for

second breakfast at 8 o'clock, and in about half an hour set out again. Ducroz led, and continued the ascent by the ridge of rocks. They proved easy; but when we had reached a considerable height, we found those on our left too steep and smooth to allow of our reaching the great couloir, nor could we climb the pointed aiguille from below. We therefore had to turn to our right, and reached the arête of Les Rouges at the summit of the lesser couloir. Up to this time there had been no difficulty, and we had not even been tied together, but we were now driven by the impracticability of the southern face to search for a way round the northern side of the aiguille to the ice arête leading towards the summit of the Verte. Ducroz went forward by himself, but whatever the southern side of the range in fact was, the northern appeared far more difficult, and he soon stopped to consult with Balmat. The latter joined him, and in a short time they called on me to follow—over and among large rocks cropping out from the snow, some of them quite overhanging the glacier below, and seeming as if they were only held from toppling over by the grasp of the ice from which they projected. Turning to the left up a slope of snow we got to the summit of the pointed aiguille. We here found that we had a very steep descent down rock before we could get on the ice arête; the rocks were, however, sound and good, and we were soon upon it. The ice was hard and blue. Ducroz, who had the rope coiled over his shoulder, after asking me 'As-tu peur, monsieur?' sprang out to cut steps on the northern edge of the arête, holding on with one toe



over its edge, while his weight rested on the other foot. The cutting of steps proved so laborious, that he shortly proposed to

go along *à cheval*. While climbing the rocks, we all agreed that it was better not to be tied together; it would have impeded our movements, and as the rocks afforded us good hand and foot hold, being of hard gneiss split everywhere with cracks, which would allow of putting in the fingers and sometimes the whole hand or foot, I thought them so safe that the rope was not in any way necessary. Here, however, while going along the arête, and chiefly for the sake of Ducroz, who was cutting the steps, I thought it should have been used. Twice I proposed this, but met with no response from the guides. Ducroz had the rope coiled over his shoulder, and to take it off and attach ourselves would have been a difficult matter while on the arête; we should have done this when we finished the descent of the pointed aiguille, but Ducroz, who showed everywhere the greatest courage, had at once started forward to cut the steps. He acted as leader all through our ascent; but from his want of knowledge of the names of the surrounding mountains, I should think he had not been long a guide, though he told me he was upwards of forty years of age, and I doubt if he had ever before been a leader in a difficult expedition. We had laid out from below what we afterwards found would have been a shorter and easier route than that by which we ascended, and I think he showed a certain want of skill in continuing the ascent by the ridge of rock past the point at which it was practicable to cross the great couloir. But to return to our position on the arête. We had on our left the great couloir running down in a continuous sheet of ice to the Talèfre Glacier, and on our right a slope also of ice, with rocks jutting out here and there, not quite so steep at first, but apparently more so lower down, as it soon became lost to view. Below this slope lay the Glacier of Argentièrre, which, as well as the Talèfre, was 3,000 ft. below us. Ducroz and I, and I believe Balmat—but I did not look back to see what he was doing—went along



à cheval, dragging ourselves by the spikes of our axes or sticks. I, however, soon changed this for the extended posi-

tion in which a sailor gets out along a spar, having my elbows, knees, and toes clinging to the arête, which was very narrow. We went on thus till we had crossed above the great couloir: here the arête became steeper, and Ducroz proposed descending to the rocks a little way below us on our left. Eight or ten steps cut in the ice brought us to them; we went along the junction between the ice and rock till nearly under the summit, when we turned up the ice-slope again, and then a short way along the arête to the highest part, which was flat and had in consequence some snow on it. Here I saw two sticks with pieces of red ribbon left by poor Mr. Hudson and his party in July; we had picked up a blue handkerchief on our way up, and I tied it to one of the sticks. Mr. Hudson had ascended by a couloir leading to the arête connecting the Verte with the Moine, and reached the summit along this arête. But as his party, consisting of good mountaineers, were $26\frac{1}{2}$ hours, with but few and short halts, in making the ascent from the Couvercle, where they had slept, and returning to Chamouni, I should suppose their route was much more tedious and difficult than Mr. Whymper's, which required but 17 hours between the same points, or than that followed by me, which took a little less than 18 hours, including halts, from the Pierre à Berenger to the summit and back to Chamouni. Mr. Whymper, who made the first ascent with Christian Almer and Franz Biener as his guides, made use of the couloirs which flank the ridge of rocks by which I went up. I believe he ascended the lesser one on the right for some way, then crossed over to the great one, and went up it till it became ice, when he took to the rocks under the summit. He must have crossed these diagonally, as he reached the summit by the arête connecting it with the Moine. In September, when I ascended the Verte, the two couloirs were ice down to the very bottom, and no progress could have been made up them. Probably the rocks were easier, as they were more free from snow.

It was half-past 12 o'clock when we were at the top of the Verte; so we did not remain long, but roped ourselves for the descent of the short piece of ice down to the rocks. Taking off the rope, we descended these till we came to the narrowest part of the great couloir. As we approached this there were two falls of stones from above; a loud noise was heard, and looking up, we could see them bounding with frightful velocity; but on each occasion we could take refuge behind a rock which at least seemed large enough to protect us. At one time Balmat loitered behind looking for crystals, and dislodged a

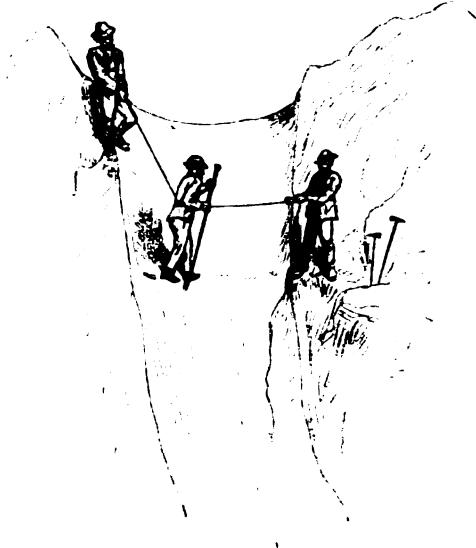
small stone, which fell down and struck me on the back of my head, cutting me slightly through my hat. When we reached the great couloir Ducroz cut steps across it, to the number of twenty or more; while doing this he was in a dangerous position, for if stones had then fallen down the couloir, it seemed doubtful if he would have had time to regain the shelter of the safe rock where Balmat and I were waiting. When all the steps were cut we two hurried over, and found ourselves on the ridge by which we had ascended, a little above the place where we stopped for a second breakfast. Nothing remarkable occurred as we retraced our steps down the rocks and over the glacier, now slippery with half-melted snow. It was nearly 5 o'clock before we reached the Jardin; and it was with the help of our lantern that we arrived at the Montanvert at half-past 8 P.M. We had to stay a short time there to settle our bill for supper the previous evening, and walked into Chamouni a little before 10 o'clock P.M.

I am sure that at least one hour was lost by our too long-continued ascent of the ridge of rock between the couloirs, which necessitated the turn to the right and the ascent of the pointed aiguille, as also the very slow and difficult passage along the ice-*arête*. I think the way followed by us in our descent to be far easier and shorter than that by which we went up; and probably the danger from falling stones might be avoided, were the traveller to set out earlier from the *Pierre à Berenger* than we did, so as to reach the summit and return to the glacier of *Talèfre* before 1 o'clock P.M., until which time the stones did not appear to me to fall. Perhaps if the upper part of this glacier were well known, the ascent might be made by light of lantern up to the rocks.

While we were on the summit of the *Aiguille Verte*, Balmat suggested that it would be desirable to go up the *Aiguille du Chardonnet*, which he said had never been ascended. Accordingly, with the same guides, I set out from *Argentière* on the morning of the 20th. After a long gradual ascent to the proper right of the glacier we came to the moraine of a tributary glacier originating in a couloir on the side of the *Chardonnet*, consisting at that time of very black ice. After half an hour's halt, at 6.30 we climbed the rocks to the left of the little glacier, which was itself on too steep a slope to allow us to make our way up it without step-cutting. Presently finding an easy couloir without any ice leading to the ridge overlooking the *Glacier du Tour*, we mounted it in hopes of finding some way to the summit of the *Chardonnet* on the side next that glacier; but on reaching the col we saw that the rocks of the *arête*

leading thence to the summit were too steep and too smooth to be practicable. To the glacier, however, it seemed possible to descend, and the guides tried to persuade me to go over this new pass and give up the attempt at the summit. I think they were both tired; and Ducroz certainly showed but little of the energy he displayed on the Verte. However, as we had still plenty of time, I insisted on returning to the route we had laid out from below. This we did, descending towards our right by another couloir free from ice or snow, which brought us to the black ice couloir. Here we stopped at 12 o'clock to dine, and in half an hour started for the summit. Keeping along the edge of the black ice, we ascended with it on our right, and soon found to our great joy that there was another couloir leading up at the back of the smooth rocks, which had hidden it from our view when below. There was some snow in this couloir, and we went up along it and the rocks on our left, till we again reached the ridge running from the Chardonnet towards the north-west. We now turned up along the arête, which here is easy, and is formed of ice towards the Glacier du Tour and of rock towards that of Argentière, till we came to a lesser peak, separated from the higher part by an arête of ice, rounded gently on the side towards the Glacier du Tour. Here I proposed that we should make use of the rope. Ducroz carried it, and proceeded to uncoil it, but somehow he managed to tangle it a good deal. It was a long Alpine-Club rope, which had been given as a present to Balmat by some former tourist. After many efforts to unravel the tangle, Ducroz suddenly threw it on the ground, took off his coat, and danced upon it and the rope, screaming out what I suppose were oaths in his patois. Balmat and I laughed heartily at his rage, and when he quieted down a little, helped him to undo the knots. A few steps had to be cut to reach the top of the arête, which is wide. We then came to some steep rocks, then to another arête of ice still easier than the last, and afterwards ascended by rocks to what seemed from below to be the highest peak. But here we saw, still farther on, a peak considerably higher, connected with that on which we stood by a short arête of ice, the sharpest I ever saw. It was the top of a couloir, which reaches straight down to the glacier between the Chardonnet and the Aiguille d'Argentière. Some ten or twelve ft. down rocks projected here and there through the ice; so we let down Balmat by the rope to one of these, while Ducroz and I held on above. Balmat then cut steps across. The couloir was so steep that as I followed my left shoulder brushed against the ice. Ducroz and Balmat,

one on each side of the couloir, held the rope, to which my belt was attached by a ring. Ducroz would not come after us, but stopped on the lower peak till we returned. After crossing



this couloir there was no further difficulty, and at 2 o'clock Balmat and I stood on the summit. The view was magnificent—the aiguilles of Argentière and Verte being close at hand. It was very similar to, but I think not quite as fine as, the view from the Verte. Not a cloud was in the sky. On a flat stone at the summit Balmat and I put a few stones, with a bottle in the middle of them; for we had not time to make a regular stone man. Ducroz left his handkerchief, with a stone laid on it, on the rock where he had stopped. We returned as we went up, excepting that we made some use of the little sloping glacier which had been on our right at the commencement of the ascent. We rested half an hour at its foot, ate our supper, and set out again: evening was coming on, and I was very lame. A loose stone, that turned as I set my foot on it, had struck me on the side of the leg. Our progress was slow, and it was nearly dark when we reached the place where our lantern had been deposited. Balmat at once found it, and, lighting it, we continued our descent. We did not get to Argentière till 9 P.M.: here we hired a char, and drove down to Chamouni. This was the first ascent which had been made of the Chardonnet, and it is certainly strange

that, with virgin peaks each year getting scarcer, a mountain considerably more than 12,000 ft. high close in view of the Col de Balme should have been left untouched. The ascent is not so difficult as that of the Aiguille Verte, and, I should think, is free from any danger from falling stones.

THE SWISS 'ALPENCLUB.'

THE valuable annual publications of the various foreign Alpine Clubs being—partly perhaps from the language in which they are written—less known in this country than they deserve, we propose in the following pages to lay before our readers a *résumé* of a portion of the contents of the last (4th) 'Jahrbuch des Schweizer Alpenclubs,' for 1867-8, which appeared during the spring of this year.

The proceedings of the Club since 1866 are first described in a paper by Dr. F. von Tschudi, from which we learn that the summer of 1866 proved very unfavourable to the designs of the members, and that but little was, in consequence, accomplished towards the exploration of the district ('Exkursions-Gebiet'), specially chosen at the general meeting at Chur, as the object of detailed investigation, viz., that section of the Central Alps comprised between the passes of the Great St. Bernard and St. Théodule. The area originally set apart had been subsequently restricted to the Mont Blanc de Cheillon group, between the Col de Fenêtre de Chermontane, and the Col de Colon, its west portion having been already more or less thoroughly explored, whilst the east division, extending from the Col de Colon to the St. Théodule, was left for another year. The Vice-President—the well-known Herr Weilenmann of St. Gallen—undertook in the autumn of 1865 a preliminary reconnaissance of the 'Exkursions-Gebiet,' whilst the preparation of a special 'excursion-map' on a scale of $\frac{1}{80000}$ based upon the original Federal survey, with contour lines at intervals of 100 ft., was entrusted to the firm of Wurster & Co. of Winterthur—already so famous for their chartographical publications. Considerable attention was also devoted by the Committee to the establishment and organisation of guide corps and the arrangement of tariffs, especially in the sections Rhätia, Tödi, and Monte Rosa. Investigations into the nomenclature of remoter valleys, especially near the points of contact of different languages, were set on foot, and lastly, in order to stimulate the zeal and economise the efforts of the members, a pamphlet was issued, containing suggestions for observers on a variety of

subjects, such as the geological and mineralogical character of mountain tops, the movement of glaciers, the height of the snow line, the limits of vegetation, the superior limits of the growth of trees, rural economy, quarrying stone, topography, folk-lore, physical phenomena, &c. By this means, it was hoped, a rich store of materials might in time be accumulated for a future volume on Swiss mountain craft.

Whilst the Central Committee was thus engaged, the eleven sections into which the Club is divided pursued their own peculiar objects, with more or less activity. In the Section Geneva (President Professor A. Favre; eighty-six members), numerous topographical and scientific papers were read, corrections and additions were noted for future insertion in the Federal map, the extension and distribution of erratic blocks was made a subject of particular study, a special organ—'L'Écho des Alpes'—was set on foot, and arrangements were made, in concert with the Sections Monte Rosa and Diablerets, for a French translation of the annual volumes of the Club.

The Section Diablerets (President M. Auguste Bernus; twenty-nine members) was prevented by the unfavourable weather from completing the erection of a refuge on the Diablerets or carefully exploring the neighbouring excursion ground, though early in July, Herr Isler accomplished ascents of the Barne Blanche, La Salle, Mont Pleureur, Pigne d'Arrolla, and Pointe d'Otemma. In other parts of the country various independent expeditions were made by members of this section, but it may suffice to mention here an ascent of the Tödi by Dr. J. Piccard, from which he returned direct, viâ the Klein Tödi and Sand Alp—a route which, it is believed, had not been tried since Hegetschweiler's abortive attempts.

The Section Monte Rosa (President Herr A. v. Torrenté; twenty-four members), established in October 1865, had been principally engaged in getting itself into working order, arranging a collection of books and maps, and drawing up guide rules and tariffs for the different valleys. Unfavourable weather put an end to all their projected tours in the official district, and an ascent of the Ofenhorn in the Binnen Thal—described as one of the finest points of view in the Valais—is the only 'free expedition' alluded to.

Section Bern is the most numerous of all, numbering 118 members, who are worthily presided over by that veteran mountaineer Herr G. Studer, 'the Nestor of the Alps.' The meetings were frequent, numerous attended, and well provided with papers on a variety of subjects. The library had received large accessions, whilst the construction of a hut in the

Trift district, as well as the repair of that on the Mönch Joch, was discussed.

The Section Pilatus (President Herr Rector Zähringer; forty-five members) accomplished a sectional excursion to the Hochstollen viâ the Milchsee Alp, whilst ascents of the Surenen-eck, Grosses Spannort, &c., were effected by individual members, and arrangements were made, especially in Uri and Unterwalden, for the organisation of guides, &c.

The Section Aargau (President Herr A. Neuberger; ten members) seems to have had to content itself with a policy of masterly inactivity, thanks to the persistency of the bad weather.

The Section Basle (President Professor Rütimeyer; seventy-three members), always active, seems in 1866 to have borne away the palm from all the rest. A convenient club-room, a library of 650 volumes, a rich collection of maps and panoramas, as well as of specimens illustrating the geological structure of the Alps, &c., afford every facility for information, and that these advantages are made good use of is shown by the fact that, throughout the year, meetings were held every fortnight and attended by twenty to forty members, whilst papers, either single or in a connected series, were freely contributed. Amongst the excursions accomplished by various members it may suffice here to mention the Kleine and Grosse Windgelle and Grosses Scheerhorn, by Herr F. Hofmann; the Claridenhorn, Kehlengletscher, &c., by Herr E. Burkhardt; the Hüfistock, Oberalpstock, and Grosses Scheerhorn, by Herr v. Haller; the Sustenhorn and Tschingel Glacier, by Herr Lüscher-Stapfer, &c. In the Valaisan official excursion district, the Mont Fort, Mont Pleureur, Mont Gelé, and Serpentine, were climbed by Herr E. Hoffmann; La Salle by Herr F. Hofmann-Merian; the Col de Cheillon, Durand Glacier, &c., by HH. Finniger, Hoffmann-Burkhardt, and Raillard; the Col du Crêt, Glacier des Eculaies, and Col de Riedmatten, &c., by Herr C. Osir-Paravicini.

The Section Uto (Zurich) (President Herr Siber-Gysi, successor to Professor Ulrich who had been elected Central President; eighty members), held monthly sittings during the winter, at which papers on mountain expeditions, the Alpine commissariat, hypsometry, &c., were read. In actual expeditions little was accomplished by the Section during the year.

The Section Tödi (President Herr Landrath Hauser) reported various successful sectional excursions, such as the ascent of the Ortstock from Schönenbühl, the exploration of the little-known group of mountains between the Hausstock

and the Kisten Pass, the ascent of the Ruchi returning along the ridge of the Hausstock and Mättlistock, and so descending into the Durnachthal. Besides these, the indefatigable Herr Hauser effected the ascent of Piz Urlaun, both summits of Piz Cristallina, the Düssistock, and the Scheerhorn.

The Section Rhätia (President Herr J. Coaz; 100 members), appears often to have combined its sittings with those of the Grisons Naturalist's Society, but finally resolved to hold special meetings of its own. Amongst private expeditions we may mention the first ascent of the Tinzenhorn by Herr E. Hauser, in which our own countryman Mr. D. W. Freshfield took part, that of the Verstanklahorn by Herren F. Brosi, and Jacob; together with the Sruors near Pontresina, and the highest peak of the Disgrazia by the guides A. Flury and P. Jenni. These last are described as being 'both *really* first ascents'—a mistake, as regards the second expedition, which probably rests upon Herr Siber-Gysi's erroneous inferences in his paper on the Disgrazia (Jahrbuch, vol. iii.), already disposed of by the writer of the present notice in the May number of this Journal, page 49.

Finally, the Section St. Gallen (Central Section of the year; 105 members), although diligent in holding meetings and reading papers, accomplished little in the way of exploration in its collective capacity. Herr Weilenmann, however, during a visit to the official excursion district (Mont Blanc de Cheillon) in July, crossed the Col de Crête Sèche, and the new glacier pass between the Trouma des Boucs and La Ciardonnay, effected the first ascent of the Bec Épicoun, and finally climbed the Pointe d'Otemma, after which the unfavourable weather put a stop to mountaineering. Dr. Schläpfer, starting from the Vereina Alp, ascended the virgin summit of the Plattenhorn in the Silvretta group.

The extraordinary meeting of delegates, twenty-one in number, for considering the modifications in the rules proposed by the Central Committee prior to their being submitted to the general meeting, took place at St. Gallen. An ordinary meeting of the same representatives followed in which the annual budget was discussed. The receipts for 1866, including the balance brought forward from the previous year, amounted to 7,190 francs, and the payments—inclusive of 919 francs expended for the Excursion map—to 1,938 francs, leaving 5,251 francs in hand, whilst the estimated expenditure for 1867 amounted to 2,049 francs. It was decided not to appoint any fresh excursion district for 1867, but to retain that for 1866 (the Mont Blanc de Cheillon group), in which, owing to the

weather, so little had been accomplished, whilst for 1868 the subdivision from the Col de Colon to the St. Théodule was reserved, thus giving time for the preparation of the necessary maps, itineraries, &c. Lucerne was selected as the place of holding the next general meeting, and it was further resolved to set aside a sum of 1,000 francs per volume as remuneration to the members of the special committee entrusted with the duty of editing the Jahrbuch. At Herr Coaz's suggestion, it was determined to use every means at the disposal of the Club to bring about the publication, on a scale of $\frac{1}{300000}$, of the original Federal topographical survey of Switzerland.

On the following day, the ordinary general meeting of the Club, at which about 105 members were present, took place. Professor M. Ulrich was chosen Central President, various other matters were satisfactorily disposed of, and the proceedings wound up with a banquet, bonfires, an excursion to Weissbad (in Appenzell) and the Wildkirchli, &c., in the most satisfactory and 'lustig' manner.

Next in the order of contents of the new volume of the Jahrbuch follows a report by Professor M. Ulrich of the proceedings of the central committee from November 1866 to July 31, 1867, from which it appears that the former editorial committee of the Jahrbuch had declined to be reappointed, but that an able substitute for a period of three years had been found in the person of Professor Theobald of Chur. The proposition for a French translation of the Jahrbuch proved difficult to carry out, but, after some delay, the necessary arrangements were concluded with Messrs. Schmid (Dalp) of Berne and Georg (Neukirch) of Bâle.

Another important subject of deliberation was the Excursion district and map, with reference to which we extract the following particulars literally:—'The group of mountains between the Grand Combin and Mont Colon, was selected for the year 1866, and an itinerary was compiled by the section St. Gallen. The season was, however, so unfavourable, that, at the annual general meeting held at St. Gallen, it was resolved to retain the same excursion district for 1867. The Excursion map for 1866 consisted of a single sheet, embracing the heads of the valleys of Bagne, Hérémente, and Arolla. To the north it had no distinctly defined limit, and the Grand Combin had to be excluded in order to make room for the title. The central committee at Zurich considered it desirable that the Excursion map for 1867 should be enriched by the addition of a northern sheet carrying it up to the Rhone, and that, by the removal of the title to the west side of the upper

sheet, the Grand Combin should also find a place on the map. The whole of the Hérens, Hérémece, and Nendaz valleys, with the upper portion of that of Bagne, are now included in these two sheets, and it only remains to express a hope that expeditions in this highly interesting section of the Pennine Alps may be more favoured by the weather than in 1866. It was further determined at St. Gallen, that in future the excursion district should be selected two years in advance, and that, for the summer of 1868, it should comprise the group of mountains between Mont Colon and the Lyskamm, with the valleys of Einfisch, Turtmann, and St. Nicolas, and that with this object a map should be prepared, consisting of two sheets, to be ready for delivery to members in the spring of 1868. The Rhone will in this case also constitute the north boundary, and their west extension will correspond with the east limit of those of 1867.'

'For the accomplishment of the aim of the Club—to give a complete delineation of, and thoroughly to explore, the mountain system of the southern Valais, a further extension of the map to the west and east is, however, still requisite, and with this object the committee propose to themselves a twofold task. First, as respects the west side from the Col de Balme to the Grand Combin, to bring out in the course of 1868 two more sheets, comprising the valleys of Ferrex, Entremont, and Bagne. The expense—about 1,000 francs—is justified by the consideration that for 1867 no *new* map will be necessary, but only an extension of that for 1866. For 1869, the mountain group from the Lyskamm to Monte Leone, including the valley of Saas and pass of the Simplon, will be selected as the official excursion district. Thus, in the course of three (or, including 1866, of four) years, we shall obtain, on a scale of $\frac{1}{100,000}$, a general view of the mighty mountain *massif* of the southern Valais, in eight uniform sheets, comprising 32' of longitude and 47' of latitude (the first sheet extending a few minutes further to the north, on account of the Velan), and executed on the system of contour lines, a work not only appropriate to the objects of an Alpine club, but which may render valuable service in other departments of research, as well as prove honourable to ourselves.'

The report of the committee then goes on to refer to the subject of special subventions, and informs us that, in addition to the original sum of 600 francs granted in 1865 towards the construction of the Silvretta hut, a further contribution of 67½ francs had been voted at the request of the section Rhätia for the purpose of completing some additions and improvements.

The hut had stood the winter very satisfactorily. The section Tödi having, in the year 1863, erected a roomy hut on the Grünhorn on the route followed in ascents of the Tödi, and received from the central fund 946 francs in three instalments, and having now applied for assistance in the construction of a refuge in the Steinhäli at the foot of the Ruchen Glärnisch, at an estimated cost of 400 francs, the committee resolved to grant a subvention of 200 francs. The section Bern desired to erect near the hut in the Trift district—for which 150 francs were contributed by the Club in 1864—a new stone one at an estimated expense of 867 francs, and received from the committee a promise of 500 francs. The old hut, if it withstands the effects of the winter, will probably be devoted in future to the use of guides and as a storehouse. Lastly, the section Pilatus has had a model of that mountain constructed in relief at a cost of about 300 francs, towards which the committee have granted 150, on the understanding that it shall be freely accessible to members of the Club.

To the same category belong two private undertakings of which the committee cordially approve. Herr Statthalter Studer, of Berne, has in hand a list of the first ascents of mountains of 12,000 ft. (Swiss) and upwards in height, and Herr Direktor Szadowsky, of Chur, has been authorised by the central committee to prepare an alphabetical list of Romansch and Ladinisch names of places and mountains, with their signification and correct orthography. Both of these catalogues, according to the dimensions they assume, will appear either independently or as contributions to the Jahrbuch.

With this preliminary general sketch, we propose to close the present notice, but hope in our next number to lay before our readers an analysis of the very interesting series of papers contained in the new volume of the Jahrbuch.

F. F. T.

SUMMARY OF NEW EXPEDITIONS DURING THE SUMMER OF 1868.

Bernese Oberland.

June 17.—Mr. Malkin and Mr. F. Martineau, with Melchior Anderegg, made a new route from Kippel direct to Schwarenbach. ‘We followed the Löttsch-pass (to Kandersteg) for more than two hours, as far as a group of chalets called Kummén. There turned south by compass up a valley, name unknown, divided into three successive basins. There seems to be a small glacier in it, for I am nearly sure we saw ice; but the whole was full of snow, old and new, there having been a

heavy recent fall. The col is called Milderstein, and a remarkable rock at the top (visible from Leuk and the Gemmi route) is called the Milderstein height, probably about 9,000 feet—Cooke's Aneroid, 22'20". This is a pass known, but little used, from Kippel to Leukerbad, there being an easier beside the Torrent-horn. Steep descent over snow-beds into the Dalathal, to the foot of the Flue Glacier, probably for 2,000 feet. Ascent on the other side for as much or more, skirting the hillside over steep grass and shale, to a col west of the Rinderhorn, between it and a pinnacle of rock called Plattenhorn. Some stiffish rock-work at the top. No difficulty on the other side, which descends rapidly and easily to the N. end of the Dauben-see, in little more than an hour. Time from Kippel to Schwärenbach about eight to nine hours, for average mountaineers, actual walking.

There is another col between the Altels and Rinderhorn, which would be shorter; but it is higher, and probably more difficult, and Melchior thought it would be unsafe for us, from recent snow. He had been to the top of both passes from Schwärenbach; but never over, and was very anxious to make out the route,—no doubt, as considering a through route to the Bell Alp or Äggischhorn a valuable discovery for the Schwärenbach inn. This may excuse my giving greater prominence to this notice than the difficulty of the pass would warrant. But the Lötsch-thal is too little known, and the whole route from Schwärenbach, whether to the Bell Alp by the Beichgrat, or to the Äggischhorn by the Lötsch-sattel, or to Lauterbrunnen by the Petersgrat, is of the grandest order. We christened our col (provisionally) the *ANDEREGG JOCH*.—A.T.M.

June 27.—Mr. Morshead, with Christian Almer and his son, took a new route up the *WETTERHORN*. On turning out of the Scheideck path, instead of going along the Enge, they struck straight up the north face of the mountain, making for a notch in the ridge overhanging the Scheideck. Passing through this, they struck into the ordinary route about an hour above the Gleckstein. Time from Grindelwald to the summit 6h. 5m., fast going. This route saves two or three hours at least, thus rendering the expedition one of moderate length for a single day; but the grass is too steep to descend easily or safely, though no mountaineer would find any difficulty about ascending with ordinary care.

OLD STRAHLECK.—*July 1.*—Messrs. George and Morshead, with Christian Almer and Hans Baumann, crossed this pass for the first time, as is believed, within living memory. 'We had slept at the Kastenstein with another purpose, which was frustrated by the weather, and adopted this as a new route to the Grimsel. The pass lies over a gap in the Mittelgrat (the ridge running from the Schreckhorn towards the Finsteraarhorn), about a third of the way down it. It is not the most obvious gap, but one about 200 yards to the right of it. The descent is by a couloir extremely like the ordinary Strahleck, but certainly steeper. We descended partly by the rocks, as is often done on the Strahleck, but found them considerably more difficult than those of the Strahleck wall, so that the descent in all occupied about 1½ hour. This pass is rather lower than the Strahleck, is much the same in character on the Grindelwald side, and more difficult on the Grimsel

side, and does not command nearly so fine a view. It cannot, therefore, be recommended except as a change for those who know the Strahleck and Finsteraar Joch. But our expedition may be said to have set finally at rest the long disputed question as to the exact situation of the Old Strahleck, and to have established by experiment the truth of the view which Christian Almer held when we explored the Finsteraar Joch together in 1862.—H. B. G.

Expeditions made by Mr. G. E. Foster.—July 21.—With Hans Baumann and a porter from Grindelwald, I left the chalet beside the lower Grindelwald Glacier about 3.30, and crossed the cirque of the Viescherhörner, between the lower Viescherhorn and a point called the Pfarrerhorn, then bearing to the left over snow slopes, ascended some steep rocks which are much swept by avalanches, and reached the col to the left of the Ochsenhorn at 4.15 P.M., the last slope having taken over six hours to cut steps up. Ascended the Ochsenhorn in fifteen minutes from the col, returning to which we descended to the Viësch Glacier by some awkward broken rocks, and reached the Rothhorn cave at 8.45. The pass I propose to call the OCHSENJOCH.

July 23.—We crossed the Lauteraar Joch in about thirteen hours from the Grimsel, descending from the top of the pass straight down the Upper Grindelwald Glacier to below the Gleckstein, a route which saves three or four hours, and I believe has not been taken before.

July 28.—The same party with Peter Bernet, instead of the porter, left the Kastenstein at 5, reached the top of the Finsteraar Joch at 7.45, and the Agassiz Joch at 11, and striking up the arête from there reached the summit of the Finsteraarhorn at 1.50. The rocks of the Agassiz Joch and the lower part of the arête are much disintegrated and unpleasant climbing. We descended to the Faulberg by 6.30.

UNTERAAR JOCH.—Aug. 1.—Mr. A. Giles Puller, with Alexandre Mënnich from the Äggischhorn as guide, and Andreas Jaun of Meyringen as porter, made a new pass between the Studerhorn and Finsteraarhorn, which it is proposed to call the Unteraar Joch. They quitted the Pavillon on the Unteraar Glacier at half-past 3 A.M., and halted at 5.30 A.M. for thirty minutes, just where the route of the Studer Joch quits the Finsteraar Glacier. The route thence lies between two ridges of rocks, of which that on the right, facing south, is entirely denuded of snow, that on the left hand, facing north, is below partially, and higher up entirely, covered with snow. After two hours of glacier work, they took to the continuation of the right-hand ridge, the rocks of which are very feasible; and from thence a steep snow-slope leads to the summit of the pass, which is somewhat higher than the true col or depression between the Studerhorn and the Finsteraarhorn, which was reached at 9.30 A.M.: descending by a *cheminée* to the head of the Studer Firn, they ascended very slightly to the col which separates the Rothhorn from the Finsteraarhorn. Descending by a snow-slope to the Walliser Viescher Firn, they ascended a third time, and crossed the Grünhorn Lücke at 3 P.M.; the Faulberg was reached soon after 4 P.M., and after an hour's rest, the Äggischhorn hotel at 8.30 P.M.

DREIECKHORN.—Aug. 26.—T. L. Murray Browne, with Peter

Bohren and P. Schlegel of Grindelwald, left the *Æggischhorn* at 3. Passing the Marjelen See, they crossed the Great Aletsch Glacier to the southern side of the ridge of rocks, called on the Federal map, Beim 2. Turning to the left, they mounted, partly by moraine, but principally by the glacier, till they arrived at a long snow shoulder, which lies above Beim 2, 3, and 4. They followed this shoulder right on to the angle of the chain, above Beim 4, whence they could look down on the glacier leading to the Löttschen Lücke. They then turned sharp to the left, up towards the peak, and crossed a large bergschrund. Time, 8.10. A steep slope of hard ice was then encountered, which required care and step-cutting. This led to the rocks, constituting the north-eastern arête of the mountain. These were easy, and were followed to the apparent summit. There is however another point, a few yards nearer the Aletschhorn, which is a little higher. Both were mounted. The top was reached at 10. The view was good, especially of the 'Place de la Concorde,' which lies immediately at the foot of the mountain, while the Aletschhorn itself constituted a most magnificent object. Leaving the summit at 11.15, the party crossed the bergschrund at 12.15, and reached the Faulberg at 2.20. The above times must be taken as approximate. The expedition has the advantage of being one of the few ascents which can conveniently be effected in one day from the *Æggischhorn*.

EBNEFLUH (19,000 ft.)—*Aug. 27.*—The same party as above left the Faulberg at 5.30. They made, at first, pretty straight for the peak, expecting to get up somewhere on the side of the Gletscherhorn. On a nearer view, however, Peter Bohren pronounced this difficult; and a long détour was therefore made in the direction of the Löttschen Lücke. The party passed completely round the ridge which runs down from the peak in the direction of the Aletschhorn; and then turning to the right, made for a time in the direction of the Mittaghorn. They then bent to the right again, up the western side of the ridge aforesaid, and picked their way along the snow slopes, till they reached the southern arête of the mountain, a few hundred yards from the peak, which was attained at 10.50. View good. Nothing could be easier than the whole ascent, which was entirely along snow slopes, nowhere very steep. The party quitted the summit at 11.15, and reached the *Æggischhorn* at 5.

Expeditions by Mr. F. Pollock.—BERGLISTOCK.—*Aug. 26.*—I crossed the Lauteraar Joch from the Pavillon Dollfus, with Peter Rubi and Peter Baumann of Grindelwald, ascending the Berglistock on the way in two hours' climbing from the Lauteraarsattel. From the summit we came down in an hour to the high plateau of névé on the Grindelwald side, and reached Grindelwald in about $5\frac{1}{2}$ hours more of clear walking. The view we gained amply repaid the détour, as the Berglistock is admirably placed for the sight of the Wetterhörner and Schreckhörner, and commands the whole expanse of the Gauli Glacier. Our ascent was the third as yet made; the first is described by Dr. Aeby in 'Das Hochgebirge von Grindelwald.' He calls the rocks by sundry hard names which I think they scarcely deserve; they are much broken, but afford good hold everywhere, and present no serious difficulty.

Sept. 4.—With the same guides and Johann Bischof of Lauter-

brunnen, I reached the point on the northern ridge of the Gspaltenhorn, already attained by Messrs. Hornby and George. Rubi and Baumann reconnoitred some way in advance, descending with some trouble to a snow-slope, by which they mounted to the rocks at the base of the final peak—the spot which, as seen from Mürren, seems to constitute the chief difficulty. Baumann got beyond this, and reported that the remaining part of the ascent was straightforward: but there was much fresh snow in very bad condition, and the stones were frozen hard together beneath it, so that, if we had succeeded in reaching the top, the descent would have been extremely dangerous. We therefore had to abandon the attempt for the present. The Gspaltenhorn is probably practicable during only a few weeks in the year, about the end of July or beginning of August.

KLEIN-SCHRECKHORN.—*Sept. 7.*—I went up the Little Schreckhorn with Peter Rubi, this being the third ascent. It is a very interesting day's excursion from Grindelwald, and deserves to become more frequent; the only difficulty is in avoiding the path of falling ice-blocks from an overhanging cliff of the Kaastenstein Glacier. The best course is to mount by the moraine and rocks beyond the couloir, and traverse the glacier above the ice-cliff. In ascending, we took a more direct but difficult way up the main buttress of rock south-west of the peak. The aspect of the Great Schreckhorn from the tributary summit is unique, and would alone repay the expedition: it presents itself as a beautiful symmetrical pyramid, the central object of a group worthy to form a setting to it. We left Grindelwald at 4.30, reached the summit at 12.30, and were back at 7.

Pennine Alps.

GRANDES JORASSES.—Mr. Horace Walker, with Melchior Anderegg and Johann Jaun, of Meyringen, as guides, and Julien Grange, of Courmayeur, as porter, ascended the highest peak of the Grandes Jorasses on June 30. They passed the previous night on some rocks about $4\frac{1}{2}$ hours from Courmayeur. Next morning they followed for some distance the route taken by Mr. Whympers and Mr. George, and then, after crossing the ridge which leads up to the peak ascended by them, struck over the glacier where it is nearly level to another rocky ridge which runs almost up to the highest peak. This they ascended without difficulty, and were then only separated from the summit by a short snow-slope. The ascent occupied $4\frac{1}{2}$ hours from the gate, and the descent to the same place $2\frac{1}{2}$, excluding stoppages. The snow was in excellent order, and there would have been no difficulty in passing from one peak to the other.

NEW ROUTE UP MONTE ROSA. *Made by Messrs. K. E. Digby and R. B. Heathcote.*—We left the Riffel at 3.30, and followed the route of the Lys Joch, up to a small patch of rocks visible from the Riffelberg side of the Gorner Glacier, immediately to the left of the icefall of the Grenz Glacier, where we halted for breakfast at 7.35. Left at 8.5, and continued in the route of the Lys Joch for another half-hour. At 8.35 we turned to the left amongst the séracs of that branch of the glacier which lies in the hollow between the ridges running from the Hôchste Spitze. We made our way without difficulty, by means of convenient snow

bridges, to the foot of a wide and steep slope of ice and snow lying between the rocks which form the western buttress of Monte Rosa and those below the Höchste Spitze. This slope runs without interruption up to the well-known 'Sattel.' The snow being in good condition, we ascended by it, instead of taking to the rocks on the left, which were quite practicable, though perhaps more difficult than those higher up. After ascending the slope, having to cut steps in the ice for the greater part of it, for about a third of the distance between the bottom and the arête, we took to the rocks, which are not difficult, and reached the Sattel at 10.5. From this we followed the ordinary route to the summit, which we reached at 11.20. We had everything in our favour: the snow in excellent order, the weather fine, good bridges in crossing the séracs, and Melchior Anderegg to lead. Under similar circumstances we can recommend the route as far finer and more interesting, though of course more difficult, than the ordinary way. It leads past the fine icefall of the Grenz Glacier into the heart of the valley between the Lyskamm and Monte Rosa. In point of time we reached the Sattel about half an hour later than a party which moved fast from where we had separated, at the point where the Monte Rosa and Lys Joch routes diverge. Guides: Melchior Anderegg, Moritz Andermatten, Franz Biener.—K.E.D.

THE MATTERHORN.—M. Seiler has, with great spirit, at his own expense, built a hut on the Zermatt arête of the Matterhorn. It stands on the arête itself at a height of about 12,000 ft., and is well sheltered from falling stones by a huge buttress of rock. It is somewhat smaller than that at the Faulberg, and is well provided with straw and rugs, but does not boast of any stove, which is rather a drawback at such an elevation. At a pinch it can contain ten persons, but four or five is enough for comfort. On this side no chains have been fixed, and they are, indeed, quite unnecessary.

The Matterhorn has been ascended several times this year. On July 27, Mr. Elliott, with Knübel of Zermatt and one of the Lochmatters, slept at the chalet, and next day made the first ascent from Zermatt since the accident. They reached the summit in about $4\frac{1}{2}$ hours from the chalet, and descended again in rather less time. The summit is quite altered this year, and they found no traces of any previous party.

The next day Professor Tyndall, with Carrel and other Breuil guides, ascended from Breuil, finding the ascent quite easy from a new route, which avoids 'the Corridor,' and from the chains placed at all difficult places. They descended to Zermatt, and the Professor speaks of the descent as extremely difficult. Probably he did not take the route now adopted by the Zermatt men. On August 2, M. Thioly and another gentleman from Geneva, with Carrel (?) and other guides, slept at the hut on the Zermatt ridge, and the next day reached the summit in about $5\frac{1}{2}$ hours from the hut. They descended on the Breuil side to avoid the difficulties of the descent to Zermatt.

On August 3, Mr. G. Edward Foster slept at the Zermatt hut, and made the ascent on the following day, descending again to Zermatt. We have received the following remarks from him:—

'On Monday, August 3, with my guides, Hans Baumann and Peter

Bernet, both of Grindelwald, I started for the ascent. At the last moment, they persuaded me to take also Knübel of Zermatt, as neither of them had seen the mountain before, but, as I expected, the addition was quite unnecessary. We reached the hut without any difficulty in about $8\frac{1}{2}$ hours from Zermatt, but it could easily be done in six, as we halted more than two hours to avoid the showers of stones which fall in the heat of the day, and present the most serious danger in the ascent. The next morning, we started at 4, as soon as it was light enough, and fearing the wind, which showed signs of rising, climbed unusually fast, and about 5 reached "the elbow." Here we halted about ten minutes to put on the ropes, which allowed about forty feet between each of us. We then crossed on to the northern face of the mountain for about 200 feet, and again climbed straight up, soon striking the arête again. The rocks here are as precipitous as is possible to climb, but give good hold, and present no serious difficulty in ascending. The upper slope of the mountain was covered deep with powdery snow, and we ran up to the summit, which we reached at half-past 6, $2\frac{1}{2}$ hours after leaving the cabin. The wind was blowing with great violence, and we were unable to stop more than ten minutes at the summit. Except on the Italian side, it was perfectly clear, and the view was one of unusual magnificence. The descent demanded most unusual care, as it would have been, I believe, quite impossible to have arrested any serious slip, and the snow-slope was in a most dangerous condition. It was far worse to descend the rocks to "the elbow" than it had been to ascend them, but there was no more serious difficulty than I have met elsewhere in the Alps, and with care to avoid the slightest slip, an accident was impossible. On reaching "the elbow," we saw some twenty feet of rope hanging on the rocks on the face some distance above us, which had probably broken off poor Lord F. Douglas in his fall. We could probably have reached it, but the furious wind which was raging forbade the attempt, and one of my hands was already slightly frost-bitten. In about three hours' actual walking, $3\frac{1}{2}$ hours altogether, we arrived at the hut, and after resting there, returned easily to Zermatt by half-past 3. I may add that I do not think the rocks more difficult than those of the Schreckhorn, but the descent to "the elbow" demands more care, as it would be almost impossible to arrest a slip. I have little doubt that the ascent might be made in one very long day from Zermatt, and believe, under favourable circumstances, nine or ten hours would suffice to reach the summit, and about eight more to descend.'

Two or three other ascents have been made since Mr. Foster's, one of them by three Englishmen together. It would seem that the line of ascent adopted by the Zermatt guides, who have now traversed it several times, is slightly different from that taken on the first ascent, the northern face of the mountain being crossed at a rather lower level. But though it has thus been demonstrated that the Matterhorn is not a mountain entirely *sui generis*, though other peaks that have been ascended are certainly more difficult, it is obviously very far from being an easy mountain, and it is strongly to be hoped that ambitious novices will not be tempted to begin there the acquisition of Alpine experience.

Itinerary of a Tour in the Caucasus, made by Messrs. D. W. Freshfield, A. W. Moore, and C. C. Tucker, with François Devouassoud, of Chamouni, and Baqua Pipia, a Mingrelian servant.

1868	Route	Observations
June 26 -28	Post road from Tiflis to the station of Kazbek.	
June 29	Reconnaissance of Kazbek. Ascent of a snow peak to the south-east of the mountain; 5 hours up; height 10,500'.	
June 30	Start for the ascent of Kazbek. 6 hours up to the last available rocks, on the left bank of the glacier on the south side of the peak, where we pitch our tent (11,150').	Easy ascent by the glen in front of the post-station.
July 1	Ascent of Kazbek (16,546'). Up the glacier to a slight depression between the summit and a second peak to the west; thence direct to the top (9½ hours). Descent from the col on the north side towards the Dariel road, and bivouac (7½ hours from the summit) with the shepherds in a glen which opens into the main valley of the Terek, about 8 versts from Kazbek station.	No difficulty from the tent up to a height of 14,800 ft.; above, as far as the col (16,200') a steep and dangerous ice-wall, costing 4 hours' work; thence to the top, easy. Descent on the north side easy throughout, but long and circuitous.
July 2	Return to Kazbek station (3½ hours).	
July 3	Post road to Kobi station (2½ hours' drive). On foot to Abano in the upper valley of the Terek (3½ hours).	
July 4	To Resch (3¾ hours). Pass (10,700') to Zacca in Dwalyth (5 hours); down the valley to Kesat Kan (2½ hours).	At Zacca, a regular row with our Resch porters, who stole one of our cloaks, and resisted with violence our efforts to regain it. The Zacca people unfriendly.
July 5	Down the valley, by a rugged and difficult route to Dalla Kar, and up the western branch	

1868	Route	Observations
July 5	of the upper valley of the Ardon to Teeb, on the Mameson road (9½ hours).	
July 6	Over the Mameson pass (9,500') to Gurshivi in the valley of the Riom (9 hours).	Much snow on both sides of the pass; road, a broad horse-path, in bad order, but has since been improved. People at Gurshivi very civil.
July 7	At Gurshivi. Reconnaissance of Adai Khokh (15,244'). Bad weather.	
July 8	Down the valley to Gola (4 hours).	
July 9	To Chiora in the western branch of the valley of the Riom (4 hours).	
July 10	Glacier pass to the valley of the Uruch. Route of the Gurdzi-eva's pass to the point where, leaving the glacier, it turns sharp to the left up steep snow slopes. Thence ascend to head of the glacier to a very conspicuous col, 11,200' (10¼ hours). Descent on the north side by a snow couloir of excessive steepness to the small glacier traversed by the known route of the Gurdzi-eva's pass. Bivouac in the forest at the point where the glen occupied by this glacier opens upon the great glacier at the head of the southern branch of the Uruch valley (3½ hours from col).	We made this pass by chance, when looking for the Gurdzi-eva's pass, which is practicable for sheep.
July 11	Difficult glacier pass to the valley of the Riom. Follow up the great glacier at the head of the Uruch valley; 6 hours in a bad ice-fall, then 3 hours over snow-fields to crest of the chain, at a point south-east of Tau Burdisula, and looking down into a glen leading straight to Gola, 12,200' (12¼ hours from bivouac). The	We propose to call this pass 'Karagam Pass,' from the name of the torrent which flows from the great glacier on the north side.

1868	Route	Observations
July 11	descent into this glen seeming too difficult, we made a détour to the left, and found a fairly easy way down into the next glen to the east, where we bivouacked (4¼ hours from the col).	
July 12	Down to Glola (2½ hours). Up western branch of the valley to Gebi (4 hours).	
July 13	At Gebi. Bad weather.	
July 14	With ten porters to the shepherds' hut at the head of the western branch of the Riom valley (8¼ hours).	Very bad weather, and way difficult, usual path being impracticable, owing to destruction of bridges.
July 15	Pass of the Garibolo Höhe (9,600') to the valley of the Tzenes Khali. Bivouac at the point where the lateral torrent by which we descended joins the main stream.	
July 16	Pass (8,400') to the branch of the Tzenes Khali valley watered by the Zeska torrent. Down it to its junction with the torrent of Koreeldatsch. Bivouac in the forest (10¼ hrs.).	Very bad weather, and difficult route through dense swamps and forests.
July 17	To Gibiani at the head of the valley of the Ingour (8½ hours), following up the Koreeldatsch, and crossing the mountains to the north-west, by a good path over luxuriant Alps, bare of snow even at the top of the pass. Height, 8,750'.	
July 18	At Gibiani.	At Gibiani the people
July 19	Down the valley to Davba (3½ hours). Then up a lateral glen to the north-east and bivouac not far from the glacier at its head (2¾ hours).	were very hostile. Our things were stolen, and then sold to us again. We only got away on the 19th, after
July 20	Pass (9,000') to Adisch (4½ hours); down the Ingour valley to Xuni (5½ hours).	a violent row, revolvers in hand, and it was fear of our firearms alone
July 21	Down the valley to Latal (9½ hours).	which prevented our being plundered. The

1868	Route	Observations
July 22	Down the valley to Pari (9 hours).	walk down the valley of the Ingour was a sereis of disputes with the man who led our baggage-horse, and who did all in his power to delay us, and expose us to the violence and extortion of his compatriots.
July 23	At Pari.	At Pari, for the first time since leaving Kazbek, we met Russian officials in the shape of ten Cossacks, who were most civil.
July 24	With eight porters, to a bivouac in the valley of the Nakra, which falls into the Ingour some way below Pari (10 hrs.)	
July 25	Ascent of the Nakra valley to the head of its eastern branch. The valley runs north for a long way, then turns sharp to the east, and then splits into two branches running respectively north and south, and filled with small glaciers. We bivouacked at the junction of these two branches (8 hours).	All this country is very imperfectly represented on the great Russian map.
July 26	Pass to the valley of the Baksan (10,800'). Up the northern branch of the valley (2 hours), then by steep grass and snow slopes in a north-eastern direction to the col (2½ hours). Descent by a small snow-covered glacier and the glen below it to the main valley of Baksan (2¾ hours). Down the valley to a chalet (2 hours).	In spite of its height, this pass is practicable for cattle. The inhabitants of Sueneth are in the habit of crossing over to Baksan and carrying off the cattle. We met a party returning with eleven oxen thus obtained.
July 27	Down the valley to the village of Uruspieh (5 hours).	Prince Ismail of Uru-spieh and his brothers received us with great hospitality. The people of the Baksan valley are Mahometans.
July 28	At Uruspieh.	

1868	Route	Observations
July 29	Start for the ascent of Elbruz, with five porters. Up the valley of Baksan to a little above its junction with the glen, through which passes the route to the Nakra valley. Thence, up a glen to the north-west, closed by a glacier descending from Elbruz, and bivouac on the alp near the foot of the glacier, 8,000' (9 hrs.).	
July 30	Up the glen, past the end of the glacier, and by steep slopes on its right bank to a point on the rocks on that side, almost on a level with the great snow plateau to the south-east of the mountain, where we pitched the tent in a well-sheltered place, 11,950 ft. (4½ hours).	
July 31	Leave the tent at 2.10 A.M., cross the great plateau, and up slopes beyond, to the base of the final peak (5½ hours). Shaly rocks to the top (2¾ hours), which was reached at 10.40 A.M. Descent by the same route to the alp below the glacier (6 hrs.). Height, 18,526 ft.	Intense cold made the ascent toilsome, but we met with no serious obstacle. The volcanic origin of the mountain is obvious. The top is a three-sided crater, filled with snow; on the ridge which surrounds it are three points of about equal height, and at some distance from each other. We visited all three, two being free from snow, and on the point first reached, which seemed to be actually the highest, built a small stone man. Two of our porters, Djapojef Djatchi and Sotaef Achia, reached the top with us.
July 31		
Aug. 1	Return to Uruspieh (7 hours).	
Aug. 2	At Uruspieh.	
Aug. 3	On horseback down the valley of Baksan to Atashkutan (12½ h.).	

1868	Route	Observations
Aug. 4	To Tzonitski in a bullock-cart (9½ hours). To Pätigorsk in a char (3 hours).	
Aug. 5	At Pätigorsk.	
-8		
Aug. 9,	Post-road to Naltschik.	
10		
Aug. 11,	At Naltschik.	
12		
Aug. 13	Start for the valley of the Tscherrek. Bivouac in the forest (11 hours' ride), some distance above the junction of the two principal branches of the valley, leading respectively to Balkar and Bezeengi.	
Aug. 14	Up the valley of Balkar as far as the village of Mukol (4½ hours).	The Chief of Mukol received us with great hospitality. There, as at Uruspieh, the contrast between the industry and courtesy of the Mahometan population, and the idleness and ruffianism of the Christian tribes on the south side of the chain, was very great.
Aug. 15	At Mukol.	
Aug. 16	Up the valley of Balkar to the point where it forks east and west, marked 'Karaul' on the Russian map (7 hours).	
Aug. 17	Ascend the slopes (3 hours) behind 'Karaul,' to examine the Kotschtan Tau (17,096') and Dych Tau (16,925').	The eastern branch of the valley of Balkar, and its lateral glens, are entirely filled with a great glacier, the end of which is about an hour's walk only above 'Karaul.' The country is very inexactly laid down on the Russian map.
Aug. 18	Over the Stuli - veesk Pass (10,500' ?), to the first châteaux in the valley of the Uruch (10 hours).	

1868	Route	Observations
Aug. 18		group is very fine. Neither Dych Tau nor Kotschtan Tau seemed to us accessible from the direction of Balkar. It is possible that from the side of Bezeengi one or the other may be practicable.
Aug. 19	Down the valley of the Uruch to Zadelesk (11 hours' ride).	
Aug. 20	To Novo-Christianski by the village of Tuga-Nova (11 hours' ride).	On the afternoons of the 19th and 20th, heavy rain fell, and the forest above Tuga-Nova was almost impassable with mud. We were much helped by a Cossack, sent up to meet us at the head of the Uruch Valley by General Lorrismélekov. The people of Novo-Christianski were most inhospitable.
Aug. 21	To Ardonk (2½ hrs.' ride). Post-road to Vladikavkaz (5 hours).	
Aug. 22,	At Vladikavkaz, the Dariel road	
23	being broken up by floods.	
Aug. 24	Post-road to Tiflis.	
-26		

N.B.—The heights in most cases are only approximate.

In reference to the above expedition, the following letter has been addressed to the Editor of the Alpine Journal :—

Dear Sir,—The following paragraph having appeared in the 'Pall Mall Gazette' of September 12, I at once pointed out its inaccuracy in a letter to the editor, which, however, he did not insert—

' Referring to the late ascent by three Englishmen of the Elbrus and Kazbek mountains in the Caucasus, a German paper remarks that it is a mistake to suppose these mountains were then ascended for the first time. In 1829 Adolf Kupffer, the mineralogist; K. A. Meyer, the botanist; and other philosophers, were sent on a scientific mission into the Caucasus by the Academy of Sciences at St. Petersburg, and ascended Elbrus with some Circassian guides. The history of this expedition is given in Kupffer's " Voyage dans les Environs du Mont Elbrouz dans le Caucase, entrepris par ordre de sa Majesté l'Empereur

en 1829. Rapport fait à l'Acad. Imp. des Sciences de St.-Pétersbourg," St. Pet., 4to, 1830; and also in Klaproth's "Nouveau Journal Asiatique" for January, 1831, No. 37. As for Kazbek, it was ascended by the geographer Moritz Wagner, brother of Rudolph Wagner, about the year 1844.

It is, I think, due to Messrs. Freshfield, Moore, and Tucker, that statements of this nature, implying a doubt of their accuracy as well as denying their claims to priority, should be exposed. Referring your readers for full particulars to the article by Mr. H. B. George, in the second volume of the Alpine Journal, p. 170, which contains a full translation of that part of M. Kupffer's volume which relates to the attempt on Elbruz, made by himself and his companions, I may, perhaps, be allowed, for the benefit of those who do not happen to possess the volume in question, to state as briefly as possible the real facts of the case.

M. Kupffer was one of several *savants* who accompanied General Emanuel in a politico-geographical progress through some of the northern valleys of the Caucasus, in the course of which, having reached the head waters of the Malka (8,000 ft. above the sea), the party, with the exception of the General who remained below, started at 10 A.M. on the morning of the 21st July, 1829, and at 4 P.M. attained the edge of the snow, at a point the height of which many assumed to be not far from 11,000 ft. Here they encamped for the night, and at 3 the next morning started with some native (Circassian) mountaineers and a few Cossacks. At first all went smoothly, but as the steepness of the slopes and the heat of the sun increased, their progress became more laborious, until at a point which was determined to be 14,000 French (14,921 English) ft. above the sea—and therefore *really* 8,600 English ft., though estimated by them to be only 1,400 French (1,492 English) ft., below the summit—M. Kupffer and three of his companions fairly knocked up. In spite of this, with strange looseness of expression, he proceeds to add:—'However, this first attempt had succeeded beyond our hopes. On entering the Caucasus we had believed Elbruz inaccessible, and in a fortnight *we were on its summit!*' Meanwhile, M. Lenz, who, accompanied by two Circassians and a Cossack, had preceded his friends, got as far as the top of a ridge of rocks in the direction of the summit by 1 P.M. and *then turned back*, as time ran short and the snow was soft.

It appears, however, that the General, seated before his tent in the valley, had been watching the proceedings of the party through a telescope, and had noticed the halt of one group at the foot of the rocks and the progress of the other up them, when, 'suddenly, he observed a single man far in advance, who had already almost crossed the tract of snow between the top of the rocks and the summit of Elbruz. The man was seen to approach the scarped rock which forms the actual summit, walk round it, disappear for a moment against the dark-coloured rock, and *then vanish behind the mists which again filled the valley, cutting off all view of Elbruz.* This took place at 11 A.M.: the General could no longer doubt that one of us had reached the summit; and he could see, by the colour of the dress, that it was a Circassian, but the distance was too great for his features to be distinguished.

Killar, as the Circassian was named, had known how to profit by the morning's frost. He had crossed the snow long before us, and when M. Lenz reached his highest point, Killar was already on his return from the summit.' Whether Killar really did or did not attain the highest point, and whether the latter was not, indeed, hidden by the 'mists,' which are a weak feature in the evidence, he, at any rate, received the promised reward of 400 roubles, and appears to have enjoyed locally the reputation of having succeeded. In any case, however, the recent ascent by our countrymen and F. Devouassoud is the first that has been effected by any but a native mountaineer.

The so-called 'ascent' of Kazbek by Herr Moritz Wagner in 1844, of which no one had heard at Tiflis, turns out, on investigation, to be still more utterly the result of the imagination of the writer in 'a German newspaper.' I had good ground for refusing to believe that, if it had taken place, it could have been unknown to Herr Wagner's countryman Dr. Radde, as well as to General Chodzko and other first-rate authorities at Tiflis, which Mr. Freshfield and his companions found to be the case; and my friend Mr. F. E. Blackstone, having kindly examined for me at the British Museum Herr Wagner's own narrative of his travels in the Caucasus ('*Der Kaukasus in den Jahren 1843 bis 1846*,' von M. Wagner. Leipzig: Arndtsche Buchhandlung. 1850), has set the matter finally at rest. He informs me that, in the volume in question, there is not the least foundation for the statement that he ascended Kazbek. Herr Wagner writes:—'During the absence of my travelling companions I visited the nearest environs of Kazbek, and ascended this famous mountain to the lower limit of eternal snow (*bis an die untere Grenze des ewigen Schnees*).' The walk to the point selected by our countrymen for their bivouac is well described, and the narrative then proceeds:—'There, from a point nearly 11,000 ft. in height, an unimpeded view was obtained over the whole glacier region, &c.,' with which that from the hut on the Aar glacier is compared. It is like the case of the French tourist who had '*fait l'ascension du Mont Blanc*,' but, upon being cross-examined, naïvely admitted that he had been '*pas tout à fait sur la cime, mais jusqu'au Montanvert*.' I am, dear sir, yours very faithfully, F. F. TUCKETT.

THE ALPINE REGIONS.*

It is but a few weeks since the genuine lover of the Alps had an opportunity of being thoroughly disgusted by reading in the 'Times' an account of certain proceedings in the Valais on the occasion of extending the new railway from Sion to Sierre. A party of the most preposterous Paris cockneys, with a number of representatives of the press, went to Sierre to celebrate the event, and would have ascended the Gemmi if they had not had the misfortune to make their guides (as they were pleased to call the mule-drivers) so drunk that very few could be induced to go beyond Leukerbad. In the speeches

* *The Alpine Regions of Switzerland and the Neighbouring Countries.* By T. G. Bonney, M.A., F.G.S., &c., Fellow of St. John's College, Cambridge.

at Siere and in the newspaper articles which followed, the true commercial spirit was supreme; and no one seemed to have any idea of the Alps except as a disagreeable obstruction in the way of travellers into Italy—an obstruction which doubtless ought never to have existed, but was at last to be happily disposed of by the exertions of a speculative railway company. Fortunately for those who do not wish to see the splendid Simplon road made into a railway, and who are still well pleased to have as much time as possible to contemplate the magnificent scenery on both sides of the pass, the very slow advance of the company even on level ground will be reassuring.

To those who, instead of looking upon the mountains as 'cold obstructions,' have learned by experience to regard every feature of them with affection, and to those who as yet know but little of the subject, Mr. Bonney's book will be equally welcome. The novice will find an abundant collection of useful information, and the accustomed mountaineer may enjoy going again in these pages over many a scene of his former wanderings. It is strange, moreover, if he does not find something new to him, for Mr. Bonney's experience has been undoubtedly large. In his preface he informs us that he happens to have a tolerably general acquaintance with the whole chain, having in the course of ten journeys wandered, usually on foot, over every Alpine district included between lines drawn, one through Genoa westward and the other through Venice northward; during which he has crossed about eighty mountain passes, explored a good deal of rarely-visited country, and had, as he believes, a fair view of every important peak of the Alps, from the Viso to the Terglou. After this amount of wanderings he says that in the present volume he has endeavoured to put together 'notes which may serve not only to give a general idea of the Alpine regions to those who cannot travel, but also to be useful as a handy book to those who are purposing to visit them.'

'The two points,' he observes, 'that I have kept before me in writing this book are:—(1) That it should not be confined to any single district or country, but should endeavour to deal with the Alps as a whole; restricting myself only, where I could, to the properly *mountain* regions: (2) that it should as far as possible touch upon all the principal points of interest connected with them, and aim to be popular and general rather than exhaustive.'

In this we think that Mr. Bonney has succeeded; and we lay down his book with the sensation of having been for the time on the summit of some 'specular mount' from which, if we could not see all the kingdoms of the earth, we could at all events behold the whole Alpine region at a glance. The generalisation of so extensive a subject is not acquired without long and attentive observation of the particulars; but great is the reward of those who strive hard to attain it. The intelligent mountaineer finds his sense of pleasure increasing daily in proportion to his experience. If a man who is perfectly unacquainted with the nature of a mountain-land could be suddenly placed upon the summit of Monte Rosa or the Finsteraarhorn, and thence see the region of the Alps for the first time in his life, his appreciation both of the grandeur and the beauty of the scene would be as nothing compared with that of the

experienced wanderer, who knows of a thousand details which are lost in the obscurity of vastness around him. The practised eye of the latter recognises old mountains with new faces, and helps memory to recall the hidden beauties of each. Yonder little peak, a mere speck in the panorama, is to him a noble mountain the ascent of which once cost him a long summer's day of pleasurable fatigue, and from the top of which he looked wistfully through his telescope at the still greater peak on which he now stands, wondering if haply it might some day be his crowning fortune to surmount it. A small patch of white on the side, hardly visible by reason of the distance, is a vast slope of ice on which he remembers to have crept upwards for four or five hours while a sturdy guide cut several hundred steps before they got to the top of it. He sees in another direction what looks only a rather rougher piece of snow than its neighbours, and knows that it is the upper ice-fall of the glacier, a mass of tottering blocks and pinnacles rising out of deep blue abysses, such a vast and perilous net-work that with the best guides in the Oberland he had been compelled to beat a retreat. A dull greenish patch on the mountain side is a beautiful and wide-spreading Alp where the cows can scarcely eat a mouthful of grass without picking up a bunch of sky-blue gentians or trampling upon sheets of white crocus and lilac soldanella. His eye looks down a valley stretching twenty miles away from the precipices at his feet, and that which appears to an ordinary observer nothing but a dark and somewhat monotonous belt is instantly transfigured by his memory into a land of glorious forests intersected by a hundred streams, rushing downwards under the shade of pine-trees, and washing the feet of mossy boulders, among which he has often sought and joyfully found tall lilies and fair spikes of pyrola, rosy cyclamens perfuming the air, purple primulas festooned about the rocks, and, last but not least, the lace-like fronds of *Cystopteris montana*.

The limits of the present volume would not admit of the author being exhaustive upon many branches of his subject, excepting at the cost of excluding the rest; he has, however, looked upon it as a whole, and contrived to say something on most of the matters which are dear to the lovers of mountaineering and natural history combined. He takes his readers about with him in such rapid flights from point to point that they are compelled now and then to pull up as it were for a moment, and steady themselves to the reflection that they are looking over the whole region with one sweep of the eye, and are supposed to have no difficulty whatever about beginning a sentence in Dauphiné and ending it in the Tyrol. He takes them up to heavenly peaks and casts them down into cold pits of subterranean ice; he entices them among slippery places, and then soothes and comforts them in the sweet chestnut-woods of Italy. To one he discourses about birds, beasts, and fishes; another feels himself button-holed about Crystallines and Coherents; and the attention of a third is arrested at the side of a crevasse or upon the brink of a moulin by a lucid description of the phenomenon before him. He has studied the delightful works of Forbes and Professor Tyndall, De Saussure, Tschudi, and Berlepsch; and from a comprehensive view of these and many other contributors to the literature of the Alps, he has

industriously striven to give a correct summary of what is known at the present moment in each department of his subject.

And what a magnificent subject it is in its entirety! How suggestive of an almost infinite variety of reflections and objects of study, in addition to the multitudinous delights of examining it in person! We confess, perhaps with shame, that the direful tales recorded by some of our friends concerning the squalor, filth, misery, and starvation encountered by the explorers of the Dauphiné Alps, have always kept us at a respectful distance from that particular district of the mountains; and we have been content to look at the Pelvoux from the summit of Mont Blanc; but we can speak with tolerable familiarity of nearly all that is included between St. Gervais and the frontiers of the Tyrol. Peaks, passes, and glaciers, crowded with sunny memories, rise around us as we write: we may truly say, 'happy is the man who has his quiver full of them.'

Here another idea suggests itself. Like the imaginary being of whom Tennyson speaks as

'Watching from a ruined tower
How grows the day of human power,'

so may we, sitting on the topmost rocks of Monte Rosa, wonder at the slowness with which the Alpine glories have come to be appreciated. Read the indolent and pampered writers of the Augustan age, who never spoke of the Alps except with a kind of indignant horror; and with whom the expression of 'horrida glacies' conveyed the only notion which they were capable of entertaining in respect to that which in these later days has become the chosen haunt of European vigour. How great a satisfaction it would be if, with the aid of some witch of Endor, we could call forth the luxurious Ovid, and make him cut steps up a couloir by way of revenge for his opprobrious epithets and scandalous allusions to our favourites! Then came long ages of human stagnation, during which the snows fell, and the avalanches thundered, and the glaciers went on their appointed way, silently but surely gnawing at the ribs of the mighty mountains, and polishing the rocks with ungentle hand, no man heeding them. Conceive the isolation and ignorance of an Alpine peasant in those days, compared with modern times, in which he sees people from all parts of the world, and in which an English traveller does not mind bringing home a favourite guide, and showing him the wonders of the Crystal Palace and a London pantomime.

As the 'stone age' and the 'bronze age' involved considerable periods of time, so did the 'tramping age' advance with exceeding slowness, especially as far as the mountains were concerned. Old Sir John Mandeville, the very prince of liars, who was prepared to swear that he had eaten the fruit of a tree which bore live lambs, and who condescends to inform us that 'he who would go to Hierusalem may go by many ways, both by sea and land,' never hints that one of his routes may possibly be through Switzerland. Then came quaint and curious Tom Coryate, who, in the reign of James I. of England, really did get within the limits of the Alpine region, and who informs us that he walked through a great part of Germany, France, and Italy

in a single pair of shoes which he afterwards hung up as a trophy in the parish church of his native Odcombe. He must have possessed some of the qualifications of a good pedestrian, but he had evidently a pious horror of the mountains, and only condescended to cross by the Mont Cenis as a means of getting into Italy. Had he not misapplied his talents, he might have been the father of mountaineers instead of dying of a flux at Surat. Scheuchzer, whose '*Itinera Alpina*' were reviewed in vol. iii. of this Journal, seems to have been about the first to inaugurate a better feeling. He at all events tried to get up Mt. Pilatus, and honestly admitted that he was beaten by the fatigue. He was a painstaking observer, but he seems in spite of science to have been somewhat credulous on the subject of Dragons. Mr. Bonney devotes several pages to this matter, and may be said to have catalogued the most eminent dragons with considerable care. Among other stories concerning them the following appears to us peculiarly interesting for reasons which we will presently explain. At p. 287 our author records the legend that 'a certain Vietor, a cooper of Lucerne, while out wood-cutting in a forest, lost his way; and being benighted, fell into a deep pit, the bottom of which was fortunately covered with soft mud, so that though sorely frightened and much besmirched, he sustained no present damage from the tumble. Still he was in an evil plight, for the walls of his prison were too steep to be scaled. Upon examining them he discovered sundry fissures in the rock, entering into which in search of shelter, he found himself to his horror face to face with a pair of dragons. In answer to his earnest prayers to heaven, these grisly beasts were not suffered to hurt him, but in this fearful companionship he passed six whole months from November 6 to April 10 nourished only by a certain brackish liquid which exuded from the rocks to which, following the example of the dragons, he applied his tongue. On the last-named day the dragons issued forth from the cave, and one of them flew up to the world above in search of a more generous diet; before the other could follow it, Vietor grasped its tail, and was thus borne up from the pit and landed on the ground above. He thence contrived to find his way home, and in order to record his escape had the portraits of the dragons and himself embroidered on a chasuble which he presented to the church of St. Leodegarius, at Lucerne.' It happens that among the stores of a friend who has travelled extensively in the East, and who, after sketching India from Ceylon to the Himalayas, has lately returned from accompanying the Abyssinian expedition, we have just seen a very interesting Amharic manuscript, illustrated with several highly coloured portraits of distinguished Abyssinian saints, the volume having apparently done duty as a family prayer-book for many years in the highlands of Ethiopia. It contains a brilliant picture of St. George on a white horse killing the dragon, which though grateful to an English eye is nevertheless familiar; but we think that very few of our countrymen are acquainted with the accompanying figure of Tekla Haimanout*, the greatest of indigenous Abyssinian saints. He was however a saint of such might that he converted the devil himself,

* The owner of the book, Mr. William Simpson, has been kind enough to favour us with this copy of the original picture.

who became a monk for forty days, after which we suppose he grew tired of the life. The monastery of Debra Damo, on a mountain near Axum, was founded by this Tekla Haimanout, and is so situated that those who go to it are obliged to be drawn up by a rope; but the saint was originally raised to the summit by hanging on to the tail of a mighty serpent. There is a singular analogy between these dragon and serpent stories; and there is little doubt of their having some symbolical meaning and a very ancient Eastern origin. Profane sceptics may perhaps say that symbols, like prophecies, are capable of various interpretations; and that these stories are to the mountaineer symbolical of



nothing but the use of the rope, without which neither Lucerne coopers nor Abyssinian saints can expect to ascend inaccessible precipices. Those however who have seen some of the illustrations of Hindoo mythology may remember the forms of Vishnu suffering and Vishnu triumphant: in the one case folded in the coils of a serpent who bites his

foot, in the other stamping upon the head of the defeated monster. The period of his suffering is, we are told, the wintry half of the year, the time of stagnation; his triumph is the summer, the period of fertilizing heat and growth; and perhaps the odd legend of Vietor being confined with the dragons from November to April may be some stray offshoot from the same idea. For this long digression about dragons we feel that some apology is due: our only excuse to our Alpine friends must be that the animals in question are strictly mountain dragons, both in Switzerland and Abyssinia, and, as such, are not unworthy of their attention.

The progress of mountaineering knowledge was still very slow, and only thirty years after Scheuchzer and his dragons we can hardly be surprised to find a well-armed band of Englishmen, headed by Poccoke and Windham, advancing to Chamouni as into an enemy's country. With De Saussure's ascent of Mont Blanc a new era set in, and men began at last to feel a fascination about mountains which had for ages repelled them with a shiver. It is, however, a curious reflection that so late as 1853 no one had reached the summit of any of the high mountains of Zermatt with the single exception of the Breithorn. The exception is now the rule; and it would be difficult in the whole Alps to find a summit which has not been ascended. The Aiguille du Dru, we suppose, is still unconquered; and, as its proportions are very like those of the cathedral spire at Strasburg, it may perhaps remain so. But, after the Matterhorn, let no mountain venture to boast.

We have remarked that Mr. Bonney's book is a summary of all that he has been able to gather together about the Alps in general, and it would be difficult to find any branch of the subject which he has altogether neglected. But, if he found it impossible to be exhaustive upon so many matters in a single volume, it is still more impossible within the limits of these pages to glance at many of the details. If he is not exhaustive, he is at all events suggestive, and his copious references may induce many a novice to enter farther into the field of Alpine literature, and study the works of De Saussure, Forbes, and Tyndall for himself. The reward will be great. The subject which will be far the most unfamiliar to the public is that which is treated in the chapter on *glacières*. Of the thousands who have either scrambled over glaciers, or looked at them from a respectful distance, very few were till quite lately aware of the fact that ice-caves were to be found below the surface of the mountains in France and Switzerland. Let us select the *glacière du Grand Anu*, near Annecy. 'Hereabouts,' we are told, 'the limestone weathers into ridges, separated by narrow fissures, like the mountain limestone in many parts of England, the sides of which are richly clothed with holly ferns and many Alpine plants. After about half an hour's walk we came to the mouth of the *glacière*, which is situated on a bleak rocky plateau with here and there a few thin patches of larch and brushwood. It was certainly a wild-looking place. We were standing at the end of a deep and comparatively narrow chasm: at our feet a steep slope of crag and débris led down to the base of the opposite precipice; on either hand the cliffs descended in a series of walls of nearly vertical rock, with here and there a ledge on which luxuriant ferns had formed a leafy cornice,

and pine-trees had fastened their roots. In front, in the face of the precipice, was a vast natural gateway, some seventy feet in height, which opened into a dark cavern, whose icy floor could barely be distinguished. . . . The cavern is circular in plan, about sixty feet in diameter: the floor is solid ice, and slopes gradually down towards the farther end. Owing to the size of the doorway, a candle, though useful at times, is not absolutely necessary. The walls are covered with sheets of ice, transparent as the finest glass, which invest like drapery each prominence of rock. The effect was as if a number of cascades had been arrested on their downward course and instantly changed into ice.' Such is the preliminary description of one of these natural ice-houses, into the inmost recesses of which the author and his friend Mr. Browne contrived to penetrate by dint of much squeezing, struggling, and besmirching. The general experience of cave explorers is that the amount of heat increases: in the case of these ice-caves it would appear that during the winter a sufficient amount of snow enters by an external opening to establish a permanent cold which seldom allows the thermometer to rise much above freezing point. The temperature of the caves was found to be only from 1° to 2° above it, when that of the outer air was 48° .

Passing by interesting catalogues of the most notable storms, avalanches, and landslips, and other phenomena of the high Alps, we must conclude with a few remarks upon glaciers. We have a short, but clear, summary of the history of glacial science, from Saussure and Charpentier down to the discoveries of Professor Tyndall. Mr. Bonney selects, and we think with reason, the G6rner glacier as his type. We know of none which, in vastness of space, in the extent of the snow-fields from which it is nourished, in the perfection of its moraine system, and the splendour of the surrounding mountains, can well be compared with it. The experience of many days spent in wandering among its marvels, besides those on which we have had to cross it in various directions when bent on longer expeditions, makes us doubt if the author has done full justice to its surpassing merits. The foot of the glacier, which for many late years was advancing, has come to a check, and it is interesting in a high degree, to see the steady process of the deposition of stones by the retreating ice. Close to it is found an abundance of Alpine plants, conspicuous among which in the month of July are the Martagon lily and *Stipa pinnata*, the feathered awns of which cluster within a few yards of the ice. A few easy scrambling steps lead us on the glacier, and nothing in the world is easier than to follow it upwards for an hour or two; but when Mr. Bonney says that from this point 'it will be a task of more than one hour to thread the icy maze that cuts us off from the upper plateau of the glacier,' we confess our astonishment. The icefall of the G6rner glacier is formidable in the highest degree, and we thought we had heard that Mr. Morshead, perhaps the most agile of extant pedestrians, had, with the aid of Christian Almer, found seven hours not too much for the enterprise of passing it. We may be wrong, but we should be sorry to undertake to do it in anything like the time indicated. Looking right down upon it from the western precipices of the Riffelberg, we should

think it quite impassable. Above this, it is comparatively plain sailing, and if we follow upwards in the neighbourhood of the central moraine we shall, in a few hours, be indoctrinated into the sublimest phenomena of a glacier.

The enormous crater-like pits in the ice, some of them large enough to contain a village, form a characteristic which we have seen in no other glacier. They are probably caused by the working of the powerful streams between that point and the base of Monte Rosa, exactly in the same way as extinct *moulins* are found, as Professor Tyndall observed, in front of those in action. An hour or two may be most agreeably spent in tracing the course of these glacial rivers, where the purest conceivable water rushes through the deep azure ravines which it has carved for itself through the ice. On the edge of the medial moraine, directly between the G6rnergrat and the Lyskamm, are by far the largest glacier tables that we have ever seen. One is not far short of forty feet in length, and stood last year on such a lofty pedestal of ice, that it was necessary to cut five or six steps upwards before we could touch the overhanging surface of the rock. Scarce a quarter of a mile lower down the glacier, we had in 1866 found one of the great ice-craters filled with water, and forming a beautiful sky-blue lake. The next year the water had passed away by some sub-glacial channel, and left the deep crater almost empty. But at one end of it was a Gothic arch, about eighty feet in height, proportioned exactly like those which support the centre of a cathedral. We reached the base of the mighty arch, and looked into a vault of perfectly clear blue ice, leading to deeper and deeper caverns where the colour became that of the fullest purple, as the eye lost itself in the recesses of the interior.

Those who have enjoyed to the utmost the splendid marvels of the high Alps, must feel a pang of sorrow as they contemplate the possible destruction of their favourite pastime. It is a sad fact that, just as men have come to consider the glaciers as the proper field for a summer holiday, the ice itself has been taken with what may be called a shy fit. The glaciers have for the most part, within the last few years been rapidly retiring. The Rosenlaur glacier has, since we first saw it, so shrunk away from its original beauty and dimensions, that it is now scarcely worth while going to see what has become of the rest of it. The lower Grindelwald glacier has within the last dozen years lost fully 100 feet of its thickness; and at this rate of diminution, another half century would abolish nearly all that is seen of it from the village. It would perhaps be a mere matter of calculation to find the time at which the Jungfrau and the Finsteraarhorn will scarcely be more worth ascending than Snowdon and Moel Siabod. But on behalf of the rising generation we will hope for better things. Meanwhile, if anybody thinks that Alpine science has been already too thoroughly drilled into the public mind, we would refer him to a recent ridiculous letter which the editor of the 'Times' did not think it beneath him to publish, and in which the writer said that a 'puff of smoke,' as it appeared on the mountain, 'raised the cry that the Glacier des P6l6rins had burst, carrying with it part of the moraine which had kept it within bounds!'

T. W. H.

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THE INUNDATIONS IN SWITZERLAND IN 1868.
By PHILIP C. GOSSET, ESQ.

LAST summer was remarkable for its atmospheric revolutions all over Europe. Russia, Sweden, Norway, England, the North of France, part of Germany, and Switzerland, had exchanged climates with Italy, and vice versâ. In the north and middle of Europe the fields were literally scorched by the sun; many cornfields in England, hundreds of acres of forests in Russia, were burnt to the ground; whilst in Italy the fall of rain was unusually heavy. As autumn approached, the north and south seem to have retaken possession of their natural climates, whilst the Alps became the headquarters of the clouds.

On September 27, a storm broke forth, the wind being SW., over the Tessin and the sources of the Rhine; in a few hours it had spread all over Switzerland; it was followed by a tremendous fall of rain, which lasted, with the exception of a few fine days, for a month. The amount of rain that was registered in several of the Federal meteorological stations in the Cantons of Uri, Tessin, and Grisons, amounted to $25\frac{1}{2}$ centimètres in 24 hours on September 27, and to 179 centimètres during the 28 days that followed. In other words, the downfall of rain in one day (the 27th) was equal to the amount of rain that usually falls in the same localities and at the same season in three months, *and the amount of rain that came down in twenty-eight days was equal to the height of a man.*

A very considerable percentage of this rain was, of course, vaporised, and a much greater portion absorbed by the soil; but what actually reached the torrents and rivers was enough to

swell them higher than has ever been observed within the memory of man—some of the lakes rose higher than they have been known to rise for the last century.

Among the sad scenes of devastation that followed the first outbreak of the storm, one sight at least was certainly magnificent; it was the Hinter Rhine tearing down the gorge of the Via Mala. This was about the only place in its long course where it did no harm. Compressed as it was between two faces of polished rock, the water rose enormously, the blocks of stone it carried down creating an almost deafening noise. The two bridges that span the gorge seemed to laugh at the fury of the torrent, untouched as they were even by its spray. A few weeks ago uprooted pines and logs of wood could be seen squeezed in across the gorge *fifty feet* above the present water-level, and forming a lasting testimony of the height it had attained.

In the Valley of the Rhine the water rose rapidly to the very top of the dikes, that had been built but a few years ago for the correction of the river; the crown of these dikes had been designed and executed with care several feet above the highest water-level as yet registered. In many places the Rhine rose higher than the dikes, poured over and burst them. The consequence was that, on September 28, the greater part of the valley was under water; in some places it formed large lakes, in other places several streams were to be seen running parallel to the Rhine, and of such breadth that one was sometimes uncertain which was the real Rhine. In the neighbourhood of Sargans and Mels the Rhine rose to such an extent that for several days it was expected it would pass the watershed that divides it from the valley of the Linth, and pour down into the Lakes of Wallenstadt and Zürich. The station of Sargans was under water; four hundred feet of railway dam was torn away at Ragatz.* At Montlingen the dike of the Rhine burst in three places, carrying away nine persons, who were all drowned; one of them was found, a fortnight later, clinging to a small tree, and buried up to the shoulders in mud and gravel. In the streets of the village of Montlingen the depth of water varied from ten to fourteen feet. At the bridge of Cardis the Rhine rose twenty-two feet above its usual autumn level. The Lake of Constance, whose surface is 24·4 square leagues, or 539 square kilomètres, rose four feet in two days.

* The railroad in the Valley of the Rhine suffered so much that it took thirty days to repair it.

The following was reported by some of the Commissioners who went into the Valley of the Rhine for the organisation and proper application of relief: 'At Widnau a young boatman told us that last Sunday was a terrible day. "From the dawn of day till late at night the church-bells were pealing in every village for assistance: add to this the roaring of the flood, that was literally tearing down the valley and rising every minute; the rain was coming down continually out of grey clouds, and we knew that before night we should be under water to the very roofs of our houses. It was enough to make one go mad. During the whole day I rowed with a man to the houses in the village where the people were screaming piteously for help. But they were so clumsy in getting out—it was a wonder that the boat was not upset a dozen times. The last I brought to Balgach was a family with five little children; the youngest, only a few weeks old, was in a cradle, and screamed considerably because it was not covered, and the rain was pouring into its little face. The mother was in front of the boat, and could not come to its assistance; so I tried to cover the child, and only then discovered that I had had no coat on all day." Other people told us that this young man brought twenty families through the foaming water, and did not rest till they were all safe.'

As the flood reached Burgerau, the wife of a small farmer was delivered of a child. The nurse was sent for, arrived in a boat, and entered the house by a window. Mother and child were then packed up in bed-clothes, lowered into the boat, and conveyed in safety to the hillside.

On the Austrian side of the Valley of the Rhine, the dikes burst in one single place—namely, at Balzers; this village is not in Austria, but in the principality of Lichtenstein. It has been comprised in the distribution of the Federal Relief Fund.

The Inn did a good deal of harm in the Lower Engadin. It tore away the bridges of Rasvella, St. Nicklaus, Sklamisott, Nairs, Clemgia, Uina, and Erusch.

The Maggia, the Brenno, and the Tessin rose enormously. To give an idea of the mass of water they conveyed, I may state that the water in Lago Maggiore rose 7·7 mètres—that is to say, 25·4 Swiss feet—above the middle water-level of the lake. I have taken the above statement from a trustworthy document. The surface of the Lago Maggiore is $9\frac{1}{2}$ square leagues, or 214·3 square kilomètres. The Boromean Islands* were

* I have, unfortunately, not succeeded in finding any description of the inundations in Italy.

partly under water, and considerably reduced in apparent size. The land-slips, that came clean down the mountain-sides like a winter avalanche, did more harm in the Tessin even than the water in itself. The village of Poleggio was destroyed by one of these. The only thing that was not buried was the church-tower. Forty-one lives were lost in the Tessin, among them Captain Corneco; he was killed whilst trying to save a family from the floods.

In the Valais the Rhone burst out of its bed: the Visp had already done some mischief during the summer at Vispbach; in autumn it tore its newly made dikes for a second time, and entered the village once more, doing more harm than the first time.

Causes of the Inundations.—Strange to say, the glaciers have been accused of being one of the chief causes of the recent inundations. This suggestion was, of course, treated with scorn by all Alpine men. A glance at the map of Switzerland leaves us certainly, at the first moment, in doubt whether the question is worth further consideration or not—the part of the country covered with glaciers being apparently so extremely small in comparison to the rest. A closer examination of the respective surfaces of ice and land shows us, however, that the glaciers (rocks deducted) cover 91 square leagues, the whole of Switzerland containing 1797·89 leagues. The part of the soil covered with ice is thus *one-twentieth* of the entire country. The following table will convey a more accurate idea of the percentage of ground covered by glaciers, and classified according to the rain-basins:—

TABLE I.*

River Basins	Surface of Glaciers	Surface of Rain Basin	Percentage of Ground covered with Ice
	Kilomètres	Kilomètres	
Basin of the Rhine . . .	264	15909	1·7
" " Aar . . .	294	11616	2·5
" " Reuss . . .	145	3411	4·3
" " Limmat . . .	45	2414	1·9
" " Rhone . . .	1037	7994	13·0
" " Tessin . . .	126	6548	1·9
" " Inn . . .	183	1971	9·3
Total . . .	2096 kilomètres, or 91 square leagues.		

* Table I. is taken from the Report of the Federal Hydrometric Commission by Lauterburg. (Berne, 1866.)

This table shows us that in the Valais 13 per cent. of the soil is covered with ice.

In the first days of the inundation it rained in the upper regions, the wind being SW. and S. ; during the rest of the period it snowed with a W. wind. The *rain* that fell on the glaciers and nevés did not fall on pure ice—far from it. It fell partly on snow, and partly on snow half converted into ice; in both cases a great part of the rain was converted into ice; part of the rain entered the glacier as water, and remained as such in it. It is evident that, had the glaciers been guilty, the Valais would have got off worst (see Table I.). As it is, Mr. Coaz,* one of the Federal Commissioners, and former President of the Swiss Alpine Club, visited several glaciers immediately after the great rainfall; he had seen them the same summer, and declares that the surfaces of the glaciers he saw did not seem to have diminished in any very remarkable way, and especially that the torrents issuing out of the glacier arches were not particularly swollen.

Thus the glaciers are *innocent*.

The true cause of the inundations is to be found in the unusual, I may say tropical, rainfalls that occurred.

Had Switzerland been what she was many years ago—that is to say, had the Alpine regions been covered with forests—there would have been probably little harm done by the rain. A pine or fir forest absorbs every drop of water that falls on it; a small part only is absorbed by the leaves or needles of the tree; the rest penetrates into the ground, which the covering of moss that may be observed in all real pine forests has kept *porous*. The moss, and not the pine or fir, maintains the permeability of the soil; but the fir produces the moss, and its roots bind together the soil. All Alpine travellers have noticed old and rotten stumps of trees (larch, *Pinus Cembra*, red and white fir) high above what is now the so-called forest region. Some of them have come to the false conclusion that the temperature of the Alps is gradually sinking, whilst, for all we know, it is more likely that it is rising. Why are there at present no forests in the upper regions that are too steep for good pasture-land? Because these forests—after having been sold by the communes and districts, cut down *en masse*,

* Mr. Coaz has written a very interesting paper on the subject of the inundations. It will appear in a few days, under the title, 'Die Hochwasser im bundnerischen Rheingebiet im Sept. und Oct. 1868. Vom naturwissenschaftlichen hydro-technisch-forstlichen Standpunkt betrachtet von Coaz, Cantons-Forstinspector.' (Leipzig: Engelmann.)

pitched into the nearest torrent, and floated off—have *never been replanted*. The miserable dwarfs of trees we now see beside the old stumps are no proof that the temperature of the Alps is lowering; they are simply nipped off by the sheep and goats in spring; these brutes prefer the young shoots of firs to grass, and this accounts for the extraordinary compactness of the dwarf trees.

The worst of all the Cantons of Switzerland for its forest administration is undoubtedly the Tessin. In the estimate of the damage it sustained last autumn, made by the Federal Commissioners, it comes in for nearly *one-half* of the total sum (see Table II.). The Tessin suffered as much, and even more, from the landslips and earth and stone avalanches that came down during the rainfall, and immediately afterwards, as it did from the floods.

TABLE II.

Comparative Table of the Amount of Damage the respective Cantons suffered.

Cantons	Total	State	Communes and Corporations	Private Individuals	Number of Persons who suffered
	frs.	frs.	frs.	frs.	
St. Gall . .	2,438,165	71,680	845,943	1,441,866	4,881
Grisons . .	2,933,403	303,030	1,319,964	1,310,409	2,511
Valais . .	1,692,542	73,150	520,322	1,099,070	2,223
Tessin . .	6,905,182	511,228	1,983,973	4,409,981	8,769
Uri . . .	513,957	183,921	59,364	270,672	480
	14,483,249	1,143,009	4,729,566	8,610,674	18,864

The organisation for relief was extremely prompt.* The President of the Confederation, Mr. Dubs, went over at once, and visited the Valley of the Rhine and the Tessin. Several commissions set to work for the distribution of food and of the first necessities of life.

The Federal Council issued a general proclamation, in consequence of which every Canton organised a house-to-house subscription. Several companies of military engineers were set on foot, and sent in to repair the broken-down bridges, and

* The Relief Fund amounts to about 3,000,000 frs. at the present moment.

render at least some of the roads practicable for the ensuing winter.

Things looked very bad when the water retired: twenty-five thousand acres of cultivated land were destroyed; the houses that had not been washed away were filled with mud and débris; the potatoes, indian-corn, apples, &c. in the cellars were spoilt after twelve days of immersion in water; the walls of the houses were in many places split, and everywhere damp. And yet there was no choice—the poor people had to get into them again. As might have been expected, typhus fever broke out; happily it did not last long, for in the beginning of November a fall of snow of unusual depth (11 inches 33 centimètres at Berne) covered the whole of Switzerland. If the misery occasioned by the inundations was intense, the help was speedy and great. Relief funds came in from all parts of Switzerland, and not only from Switzerland, but from every part of Europe and America.

Among the divers entries inscribed in the General Relief Fund, there is one I especially request, as a member of the Swiss Alpine Club, to be permitted to quote; its appearance is chiefly due to the energy of Messrs. Tuckett and Wills:

The Alpine Club to the President of the Schweizer Alpenclub, for the Central Relief Committee, as a token of the friendly sympathy of their brother mountaineers in England. . . . 10,000 frs.

PH. GOSSET.

BERNE: JANUARY 20.

In reference to the above, we have much pleasure in publishing the following letter from Mr. Tuckett:—

THE ALPINE CLUB SWISS INUNDATION FUND.—*To the Editor of the Alpine Journal.*—Dear Sir,—The general result of the appeal, which I was authorised by the Committee of the Alpine Club to make, on behalf of the sufferers in the Swiss inundation, has already been announced in a letter, recently inserted by the *Times* and other papers; but some further particulars may not be without interest to our members, and, at any rate, I feel it due to those who have so generously subscribed to the fund, to place before them the following information.

The total amount received up to the present time is 465*l.* 11*s.* 6*d.*, of which about 200*l.* has been contributed by members of the Alpine Club, and the remainder by the public at large.

A sum of 400*l.* has already been remitted to our correspondent at Berne, Mr. Ph. Gosset—secretary to the Federal Topographic Bureau, and a member of both the Swiss and English Alpine Clubs—with a request that he would hand it to Professor Melchior Ulrich, of Zürich, the President of the Schweizer Alpenclub, as a proof of our friendly feeling towards a kindred association, as well as of our sympathy for his suffering countrymen, and with a view to its being transmitted by

him to the central authorities, charged by the Federal Council with the allotment and administration of relief.

From Professor Ulrich, as well as from Herr Schiess, Chancelier de la Confédération, letters have reached me, expressive of warm thanks for the welcome aid of English mountaineers and other sympathisers in this country. Herr Schiess says :—' Conformément à l'ordre qu'elle a reçu du Conseil fédéral, la Chancellerie soussignée s'empresse de vous prier d'être auprès de votre Club l'interprète des vifs sentiments de reconnaissance dont sont animés le Conseil fédéral, ainsi que les populations auxquelles ce don généreux est destiné. La Suisse, dont la belle nature fait l'objet de vos explorations incessantes, gardera un précieux souvenir de ce beau témoignage de sympathie.' Professor Ulrich writes :—' For this generous gift my warm thanks are due to the English Alpine Club, not merely in grateful acknowledgment of so noble a proof of their sympathy with the sufferers, but also for their selection of the Schweizer Alpenclub as the channel for its conveyance to the Federal Council. A bond is thus cemented between the two kindred associations which we hope may be drawn yet closer under brighter circumstances.' In reference to the inundations, he remarks :—' The injury to private and cantonal property amounts to, at least, twelve million francs. The Canton Tessin, especially in Val Blegno, is so ravaged that anything like complete restoration of the damage is out of the question. In many places the soil has been completely carried away, down to the very rock; and in others so covered with débris that it must entirely pass out of cultivation. All the rain which usually falls in the course of the summer descended in one concentrated downpour upon these valleys within a period of fourteen days. The subscriptions amount to about three million francs, without reckoning clothing and food. Of potatoes, above 46,000 centner have been received up to this time (December 21), of which more than half have been distributed, whilst the remainder must serve to carry the sufferers through the winter. The mode of appropriation of the contributions in money has not yet been decided on, but the same course will probably be pursued as on former occasions; their quota of contributions will be assigned to the Cantons, and aid from the resources at the disposal of the Federal Council afforded to each, in proportion as it fulfils the duty imposed on it. The construction of dams, the embankment of dangerous torrents, the protection of forests, and other measures calculated to prevent such catastrophes in future, will especially claim attention.'

At the annual general meeting of the Alpine Club, on December 9, a strong desire was expressed by many of those who were present, and had subscribed to the fund, that some moderate portion of it, at least, should be appropriated to the relief of the sufferers from the same calamity in the Italian valleys of the Alps; and, the matter having subsequently been repeatedly brought to my notice, I ventured, as a preliminary measure, to communicate with my friend Mr. R. H. Budden, who is a member of the 'Direction' of the Club Alpino, with the view of ascertaining whether any Italian organisation for relief existed. On the receipt of his reply, intimating that the Club Alpino would itself willingly undertake to act in our behalf, and superintend

the distribution of any sum we might entrust to it for the purpose, I submitted to our own Committee, at their last meeting, on the 12th instant, that the balance of 60*l.*, then remaining in hand, after the remittance of 400*l.* to Switzerland, should be so appropriated. The proposal was considered and approved, and I was authorised to hand the amount in question to Mr. Budden; which I accordingly did, by the next post.

Should any further subscriptions be received, I should suggest—unless they amount to 40*l.* or 50*l.*—their being handed to M. Rapp, the Swiss Consul-General, who has undertaken to forward, free of charge, any sums that may be entrusted to him, and has already, I believe, received between 2,000*l.* and 3,000*l.*

Allow me, in conclusion, for myself, as well as on behalf of the Committee and my friend Mr. Wills, who has most kindly aided me by advice and assistance, to express my warm thanks to those who have so generously responded to our appeal; as well as the gratification we feel at having been enabled to offer a tangible proof of the sympathy of Englishmen for the misfortunes of a country which gives us so rich a harvest of pleasure.

Believe me, dear Sir, yours very faithfully,

F. F. TUCKETT.

FRENEHAY, near BRISTOL: January 14, 1869.

THE NORTHERN AND SOUTHERN ASCENTS OF THE MATTERHORN. By F. CRAUFURD GROVE. Read before the Alpine Club, on Wednesday, Dec. 9, 1868.

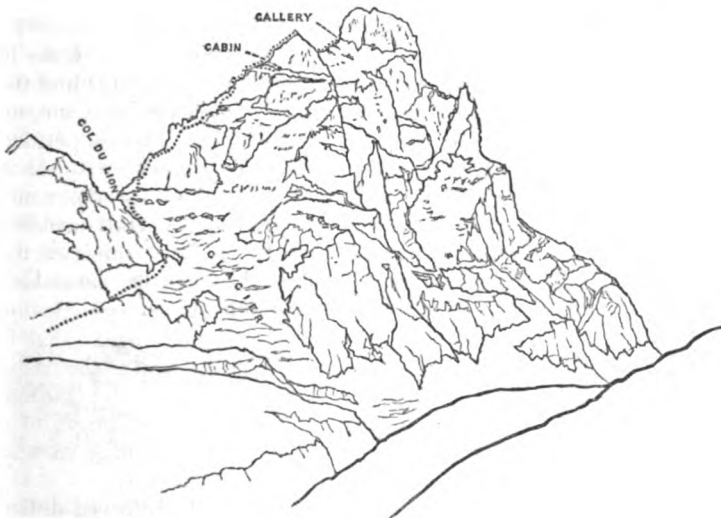
THE Matterhorn was ascended twice in 1865, three times in 1867, and, I believe, nine times in 1868, so that this famous peak, so long thought impossible, so long and, as it seemed, so hopelessly toiled for, has now become as hackneyed as any of the really rugged Alps are ever likely to be. The Alpine Club has not been accustomed to listen to the story of any but a first ascent, and I feel that some apology is due for speaking of a mountain with so trampled a summit. Let me ask leave, then, to pay a tribute of respect and admiration to the once desired Matterhorn, before his head has lost the last rays of a sun departing to gild loftier and more distant ranges, and before he is covered by those waters of oblivion which have long overwhelmed the Jungfraus and the Finsteraarhorns of our youth. Indeed, so far as the Alps are concerned, we can now, I fear, expect nothing free altogether from the taint of staleness; for us the familiar hunting-grounds exist no longer as they once existed. Very pleasant they will continue to be, but they will yield us no more the tales of wonders untold before. From regions in the far West, from

regions in the far East so critically situated that nobody can say exactly to what quarter of the globe they belong, must come the stories of virgin peaks, of untrodden snow, of cols traversed by the ibex alone. Those of us who are obliged to travel near home can tell of these things no longer, and it only remains for us to dally awhile with the best recollections of now degraded mountains. In this spirit I propose to say a little of the most celebrated and most beautiful of the Alps.

The Matterhorn, one slope of which is at present suffering slightly from over-civilisation, possesses the rare advantage of having two sides. With the exception, perhaps, of the Jungfrau and the Lyskamm, there is no other first-class peak of which this can be said. Mont Blanc and the Mönch have had, it is true, some sort of rough and imperfect second sides added to them by the energy of travellers, but still they are essentially unilateral mountains, as one side of each is for practical mountaineering purposes a blank, and as they cannot be said to possess two routes to the summit, of anything like well-balanced beauty, difficulty, and attractiveness. That this double way is a great blessing need hardly be said. It enables a man to combine the utilitarian enjoyment of the pass with the abstract excitement of the mountain; to console himself, if exhausted during the pull to the top, by making up his mind that the descent is perfectly easy; or, if very strong and adventurous, to reflect during the whole day over the pleasing idea that the worst difficulties are yet to come. I confess that not infrequently in the Alps my principal feeling after wriggling up some abominable *mauvais pas* has been very great wonder how I ever was fool enough to come up such a place: how inexpressibly gratifying under similar circumstances to think that one will not be such an ass as to go down again. As to the two sides of the Mont Cervin, the common idea amongst the guides last season was that the northern side was best for the ascent, and the southern for the descent; and also that the southern side was, on the whole, the most difficult. In both of these opinions the guides were, I think, substantially right; and I will endeavour shortly to describe the routes which lead up the northern and southern faces, and to show in what consists the difference between the two.

The southern side must have been considerably the most difficult, before the rather excessive energy of the Valtornanche guides, who are admirable mountaineers, but perhaps too zealous, stretched ropes over all the evil places; and the southern path is, so far as the climber is concerned, by far the most beautiful. I need not tell the Alpine Club that the beauty of the route

up a mountain is not exactly proportionate to the beauty of the mountain when seen from the valley; and though the Matterhorn looked at from Breuil is not so symmetrical or seemingly so abrupt as the Matterhorn looked at from Zermatt, the towered and broken wall which rises over the Valtornanche, and the vast cliffs which face the S., appear, when closely approached, more sheer and sudden than aught seen on the Swiss side; which, when actually climbed, is, I think, scarcely so impressive as might be expected from the appearance of the famous pyramid beheld from Zermatt and the Riffel. The route up



THE MATTERHORN FROM BREUIL.

the southern side may be seen from the drawing. First the Col du Lion is reached by a track passing up and across the couloir and to the right of the rocks where some years ago Mr. Whymper executed his celebrated *saut périlleux d'élévation*. From the Col du Lion the ridge is followed for a short distance, then quitted to outflank a great castle by dropping down on the southern face, reached again, and again quitted for the savage southern slope, and then once more attained with much hauling and yelling, and tearing of clothes, and scraping of skin, by the ropes hanging down the steep and rounded cliff which Professor Tyndall scaled with so much difficulty in (I believe) 1862. There is but little trouble in getting from this place to the hut which has been constructed very high upon the face of the shoulder.

It was on the ground traversed by this route that all the early attempts to ascend the Matterhorn were made, but let not the younger generation of mountaineers, exulting in easy victories over the once dreaded Cervin, look with scorn on the slow progress of the pioneers of civilisation. This Breuil ridge in its uncorrupt state presented one of the finest climbs in the Alps, and the comparative ease with which it is now traversed is due to the Valtornanche guides, who, with a zeal for which the traveller does not feel unmixed gratitude, have put a ring in the nostrils of the leviathan, or, to change the metaphor, have bound their captive with cords; and a glorious smash will one of those cords some day or other produce.

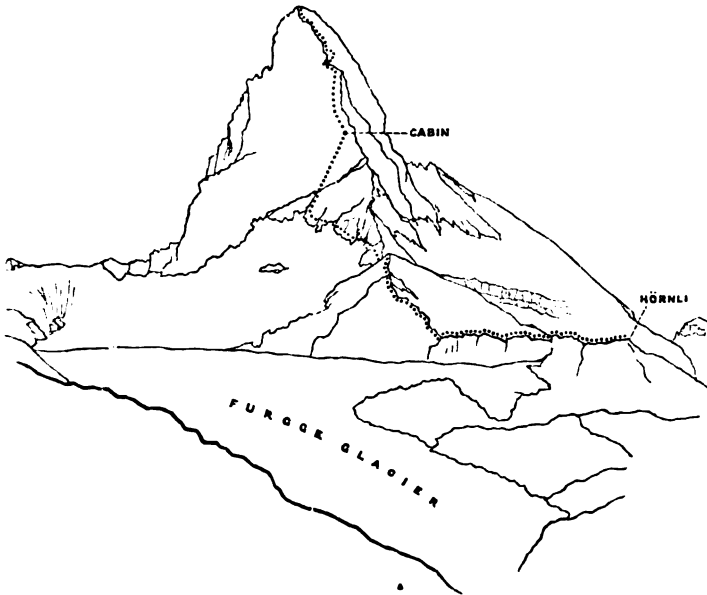
In my time these luxuries ceased with the hut. I say in my time, for alas, a mountaineer grows old quickly, and the route which only fifteen months ago I followed from the hut to the summit is now in great part obsolete. This is perhaps not to be regretted, as part was, I think, dangerous, but it certainly was as varied and exhilarating a climb as man could desire. The line leads first over the *Arête Tyndall*, which I need hardly say is the ridge running from the summit of the shoulder to the main peak. This yields a lively scramble; the passage is not over difficult, but presents every orthodox horror—gaunt and pitiless slopes on one side, and what is apparently a sheer precipice on the other, while the ridge itself is as broken and jagged as an old tooth-comb; indeed, the advance of our caravan over it reminded me strongly of a circumvented cat which I once saw, obliged to make its way along spikes and broken bottles on the top of a wall.

On the final peak itself, the route which I followed differs from that now adopted. The line which has been since taken leads straight up the peak by a very steep ridge on which the hand of civilisation has fixed the useful but humiliating cord. When I was on this side of the Cervin in August 1867, this ridge had not been discovered, and it was necessary to cross the western face of the mountain some little distance below the summit, and to get on to the *arête* which falls towards the *Zmutt Glacier*. The western face was crossed by what the guides call the 'gallery,' a narrow sloping ledge of rock, to my mind dangerous, leading to a very remarkable gully by which *Zmutt Arête* was reached. I shall not attempt any description of this part of the route, curious and interesting as it is, since it has been entirely abandoned, not having been traversed since my guides led me over it; moreover, I should be sorry to deter any mountaineer from taking this line up the Matterhorn. If he succeeds, he can say that it is child's-play,

which is always gratifying and worth a good deal of trouble, and if he should chance to break his neck—why, he will break it well.

And now a few words about the northern side.

The first complete ascent after the accident was made this year by the Rev. Mr. Elliott, Mr. Leighton Jordan having, in 1867, been over a considerable portion of the route. Since Mr. Elliott's expedition numerous ascents have been made; one by Captain Utterson Kelso, the Rev. E. G. Girdlestone, and myself amongst the number. The mountain has been



THE MATTERHORN FROM THE NORTH-EAST.

crossed from Breuil to Zermatt, and from Zermatt to Breuil. Probably next season, if the weather is fine, the Matterhorn will be scaled once or twice a week. *Tout lasse, tout casse, tout passe.*

The commencement of the expedition is not difficult, inasmuch as it begins by the well-known path leading to the Hörnli, the ridge of which is traversed to the foot of the mountain; the great eastern face is then crossed for a short distance, the track going over some singular pieces of hanging glacier which everyone must have noticed from their strange appearance, for they look exactly as if they had been washed up

against the mountain and had frozen there. From the second of these ice-waves the route leads up the eastern face to the *cabane* which has been constructed about half-way between the northern shoulder and the Furgge Glacier.

Difficulty in this first day's travel there is none; indeed, this great eastern face of the Mont Cervin is a remarkable imposition. All know how terrible that scarred and furrowed slope appears from Zermatt and the Riffel. Apparently precipitous in the extreme, holding the snow but a few days after the heaviest downfall, raining down stones endlessly, it seems the very place where, to use the old phrase of the chamois-hunters, a man should go when tired of his life. Strange to say, when closely approached, it loses all its terrors; in the journey up to the cabin it is possible to walk a great part of the distance without ever using the hands, and where climbing is necessary, it is climbing of the mildest kind, save a little scramble at the last. Nor is the appearance of this slope very impressive to those who are actually upon it; it is a great sad wilderness of rock, more or less decayed, smeared here and there with blotches of snow. It is, however redeemed from being common-place by the wild fantastic pinnacles of the Hörnli Arête, often wonderfully like the work of man's hands.

As it is with the track to the cabin, so it is with the track from the cabin to the northern shoulder, which track, by the way, leads up the face, and not, as is commonly supposed, up the ridge. The mountain does, indeed, become slightly more difficult as it is ascended; here and there comes a scramble up a gully, steps have to be cut across the ice on the face of the shoulder, and the rocks underneath the short ridge between the shoulder and the final peak require care, but the obstacles are all of a gentle kind, and the traveller, as he finds himself on the ridge aforesaid with the summit close at hand, and the great head of the Matterhorn just over his own, is principally filled with the feeling that the mountain is a bully who escaped detection for an unusually lengthy period, in fact, from about the time of Creation until 1865. This feeling, gratifying or not, as the case may be, does not last long; a very curious surprise is at hand; at least, I know that Captain Utterson Kelso, Mr. Girdlestone, and I were very much surprised by what we found above the shoulder.

Many must have noticed the singular resemblance of the upper part of the Matterhorn to a house. There is the steep roof and a sort of rough shattered wall beneath. Having passed the shoulder, the traveller stands at the foot of this wall. Perhaps Alpine vanity is in the ascendant with him,

and instead of feeling the slight contempt for the Matterhorn which I have described, he yields to a natural and pardonable self-delusion produced by the hitherto easy ascent, and refers his rapid and facile rise rather to the skill and strength which many years' practice in the Alps has given him, than to the simple nature of the work; the wall is not by any means high, and he thinks that five minutes or so of good effort will plant him on the top ledge, crowing loudly, and ready to march straight on to victory. Alas, pride has a fall—no, not a fall, I hope; let me rather say, gets a snub. In a few moments the oft-repeated lesson is administered, and in the agonies of a real *mauvais pas* the Englishman acknowledges to himself for the fiftieth time how weak and uncertain are those limbs which he fondly deemed so strong and so sure, as he compares his own slow, tremulous, and faltering movements with the confident activity, the easy balance, and the well-applied strength of the chamois-hunters who are leading him on.

I certainly thought this wall a serious difficulty, and I believe that my companions agreed with me. The precipitous rock gives bad foothold and bad handhold; few steeper cliffs can have been scaled, and there is a remarkable want of those convenient stages generally put by Nature over evil places, whereon men can firmly secure themselves either for hauling their companions up in the ascent, or with the more important object of resisting a slip in the descent. I need hardly say that the going down this part of the Matterhorn is more difficult and requires more time than the getting up it.

I am aware that in giving so pronounced a character to this, the only serious obstacle found on the northern side of the mountain, I am differing from some travellers of greater experience than myself, who have pronounced the whole northern ascent a comparatively easy one. I think it best, however, to describe the place as it struck me when I was actually upon it, and not as I have afterwards persuaded myself from the accounts of others that it ought to have appeared to me. I should add that my companions and I had some unusual difficulties to contend with. We were a large party—three travellers and three guides; there was a great amount of fresh snow; and as bitter a northern blast beat upon us as ever numbed fingers and cramped legs.

It was on this steep and broken part of the Matterhorn that the famous accident of 1865 occurred. It does not seem however to be clear whether the traveller now passes over the place from which the four men fell. The guides—without any reason so far as I could make out—consider that the modern

route does not cross the ground where the slip occurred. I believe myself that the actual place of disaster is traversed; but the matter cannot be settled until one of the three survivors ascends the mountain again. The last part of the mountain which I have called the roof, comes next, and presents no difficulty unless the snow is in a dangerous state.

And as to the summit—well, the Matterhorn, I am sorry to say, has no very well defined summit. The top of the mountain is just what any careful and experienced observer who had looked at it from Zermatt would expect it to be—a ridge of snow with a dump at each end, the two dumps being of about equal height. I speak merely from judgment by the eye.

We who have been in the high Alps have learnt to avoid attempting the description of Alpine views, if we have learnt naught else, and I shall therefore say nothing about the view from the Cervin, except that it has all the peculiar character which might be expected from the isolation and pyramidal form of the peak, but there is one feature of the mountain which will live long in the memory of those who have scaled it—I mean the southern precipice; its like, or indeed anything approaching it, I have seen nowhere, and think that, however harried the Matterhorn may be, the man who stands on that delicate crest, looking straight down to the streams and pastures of the Valtornanche, will have an idea of the sublime which one step will not make at all ridiculous—at least so far as his feelings are concerned.

I have now endeavoured to describe the two routes up the Matterhorn. The southern side is to my mind the most beautiful, and in its natural state must have been by far the most difficult; there is a hut or refuge on each route, that on the S. having the most picturesque situation, and that on the N. the finest view; and finally, it should be added that the southern side is in great part free from the terrible cutaneous disease of the Alps which results in loose rocks and falling stones. The northern side has not this immunity, producing, I regret to say, these abominations, and is moreover a great deal more subject than the other to the gentle dew from Heaven, which falls upon it in large quantities, so that the leper is truly as white as snow. One parting word of advice I would give—if there is any one who thinks that the Alps are exhausted, that everything has been done *ad nauseam*, and that the orthodox sensations are to be obtained no more, let him bring a little capital to bear, and I will ensure him some wholesome and legitimate enjoyment. What I would suggest to such a

one is this. Let him bribe first the Valtornanche guides to go up secretly and cut away all the ropes. Then let him ascend from Breuil, going over the gallery, and down the gully, and up the Zmutt Arête, to the summit; thence let him either drop down to Zermatt, or return to the place whence he came. In either case I will wager that he will not complain of any want of exhilarating and substantial excitement, and that he will never speak with flippancy or heartless levity of the Matterhorn, although its purity has departed, and its glory is gone for evermore.

THE SOOROO ROUTE FROM LEH TO CASHMERE.

By F. D. BROCKLEHURST.

IN the summer of 1861 it was my good fortune to be rambling in company with two pleasant companions in and around the Valley of Cashmere, that delightful land of bright flowers and luscious fruits, of regal gardens and placid lakes, the acknowledged gem of the Himalayan range.

After we had loitered in the valley long enough to enjoy thoroughly its many charms without becoming satiated with them, that evil spirit of restlessness and curiosity that, in the opinion of the lethargic Cashmiri, possesses the whole race of much-to-be-pitied Britishers, led us up into the inhospitable desert country of Tibet. Leaving Cashmere by the Sindh river route, we followed the regular track, which in many places is no track at all, through Duras and Kargyl and over the Photola Pass, to the Indus at Kulsî, and so on to Leh, the barbaric capital of an iron-bound and most forbidding country. Here we halted to take breath, but the demon was soon at us again, and we found ourselves driven ruthlessly along, in spite of scorched noses and blistered feet, over burning plains and tremendous mountain passes, to the great Salt Lake of Tso-pangong on the borders of the Chinese empire, a sheet of brine some eighty miles long by four or five wide, resting in weird solitude at an elevation of 14,400 ft. above the sea level. Leaving the lake behind us, we struck across country due south to the Indus, some few miles above Chumatung, and enjoyed the painful satisfaction of sleeping for one night at an altitude of between 16,000 and 17,000 ft., in company with the *Ovis Ammon* and numbers of wild asses.

Pursuing our way down the Indus, which here, although upwards of 2,000 miles from its mouth, is still a river of no inconsiderable proportions, we again visited Leh, and returned

by the way that we came (with some slight deviation) as far as Kargyl; here, however, we deserted our old track, and returned to Cashmere by way of the then little known and less frequented Sooroo river route and the Wurdwun Valley.

No doubt since 1861 this Sooroo Valley has been often visited by the enterprising Briton; nevertheless it is of this route that I propose to give a more minute description, as far as a few hastily taken notes will enable me, believing that it may still be looked upon as one of the 'things not generally known.'

Kargyl, by comparison with the generality of Ladaki hamlets, is a place of some pretensions. Situated at the confluence of two considerable streams, the Duras and the Sooroo river, it can boast of several hundred acres of productive land. Its precious soil is most carefully preserved and held together by means of low stone walls, the land divided into innumerable small fields, and cultivated in terraces raised with Japanese neatness along the steep slopes which run down from the foot of the mountains to the water's edge, the method adopted by all countries where artificial irrigation is necessary. The houses of the natives are the usual poor-looking, flat-roofed, and mud-plastered hovels; but near the water's edge is a small killah or fort, that, refulgent in a coat of whitewash, attracts the eye before everything else, and commands a long and dangerous-looking wooden bridge, thrown over the united waters of the two streams. As a sign of the comparative opulence and importance of this hamlet of Kargyl, I may mention that it was the only place for miles round where we were able to get a few scraggy fowls and a small basket of eggs. Magpies there were in abundance, own brothers, to all appearance, of the veritable British bird; but, hard up as we were, we scarcely relished the idea of a magpie pudding.

On the morning of August 11, we turned our backs upon Kargyl, and our first day's march of fifteen miles was of the most pleasant nature. The hope of soon again enjoying the many delights of the rich Cashmere district, and the feeling that we had left behind us for good the worst features of the Tibetan wilderness, filled us with fresh energy, and merrily we stepped along, in spite of a scorching sun and most overpowering heat. We at once entered the grand gorge of the Sooroo river, and during the whole day's march our track led us over a succession of cultivated plateaux bordering on the river, and enlivened with groups and rows of tall Lombardy poplars and shady willows, while rugged and barren mountains rose to a great height on either side, liberally sprinkled towards their summits with patches of snow. Having passed one or two

small villages of no importance, we camped for the first night at Chaliskote, a somewhat larger cluster of dwellings situated on a fine open cultivated plain near the bank of the river.

In proportion as the country becomes more cultivated the people appear gradually to lose their true Tibetan appearance, both in type of feature and style of dress; the men no longer wear the pigtail, that invariable appendage of the lords of creation on the other side of Kargyl, nor do the women adorn themselves with that very peculiar Tibetan head-dress, the Feroz, a long strip of red or black leather or cloth about two inches wide, gradually tapering to a point at one end and thickly studded with large rough turquoises, varying from the size of a half-crown to that of a horse-bean, the broad end with the larger stones being fastened over the central parting of the owner's matted raven locks, and the whole reaching from the forehead more than half way down the back.

The next morning a march of about nine miles brought us to the charming little valley of Sanko, about three miles long by two wide, green as an emerald, carefully cultivated and pleasantly dotted with willows, forming altogether the strongest possible contrast to the still barren snow-capped mountains that hemmed it in on all sides. Here a wide but shallow torrent intercepted our path, rushing headlong over loose rolling boulders down to the Sooroo river, in the Sanko Valley, while another stream of about the same size met it from the exactly opposite side of the valley. Here my little Cabuli horse, that had followed me for several hundred miles, in fact all the way from Lahore, and was always ready in cases of emergency, proved himself useful for the first time since leaving Leh, and carried me over in safety; but one of our party, thinking that a foot-bath would be rather invigorating than otherwise, boldly stepped into the icy cold water considerably above his knees, and on reaching the middle was suddenly taken off his legs, ducked and drenched to his heart's content, and carried some distance down the torrent: he managed, however, to scramble to the other side, unhurt, and minus only a favourite stick and his tiffin; and well it was so, for not many days before we had seen in the distance the dead body of a Ladaki stranded on the beach of a sedgy island far out of reach in the middle of a wide and rapid stream, and were told that he had been washed down from some miles above, having missed his footing while trying to cross a tributary torrent; no doubt the poor fellow had been stunned by his head coming in contact with some of the rolling boulders or projecting rocks.

Continuing for some miles further up the left bank of the

Sooroo, we at last came to where the steep shelving rocks rose sheer out of the swift-flowing river, the track, if it deserved the name, consisting for the most part of a few good-for-nothing poles and planks laid along the face of the rock, and supported by wooden pegs and brackets driven into holes and crevices. My horse, of course, was obliged to make a considerable detour, and scramble up some six or eight hundred feet of rough rocky ground to avoid this dangerous-looking place. Hereabouts on the other side of the Sooroo was a neat little cultivated plain, with a few huts and a very fine ground for the national game of Chaughan, or hockey on horseback, a game so exciting, and requiring such manly skill in horsemanship, that I cannot refrain from giving here a slight description of one I had the good fortune to witness only a few days previously.

On passing through the village of Poshkum, seven miles beyond Kargyl, in the direction of Leh, I was struck with the unusually deserted appearance of the place, the doors of the huts all fast closed, not a sound to be heard nor a living creature of any kind to be seen about; on leaving the village the fine Chaughan ground particularly attracted my attention, it being a most unusual thing to see so large an area of perfectly level ground in this country. At a rough guess it may have been about two hundred and fifty yards long by sixty yards wide; tall Lombardy poplars and stunted willows lined it on either side, and at one end it was overlooked by the ruins of what must formerly have been a very important and extensive stronghold, perched on the summit of a mountain spur, several hundred feet high.

While taking a sketch of this interesting place, I was surprised by the sudden appearance on the ground of a number of horsemen and a crowd of country people on foot, more horses and more people arriving every minute, till the Chaughan ground presented quite an animated appearance. Presently two curious-looking individuals approached me from the crowd, one a swarthy, cunning-looking old Ladaki, with one eye, dressed in the usual loose blue woollen tunic, bound round the waist with a wide sash, heavy cloth boots, and a black woollen cap, the bag-shaped crown of which hung over one ear and almost touched the shoulder. The other, a Sikh, probably the representative in these parts of his Royal Highness the Maharajah of Cashmere, presented the strongest possible contrast to his ill-favoured companion; tall, elegant, remarkably handsome, and foppish to a degree, he was dressed from head to foot in rather tight-fitting white cotton garments, with an elaborate white turban, and Turkish slippers turned up at the toes.

They had not much difficulty in informing me that a game of Chaughan was about to be played, and leading me back to the ground, they placed me in a good position to see the sport, which proved to be one of the most spirited and exciting games I ever had the pleasure of witnessing. To all appearance the rules of the game are exactly similar to those of our schoolboy game of hockey. The preliminaries being arranged, the ground was cleared of loiterers and taken possession of by the two contending sides, consisting of about twenty-five horsemen each. The game was commenced by one rider starting forward at full gallop, chucking the wooden ball lightly into the air, and sending it forward with a swinging blow from his crooked hockey-stick; immediately there was a grand rush after it, and then followed a scene of hurry and skurry, dust, dashing of sticks, clattering of hoofs, shouting and confusion that would be difficult indeed to describe, the excitement being aided by the blatant clangour of a band composed chiefly of such instruments as clarionets, gongs, and cymbals. The horses were all small, few of them being over fourteen hands high, with long flowing manes and tails, wonderfully active, and appearing fully to enter into the spirit of the game and to understand it as well as their riders. For instance, at one time the ball having gone into goal, a rider who was near dismounted and ran to pick it up, leaving his horse standing perfectly still while all the other horses came rushing round it with tremendous clatter and noise, nor did it move till its master returned and remounted it. I noticed one fellow, while galloping along at a sharp pace, stoop down, pick up with his hand another man's cap that had fallen to the ground, and chuck it across into the hands of its owner with an easy grace that was quite delightful to see. Several other tricks of a similar nature were quietly done, while the whole fifty horses were rushing after the ball, all jumbled together in a cloud of dust.

It being evidently a holiday, every one, whether player or spectator, was adorned with a bunch of French marigolds in his cap, the marigold being about the only flower I ever saw cultivated in Tibet.

The game lasted over an hour, and at the close of it all the men rode up to the band-stand, and hoisting their sticks high in the air, simultaneously shouted the same word several times over, and then dispersed, laughing boisterously, evidently much amused at the joke, whatever it might be.

To resume my journey: the road from the village above mentioned continued very bad for a long distance; in some places we had to creep along the face of the rocky precipices with

the utmost care, as a false step would have either precipitated us into the river, or smashed us against the projecting ledges. At every step the wildness of the scenery and the quantity of snow on the surrounding mountains increased, and the climax was reached when, on turning a sharp bend in the valley and arriving at our camping-ground, we saw before us, rearing its head high into the pure blue of an unclouded sky and clothed with the gorgeous colouring of the setting sun, a peak of un-sullied snow, the summit of which is computed to be at least 23,600 ft. high. This mountain is one of two of about the same height, twin brothers, standing side by side, and known by the name of the Noon Coon Peaks. Glowing with all the intensity of red-hot iron, so magnificent a picture did this amazing peak present that it quite rivetted our attention, jaded as we were with the fatigue of a very rough twenty-four miles' march; nor could we cease from gazing at it till darkness overshadowed everything, and it faded out of sight like some mysterious dissolving view.

Most fortunate were we in arriving just in time for this gorgeous display of Nature's richest colouring, for the next morning thick clouds and mist hung heavily around us, hiding everything, and dispelling all our hopes of catching a glimpse of the brother to the superb peak that had so fascinated us the evening before.

The mountain sides now began to assume a much less barren appearance as we approached the snow limit, and on starting upon our next march we were greeted by the shrill and cheerful chirrup of the Himalayan marmot, a pretty little animal, somewhat larger than a hare, and with a coat of rich red fur. The habit of these charming little fellows is to sit bolt upright on their haunches, on some fragment of rock or mound of earth, close to the mouth of their subterranean dwelling, and chirrup to one another with a clear ringing whistle, that can often be heard more than a mile off in the stillness of these mountain solitudes. A walk of about six miles brought us to the edge of a formidable torrent, some sixty yards wide, and of considerable depth, throwing up great waves from three to four feet high. Over this torrent was thrown one of the rope bridges peculiar to this part of the world, a flimsy-looking structure, consisting of three ropes made of roughly plaited osier twigs; the strongest rope, rather less than a foot wide, forming a support for the feet of the passenger, while one on either side answered the purpose of a railing for the hand; the whole affair swinging merrily in the breeze, and creaking under the passenger's weight.

It was a long piece of work getting our whole establishment over, consisting as it did of some eighteen or twenty household servants and as many or more Coolies carrying the baggage, three dogs, and a small flock of sheep. Crossing over first ourselves, we lit our pipes, sat under the shade of the rough stone pier into which the ends of the ropes were fastened, and settled down to the enjoyment of a ludicrous scene that lasted the better part of two hours. The bridge was not considered strong enough to bear the weight of more than one loaded man at a time; the sheep, of a breed as active and obstreperous as goats, had to be caught and carried over separately on the shoulders of our stalwart little Ladakis; then some of our Indian domestics, who on several previous occasions had behaved themselves more like babies than men, refused to trust their own feet and heads to carry them across the trembling fabric, and yielded themselves to the far more dangerous alternative of being served like the sheep. Loud, however, and prolonged was the cheering when two of our dogs actually took it into their heads to make their own way across, unassisted except by verbal encouragement; the one was a large and handsome Tibetan mastiff, the other an affectionate and playful spaniel. But the greatest piece of work was the getting of my horse across the torrent. The bridge for him was a veritable *pons asinorum*, and there was clearly nothing for it but to lug him through the water, and risk the consequences. For this purpose a rope was wanted, to procure which messengers had to be despatched long distances to the nearest dwellings; presently a bit turned up from one place and a few yards from another, till, the various fag-ends being carefully joined together, a rope was formed sufficiently long to reach across the river; one end was then fastened to the horse's neck, while six men on the opposite bank took the other end in tow. The poor beast, being blindfolded, was then led gently down into the water, and finding himself very soon out of his depth, and unable to turn, he struck out gallantly, and after a severe ducking (especially in the middle of the torrent, where the waves ran highest) he landed safely on the other side, winded, and trembling in every limb, but unhurt, having been carried a considerable distance down stream during the operation.

About two miles beyond this, and not much more than eight miles from the previous night's camping ground, we came to the village of Sooroo, the capital of the district, where we again pitched our tents, having here to find fresh Coolies, and lay in a supply of provisions sufficient to last us for at least five days; an operation that cost us a vast amount of talking and

trouble, and occupied the whole afternoon. Flour here, after the obstinate tenacity of the holder was once overcome, could be purchased at the rate of one rupee for 80 lbs. The squalid village of Sooroo stands on the bank of a torrent similar to the one we had just crossed, and about a mile above the main river. Near the confluence of these two streams stands a killah, or fort, somewhat similar to the one at Kargyl. The whole district presented the most dismal aspect under the influence of a driving mist and occasional heavy showers of rain.

Leaving Sooroo the next morning in bright sunshine, we bade adieu to the main valley, and followed up the windings of the torrent, on the banks of which we had spent the previous night. At every step the natural growth of grass, low shrubs, and wild herbage, became more and more plentiful; and we were particularly struck with the rich carpeting of wild flowers, chiefly of a bright blue, that bordered the stream on either side.

After scrambling up this rough gorge for at least ten miles, passing on our way the remains of a huge snow drift, or more probably an avalanche of snow, that formed a substantial bridge, spanning the river with a beautifully curved arch, we came to another ravine running up to the left, backed by a picture of snow mountains and precipices unsurpassed by anything we had yet seen: up this ravine lay our route (track there was none), which led us up to the foot of the glacier pass that was to occupy our attention on the morrow. My poor horse, whose legs were already sufficiently battered and bruised, became now an object of real anxiety to me, and much I regretted not having sent him back into Cashmere by the direct route from Kargyl, in spite of the assurances of the good people of that village that the Sooroo route was practicable both for man and beast. It became quite evident that to get him over the glacier pass would be an impossibility; and at last, acting on the principle 'out of sight out of mind,' I decided to trust him to the tender mercies of a brace of Soorooites, who volunteered to get him over the mountain barrier by a circuitous and little frequented route; where there were no glaciers, and where the crevasses were only of rock and not of ice. So off they started, following the course of the Sooroo torrent, the tough little horse stepping out over the rocks as unconcernedly as possible; but not so the wretched Sais or groom, who was evidently much alarmed at being separated from the main party, and finding himself alone with two Jungley Wallahs, or wild men, as he very disrespectfully called them. Our night's camping ground was on a grassy elevation, high above which a great

glacier reared its ice wall. Opposite us, on the side of the valley, a graceful waterfall leaped down the mountain side with a fall of about a hundred feet; wild flowers were abundant, and the cheerful chirrup of the marmot rang through the cold bracing air. A high and cutting wind, which rose towards evening, compelled us for once to dine under canvas, with tightly closed curtains. The next morning we were up and off as soon as there was sufficient light to enable us to see our way about; we had but a very vague idea of what was really before us; but, as it turned out, the day's march proved a very enjoyable one, and far less difficult than we could reasonably have expected. Mounting the face of the glacier, which we found tolerably smooth and free from anything like dangerous crevasses, we followed up its steep incline for five good miles to the top of the pass, crossing on our way several large and very steep tributary glaciers. The top of the pass was a flat, undulating field of ice, some half a mile in length, and as much in width; a continuation, in fact, of the glacier up which we had been ascending, and which presently began to slope down the southern side of the mountain range we were crossing. Here we halted for breakfast, and to await the arrival of our numerous train of followers. The air, although a good deal rarefied, caused us no particular inconvenience, and we thoroughly enjoyed spreading ourselves out in the rays of the early sun. The prospect was grand. We were in all probability at an elevation of at least 13,000 feet. Several tributary glaciers came sweeping down from various quarters. Sharp serrated ridges and high peaks of snow surrounded us on all sides, and in particular one peak on the opposite side of the glacier, presenting on our side sheer precipices of 2,000 feet and more, reared its head with an impressive air of superiority. Behind us, and lying some distance back, rose a pure cone of snow running up to an apparently sharp point, which formed the summit of a mountain that overlooked everything far and near, and must have been of very great height.

On commencing the descent, we soon found that we were on a comparatively small tributary glacier, leading down to one of really grand proportions. This main glacier, some two miles wide at the point where we entered upon it, increased in width as it ascended to our left until it spread itself out into a vast ice-sea, tossed about into steeply undulating hills and dales, and backed by a chain of distant peaks that shone with such intensity, that it was impossible to take more than a rapid glance at them at a time. Looking down on our right, the glacier appeared to lose itself in its own horizon.

And now the really tedious part of the day's journey commenced. Long crevasses running at right angles across the face of the glacier became very numerous; our leaping powers were severely tested; long zig-zag detours had to be made to avoid impassable chasms, and once or twice I had to resort to the saddle-bag mode of progression, my head not being sufficiently good to allow of my footing it over slippery ledges not more than a foot wide, with a yawning abyss on either side. One of our sheep missed its footing, a most unusual thing for these hardy little mountaineers, and in an instant was plunged headlong down a deep blue crevass far out of sight, and past all hope of recovery. Our party got broken up into several groups, each of which could be seen carefully picking its own way along, there being no recognised track over this little frequented glacier pass. Our guides, for some good reason of their own, kept us as much as possible in the centre of the glacier, and after contending with its many difficulties for several hours, we were thankful to find ourselves once again on terra firma; the more so as at this particular crisis a heavy thunderstorm swept over us with drenching rain, that would have rendered travelling on the slippery ice doubly difficult. From hence to our camping ground was a rough march of seven miles down a grand gorge alive with numbers of cascades that streamed down the rocks on either side, and threw ugly obstacles in our way in the shape of unbridged torrents. It was growing dusk before we reached our destination after a hard day's march of not more than nineteen miles, twelve of which had been over snow and broken ice. Before turning in for the night, I was well pleased to see, in the glimmer of a distant bonfire, my horse with his three attendants encamped on the opposite side of the glacier torrent, already a swift and unfordable river, and learnt, by dint of much yelling across the brawling water, that all was well with them, which meant that the poor beast's legs and feet were so battered and bruised, that he was a sad cripple for many days afterwards.

Our next day's march of eighteen miles down the steep and highly picturesque valley of the Inchin river was very enjoyable; the first eight miles led us over grassy slopes, brilliant with wild flowers, thickly strewn with boulders and blocks of rock, and swarming with marmots; then, to our no small satisfaction, we again found ourselves within the limit of the growth of trees, the forest commencing as usual with small stunted birch trees, that seemed to vie with one another in their efforts to climb higher and higher up the mountain sides. Presently we found ourselves under the grateful shade of forests of

deodar and other pines, every bend in the river presenting a more and more charming picture of wood and mountain. Towards mid-day we crossed the river by means of a very flimsy wooden bridge, the first sign of civilisation. Between this bridge and the little Swiss-like village of Soaknez, we had to cross some half-dozen torrents, that came streaming down from the mountains above us in a succession of falls and cascades, adding much to the beauty of the surrounding scenery. For three miles before reaching Soaknez, our track led us through a rank profusion of wild flowers, covering acres of steep hilly ground, and growing so high that in many places we could only just see over them as we walked along. Amongst them I recognised the balsam, holly-hock, forget-me-not, thistle, onion, and several other old friends, beside many pretty strangers. But it will not do for me here to expatiate upon the charms of this wild and beautiful valley of the Inchin or Wurdwun, the favourite haunt of the black and brown bear and that magnificent antlered beast the Burra Singh. Two high passes connect the Wurdwun Valley with Cashmere proper, one called the Murgun Pass, 11,600 ft. high, and another, some miles lower down the valley, called the Hoxa Pass, 13,300 ft., over both of which we passed during our hunting expeditions somewhat later in the season. Whoever may have the good fortune to cross the summit of the Hoxa Pass on a bright clear morning, and obtain from thence such a view of the mighty Brihma Range as it was our happiness to enjoy, will have indelibly impressed upon his memory one of the most striking snow views in the world.

THE SWISS 'ALPENCLUB'—(continued).

I. EXPEDITIONS IN THE OFFICIAL DISTRICT (*Clubgebiet*).

1. *The Ruinette* (3,879 mètres = 12,727 E. ft.). By J. J. Weilenmann.

IN this paper the veteran climber of St. Gallen describes a reconnaissance of the Val de Bagne in September 1865, for the purpose of preparing an itinerary for the 'Excursion District' of 1866. A preliminary observation resulted in the selection of Mont Gelé, Mont Pleureur, the Ruinette, the Bec Épicoun, and the Pic d'Otemma, as the most desirable points of view. Having slept at the chalet of Petite Chermontane on September 6, Herr Weilenmann started at 5 the next morning with one of the shepherds of the *Alp*, Jean Maurice

Rosso by name, who declared that he had already ascended the Ruinette, and was certainly well acquainted with its environs.

Descending the valley and crossing the stream to the pastures of Vingt-huit, they ascended the spur immediately N. of the Glacier de Breney, at the head of which appeared the gentle snow-slopes of the Pigne de l'Arolla, looking more likely to be attacked with success from this direction than from any other. Rosso now admitted that he had never been on the actual summit of the Ruinette, and maintained that it had, in fact, never been ascended. The route next lay up a portion of the Breney Glacier, and then to the N., towards the Ruinette; but as appearances were not very favourable in this direction, they diverged to the E., at Rosso's suggestion, and at length gained the summit by the SE. arête, to find, after all, the stone man erected by Mr. Whympfer, with Almer and Biener, about two years before. However, a more suitable point for a general reconnaissance could not have been selected, and after noting the details of the view, the two descended by the W. arête, upon the Glacier de Lire Rose, and at 5.30 P.M. reached Petite Chermontane.

2. *Passage of the Col de Severen and Ascent of the Pte. de Rosa Blanche* (3,348 mètres = 10,984 E. ft.).—*Passage of the Cols de Riedmatten and de la Maigna, and Ascent of Mont Blanc de Cheillon* (3,871 mètres = 12,700 E. ft.).
By J. J. Weilenmann.

A few days later (September 10), Herr Weilenmann, in company with the guide Justin Felley, quitted Chables at 2 A.M., and proceeding up the Val de Bagne, struck off to the left a little below Fionnay, and at 9.30 reached the Col de Severen *viâ* the glacier of the same name. The view towards Mont Blanc and the Grand Combin is described as very fine, but in other directions it is restricted. Climbing a ridge to the N., and descending upon another col, they gained the summit of the Pte. de Rosa Blanche (3,348 mètres = 10,984 E. ft.) without difficulty, but perceived that they would have acted more wisely to attack the peak from the Col de Cleuson. The view was superb—the groups of Mont Blanc and the Combin, Monte Rosa, and the Bernese Oberland, being all admirably displayed.

Returning to the Col de Severen, they descended the Glacier des Écoulaies to the Liappey Alp (2 P.M.) in Val des Dix, and proceeding up the valley after half an hour's rest, they reached the Col de Riedmatten at 4.15, and at nightfall arrived at the

Arolla châteaux. The following day they descended to Evolena, and then traversed the Col de la Maigna (3 hrs. from Evolena), the view from which is extremely fine, to the châteaux of Liappey—not, however, to rest, as Herr Weilenmann pathetically remarks—

Von Bagne bis nach Heremenz,
 Von Nendaz bis Arolla;
 Da führen die Flöhe ihren Tanz,
 Dass sie der Teufel hole!

At 3 next morning (September 11) the pair started for the Col de Cheillon (or Seilon) up the Glacier de Durand, reaching it at 6, and proceeding at 7 to the assault of Mont Blanc de Cheillon (or Seilon) by its south-west flank. Up to a height of about 11,000 ft. not the slightest difficulty was encountered, but the arête running in a NE. direction to the summit presented unexpected difficulties, and it was not till 11.30 that the goal was won. The distant view is stated to be very similar to that from the Ruinette, the height of which is greater by 8 mètres. The descent was commenced at 1, and in an hour and a half the head of the Giétroz Glacier was reached. Felley now started for his home, whilst our author recrossed the Col de Cheillon (2.30 P.M.), gained the Col de Riedmatten at 5, and at 9.30 arrived at Evolena.

3. *Mont Fort* (3,330 mètres = 10,925 E. ft.); *Mont Pleureur* (3,706 mètres = 12,159 E. ft.); *Mont Gelé* (3,517 mètres = 11,539 E. ft.); and *Mont Serpentine* (3,691 mètres = 12,110 E. ft.). By E. Hoffmann.

On July 10, 1866, Herr Hoffmann, with Justin Felley and Seraphin Bessard—a young Jäger, who is spoken of in the highest terms—slept at Fionnay, in the Val de Bagne, and, starting at 2 the next morning, reached in 3½ hours, *viâ* the Louvie Alp, the little lake at the foot of the glacier below Mont Fort, not far to the W. of the Col de Louvie. At 6.5 they entered on the glacier, gained the base of the Mont Fort, and soon reached the ridge of the mountain by one of three débris-filled couloirs. The *Kamm* was found to consist of great blocks, very unstable and highly weathered, but at 8.53 the top was reached. The view, which must be very similar to that from the Pte. de Rosa Blanche, was altogether unobstructed towards the north-east and west. An ascent from the north-west by the Col de la Chaux and Glacier du Mont Fort appeared perfectly practicable. No trace of a stone man was discovered, and no one in Val de

Bagne or at the Louvie Alp seemed to have heard of any previous ascent. An hour and three-quarters sufficed for the descent to the lake, and three more brought the party to Mauvoisin *via* Fionnay.

On the evening of the 12th, they proceeded to the Giétroz Alp, $1\frac{1}{2}$ hour distant, where they were joined by Joseph Gillioz, and found capital quarters, which they quitted at 3 the following morning. At 5.25 the Giétroz Glacier was reached and traversed to the rocks at the foot of Mont Pleureur, where a halt was called for breakfast till 6.10. They now contrived to select a broad couloir which led them quite in a wrong direction, and had to accomplish a dangerous traversée in order to reach a snow-slope which, gradually increasing in steepness, led up to the ridge of Mont Pleureur. Following the latter in an easterly direction, the summit was reached at 10.50. The view is described as decidedly fine, and more extensive than that from Mont Fort. At 12.35 the descent was commenced, and at 2.20 the farther (W.) side of the Giétroz Glacier reached, from whence, after dismissing Gillioz, the others proceeded to the Boussine Alp, higher up the valley.

On the morning of July 14, they proceeded to the Col de Fenêtre (7.20 A.M.), and, after 20 minutes' halt, addressed themselves to the ascent of Mont Gelé. It is difficult to follow the route from the description, but they appear to have made a bad shot at first, and to have encountered, in consequence, considerable difficulty before reaching the Glacier de la Balme, by way of which the summit was gained at 12.20. It had previously been ascended by Mr. Jacomb in 1861 (see 'Peaks, Passes, and Glaciers,' 2nd series, vol. i.). Future comers are recommended to descend from the Col de Fenêtre to the end of the lake *via* its right bank; then to approach the cliffs, and gain the Glacier de la Balme by the couloir between Mont Faudery and Mont La Balme. Two hours and a half sufficed for the return to the col, and four more to reach the inn at Mauvoisin, where a much-promising bottle of Martigny beer, sweet to the sight, but bitter to the palate, elicited the reflection—

Gott macht Gutes,
Böses wir;
Er braut Wein,
Wir brauen Bier.

On July 15 the party slept at the Lancet Alp, and, starting the next morning about 4, proceeded up the Breney Glacier, and reached in five hours the Col de la Serpentine, between the peak of that name and the Mont Blanc de Cheillon.

Working round in the direction of the Col de Breney, they gained the arête leading up to the summit, and reached the latter without difficulty at 11.45 (1½ hour from the col). On the descent they attempted to reach the Col de la Serpentine side by a more direct route, and involved themselves in a difficult piece of climbing, which greatly delayed their progress, so that it was 7.30 P.M. before the Lancet Alp was reached.

On the following day the weather broke up. Felley and Bessard are both spoken of in the highest terms.

4. *Ascent of La Salle* (3,641 mètres = 11,946 E. ft.). By F. Hoffmann-Merian.

II. INDEPENDENT EXPEDITIONS (*Freie Fahrten*).

1. *Ascent of the Fluchthorn*. By J. J. Weilenmann.

This paper forms the sequel to one which appeared in the last volume of the 'Jahrbuch,' under the title of 'Streifereien im Vorarlberg.' Starting at 3.30 A.M. on July 12, 1861, from a châlet in the Larein-Thal above Galthür, with Franz Pöll, the col between the Fluchthorn and the summit, marked 3,006 mètres on the map, was reached at 6. They now descended slightly from the pass, and, bearing round to the W., made for a second 'Sattel,' or depression, 2,974 mètres in height, S. of the Fluchthorn, which was reached at 8. Here they took to the southern cliffs of the mountain, working up and across them from E. to W., and at 9 gained the ridge at no great distance from the most southerly and highest of the points of the Fluchthorn, after a steep and sharp climb. They now found that it would be necessary to go round the sharp SW. angle of the summit, from which the arête they had reached descended, and attack the final peak by its southern side—a course which landed them on the summit at 10, though not without encountering many difficulties and no little danger from the extreme steepness of the slopes and the looseness of the snow. The view, of which Herr Weilenmann gives a most admirable and spirited description, was extremely fine, though limited to the W. by clouds, and 2¼ hours flew rapidly by in its examination.

In 1½ hour the southern saddle was regained, soon after quitting which Herr Weilenmann took leave of Pöll, whom he highly recommends, and descended alone to the Fimber Alp on the way to Ischgl, where he spent the night. The whole

narrative is full of life, and bears the mark of a practised hand, whilst the writer displays an honesty in owning to fatigue, occasional fear, &c., which is in refreshing contrast to the too common practice of poohpoohing danger, and thus suggesting by implication superior powers of self-control or endurance. After describing how his active guide Pöll left him to himself, and went ahead at a perfectly killing pace, over ground where an occasional grasp of the hand would have been more than once very comforting, to say the least, Herr Weilenmann remarks as follows:—‘There is scarcely anyone who has attempted fatiguing ascents who has not, under similar circumstances, felt a certain exhaustion. The growl, however, seldom gets to the ear of the reader, who rarely sees how fear or discouragement is reflected in the face of the bold summit-stormer. All this is skilfully passed over in silence, in order not to expose oneself, to make the deed appear more *éclatant*, the renown greater; or, if the truth must be confessed, the blame is laid on the rarefaction of the air, &c.’ Again, with reference to the relative share of work demanded of the guide and his employer, he remarks with great truth, alluding to Pöll:—‘Sometimes he was off reconnoitring to the left, sometimes to the right, whilst I waited and reflected how very subordinate a *rôle* is played by the traveller in ascents undertaken in company with able guides; how small a portion of the credit is due to him; for, with the exception of the mere mechanical upward movement, his guide does nearly everything for him—thinks, examines, reconnoitres, calls his attention to good or bad foothold, helps him over obstacles—in short, directs him like a passive and unreasoning machine.’

2. *Ascent of the Ritzlihorn* (3,283 mètres = 10,771 E. ft.), near *Guttannen*. *An October Excursion in 1866*, by G. Studer.

The first ascent of this mountain was effected by Messrs. S. Taylor and H. M. de Fellenberg, on August 3, 1861, with Blatter of Meyringen and Steiger of Hasle im Grund.

The veteran author, after a description of the general character of the *massif*, remarks that, in conjunction with the neighbouring chain which bounds the Urbach-Thal and Gauli Glacier, it offers many details deserving examination which have as yet been very imperfectly explored; attention having hitherto been more especially concentrated on the western range—the Ewig-Schneehorn, Gauli Pass, Berglistock, passes between the Gauli and Rosenloui Glaciers, &c.

The first ascent of the Ritzlihorn by Swiss mountaineers

appears to have taken place on June 22, 1865, the party consisting of Herr Marti, the Pfarrer of Guttannen, and Peter Sulzer, of the same place. Herr Studer, accompanied by the same guide, left Rufibach's Inn at Guttannen at 3.30 on the morning of October 12, 1866, and in two hours reached the Mittelbergli, a grassy sheep pasture running steeply upwards to the higher cliffs of the mountain, to which it thus affords the easiest means of access. A long and wearisome climb up weathered rocks succeeded, and it was not till 12 o'clock that the '*Grat*' was reached, whilst two hours more were consumed in following its various elevations and depressions to the actual summit. The view proved extremely fine, and it is described with great detail and precision. At 3.15 the descent was commenced. Peter and the Pfarrer had taken the direction of the Weissbach Glacier; but this course had consumed much time, and Herr Studer therefore followed the ridge in a northerly direction till the head of the first couloir on the W. slope was reached, and then struck down by this. Advancing years, however, appear to have rendered his progress slow, and the result was that night came on, and, after many wanderings and much perplexity, they reached the Matten Alp in the Urbach-Thal at 8.45, only to find it deserted, and to pass, in consequence, a somewhat comfortless night. In conclusion, 'Vater' Studer remarks that, under ordinary conditions, a fair mountaineer would accomplish the ascent in six hours from Guttannen and five from the Matten Alp.

3. *Ascent of the Tinzenhorn* (3,132 mètres = 10,276 E. ft.). By Emil Hauser.

This expedition was shared in by Mr. D. W. Freshfield, accompanied by F. Devouassoud, and a short narrative of its leading features was published by him in the '*Alpine Journal*,' vol. ii. p. 362, so that it is unnecessary to enter here further into detail, after mentioning that Jenni and Flury of Pontresina were Herr Hauser's guides.

4. *Ascent of the Dom*. By F. Thioly.

III. MISCELLANEOUS ARTICLES.

1. *Music and the Musical Instruments of the Dwellers in the Alps*. By H. Szadowsky.

From this paper we cull the following facts:—The Alphorn, or Lituus Alpinus of Conrad Gessner, in his work on '*Pilatus*,' printed in 1550, was in the year 1820, according to Herr F. Huber, still called the '*Liti*' in Unterwalden. Notices of

the instrument occur as far back as the thirteenth century, but it undoubtedly dates from the ninth. It is probably unknown in the eastern Alps, and is most frequently to be met with in the upper Valais. The Hackebrett (sackbut or psaltery) is more especially characteristic of Appenzell, Valais, and the S. slopes of the Alps, and is most commonly used at dances and open-air festivals, accompanied by a clarionette or fiddle, its loud tones rendering it especially adapted for such a purpose, whilst justifying the description of an old writer (1536) that it is 'instrumentum ignobile propter ingentem strepitum vocum.' Its origin is lost in obscurity. The ancient Hebrew instrument known under the name of 'Nebel' (Romansch, nablo; in Ovid, nablium) is said to be the same as the mediæval psaltery. At the present day the Italians call their Hackebrett 'salterio tedesco.' The old three-cornered Hackebrett is an imitation of the Arabic Kanun, and the Arabs pass for the inventors of the instrument; so that its introduction into Switzerland may date from the period of the Saracenic incursions into Rhætia. The Schalmei (shalm or reed-pipe) is still to be met with in the Austrian Alps, but has disappeared from Switzerland. It is the 'chalemel' of the early French, and the calamus of the Romans, and was used by the Jongleurs. Cassiodorus alludes to it in the fifth century, and, according to Ambrose, its origin may be traced to India. It lingered on in various parts of Switzerland into the present century, but has now almost entirely disappeared, though, on the other hand, it is thoroughly domesticated in Tyrol.

The Kuhreihen (*Ranz des Vaches*) are derived by Wyss from *Reihen* or *Reigen*, which means a song or ditty, as well as a dance. Of *ranz* or *rans*, Wyss thinks that he has found the root in *ranner*, which, in one of the Swiss-Romansch idioms, means to shout or hollo. The Sackpfeife (bagpipe), formerly of frequent occurrence in the mountains, has now become rare. The Hirtenflöte, which was played like a clarionette, has entirely disappeared, and its use was probably never widespread in the Swiss mountains, though it was to be met with in Appenzell. The kleine Querflöte (lesser German flute) may be found in many communes of the upper Valais, in Inner-Rhoden, on the Lake of Lucerne, and in Canton Vaud. The Zither is unknown in Switzerland, and the people seem disinclined to take to it, as all attempts to introduce it have failed. Throughout the Bavarian and Austrian Alps, it is a well-known national instrument, and in the hands of a skilful performer can discourse most excellent music.

2. *On Land, Alp, and Forest Craft in Mountain Districts.* By E. Landolt.

This paper contains some useful and interesting statistical information, and embodies many valuable hints and suggestions, to which we cannot further allude.

The surface of Switzerland is stated to consist of—

Cultivated land (arable, meadow, vineyard, and garden)	. . . . .	20	per cent.
Pasture	. . . . .	33	”
Wood	. . . . .	15·5	”
Unproductive	. . . . .	31·5	”

The higher valleys are deficient in wood precisely in proportion as the lateral slopes are of moderate inclination and vice versa, in support of which statement the following facts and figures are cited:—

Urseren	. . . . .	Almost woodless.
Ober-Engadin contains	. . . . .	9·4 per cent. of wood.
Bernese Oberland	. . . . .	10·4 ”
The Herrschaft in Bünden	. . . . .	37·5 ”
The Emmenthal	. . . . .	27·8 ”
Unterwalden nid dem Wald	. . . . .	24·8 ”
District S. of the Lake of Lugano	. . . . .	44·0 ”
Val Maggia	. . . . .	9·7 ”

Cultivation is stated to be in a very backward state, leaving much to be desired. Even the management of cattle, for which Switzerland has so just a reputation, is capable of considerable improvement; whilst the breed of horses has deteriorated rather than improved; and little or no alteration for the better is observable in sheep. In the matter of woodcraft the state of things is still worse, according to our author. 'Everyone takes from the woods in the most irregular manner whatever he may require and can find, but no one will do anything for their preservation and renewal; indeed, in general, even the existence and development of young forest-trees is, whether intentionally or through thoughtlessness, absolutely prevented.

In proof of the lessened value of *alps*, the fact is cited that, whilst those of Glarus furnished in 1636 pasture for 13,000 cows, in 1863 the number had diminished to 10,178. The paper concludes with various suggestions for the remedy of existing evils.

3. *The Canton Lucerne at the Period of the Great Extension of Glaciers.* By Professor H. Zähringer.

The paper commences with a slight sketch of the glacial period, and, after describing the mode of formation and laws

of progression of existing glaciers, goes on to state that there must have been two epochs of greater glacial development, in the first of which the glaciers experienced a still wider extension than in the second, 'as otherwise the existing remains of ancient terminal moraines would have been destroyed by the advance of the ice.' The explanation does not seem a very satisfactory one, and, in fact, can only hold good on the assumption that there were two periods, which the phenomenon in question by no means proves. A better argument appears to be derivable from the fact that beneath and above the carboniferous shales of Wetzikon and Mörschwyll are found deposits of erratic blocks, so that the coal must have been formed during an interval of perhaps many thousand years occurring between two glacial epochs.

A comparatively slight change in the relations of the land and sea, followed by a diminution of atmospheric precipitation, would suffice to account for such a result; whilst still greater changes of a similar character would confine the glaciers to the heads of the higher valleys as we find them at the present day.

Five great glaciers flowed from the N., and two from the S., of the Central Alps. 1. The Rhone Glacier, the largest of all, extending as far as Geneva, Neuchâtel, Bienne, and the Jura, and uniting on the W. with the Arve Glacier at Geneva, and on the E. with the Reuss Glacier at Zofingen. 2. The Aar Glacier, which sent an arm over the Brunig as far as Sarnen, and with its main stream flowed over the space at present occupied by the Lakes of Brienz and Thun, and finally stretched away northwards as far as Burgdorf, where it encountered the Rhone Glacier. 3. The Reuss Glacier, which, after filling the valleys of Uri, a portion of Schwyz, and Unterwalden, spread over a great part of Lucerne, with portions of Zug, Zürich, and Aargau, and pushed its terminal moraine as far as the Aar and the Jura, meeting the Linth Glacier on the Limmat, and the Rhone Glacier on the Aar. 4. Further to the E. the Linth Glacier occupied the valleys of Glarus and a portion of Schwyz, spread its icy covering over the lakes of the Canton Zürich, and, following the course of the Limmat, finally fell in with the Reuss Glacier. 5. In connection with the last was the Rhine Glacier, almost rivalling that of the Rhone in magnitude. Dividing into two arms at Sargans, the left branch occupied the basin of the Wallensee, and, uniting with the Linth Glacier at Wesen, contributed to the moraines of the latter those from the left or W. side of the Rhine Valley. The right branch filled the course of the Rhine, overwhelming the Bodensee and Canton Thurgau, and stretching

far up the Vorarlberg and into Germany, whilst coalescing with the Linth and Reuss Glaciers in Lower Aargau.

Of the southern glaciers the most mighty was that of Monte Rosa, which, however, was not situated on Swiss territory, but, issuing from the narrow Val d'Aosta, spread itself over the plain of Piedmont, and piled up masses of Alpine débris which now form ranges of hills 1,500 feet in height. The two southern glaciers occupying Swiss soil—those of Tessin and the Adda—were less important. The first filled the valleys of the Canton Tessin and the Lago Maggiore, and spread itself over the plains of Lombardy. The second, descending from the Splügen and Val Bregaglia, united with that from the Valtelline, occupied the trough of the lake of Como, and pushed its moraines as far as Monza.

To the extension of glaciers is due the preservation of the numerous lakes, since the ice, filling their basins, served as a bridge across which the masses of débris brought down by them from the Alps were transported, instead of filling up the depression, as must otherwise have been the case, whether ice or water-borne. They have also contributed to the maintenance of lakes by depositing their moraines at the outlets, and thus raising the level, whilst some lakes may be considered as owing their origin to this cause alone. Of both classes examples are to be met with in the Canton Lucerne.

The course of the Reuss Glacier is then described by the author with considerable minuteness, and he shows that the lakes of Wauwyl, Sempach, and Baldegg are all due to moraines, after depositing which the glaciers appear to have retreated uninterruptedly to their present limits, as no further development of this kind took place.

4. *Letter of Professor Eisenlohr on Sartorius von Walterhausen's Explanation of Erratic Phenomena.*

It appears that Herr von Walterhausen is of opinion that the climate of the earth was formerly much warmer than at present, and that erratic phenomena are of purely local origin, so that Escher's theory of the connection between the drying-up of the Sahara and the diminution of glaciers would in his view be unnecessary. He supposes that the Alps, as well as the surrounding countries, were formerly much more elevated, and have sunk to their present position during the diluvial period; that the glaciers, though far more extensive than at present, were by no means so developed as glacial theories assume, but were confined to the higher Alpine valleys; that between the Alps, the Jura, and the German Central Mountains (Mittelgebirge)

there existed a great inland sea, extending from Chambéry to Ratisbon, originally in connection with the Mediterranean, but subsequently cut off by an elevation of the land near Chambéry, which converted it into a fresh-water lake. The waters of this lake ran up into the lower Alpine valleys, like Norwegian fjords, and floated off bergs from the glaciers, which spread the so-called glacial deposits.

These opinions are combated by Professor Eisenlohr in a letter to Professor Desor, which, however, contains such a mass of calculations as to the effects of a warm wind upon the snow that it is impossible in the space at our disposal to refer to it in detail. Amongst the results of the discussion are— 1st. That the temperature and elastic force (*Expansivkraft*) of air being the same, the air is heavier the less water it contains, and the driest air is the heaviest. 2nd. That absolutely dry air in cooling gives out more heat than damp air of about the same temperature, unless the latter is absolutely saturated with moisture, and rain is the result of the cooling process. If, then, the wind coming from the S. is dry—that is, comes from the Sahara—it will melt more snow than if it were damp to an extent short of saturation. When, therefore, the Sahara was covered with water, the S. wind in the Alps must have been moist, and consequently gave out less heat, thus favouring glacial development.

5. *Vegetation of the High Alps in its Struggle with Glaciers and Snow.* By Professor G. Theobald.

An interesting botanical paper, from which, however, it would be very difficult to cull.

6. *The Bog-World of the Alps.* By W. Pfeffer, Ph.D.

The same remark applies to this paper as to the preceding one.

7. *Signification of Swiss Local Names in the High Alps.* By A. Gatschet.

The etymology of a vast number of names of mountains, passes, alps, villages, glaciers, &c. is given in this paper, from amongst which we extract the following by way of sample:— The author remarks that in all German cantons a number of non-German names are met with which are derived for the most part from the former vulgar speech of the Roman country-folk, which, long after the political fall of the empire, maintained itself sporadically in outlying provinces. To come to a few of the etymologies— Sanetsch Pass, French Senin, anciently

Senenz; as the name of the River Saane and of the village of Saanen may be looked upon as the patois word *tzan*, *dzan* (field or plain), so Senenz may embody the late Latin *campensis*, and the pass be so called because it leads to Saanen. *Tzan* is also met with in the neighbouring Valaisan Sanfleuron Alp. The name of the glacier at the head of the Valpelline, Zardezan, may possibly be also connected etymologically with it. Abländschen (French Avérenche), near Saanen, derives its name from the avalanches (in patois *avélantze*, *avalantze*, *liantze*, from the mediæval Latin, *advallare*, to fall into the valley) which descend from the Gastlisfühen. The Gross- and Klein-Lohner (between Adelboden and the Kander Thal) are the Lauener, or *montes labinariû*, from which various avalanche-tracks descend into the valley of Adelboden. The expression Egg (dialect for Ecke, new Hoch-Deutsch) is used throughout Switzerland to describe a longer or shorter continuous range of hill or mountain. Thun is derived from the Gallic *dun*, originally a fortified place. The Harder at Interlaken is the woody mount (old Hoch-Deutsch, *hart*, wood). Brienz signifies copse (mediæval Latin, *brenitia*); Mürren or Müeren, old Hoch-Deutsch, *muor*, moss or bog. Schreckhorn, old Hoch-Deutsch, *scrican*, to spring or leap. Wetterhörner, old Hoch-Deutsch, *wetaro*, a fork, which again appears in Wetterlücke, near the Tschingel Glacier, and Wetterlatte, near Reichenbach in the Frutigenthal. Dossenhorn is the Latin *dorsum*, a mountain ridge or *Rücken*. The Titlis, called Titli in the local patois, is named after a neighbouring alp, formerly the property of a Titulus, i.e. of a titular church. Linmi, occurring in Steinlimmi, &c., is *limes*, threshold. Grimsel (anciently, 1397, an der Grymslun) means a slight elevation, mediæval Latin, *crematiolum*, probably in reference to the knoll on which the hospice is erected. Guttannen, anciently Guotentan, or beautiful Tann (pine) wood. 'It is easy to convince oneself that the most ancient settlements in the Oberland, both on the mountain slopes and in the valley bottoms, belong to a people preceding the German immigration, as their names are only to be explained by means of the old Latin or Roman vernacular.' In Damma, Stock, and Firn, we see the Italian *damma*, *daino*, *daina* (chamois), from its similarity to the Damhirsch (fallow buck). The Gallenstock is so called from the frightful steepness of its eastern precipice (*gellende Felswand*). Gletscher was formerly rendered by *glaciers*, and is really of Roman and not of German origin; its early Latin form is *Glaciarius* (Mons). Obergestelen is oberes Castell; Val Bedretto in Bedretto is glacier, Latin *inveteratus*, from

old snow. Viesch is the Latin *vicus*, village. The Aletschhorn is the avalanche peak (Lauinenspitze), *alenz*, contracted from *avelantze*, being the patois for Lauine, avalanche. The Märjelen Alp is the alp where Majoran (Latin, *amaracus*; French, *marjolaine*; English, *marjoram*) grows. Lax is named from the four small lakes (*lacus*) of the neighbouring Laxer Alp. Visp or Vispach has arisen from Wiesenbach, of which Praborgne, the French name of Zermatt, is another form. Gorner is met with again in the Rhætian Cornära. The Riffelhorn is the horn that has been sawn to pieces, old Hoch-Deutsch, *rifflän*, to saw.

Of the so-called Arabic local names in the Saasthal, our author remarks that a body of Saracens did indeed settle in the Valais, and even in Canton Vaud traditions are to be met with of Saracenic inroads, whilst a Grison early history of 940 witnesses to the unwelcome presence of that people in eastern Switzerland. No historic data on the subject of their irruption into the Saasthal have reached us. Moro (in Monte Moro) may mean no more than copse (mediæval Latin, *moro*, bramble-bush). Almagell is the Italian *allo majello*, at the little birch wood (*majo*, *maia*, the birch). Allalinhorn is probably the Italian *all' alagna*, by the bushes (mediæval Latin, *avellana*); Macugnaga is derived from the Italian *macchio*. The name Fée marks the position of a beech wood (Latin, *fagus*), whilst in Val Formazza we have the mediæval Latin, *vallis formatica*, or cheese valley.

IV. SHORTER COMMUNICATIONS.

1. *A Storm in the Mountains.* By A. Heine.

This is a most vivid and spirited description of a tremendous tempest encountered by the writer, October 4, 1866, whilst seeking refuge in the inn on the summit of the Gross-Mythen, near Schwyz, where for some hours he was quite alone and in considerable danger.

2. *Peculiar Phenomena during a Mountain Storm.* By G. Theobald.

The well-known professor describes the experience of himself and some friends on July 22, 1864, on the ridge between the Piz Rosag—a peak 2,995 mètres in height above the Baths of St. Moritz—and the neighbouring Piz Surlei. Being caught in a storm, their bâtons emitted the peculiar singing sound often observed and described under similar conditions, smart shocks were felt in their hands, their hair stood on end, and along a line on their foreheads, corresponding to the silk band

on their hats, a sharp pricking sensation was experienced. Immediately after a flash these phenomena ceased, but recommenced during the succeeding interval.

3. *Stone Whirlwind.* By G. Theobald.

In the summer of 1865, the Professor and Herr Wolf, whilst on the Calanda near Chur, saw, on a spot covered with weathered fragments of calcareous slate, a sudden movement communicated to the stones. Fragments several inches in diameter rose in the air to the height of a foot or more, were carried round in a circle about twenty paces in diameter, and descended only to rise again. The cause was a whirlwind blowing across the ridge from W. to E. Herr Förster Emmermann of Samaden made a similar observation on the Weisse Platte in Val Müsellas, between Samaden and Camogask. Fragments of gneiss and mica-schist as large as his fist were carried high into the air and whirled round with such force that he did not venture to approach them.

4. *On Photography in the Higher Regions of the Alps.* By J. Beck.

The author remarks that well-prepared dry plates are the first and essential condition of success, and adds that Puech (21 Place de la Madeleine, Paris) and Liesegang, of Elberfeld, are the only dependable houses which his own experience justifies his naming.

The principal object of the paper seems to be to show that, with a very small amount of practice, an amateur may obtain a large enough percentage of successful plates, even in such elevated positions as the summits of the Wetterhorn and Monte Rosa, to repay him for the moderate outlay which a sufficiently portable apparatus involves. His own camera and appurtenances cost about 12*l.* and weighed less than 20 lbs.

5. *Geological Maps and Mining.* By B. Studer.

6. *The Ruchi Pass* (2,770 mètres = 9,088 E. ft.). By F. Hoffmann-Merian.

The paper describes the passage on June 29, 1866, of a new col from the Club Hôtel in the Maderaner Thal to the Schächenthaler Brunnithal, between the Kl. and Gr. Ruchen.

7. *Cresta Güzza* (*Cresta Agiuza*), (3,872 mètres = 12,704 E. ft.). By the Editor.

This is a note by the Editor to record that the peak in question was ascended by Messrs. Weilenmann and Specht, with Pöll, of Galthür, and Jacob Pfitscher, of Passeier, on July

14, 1865. A full account of the expedition will appear in the 'Jahrbuch' for 1869.

8. *Ascent (the First on Record) of Piz Platta in Oberhalbstein* (3,386 mètres=11,109 E. ft.). By B. E. de Beurnonville.

The party, besides M. de Beurnonville, consisted of Herr Balzer and Herr Gadiant, of Mühlen, with Stephan Hartmann, of St. Moritz, as guide, and the expedition took place Nov. 7, 1866. Proceeding from Mühlen to Val Berela, viâ the Faller Thal and Alp, the S. side of the peak was reached, and the summit gained without serious difficulty by the southern glacier, steepish rocks, and slopes of débris. The ascent occupied 5½, and the descent 4 hours, including halts.

9. *Correction relative to the Panorama from Piz Buin* (Jahrbuch, vol. iii. p. 76). By J. J. Weilenmann.

10. *Remarks on the Panorama from the Col du Mont Rouge* (accompanying the present volume of the 'Jahrbuch'). By G. Studer.

11. *Additional Excursions in the Club District.* By J. H. Isler, of Lausanne.

V. APPENDIX.

1. *Report on the Expeditions in the Excursion District for 1867—Grand Combin to Mont Collon.* By Prof. M. Ulrich.

This valuable paper contains a careful compilation of all the known expeditions chronologically arranged, but it would far exceed our limits to attempt even the most rapid epitome of its elaborate details, and we therefore confine ourselves to the novelties recorded.

Dr. Balzer and Herr Schröder, July 18, 1867—the Tourne- lon Blanc (3,712 mètres=12,179 E. ft.) from Mauvoisin, in the Bagne-Thal—first ascended by Herr F. Hoffmann, viâ the steep ridge W. of La Liaz; July 31, the Oulie Cecca (3,550 mètres=11,647 E. ft.); Aug. 5, from the Hôtel Collon, at the Arolla Glacier, to the Col de Chermontane, by the Pièce Glacier, then between the Vord. and Kl. Mont Collon to the Grat, and thence to the summit of the Mont Collon, and back to the Hôtel Collon by the Vuibez Glacier, and the morning's route.

2. *Chronicle of the Club during 1867.* By Prof. M. Ulrich.

A Central Committee for the years 1867-8-9 having been

chosen, and Prof. M. Ulrich elected its president at St. Gallen in 1866, the annual meeting for 1867 was held at Lucerne. As the Excursion District for 1869, the group from the Lyskamm to Monte Leone was selected, and for 1868 that between the Col de Balme and Grand Combin, in addition to that from the Col de Collon to the Lyskamm. Berne was chosen as the place of meeting for 1868, with Herr Regierungshalter G. Studer as Fest-President. Our countryman, Mr. A. A. Reilly, was elected an honorary member of the Section Geneva, "in recognition of his topographical and cartographical labours in connection with the southern Valaisan Alps, from Mont Blanc to Monte Rosa." It was also decided to erect a hut on the Col de la Maison Blanche, at the foot of the Grand Combin.

THE SECTIONS.

Geneva, under the active presidency of M. C. Long, has increased to ninety-four members. The editors of the '*Écho des Alpes*,' MM. Freundler and Jullien, have now, after three years, 160 subscribers. The Committee for the preservation of erratic blocks, MM. A. Favre and Soret, have associated themselves with the *Société géologique de France*, and rescued a great number of blocks in Faucigny and Chablais from destruction. The same course has been successfully followed in Switzerland with the aid of the *Schweiz. Naturf.-Gesellschaft*.

The Section St. Gallen is under the presidency of Dr. F. v. Tschudi. 200 francs yearly, for three years, were granted for the improvement of the Säntis route. By June 1868 a little house will be ready beneath the summit, with kitchen, sleeping-room with two beds, and a hay gîte in the roof for twelve men. The Section contributed 200 francs to its erection, and will furnish it with meteorological instruments. Several interesting expeditions were made.

The Section Monte Rosa, under the presidency of Herr v. Torrenté, now numbers forty-six members. Its principal task has been the completion of the guide and porter rules and tariff. These will be issued in a volume; those for Ober-Wallis being complete, whilst those for the whole Canton were to be submitted to the Government in the course of 1868, and then published. A hut will be erected on the N. slopes of the Matterhorn, a member of the Section (Herr Seiler?) contributing 500 francs. This has since been done. The erratic block on the Fort Valeria, at Sion, is to be dedicated to the memory of Herr Venetz (Vater), his name being engraved upon it—an appropriate and well-deserved compliment.

The Section Diablerets, under the presidency of M. Bernus, numbers thirty-three members.

Section Basel (President, Professor Rüttimeyer; eighty-three members).

Section Tödi (President, Herr Landrath Hauser). The hut at the foot of the Glärnisch-Firn is completed. The N. summit of the Mütschenstock, and that of the so-called Rüchi, SW. of the Hausstock, were ascended by HH. Freuler, Balzer, and Piccard. The Rüchi was climbed by a party under the leadership of Herr Hauser, the pass between it and the Hausstock crossed, the last-named peak climbed, and a descent effected to Elm—a walk of eighteen hours from the Unterstaffel of the Baumgarten Alp. Herr Speich ascended the Bündner Tödi for the first time.

Section Uto (Zürich; President, Herr Siber-Gysi; 102 members).

Section Pilatus (President, Professor Zähringer; fifty-two members). The excursions do not appear to call for special comment in this place.

Section Berne (President, Herr G. Studer). The new Club hut in the Trift District was satisfactorily completed in 1867, at a cost of 908 francs. Excursions:—Herr E. v. Fellenberg, July 13, 1866, the Mönch, from the north (new); July 27, the Wetterhorn (Mittelhorn) and over the Bergli-Joch to the Gauli Glacier; July 31, the Wellhorn—first ascent, and very difficult. 1867: August 14, the Jungfrau from the N., with P. Michel, P. Eggen, Schlegel, and another Michel; August 19, the Bietschhorn from Kippel, with P. Michel, P. Eggen, A. Sigen, and a young Sigen. (Left Nesthütte at 2 A.M., Schafhorn 6 A.M., summit 2 P.M.; commenced descent at 3 P.M., return to Nesthütte 11 P.M.) Herr Lindt and Dr. Lindt, with P. Sulzer of Guttannen, traversed the Gwächtengrat, passed the Triftstöckli, and reached the Club hut on the Thällistock, effecting the first ascent of the Gwächtenhorn en route.

Section Rhätia (Graubünden; President, Herr Coaz; 100 members).—A hut will be ready in 1868 on the *Sattel* below the Stätzspitze.

Section Aargau (President, Herr von Hallwyl).—No important excursions.

Of course it would be unreasonable to expect that Englishmen—to many of whom the Alps offer, and are rightly regarded as affording, a mere field of relaxation from the serious duties of a laborious home existence, in which the overtaxed brain may obtain the absolute rest it so much needs—should rival in their methodical observations and special objects of

study the many able men, an honour not merely to Swiss, but to European science, who adorn the ranks of the Swiss Alpenclub, and give a tone and enduring value to its publications, which it is more easy for us to admire than to imitate. Yet our countrymen have shown that they, too, can describe as well as they climb, can investigate as carefully as they write, and the varied range of subjects handled in the volume of the 'Jahrbuch,' of which the present paper attempts to give some general idea, may well stimulate us to methodise our efforts, and, as novelty ceases to throw its undeniable charm around mountain expeditions, to work out more thoroughly the endless problems which await solution, and meet the attentive observer on the most hackneyed routes and most frequented summits. Honour to the pioneer who hews away at the giant stems of the primeval forest! But let him not think that his task is accomplished, lest another wiser than he, with patience to clear and till, should reap the harvest. Our Swiss mountaineering brethren keep the latter point steadily in view, and we may take a useful hint from them without abating our enthusiasm for mountaineering pure and simple as a noble pastime and a 'joy for ever.'

F. F. T.

THE LATE PRINCIPAL FORBES.

AMONG the many names which the past year has erased from the list of living scientific men, there is one which must be recorded in these columns with peculiar sorrow and regret. On the last day of 1868 died James David Forbes, Principal of the United Colleges of St. Andrews, alike eminent as a philosopher and as a traveller. But while the whole scientific world deplores the loss of an ardent and most laborious fellow-worker, to those more especially interested in the Alps, either as mountaineers or observers, the loss of his wise advice and kindly sympathy is great indeed.

It is not necessary to speak here of the numerous contributions made by him to almost every branch of physics. At an unusually early age he had commenced his labours, and at 22 he was appointed to succeed Sir John Leslie as Professor of Natural Philosophy at the University of Edinburgh. His subsequent career was very brilliant: he won medals from the Royal Societies of London and Edinburgh; he was elected corresponding member of the Institute of France; and his name appeared on the lists of numerous scientific bodies both in England and on the Continent. That he was an untiring

labourer in the field of science is evidenced by the fact that before 1852 he was the author of 101 valuable papers on various subjects. But he had overtaken his energies. The fatigue and exposure undergone by him during his expedition to Norway, in 1851, acted injuriously on strength which he had never spared, and health which he had freely risked in pursuit of scientific truth; and a terrible illness ensued, brought on more immediately by some laborious researches in the laws of heat, which he had resumed on his return. From that period his life was one long illness. Only his indomitable courage could have enabled him to tax his failing powers as he continued to do, and to carry on to the very last the work for which he had indeed given his very life.

Amongst the numerous celebrated men who have devoted their attention to the physical geography of the Alps and the laws of glacier-motion, his name must always stand as one of the highest. He was, perhaps, the first to recognise the fact that to arrive at any theory worthy of the name, a very different method of investigation must be employed from that previously in use; and he determined to replace 'a system of relying on conclusions gathered from uncertain data, or the hazardous assertions of peasantry about matters in which they take not the slightest interest,' by a system of patient and most laborious personal research. Not content with visiting and exploring almost all the glacier-systems of the Oberland and the Pennine Alps, he determined to investigate as exhaustively as possible the motion and structure of some large glacier, and executed as a preliminary step that remarkable survey of the Mer de Glace, which was for some time after its publication the only correct Alpine map in existence.

The theories deduced by him from a mass of hard-won data have not escaped criticism, but the controversy which ensued was rather a question of words than of facts; and it must always be a matter of deep regret that the failure of his health, in 1851, cut him off, at once and for ever, from the further pursuit of investigations which had already produced such important results.

The Alpine Club has owed him much, ever since its founders, with his map in their hands, fought their way alone to the summit of Mont Blanc. He was an active and intrepid mountaineer, in days when mountaineers were indeed few; and he rendered valuable service by his accounts of districts before scarcely known to Englishmen, which he opened up by a series of excursions extending over the whole chain of the Pennine Alps. In 1841, after having explored the volcanic districts of Central France with Mr. John Mackintosh, and made several excursions in Dauphiné with Mr. Heath, he spent some time

with M. Agassiz on the Lauter Aar Glacier, after which he crossed the Ober-Aar-Joch, and made the ascent of the Jungfrau. In 1842, besides his observations on the Mer de Glace, he explored, in company with M. Studer, the mountain-chain lying between the Great St. Bernard and Monte Rosa, crossing afterwards the Col du Géant, which was then the only known glacier-pass traversing the chain of Mont Blanc, and to which he some years afterwards added a second—the Col de la Fenêtre de Salena. His visit to Norway in 1851 unhappily closed his active career; but although he turned his researches from these to other branches of physical science, his old love for the Alps remained as tender and vigorous as ever, and his heart, as he has wistfully said, remained where his body could never be. He always hailed with undiminished interest a new scientific observation, the ascent of an unknown peak, the opening of a new pass; and to those who were interested in establishing, on something like a firm basis, the topography of the Alps, he was ever ready with advice and assistance—so much so that it was entirely owing, first to his example, and then to his encouragement and assistance, that amateur surveying was brought to bear, both in the English and Swiss Alpine Clubs, upon important districts, which but for this system would now remain practically unmapped.

The scientific value of his life will not soon be forgotten, and by those who enjoyed the privilege of his friendship his memory will be always affectionately cherished; for they had found, beneath a mental organisation of singular power and vigour, a heart so gentle, guileless, and tender as has seldom been given to the sons of men.

A. A. R.

REVIEW.

ALASKA AND THE YUKON.*

Many of us can probably remember how, in the map-copying days of our youth, we carefully followed up the coast-lines on each side of the Pacific Ocean till we passed the latitude of Kamchatka, and imagined a mysterious end of all things at the entrance of Behring's Straits. Surely we had done enough; the pedagogue could hardly be so unreasonable as to expect us to trouble ourselves or him with what we conceived to be the seat of everlasting and unprofitable desolation! Eugène Sue must have had some such idea of the same region when he selected it for the first scene in the 'Wandering Jew.' The time is supposed to be the latter part of September, and this is what the novelist says: 'On the east, between the two points of Cape Oulikine,

* *Travel and Adventure in the Territory of Alaska.* By Frederick Whymper.

the eastern boundary of Siberia, a dull green line is seen, along which vast blocks of white ice are transported. It is Behring's Straits. On the farther side of the straits, and looking down upon them, rise the granitic masses of Cape Prince of Wales, the extreme point of North America. These desolate latitudes no longer belong to the habitable world. So terrible is the cold that the rocks burst, the trees split, the cracking earth shoots forth bundles of frozen spangles. No human being seems capable of encountering the solitude of these regions of hoarfrost and storms, of famine and of death.'

After all, however, it appears that these desolate regions are inhabited, on both sides, by busy tribes of men, who cross the intervening seas in frail canoes; that the rivers are absolutely alive with salmon, and the forests full of game; and that, though the cold is undoubtedly very severe at one part of the year, yet at others the thermometer rises to 70° and 80° in the shade, and the delicate mosquito arrives at the maturest powers of making himself obnoxious to mankind. A somewhat similar instance of the strange mistakes made by men who know nothing of the countries which they attempt to delineate, occurred in the experience of the writer of these pages. We were sailing along the coasts of Brazil, and had just been visiting the lovely neighbourhood of Bahia, a place in which are united all the phenomena which are required to make this earth transcendently beautiful—where all the elements combine to produce every symptom of luxuriant life; when, to our astonishment, we found, in the pages of a novel called, if we remember rightly, 'Hide and Seek,' that this lovely neighbourhood had been selected by a popular English author as the spot upon which a cynical character was condemned to wander among deserts of everlasting sand!

Such exaggerations and mistakes falling occasionally under the notice of those who read about distant regions, it is refreshing in a high degree to follow the wanderings of an intelligent traveller, who has not only seen what he writes about but describes it in so clear a manner that it is no hard task for the reader to imagine himself one of the party. This is our feeling as we lay down Mr. Whympers' book upon Alaska. The book is a kind of literary triptych, the main portion of it being devoted to Russian America and Kamchatka, while one of the side-panels consists of some preliminary excursions in British Columbia and Vancouver Island, and the other contains some useful concluding remarks upon the present state of California.

At the outset we come upon the strange episode in the history of geographical discovery which is connected with the Straits of Fuca. The poor old Greek pilot who, in 1592, discovered these straits, and made the passage between the mainland and Vancouver Island, died discredited and in poverty; and it was not till exactly 200 years afterwards that Vancouver, in 1792, removed all doubt as to the discovery. Meanwhile Captain Cook, the circumnavigator—in whom we have hitherto implicitly believed, and intended to believe *si fractus illabatur orbis*—reached Cape Flattery in 1778, during his exploration of this coast, but missed seeing the entrance of the straits, and recorded the following observation about them: 'It is in this very latitude where

we now were, that geographers have placed the pretended Straits of Fuca. But we saw nothing like it; nor is there the least probability that ever any such thing existed.' English captains seem to have been particularly hard on poor old Juan de Fuca. After being 'fortie yeares' in the service of the Spaniards, he had lost sixty thousand 'duckets' in a galleon captured by Captain Candlish, Englishman, and about a couple of hundred years afterwards Captain Cook robbed him of his character for veracity.

There are the Straits of Fuca, nevertheless; and through them, in 1862, passed Mr. Whympier with a large number of fellow-passengers, most of whom were bound for the Cariboo gold-diggings, and were in full enjoyment of that bliss which was afforded by a complete ignorance of the miserable and unsatisfactory life which awaited them. *Auri sacra fames* is but seldom gratified in proportion to the hopes of those who entertain the passion; they may labour, but other men enter into the fruit of their labours; and Mr. Whympier, when in 1863 he made a sketching and pedestrian trip to the northern El Dorado, found many of his late companions already on the way down, crestfallen and disgusted. There appears to be a full knowledge of the various methods of 'doctoring' the ground with a modicum of gold-dust or bits of brass candlesticks; but the most delightful suggestion about the precious metal lies in the report that a gentleman in the Hudson's Bay service found the Haidah Indians of Queen Charlotte's Island using golden bullets instead of leaden ones. We wonder if some enterprising speculator has allowed himself to be shot at by the natives, upon the chance of being able to extract a golden bullet from an inconsiderable wound!

Our author's first expedition commends him at once to the welcome of the Alpine Club; he took an opportunity to proceed by sea up the straits to Bute Inlet and the Homathco River, whence he proceeded on foot through the forests, to visit some of the glaciers which have their origin in the high mountains of the mainland. His first attempt at an Indian guide to the great glacier was a failure; he could not make him understand anything he said, and after two days' wandering he was obliged to return and secure the services of an old chief named Tellot, of some intelligence. 'Few,' says Mr. Whympier, 'can have any conception of the old forests through which our course lay who have not themselves seen such. Thick with living vegetation, they were equally so with decay and death. Now an immense fallen trunk, over which we were obliged to climb, blocked the path; now one under which we had to creep; and now and again an accumulation of the same, the effect of some wintry storm or natural death. Here, as the tree falls so it lies, and has lain undisturbed for ages. Hence, a log, green with moss, suddenly collapsed as we trod on it, and we were half-buried in tinder. Prickly thickets were common.' In another passage we are informed that the chief of these trees (called cedar in the country) is the well-known *Thuja gigantea*, one specimen of which was found to be 45 ft. in circumference breast-high from the ground.

It was in the latter end of March when Mr. Whympier traversed

this part of the country, and found that rotten snow covered the ground, logs, and underbrush, to a depth of several feet, and made travelling with the loads which they carried hardly pleasurable. They pushed on, however, and after following the Homathco River more or less closely for the greater part of a day, they reached the first glacier-stream, and soon obtained a distant view of the great 'frozen torrent' itself, with the grand snow-peaks behind it. Then came an instance of virtue rewarded in a notable manner; for the author found that in wading through this stream he would have been carried off his legs if he had not had fifty pounds' weight on his back to steady him. Think of this, ye who grumble about a knapsack containing not much more than a spare coat and a pair of slippers! That our author is possessed of more than ordinary physical fitness for rough explorations is evident from such a passage as the following: 'When a man can enjoy any kind of diet,' he says, 'even one of beans, of a kind only given at home to horses; when he considers tea the best and most refreshing of drinks, it is a pretty good sign that he is in vigorous health, that he sleeps well, and that life is no burden to him. Such was our experience at times when we carried on our backs loads of from 50 to 120 lbs. in weight, through a rugged country, where rivers were mountain torrents, the woods almost a jungle, and where we rarely turned into our blankets at night except in a wet condition.'

After camping with the intelligent Tellot upon an open space some miles below the foot of the glacier, he found next morning that the said Tellot refused to go any farther, or take any more trouble. So he was left behind to take care of the traps, while Mr. Whympfer gallantly resolved to push on, and see the glacier by himself. To do this he had to struggle through two miles and a half of very deep but rotten and thawing snow, sometimes letting him suddenly through up to his chest, and jamming him miserably between logs and boulders concealed below the surface. This was on the 24th of April, and it seems to us manifest that the expedition was made too early in the season; in a very short time afterwards all the inconvenience caused by the melting of the winter snow would have been avoided, and the author would have doubtless been tempted to pursue his researches among the glaciers of British Columbia to a much greater extent than he did. As it was, he saw quite enough to tempt future travellers into further explorations of this new Alpine region. Here was a magnificent glacier three-quarters of a mile wide at its extremity, and considerably wider at its upper part, with lofty and fantastic mountains rising above it in the background—one of them having, as appears from the author's sketch, almost exactly the same configuration as the Matterhorn. Before him were crevasses and séracs, moraines, boulders, and all the phenomena which make the broad distinction between true glaciers and mere beds of more or less permanent snow. Moreover, this range of snowy mountains must be of immense extent, in a line approximately parallel to the coast of the Pacific, and forming part of the same backbone as the Sierra Nevada of California. The glacier upon which Mr. Whympfer found himself can hardly be 100 miles from the famous Mount Baker, which he mentions in a later part of his book,

and which, according to recent intelligence, has been at length ascended by Mr. E. T. Coleman, one of the earliest members of the Alpine Club. Twice he failed, owing to dense forests, wild mountain streams, lack of guides, and the difficulties incidental to these half-developed countries, in which it is almost as difficult to get to the bottom of a mountain as to reach its summit; but those who know his steady power of perseverance will be more delighted than surprised to find that he has finally achieved success. This mountain is of volcanic origin, still manifesting itself in smoke and vapour; and it is extremely fortunate that our friend did not make his ascent on a certain day in 1865, when California was frightened by an earthquake, which, among other damages, shook down part of the the summit of Mount Baker.

After spending the day in wandering and sketching, amidst a scene of tranquillity which was only disturbed by the undying restlessness of the glacier, with its falling stones and tumbling streams, our author rejoined the lazy and rascally guide who had refused to go on with him, and who now received him with a manner which expressed conviction that the Englishman was a fool for his pains. Those of our Alpine brethren who may have been occasionally tormented by a good-for-nothing porter or guide may derive a sort of vicarious satisfaction from the knowledge that this intelligent Redskin was very soon afterwards hanged, though not so much on account of backsliding at the glacier as in consequence of his share in a brutal massacre at Bute Inlet.

In the summer of the same year, Mr. Whympers volunteered, in his character of artist, to accompany a party which was selected to explore the unknown interior of Vancouver Island. In the operation of crossing it from the eastern to the western shore, they met with difficulties and troubles enough to try the temper of a saint among interminable forests and impracticable streams. On arriving at a river flowing westwards, the party divided—some sticking to the land, some going down the river in a rickety deserted canoe; while the artist, with one of his companions, on a small improvised raft, descended a succession of 'riffles,' or rapids, alternating with deep pools, in so ludicrous a fashion that the reader must consult the illustration (at p. 49) if he wishes to have anything like an idea of it. In due time they made the acquaintance of the Ahts, or natives of the west coast of the island. One of these gentlemen consented to sit for his photograph, the result of which may be seen at p. 53. This ugly rascal affords an illustration of the peculiarities of his race, among which the unkempt hair and a wreath of leaves (put on to keep off flies and mosquitoes, as well as for ornament) are conspicuous. He looks like grimy Pluto, dressed up in the character of a bacchanal, and trying in vain to look pleasant for a moment. On being joined by some of the land explorers, they found that their perils among 'riffles' had been sport compared with the troubles experienced among forest-covered mountains. A distance of twenty miles, *on the map*, had occupied ten days to travel; and they used very strong and emphatic language in regard to an old Admiralty chart, on which their route was marked as 'level plains'!

Among the Nittinaht Indians of Pachearah, on the SW. coast, they found a Mr. Lawton, who, for trading purposes, was living there by himself, and with no white neighbours within three or four miles. This gentleman appears to have had some singular experiences of his savage neighbours, who on one occasion made a warlike expedition to the Cape Flattery Indians, on the mainland, and brought home twenty-six human heads, which they exhibited to him with savage glee. His anticipations that reprisals would soon take place were fully realised by a counter-invasion from the outraged tribe. The Nittinahts cleared out in time, and the disappointed Flattery-men revenged themselves by an attack upon the log-house of Mr. Lawton, who would infallibly have been killed if he had not taken the precaution of loading all the trading guns in his store, and firing them as fast as possible into the ranks of the enemy.

Of the American Indians in general, Mr. Whympier, like most of those who have visited them, takes anything but a sanguine view, and the attempt to successfully civilise them seems to meet with little reward. 'It is easy enough,' he says, 'to find natives who have abandoned that simple costume, a blanket, for more decorous clothing, who can swear in broken English, sing "Sally come up!" and drink all the camphine whisky they can obtain; but it is very rare to find those who are the better for intercourse with the palefaces. My experience is decidedly this, that the least degraded Indians were those who had least to do with the white man.' There are some exceedingly interesting remarks on this subject by Mr. Sproat, who, as the owner of sawmills in Barclay Sound, was an extensive employer of native as well as white labour. In his establishment every care was taken of the Indians—they were better fed, clothed, and taught than they had ever been before—and the place was conducted on temperance principles. 'It was only,' says Mr. Sproat, in his 'Scenes and Studies of Savage Life,' 'after a considerable time that symptoms of a change amongst the Indians living nearest to the settlement could be noticed. Not having observed the gradual process, my mind being occupied with other matters, I seemed all at once to perceive that a few sharp-witted young natives had become what I can only call offensively European, and that the mass of the Indians no longer visited the settlement in their former free and independent way, but lived listlessly in their villages, brooding seemingly over heavy thoughts. Their curiosity had been satisfied; they had been surprised and bewildered by the presence of machinery, steam-vessels, and the active labour of civilised men, and they seemed to have acquired a distrust, nay almost a disgust, for themselves. They began to abandon their old habits, tribal practices, and ceremonies. By-and-by it was noticed that more than the usual amount of sickness prevailed among them, and a high death-rate continued during the five years I was there. Nobody molested them, they had ample sustenance and shelter for the support of life, yet the people decayed. The steady progress of civilised life seemed to dim and extinguish the flickering light of savageism as the rays of the sun put out a common fire.'

But we must be moving more towards the Arctic regions, and leave

the Ahts of Vancouver Island for the Yukons and Tchuktokis of Alaska and Siberia.

In 1865 the Western Union Telegraph Company of America, the largest corporation of its kind in existence, commenced explorations for a proposed overland telegraph, which, by means of a cable under Behring's Straits, was to unite the New and the Old World. This scheme, after an expenditure of three millions of dollars, was abandoned in 1867, owing to the success of the Atlantic Cable. It was a very large sum of money to sacrifice; but the world has been the gainer by the loss of the company. 'An expedition employing several hundred explorers, who examined six thousand miles of country on both sides of the Pacific—from Fraser River to Behring's Straits, and thence southward to the Amoor—has added something to our knowledge of these unfrequented lands.' No expense or pains appear to have been spared; skilful and active men were selected by Colonel Buckley for each branch of the service, and, amongst other results, we are indebted to it for the present work of Mr. Whymper, the artist to the expedition. With a proper appreciation of the principle, '*Divide et impera*,' a considerable number of exploring parties were simultaneously set to work upon various divisions of the vast territory to be explored, but we must content ourselves with following the footsteps indicated in his volume.

'The recent acquisition of Russian America by the United States Government is,' says Mr. Whymper, 'one of the events of the day. Four hundred thousand square miles of territory have been added, under the name of Alaska, to the already vast domain of Uncle Sam, and Russia has rid herself of a possession of doubtful value. The purchase was not allowed to be completed quietly. On its announcement the people of the United States were, in fact, taken by surprise; there was much hostile criticism and strong political opposition. That has now for the most part passed away, and American enterprise has begun to develop the resources of the country. For some time, indeed, Mr. Seward's position in regard to it (he being always considered the originator of the project) was anything but a desirable one. It was regarded as a bad business, and an unfortunate speculation, and was ridiculed as "our new possession of Walrussia." Mock advertisements, purporting to come from the Secretary of State, appeared in the daily papers of New York and the large cities generally, offering the highest price for waste lands and worn-out colonies, submerged and undiscovered islands, icebergs, polar bears, earthquakes, and volcanoes—provided they should not shake the confidence of the State Department. In the House of Congress it was made a party question, and therefore the colony was, on the one hand, described as the tag-end of creation, and on the other as an Elysian field.'

Our author, apparently, is on the side of those who think that this purchase is only a symptom of the 'manifest destiny' of the United States to swallow up the whole continent of North America, and who believe, further, that it will be for the interest both of Canada and England that such should be the case. The same arguments would apply to the surrender of almost, if not quite, all the foreign possessions of the British Crown; and very likely the clever author of 'Greater Britain' (Mr. Dilke) would be quite satisfied, in this instance at all events, by the reflection

that it would be part of the triumph of the English race; but still the name and greatness of the British Empire must be dear to Englishmen, and we cannot help wondering what they would be if she were once more reduced to the limits of these islands.

Alaska, however, is already an American fact, and was the scene of some of the most interesting explorations by the telegraph party. A glance at the map shows us that it must be more valuable than the *general* situation of the country would lead one to imagine; for it includes a long belt of coast, reaching right down to Queen Charlotte's Island and the confines of British Columbia. We cannot help thinking that, like an epigram, it has *its sting in its tail*. Nearly in the middle of this coast-line is an island, upon which is Sitka, or New Archangel, the headquarters of the Russian-American Company, and now the capital of the new territory of Alaska. Sitka enjoys the unenviable position of being about the most rainy place in the world. Rain ceases only when there is a good prospect of snow. Warm sunny weather is invariably accompanied by the prevalence of fever and pulmonary complaints, and rheumatism is looked upon as an inevitable concomitant to a residence in the settlement. The winter is by no means severe, the thermometer rarely standing below 20° Fahrenheit. There is a very common prejudice in Western Europe in favour of abusing Russian institutions, and it is worth while to pause for a moment, and see what was the state of affairs in this Sitka, which may be described as the last joint of the little toe of the hinder foot of the great Russian bear:—'After passing the Governor's house, which is perched upon a rock, we found the bureau and workshops of the Company, and a number of the better class of houses for employes; on the left of the street a shrubbery, the Club Gardens, with summer-houses, card and supper rooms, and swings for the children; and a little further the Greek church, with its dome and spire of Oriental style, overshadowing a plainer Lutheran structure within a few steps of it, attracted our attention. Then came the Club House, occupied by unmarried servants of the Company; the school-house, from which *scholars of promise were sent to St. Petersburg*; and the hospital, a very neat and clean building. Beyond these a few dozen cottages and shanties, and then the woods, with the one promenade of the place running through them.' Not so bad for the same latitude as the middle of Kamchatka!

Not only has Sitka been the headquarters of the Russian fur-trade but it is also in the centre of a marvellously productive salmon-country. The rivers are sometimes so blocked with these fish that the passage of boats is impeded, and they are occasionally driven on the banks, to putrefy in masses. They are dried, and sent by hundreds of thousands to the Sandwich Islands and elsewhere. By far the grandest work in progress in the world is the Great Pacific Railway, which, as we learn from other sources, will be opened in 1870. It will directly connect New York with San Francisco; and, in a country where they can send a letter for 3,000 miles at a cost of three-halfpence, there will be an opportunity of sending the produce of Alaska to England in three weeks. No wonder that, in the very short time since the acquisition of that

country by Brother Jonathan, the population of Sitka has already jumped from 800 to upwards of 2,000. Depend upon it, our cousins will 'develope' something out of the country in their vigorous and industrious fashion; and we are scarcely surprised to hear a whisper that Mr. Seward is so pleased with his first investment in 'icebergs and snow-fields' that he is almost prepared to follow it with a bid for Iceland and Greenland. One part of the ice is very practically useful. At St. Paul's, Kodiak Island, which is included in the purchase, an artificial lake of forty acres has been made, where in the winter months vast quantities of ice are cut and stored, for summer consumption in San Francisco and the southern ports.

Anyone who looks at the map will observe that the promontory of Alaska tapers off to a point, whence the long chain of the Aleutian Islands, like a disjointed backbone, stretches westwards through nearly thirty degrees of longitude. The whole of these, as far as Attu, are included in the American purchase. After a short interval, following in the same direction, the eye meets a few more islands, one of them named after the famous Behring, who there welcomed death as the end of his sufferings and explorations; and then we come to a mountainous headland of Kamchatka. This appears to be a very interesting piece of the world, for the island chain is in reality a great backbone of volcanic mountains, in more or less activity, separated only by small intervals of sea, and presenting themselves in magnificent proportions to the traveller. The water of Behring's Sea is extremely shallow, so much so that we hear of whalers anchoring in almost every part of the open sea; and between the 64th and 66th parallels of north latitude, it was found to have an average depth of only 19 fathoms. It is highly probable, from these physical phenomena, that the whole region is going through a process of upheaval; if so, in some future ages the Aleutian Islands will appear as a chain of splendid volcanic mountains, like the Andes of South America, while it is manifest that if the earth under the neighbourhood of Behring's Straits were only to rise 120 feet, the straits themselves would become terra firma, and Asia and America would become one continent.

Passing through this string of volcano-covered islands, Mr. Whymper, with the staff of the expedition, paid a preliminary visit to Norton Sound, whence they crossed over to the Asiatic side, and paid a visit to Plover Bay and its Tchuktchi inhabitants. The natives seem to be a harmless set of people, who are only now and then guilty of petty larceny and lying. One of them, named O-cock-craz, came off with a letter of introduction from a preceding explorer, but the letter only said that 'a bigger liar never walked the earth' than the bearer of the epistle. In thieving matters they appear to have been peculiarly unlucky. Upon one occasion they stole arsenic, which they mistook for sugar; and they carried off a bottle, which they thought to be whisky, but which really contained a liniment of turpentine and sugar of lead. A native on the Yukon, in the same way, got some arsenical alcohol prepared for the preservation of specimens; and in Plover Bay, some of the men, having found a keg of specimens preserved in alcohol, and having had a long abstinence from exhilarating drinks, felt the temptation too much for

them. They broached the cask, drank up the contents, and then proceeded to eat the fish, snakes, and lizards that had been in the pickle. The consequences were fearful.

The Tchuktchis seem to have no other great faults, excepting the palpable one of having such a diabolical name. They are, for the most part, very good-humoured and willing to assist, and one of them could carry a carpenter's chest weighing 200 lbs. without thinking much of it. Their prudence and economy may be inferred from the fact that their pipes consist principally of stem; the allowance of tobacco is infinitesimally small, but they compensate for this by swallowing and 'consuming their own smoke.' It was whispered, by-the-bye, that they murder the old and feeble, but never without the consent of the victim, who is stupefied by an application in the nostrils preparatory to the opening of a vein! They are all intensely fond of ardent spirits, and might agree with the truth-loving Chippewa Indian, who, when asked if he was a Christian Indian, replied, 'No, I whisky Injen!' One of them, who had learned a little broken English, explained his comprehension of the telegraph by saying, with much reason, 'S'pose lope fixy well—one Melican man Plower Bay, make talky all the same San Flancisco Melican.'

The chief seat of civilisation on the coast of Kamchatka is Petropaulovski, a place which very few Englishmen ever heard of till the Crimean War, when they found that 'the flag which braved a thousand years,' &c. had there met with a grave disaster. Buenos Ayres, in the River Plate, can boast of having completely defeated a British army, but to this little town of Asiatic Russia was reserved the luxury of beating off a combined force of Englishmen and French. Mr. Whymper's sketches of the town and harbour of Petropaulovski, and the range of snowy volcanoes in the background, make it very easy to understand why he is convinced that Kamchatka would repay a detailed examination. 'It is,' he says, 'a partially settled country; the Kamchatdals are a harmless, good-natured, semi-civilised race, and the few Russian officials and settlers would gladly welcome the traveller. The attractions of the country for an Alpine traveller cannot be overstated. The peninsula contains a chain of volcanic peaks of the grandest character, attaining, it is said, in the Klutchkevoi Mountain, a height of 16,000 ft. In the country immediately behind Petropaulovski are the three mountains Koriatski, Avatcha, and Koseldskai, the first of which, being between 11,000 and 12,000 ft. high, is an un-failing landmark for the port.'

The first visit of the party to Petropaulovski was in the latter part of October, when these mountains were already entirely covered with snow. When they returned in the following August, everything was in summer costume; the mountains showed grand rocky sides, and many of them were very bare of snow. 'We found it,' says Mr. Whymper, 'in its brief summer garb—wild flowers, coarse grass, and mosquitos all abundant. The thermometer stood at 80° *in the shade*, and I found myself nodding over my outdoor sketching—which was, perhaps, partly due to the constant round of festivities. Three months of Russian hospitality would kill most men, and the fortnight spent on this visit was the

hardest work I have ever done in my life!—done, too, at a time when the summer heat was intense, and when everyone who could got into silk, duck, or alpaca clothing, like that worn in tropical countries. Our preconceived ideas of Kamchatka were entirely upset.'

In spite, however, of the attractions of Alpine scenery and Russian hospitality in Kamchatka, we must accompany our author once more to the American continent, and see how he spent a winter on the Yukon River, in the territory of Alaska. Their first station was St. Michael's, in Norton Sound, an island which, according to Indian tradition, was upheaved from the sea; and it is said by Zagoskin that the spot where the fort now stands was covered by the sea within the memory of Indians living at the time of his visit, in 1842. Thence they went to Unalacht, sixty miles to the north, in a small steamer. Here a large party of the telegraph employés prepared to winter. The Kaveak and Malemute Indians of the place appear to be a very creditable race, and far above the average of Indians in every respect. They smoked their pipes in the same fashion as their Siberian cousins, but carried economy to a still greater length by diluting their tobacco with willow-chips.

On October 27, Mr. Whympers parted from headquarters; and with five of his American companions and three Indians, taking with them four heavily loaded sledges and a skin canoe, went across country to Nulato. The sledges were drawn by dogs; and they on foot seem to have had a full share of the customary excitement of such travelling—sometimes having to help the sledges out of soft snow, sometimes having to hold on behind as drags, when the dogs ran away too fast on a hard surface; sometimes camping in an Indian village, and at others making a shake-down for themselves round a fire among the fir-trees. Following mainly the line of the Ulukuk Mountains, a range of only about 3,000 ft. high, they, on November 10, wound up with a splendid glissade down the hillside, and found themselves on the bank of the mighty Yukon. A few days later they arrived at Nulato, the most inland and the most northerly of the Russian Fur Company's posts, where, after a hospitable welcome and a delicious steam-bath, they came to the conclusion that life in Russian America was by no means intolerable. Here they remained till the spring, and appear to have been pretty comfortable as long as they confined themselves to the appropriate dormouse existence of an Arctic winter. Mr. Whympers, however, was not so easily satisfied, and persisted in sketching under difficulties, even when the thermometer was at 30° below zero! In spite of running about for exercise between every five strokes of the pencil, or going into quarters for warmth, he several times skinned his fingers, once froze his left ear (which swelled up nearly to the top of his head), and was in constant fear for the preservation of his nose. The greatest cold was early in December, when the thermometer gradually descended day by day, till on the 5th it reached — 58 Fahr., or *ninety degrees* below freezing. 'But the weather was lovely; no wind blew or snow fell during the whole time, and we did not feel the cold so much as on many other occasions.'

Amongst a large quantity of interesting matter, we have a record

of the advance of spring. On April 5 came a thaw; on the 9th flies made their appearance, and the courtyard became a swamp; on the 10th willows and smaller trees were found budding; on the 28th came the first goose from the south—a good symptom for the larder; on May 5 the Nulato River began to break up decidedly; on May 12 mosquitoes appeared; on the next day the swallows were flying round the fort; and on the 19th the great Yukon River began to break up.

A very lively sketch (at p. 197) gives us a capital notion of what a sporting affair the first part of the journey must have been, when, on May 25, they started in a canoe to ascend the river from Nulato, tugging against the stream, and dodging amongst the broken-up masses of floating ice. In twenty-nine days, often almost knocked up with the heat, they travelled 600 miles, and reached their destination—Fort Yukon, situated at the junction of the Yukon and Porcupine Rivers. The fort is thus 1,300 miles up the river from its mouth, but the source of this magnificent stream is 700 miles farther away, in the still mysterious interior. Fort Yukon is the point at which two advancing races have met. It is the most westerly station of the British Hudson's Bay Company, and the farthest point to which the Russians have advanced towards us from the east. One peculiarity of Russian America has arisen from this migration in opposite directions: as the Russians came eastward, while we went westward, the Alaska Sunday falls on our Saturday, and those who please can enjoy the luxury of two Sundays in a week.

Mr. Whymper had, in a most commendably adventurous expedition, attained the height of his ambition, and penetrated into the heart of an almost unknown land, a region of mystery to the great mass of mankind. He took once more to the life of a canoe, and in fifteen days descended the whole distance of 1,300 miles from Fort Yukon to the mouths of the great river. The news of the success of the Atlantic Cable had arrived; the great Western Union Telegraph Company shrugged its shoulders, and, after a most plucky expenditure of three million dollars, adopted the advice of 'My Uncle Toby,' when he heard that the great Lepsius had written a book on the day he was born—they 'wiped it up, and said nothing more about it.' The world, however, will owe them some gratitude for much information gathered by their exploring parties; and if Mr. Whymper did not actually ascend high mountains, he has, at all events, indicated some fine fields of enterprise for members of the Alpine Club, who gladly welcome anything connected with the regions of ice and snow.

T. W. H.

ASCENT OF POPOCATEPETL.

We have much pleasure in publishing the following notes of an ascent of Popocatepetl in August last, which have been communicated to the Editor:—

'On Saturday, August 8, at 6 A.M., I started in the diligence with three companions to Amecameca, a small town, at which we were told

that we should be able to provide ourselves with everything necessary for the ascent. The road by which we travelled runs through the once famous Chalco, now a miserable village, and was in the first half so dreary, and in the second so rough, that we were glad enough when at about 3 o'clock the coach drew up not far from the house of a Spaniard to whom we carried a letter of introduction. As an attempt to ascend in the rainy season had never been made before, Don Francisco Noriega at once declared that we must give up all idea of the thing, and in this he was stoutly backed by his brother Don Juan. When, however, these worthy and obliging men found that we were resolute, they willingly undertook to procure us provisions, guides, and horses, and gave us also a room for the night. As I knew beforehand that the unsuitableness of the season would certainly be urged upon us, and that it was not unlikely that no guides could be found to assist us in the attempt, this beginning seemed to be a very satisfactory one, and for a time my companions appeared satisfied too. When, however, this arrangement was made, they became very despondent, and it even appeared at one time that I should be compelled to go on alone. They seem to have had no conception that any difficulty could arise out of the time of year. I had had this frequently in my mind, and had on two occasions discussed the possibility of a successful issue of the attempt with men who had made the ascent in the dry season. These gentlemen, though positive that an attempt during the summer months could only lead to complete failure, were quite unable to give any sufficient reason for their conclusion. I had had, moreover, many opportunities of examining the mountain between sunrise and 9 A.M., and, as far as was possible to judge of the matter at a distance, it was certain that the accumulation of fresh snow was very small, and that if we could manage to reach the top before 9 A.M., we should enjoy a view that would amply repay us for all our trouble. As, too, the moon was not far from full, there seemed no reason why we should not arrive as I proposed.

'The morning of the 9th was as bright and clear as we could desire, and we all started off in great spirits. Once on horseback, nothing more was heard of difficulties. The road for the first few miles ran along a slightly inclined plain, but soon entered rough forest land, and broke up into paths often as much as 4 ft. deep, and about 18 in. wide. The thick forest continued unbroken until we reached the small open space that intervenes between the lower forest and the upper one of firs. The riding now became exceedingly rough, in fact, impossible on anything except the hardy little Mexican horse. Shortly after 4 o'clock, we finally emerged from among the trees, and found ourselves in a small desert of fine white sand, not very far from the foot of the cone. Here, in a small oasis, we found a ranch in which we determined to sleep. The night was cold and very clear, and I was anxious to start again as soon as the guides were sufficiently rested, as it appeared very uncertain how long we should take to reach the top. My companions would not hear of this, and I was compelled to be satisfied with the promise that they would move on again at 5 A.M. Many times in the course of the night, I turned out fearing lest we should over-

sleep ourselves, or lest some unfavourable change should occur in the weather. The beauty of the snowy cone glittering in the bright moonlight, set off by the dark form of the strange basaltic rock known as El Frayle, kept me outside until the cold compelled me to go again into the smoky hut. When at last it appeared to be growing towards sunrise, I roused the Indians, and with some difficulty we got on our way again.

‘ For a short time we wandered among the ravines that run about the edge of the base of the cone. After passing these, we found ourselves on a vast bed of black volcanic dust smelling strongly of sulphur. Through this in some places large masses of rock protruded, and to one of these, when riding was no longer practicable, we fastened our horses, and went on on foot towards that edge of the cone that appeared least steep. It was almost impossible to make any progress, except along the long tongues of snow that stretched far down from the main mass over the dust. Just as we reached the point where the snow covered the whole surface, we obtained a very fine view. The needle-like point of Orizaba thrusting itself far above all the other peaks, the white ridge of Ixtaccihuatl, the city of Puebla and the lake and city of Mexico could all be seen at once. The height, however, was not sufficient to enable us to see beyond the valleys immediately surrounding us.

‘ During the rest of the journey we had nothing but the smooth snow to walk on, in some places unpleasantly soft. The slope was too great to allow us to mount in a straight line. In no place, by as careful a determination as we could make, was it less than 30° . Of course at the height at which we now were, we found all exertion extremely irksome. I managed to refresh myself with a little coffee, which during the long night I had carefully prepared. My companions, however, preferred brandy. The guides were wise enough to refuse the spirit, and my companions were sensible afterwards that they were mistaken in pressing on their lungs any extra duty. The guides at last began to say that the snow was becoming dangerous, but after a little pressing, they went on again. We all of us fell into a steady walk of about twenty steps, and then a rest, and after persevering in this till about half past 11, we came very suddenly upon the crater. In every direction but one clouds covered the lower ground, and we had the bare satisfaction of proving that in the rainy season this peak is still accessible.

‘ From orifices in the crater, small streams of sulphurous smoke were ascending, but as we had no ropes with us, we were unable to descend to examine anything minutely. We sat for a short time on the edge of the crater to rest ourselves, and consumed the remainder of the brandy in honour of the event, the Indians no longer refusing any share of it.

‘ During the journey upwards, I noticed that the guides carried with them two mats made of reeds, each about 4 ft. square. The use to be made of these we had none of us understood. It soon, however, became apparent. They were folded and placed on the snow, and a guide sat himself down on the front part of each, and invited us to take our seats behind him. As soon as we had done this and arranged our feet

over his knees, he lifted up his heels and we shot with but one stoppage, to avoid a precipice, from the top to the bottom. We very soon reached our horses, and were at the ranch by 12 o'clock, and back again at Amecameca just at sunset, where we were received with great honour. The height above the sea is about 17,780 feet.

‘F. L. H.’

MOUNTAINEERING NOTES.

1. — Mr. Morshead and I crossed, last July, from Hinterrhein to Olivone, over the summit of Piz Valrhein. So far as I know, this expedition—which is a very interesting one, and not over-long—has not been made before in this direction, in which alone one can conveniently do it without sleeping in châteaux. We, moreover, took a line, both of ascent and descent, which does not correspond with any of those detailed in Ball's Guide, and by no means difficult. We took a local porter on to the Rheinwald Glacier, having an idea that the way was intricate and hard to find; but it was scarcely necessary. The track turns off the road of the Bernardino just after crossing the Rhine, and ascends the right bank for some way; the infant Rhine must be crossed, wherever convenient, by beds of old snow, under which it flows, and then one has simply to keep along the hillside, ascending gradually, and get on to the Rheinwald Glacier, above the spot called ‘Paradies,’ by a descent of a couple of hundred feet. The glacier is perfectly smooth and uncrevassed, and there is not the slightest difficulty in ascending from it to the col (Lenta Pass?), the lowest point on the ridge circling round from the Gufershorn to the Piz Valrhein. This ridge, which is narrow, but perfectly easy to travel, is met at right angles, some distance along, by another which separates the Lenta and Bresciana glacier-basins, and then becomes steeper. Here previous climbers seem always to have diverged to the right and circled round the snowy northern face of the peak, which is, in fact, the highest part of the Bresciana Glacier. We thought it easier and more direct to keep to the Rheinwald Glacier side of the peak, and made our ascent without the least difficulty, partly by the rocks which project on that side. In descending, the snow-slopes being in a loose and dangerous state, we preferred keeping mainly to the rocky ridge which forms the left-hand boundary of the Bresciana basin, overhanging the head of Val Camadra. We diverged once or twice, but finding that we encountered ice, and being unprepared for much step-cutting (our sole companion was young Ulrich Almer), returned to the rocks, which are easy enough, though here and there steep. After reaching the level of Val Carassina, we crossed it to the little col overlooking the head of Val Soja, whence a very steep zigzag path leads down to the head of the valley, some 2,000 ft. below, and so to Dangio, on the road of Val Blegno, about 3 miles below Olivone; but it is doubtful whether this is better than Messrs. Moore and Walker's way through Val Carassina. Actual walking—Hinterrhein to the summit, 5 hrs. 40 min.; summit

to Olivone, 4 hrs. 20 min. Thus this expedition is shorter than average glacier-passes, and has the advantage of going over a peak which has no rivals within many miles.

2.—Another expedition made by us may perhaps be worth mention on similar grounds, as having been made without sleeping out—a process which most mountaineers dislike, as expensive, troublesome, and uncomfortable. We slept at the Bernina Hospice, crossed the Cambrena-Sattel to the side of the Palü Glacier, ascended its left bank, skirted its head, crossed to the head of the Fellaria, rounded its head under Piz Zupo, descended to the Scerscen Glacier, ascended to the Sella Pass, and so by the Roseg Glacier to Pontresina. The usual tour of the Bernina is made up the Rosegthal, and crosses the main chain between Piz Palü and Piz Zupo. Our walk involved 13 hrs.' walking; but as we had no local knowledge whatever, as the maps are not accurate, and Ball's guide-book does not profess to supersede local knowledge, and as the snow was also much softer than was consistent with speed or comfort, we lost a good deal of time—notably in descending a very steep little wall of rocks and ice from the Fellaria to the Scerscen, we being ignorant that we ought to have made a great détour lower down the snow-fields. Apart from the gain of starting from the great height and comfortable quarters of the Bernina Hospice, this walk has two advantages over the tour of the Bernina taken in the opposite direction: it can be easily curtailed, if anything goes wrong, by crossing the Bella Vista Pass; and the whole latter part, after once reaching the Scerscen Glacier, is mere walking, so that one need not be very anxious about time and daylight. The only drawback is the difficulty, without local knowledge, of discovering where and how to pass from the Fellaria basin to the Scerscen.

H. B. GEORGE.

New Inns and Roads.

1. On the top of the Bernina Pass a large and commodious inn has been erected, which receives some subsidy from the Government as a hospice open all through the winter. The accommodation was very good in July last, considering that the inn had only just been opened, and the people very civil; the only fault we had to find was that they did not understand mountaineers' hours.

2. A new and large inn was built, but not yet furnished, at the beginning of last July, at the point where the new carriage-road over the Flüela turns out of the road from Davos to the Prättigau. The new road is a most remarkable one, both for engineering and for the genuinely high-Alpine nature of the scenery.

3. A large new inn (Zum Piz Aela) has been opened at Bergün, in consequence of the rapidly increasing traffic over the Albula. From Tiefenkasten, where the Albula and Julier roads diverge, a carriage-road was last summer constructed through the gorge of the Schyn to Thusis. A new bridge crosses the R. Albula close to the Solisbrücke, and the road is carried at a level along the left bank of the river, through a good many small galleries.

4. Engineers were actively employed during last summer in sur-

veying the Lukmanier for a carriage-road. I believe it is to be taken entirely up the right bank of the Medelser Rhein from Dissentis, an operation which will require a great deal of tunnelling in the narrow gorge before Curaglio is reached.

5. An inn was opened early last summer at Platten, a little way above Kippel.

6. The inn at Randa has been shut up, and that at Obergestelen had also been closed before the fire which destroyed the whole village.

7. The owner of the châteaux of Cour de Lys intends, I am informed, to open a small inn in that immediate neighbourhood next summer.

H. B. GEORGE.

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THE CAUCASUS. By C. COMYNS TUCKER. Read before
the Alpine Club on February 2, 1869.

AS Kasbek and Elbruz have now, I believe, become tolerably well-known names in connection with the Caucasus, I fear my readers will be somewhat shocked when I tell them that they will find little or nothing in this paper about either one or the other. I must begin consequently by apologising to those famous mountains for thus leaving them out in their usual cold, and to the Club for not dwelling at length on the only names with which they may be supposed to be familiar. My reasons for writing a general paper on the Caucasus in preference to giving a record of special ascents are various. Firstly, one ascent must of necessity be very like another—at any rate, on paper; and of mere mountaineering the Club hears enough, and some times to spare; secondly, the method of ascending mountains is by this time pretty well understood, while information, as to the general character of the country, and the precautions to be taken on entering it, may be useful as well as interesting. Finally, if these reasons be not considered sufficient, I must fall back on the hope that one of my companions will supply the omission in a separate paper, which shall describe in detail our successful assaults on those monarchs of the chain.

After a few words, therefore, as to the general structure of the range, I shall attempt to put before you our *every-day* experiences in the Caucasus, and the difficulties we met with in exploring it, whether arising from the general roughness of the country, the lawless nature of its inhabitants, or the

inherent obstinacy of its peaks ; to point out in what respects it seemed to us superior and in what inferior to the Alps ; and how, after all deductions made, it is in the highest degree worthy of claiming our attention and our efforts.

And first as to the general character of the chain : on the east and west it is cut off abruptly by the Black and Caspian Seas ; on the north and south by four rivers, two on either side, beyond the valleys of which the mountain chain does not pass. These rivers are the Rion and Kuban, flowing towards the Black Sea ; the Kur and the Terek flowing eastwards to the Caspian. The only exception to this rule is to be found in the low ridge of Suram, which divides the waters of the Rion from those of the Kur, and acts as a connecting link between the Caucasus and the Armenian mountains. With this trifling exception, the Caucasian chain is sharply and accurately defined. Of this tolerably straight and well-marked range, 600 miles in length, we explored a section—the highest and most important perhaps, but still only a section ; and any further remarks therefore on the peculiarities of the chain must be understood as applicable exclusively, or at least mainly, to that portion. The scene of our explorations extends west from the Dariel road for a distance of about 120 miles. Kasbek is at one, the eastern, Elbruz at the other, or western end. The close approach of the four rivers to its N. and S. flanks, seemed to us to imply that the chain was in the main a single one, and this in the explored section we found to be the case. There is no room for great mountain masses off the main chain, such as the Oberland or Glarus groups in the case of the Alps. This singleness of the chain is proved by the fact that, from elevated points N. and S. of the range, the same peaks, generally speaking, are visible from this side and that ; whereas an observer from Berne would have about as magnificent a view of the Pennines as an observer at Milan would have of the Oberland, i.e. none at all. Such ramifications as there are, are either gigantic buttresses of the main chain, and not more distant from it than are the Weisshorn or the Mischabel from the watershed of the Alps,—or parallel, and generally lower ranges, preserving pretty accurately the direction and characteristics of the chain itself. Of the former kind Kasbek and Elbruz are notable examples ; of the latter, the range which shuts in the Upper Rion on the S., and the Laila Gebirge which perform a similar office for the Ingur, may be cited as instances.

Having thus briefly described the general aspect of the chain, I must now allude to the classification of difficulties

with which I began this paper. Those arising from the roughness of the country we encountered chiefly in the Zenis-Squali Valley; those connected with the character of the inhabitants, mainly in the Ingur district; those from the inherent obstinacy of the peaks we can scarcely be said to have met with at all. It is true that we found an ice-wall of the most formidable description on Kasbek, but we only did so because we ascended that mountain on the wrong or difficult instead of on the easy side, where no such obstacle exists. Such being the case, it would seem superfluous to mention mountaineering difficulties at all. I do not think so, however. The fact is, that Kasbek and Elbruz, if the most famous, are also perhaps, of all the considerable peaks, the easiest mountains in the Caucasus. Unless, therefore, gentlemen who may follow our footsteps are satisfied with doing what we did and *no more*, they will be instantly met by these same mountaineering difficulties (prudently, I think, avoided by us as first explorers) in a somewhat startling form. The principal peaks other than Kasbek and Elbruz, in this portion of the chain, are Adai Choch, the Jibiani Peak, Tau Tötonal, Kosch-tan-tau, Dych Tau, Usch Ba (rain-peak), and Tung Zorun—all much over 15,000 ft. in height, one (Kosch-tan-tau) over 17,000. All these peaks seemed to us excessively difficult (except perhaps Tau Tötonal). Adai Choch presents arêtes more formidable in appearance than the ridges of the Matterhorn as seen from Breuil, or those of the Dent Blanche from the Col d'Erin. Usch Ba rejoices in precipices such as no mountain in the Alps can match. Some of these peaks are provided with slopes which, from their height, their steepness, and, I may add, their shiny appearance, suggest days rather than hours of step-cutting; others, at first sight less inaccessible, are fortified with bergschrunds to their very summits. It is evident, therefore, that a man who wishes to mountaineer in the frosty Caucasus, must take with him all the skill which he may have acquired in the Alps. From this, too, it is clear that, besides a mountain equipment complete in other respects, an efficient force of step-cutters is indispensable for success. There are as yet no natives trained to the work. Step-cutters must be brought, or you must do the work for yourself.

It was barely a fortnight since we had left Tiflis. We had triumphantly ascended Kasbek, had penetrated the upper gorge of the Terek, had crossed over to the Ardon, and reached the Mamisson Pass. We had encountered no great obstacles; it is true that our first set of porters—handsome and powerful Ossetes, hired at Resh—had robbed us of a cloak, an incident

which led to what the Americans call 'a free fight,' carried on happily with fists alone, and in which we did some execution, though our foes retained the prize; but no very serious attempts, except in the way of extortion, had been made on us; we had found the paths good and the passes easy, and we ought, by all the rules of well-regulated minds, to have been excellently satisfied with our progress. In truth, however, such was far from being the case. Kasbek was a success, but we already wearied of fighting him o'er again. We had crossed some fine pastures and seen some tolerable peaks, but we could not help confessing that the scenery of the N. valleys was ordinary, not to say dull, and certainly horribly bare. The vision, too, of the noble Caucasian was rapidly vanishing, and, picturesque as many of the costumes were, we soon lost our interest in people we were constantly suspecting of petty cheating, and knew to make the most inefficient and insolent of porters. On the whole we began to fear and occasionally to hint to each other, that 'le jeu n'en valait pas la chandelle.'

With the summit level of the Mamisson Pass, all this was changed. The enormous mass of Adai Choch, its cliffs, its glaciers and its ice-falls, rose before us, half-wreathed in flying mist, it is true, but perhaps all the more impressive, for only revealing half its strength. Already glimpses of glorious wooded valleys opened upon us from below, and beds of snow-drop and wild hyacinth received us, as we leapt across the waters of the infant Rion. During the morning we had told Paul, our Mingrelian servant, that we should cross the Rion—his Rion—ere nightfall; and he, having in his mind's eye only the lordly stream as it flows from Kutais to the sea, had asked us innocently as to how we should get across, and whether we should find a boat provided for the purpose. He was now charmed to have discovered the Rion in such humble guise, especially as there is a belief among his compatriots that the source of the Rion is unapproachable. To them it is a very Nile, in the mystery of its birth. The descent into the valley more than confirmed our hopes, and at Gurschavi, the highest hamlet in the E. branch of the Upper Rion, and commanding a complete view of it to its junction with the western stream, we halted for two days, to reconnoitre and to rest. From the slopes above the hamlet, thickly clothed with coppice of beech and oak, and carpeted with dwarf rhododendron and luxuriant bilberry plants, we scanned the great chain long and anxiously. Adai Choch was reluctantly pronounced hopeless for our small party, but Moore's fancy was much taken by a formidable gap of some 13,000 ft. in height, which he, for his part, felt quite

sure must lead *somewhere*—a fact which we did not attempt to dispute. In spite, however, of the alluring character of this pass, we descended the valley to the junction of the rivers, by an excellent path carried through the most splendid pine forests we had ever seen, and mounted the western branch to Chiora.

Here Moore broke into open mutiny: we had done no mountaineering except one ascent; we knew as little of the real composition of the chain as when we started; if we did not take care, we should lose our power of going up mountains altogether. He spoke to no unwilling listeners, and leaving Paul to superintend the baggage at Chiora, and if possible to get it moved higher up the valley to Gebi, we made a dash across the chain to the head waters of one branch of the Uruch Valley and back to the Rion next day near Glola. The first, a glacier pass of 11,250 ft., and not unlike, according to Moore, the Trift Joch, was not wholly easy; the pass by which we returned, 12,250 ft., was wholly difficult. Its glorious ice-fall, up which we were well led by François Devouassoud, was some 4,000 ft. in height, and took us six hours of arduous work. The descent, too, was not easy to find, and we had to bivouac a second night 'sub Jove,' which, being interpreted specially for our case, must be translated 'under a birch tree.' Our provisions were low, and we had to go on half rations; the weather too, which, during our two days' march, had favoured us with glorious views, changed in the night, and a heavy thunder-shower proved somewhat a trial for the cheerfulness of our little party. These two passes are worthy, in every respect, to be matched with the finest in the Alps, and merit a more detailed description than can be given of them here.

At Gebi, decidedly one of the most picturesque villages in the Caucasus, perched on a brow overlooking the ravine through which here flows the Western Rion, we halted two days, detained partly by unfavourable weather, partly by the necessity of making more elaborate arrangements for our tour through the tangled wildernesses of the three-headed Zenis-Squali River. As it was between this place in the Rion and Jibiani in the Ingur Valley that we chiefly encountered the difficulties arising from the roughness of some portions of the Caucasus, and as it is impossible, in the course of a paper like this, to describe at length our laborious progress, I will attempt to give a sketch of one day's proceedings, to serve as a specimen and type of all.

The time is 5 o'clock A.M. The scene, a grassy glade

lying in branch No. 1 of the Zenis-Squali. Within this glade is pitched our tiny tent, the centre of attraction for clouds of black flies, and mosquitoes which have been giving the unhappy inmates a restless night enough. Close at hand, under rugs and sheepskins, our servants and eight Caucasian porters are stretched round the remains of their bivouac fire. A black cloud is sweeping up along the white range above, and growls of thunder portend a juicy day. Moore, in the character of the 'Early Village Cock,' which he, I must admit, represented *à merveille*, now sounds the alarm, and Paul and Devouassoud are summoned, directed to arouse the porters, cook anything there may be to be cooked, and generally to look alive. We next proceed to devote ourselves to our toilet. This is not a lengthy operation, and consists in each drawing forth and fitting to his person the coat, the revolver, cartridge-pouch, and Alpine boots, which constitute his pillow, more luxurious, it is true, than that of a Spartan, but hardly up to the standard required by the modern Sybarite. About this period I summon up courage to suggest a wash, but am instantly suppressed by my companions, with an unanswerable quotation from Galton's 'Art of Travel,' to the effect that the bath is a luxury which civilised people can afford, but a proceeding wholly at variance with the habits of the true bush-traveller. I regret to say that I acquiesce in the verdict without a murmur.

After tedious delay, the fried ham is brought and eaten, the tent struck and rolled up, the packs arranged on the unwilling backs of our Gebi men, and the cavalcade slowly gets into motion. A torrent has to be crossed, and then a ridge, involving 2,000 ft. of ascent, to the next branch of the river, down which we hope to win our way for many miles ere the day closes. The torrent does not stop us long; though rapid, it is narrow at one place; the Caucasians rapidly fell an alder-tree across, and the necessity of wading is avoided for the moment. The forest is thick, but we follow the dry bed of a stream upwards towards the ridge, and make fair progress. The slopes soon, however, grow excessively steep; our porters, after every ten minutes' toil, sit down for a ten minutes' rest, and receive our remonstrances with calm contempt. By dint of perseverance, however, we finally get them to the top of the ridge, which falls away with equal steepness to branch of the Zenis-Squali No. 2, which appears ominously wooded, and, as far as we can see, without either path or habitation. During the descent the Caucasians are rather nervous, but we reach the valley without mishap, and though the rain is now falling

in torrents, plunge in Indian file into the lush grass, four feet high, through which our route lies. Then ensue four or five hours of hopeless work enough. Now we push through masses of hemlock and nettle, burdock and tiger lily, streaming wet; now force our way through matted forest, clambering over piles of alder trunks, or creeping among the network of their roots, often ankle-deep in water, and acutely conscious that not only ourselves but also our beloved chattels are getting hopelessly and irretrievably soaked.

A gleam of sunshine occurs about midday, and we make a delicious lunch off cold sheep's-brains, which we finish, much, I fancy, to the disappointment of Paul, who in his heart has entertained hopes of the reversion thereof. The valley now narrows to a gorge, and we are forced to mount high on the hill-side. It is impossible to keep the level. Ravine after ravine, giving fine glimpses of the short hanging glaciers of this part of the chain, has to be crossed, and their crossing involves tedious circuits and descents. The weather, too, again becomes determinately bad, and the porters are getting tired. Short spurts are all now that they will do, and in the intervals they sit, munching the long green stalks that grow around, with a gravity which is truly provoking. What potatoes are to an Irishman, these succulent weeds are to the Caucasian porter, and the constant excursions made by him to secure a fine plant are a source of tedious delay. I should think that each Caucasian cuts, peels, and devours some ten or twelve pounds a day of this green rubbish when he is on the march. I have tasted fragments occasionally, and have found them to resemble inferior celery. This is an experiment, however, to be made with caution, as I believe several kinds, scarcely to be distinguished by the eye of a novice from the edible sorts, to be highly poisonous. We are now approaching the junction of our stream with the Zenis-Squali branch No. 3, up which lies our to-morrow's route to Jibiani; but no place offers itself on the steep hill-side where it is possible to pitch our tent, and we jog on gloomily till nearly dusk, when, crossing the spur which divides the rivers, we see below us a group of fine pines, which afford us hopes of level ground and partial shelter.

One enormous tree leaning over a steep bank presents an admirable gîte for the porters, but all situations suggested for the tent seem equally undesirable. The poles are swollen with the wet, and refuse to fit into their sockets—the canvas is soaked and flops inwards uncomfortably; our mattress is in a similar condition—we ourselves are wet to the skin, and prospects of dinner are afar off. It is not surprising, therefore,

that one of the party, who shall be nameless, about this period exclaims with a groan, 'What a fool I was to come to this beastly Caucasus!' and that it was with a look of settled despair that a second sits stolidly down to write his notes, an ironical proceeding soon put a stop to by the heavy splashes of rain which descend on the open page. The ridiculousness of our position, and the thoughts of the curious figure we should present could any of our friends in England look in upon us now, at last rouse us to action, and it is in a somewhat Mark Tapleyish spirit that we set to work to lay pine branches under the tent to drain off the water which runs down on us from above, and dig a trench to carry it off to the sides. The rugs had been saved by their position inside the mattress, and we discover with delight that our changes of trousers and socks are not the worse for wear. Paul, too, who always showed best under difficulties, soon sends us in a brew of soup, and before long all our troubles are forgotten in sound and refreshing sleep. Such are the experiences to be expected by the traveller in the Zenis-Squali Valley. It is to be remarked, however, that this day, distressing as it was, was chiefly rendered so by the miserable weather, and that, even under these damping circumstances, the wonderful contrast between the rocky and ice-crowned chain and the bright vegetation which runs up almost to its base, formed a scene which it is impossible to forget.

I must hasten on, however, to the valley of the Ingur. The upper basin of this river, some 50 miles long by 15 wide, and lying between the great range and the chain of the Laila Gebirge, is divided longitudinally by various spurs, among which the streams, which descend from the mountains on either side, wander often for many miles before they can make up their minds to unite their fate with that of the Ingur. The most important of these streams, and nearly equal to the Ingur itself in size—the Mushal Aliz—is especially coy, and maintains an independent and almost parallel course for some 20 miles before it finally overcomes its reluctance, and joins the main river near Latal. The excellently made paths down the valley ordinarily run along the crests of the spurs, and their beauty is almost indescribable. The path wanders at will, now on this side of the ridge and now on that, as if itself doubtful whether the more enchanting spectacle be offered by the broad vale of the Mushal Aliz, dotted with towered villages, and backed by the long and finely curving glaciers of the main chain, or by the deep pine-clad gorge on the southern side, across which the Laila Gebirge raise their snowy crests.

Here we stroll along for miles on delicious green sward, now beneath a shade of birch and laburnum, now between banks of white or lilac rhododendron, now amid the golden branches of the azalea, or thickets set with the humbler blossoms of the hollyhock and campanula, lupine and tiger lily. The greatest sensation, however, was perhaps experienced when, on the fourth day after leaving Jibiani, and after a long ascent, rather dull for the Ingur Valley, we suddenly turned a corner and found ourselves face to face with the astounding pyramid of Usch Ba. Rising from a broad base, itself perhaps 8,000 ft. above the sea, this glorious peak rears itself to a height of 16,000 ft., in two gigantic precipices, and the glistening cap upon its summit, cut off by their grey walls from all connection with the snowy plains below, seemed to smile upon us with a sense of proud security which we were scarcely likely to disturb. There are other beauties to be met with, almost without number, by the most casual explorer of the Ingur Valley; among which I may mention an ice-fall, probably the finest in the chain, and far superior to anything of its kind with which I am acquainted in the Alps. It is a single and continuous fall of 4,000 ft., and is composed of the purest ice. It pours from between two noble peaks, and bristles with every form of pinnacle and spire. At the foot of the fall, with scarcely more disturbance than is indicated by a few wavy lines, the glacier remakes itself in graceful fan-shell form, far purer than, and almost as regular in shape as that of the famous glacier of the Rhone. Up the centre of this fall the Ordnance map, with its usual happy discernment, marks a known pass, a piece of stupidity which would be most fitly punished by requesting the cartographers to mount by their own route. They would groan more loudly, I suspect, than ever the wretched Perillus did when inclosed within the brazen bull of his own workmanship.

When I turn from the scenery to the inhabitants of the Ingur Valley, all the remarks I have made must be taken *au contraire*. It may truly be said of this fairy retreat, that 'every prospect pleases, and only man is vile.' Position, history, and the superstitions without the reality of Christianity, may have combined to degrade him still further, but I cannot help thinking that the Suanetian must have been 'a bad lot' from the beginning. If we are to believe Herr Radde, the enterprising German savant who penetrated this district before us, and who, I imagine, was not happy till he had quitted it, each man in this valley has committed several murders—for murder with them is a praiseworthy act. They are virtually

independent of the Russians, and village fights against village, with all the animosity and twice the barbarism of the Italian towns of the middle ages. Divided among themselves, they will readily combine against defenceless strangers, and in fact they only possess one estimable quality—that of a profound respect for an English revolver. I may say with confidence, that it was our heavy armament alone which in this valley saved us from robbery and open violence.

At Jibiani, which, after our rough work in the Zenis-Squali, we looked on as a haven of rest, we found the inhabitants insolent and aggressive. Several small articles were stolen, and unblushingly offered us again for sale. Moore created a momentary sensation by firing off his revolver, but it soon passed off, and we saw we should be lucky to escape without a fight. A horseman who had agreed to convey our baggage down the valley, seemed in league with the villagers, only brought one horse, and would not allow us to place upon that more than a few insignificant parcels. Lastly, in the hurry of starting, Paul and François were left behind, and instantly shut up in the empty barn we had quitted by a rush of natives. Freshfield dashed back, banged the door open with his ice-axe, and planted the muzzle of his revolver against a burly Caucasian who stopped the way. He fell back in dismay, and our men got free. We then began to drag the horse out of the village by a sunk lane, on either wall of which stood crowds of ruffians, shouting and brandishing their weapons. A few copecks were thrown as a sop to Cerberus, and as they were scrambling for them we got outside the enclosures, whither, being no longer able to surround us, the cowardly horde were afraid to follow. The line we had adopted of shouldering our saddle-bags ourselves, and marching out in hollow square, revolver in hand, had thoroughly puzzled them; and being scarcely aware of the real capacities of our weapons, they had not dared to begin a fray in which they might have been ultimately successful, but in which they would probably have suffered severely.

This was by no means the only taste of Suanetian qualities which we experienced. During our progress down the valley our horseman, Islam (of whom let all travellers beware), on two or three occasions drew his pistol on us in an access of rage, but feeling himself in a minority, suffered himself each time to be laughed out of his tantrums. At Latal, when extortionate demands were made upon us by an usurious native, Moore frightened him out of his wits by flourishing an old Foreign Office passport in his face, and telling him to beware, as he

knew not whom he was offending; a safe remark, and one that had a great effect. In like manner ten porters, hired at Pari to cross the chain to the northern side, when they had got us well into the forest, struck for higher pay, and that too down on the nail, intimating that it would be better for us to comply, lest they might tie us up and take our baggage from us. We could only reply to this threat by requesting them to 'try it on.' Lastly, it was while crossing this pass that we met four Suanetians driving eleven cows before them that they had stolen from the industrious Mahometans on the N. side of the chain, and had succeeded in lifting over a snow pass of 10,800 ft. Add to this that, though probably capable of great physical exertion, the Suanetians, like the generality of Caucasians, are the most indolent of races, and, in spite of persuasion and remonstrance, it is impossible to achieve anything like a respectable distance in the day. Thus an ordinary walker would easily pass from Gebi to Jibiani in three days, from Jibiani to Pari in three days more, and another three days would see him safely at Uruspieh. Owing to the sluggishness of our porters we took twelve days, exclusive of halts, instead of nine, to complete the entire distance.

No Englishman, however, need fear anything but a hospitable reception from the Tartar race which occupies the valleys of the Baksan, the Tchegem, and the Tscherek. Mahometans themselves, they lean to the Turk, and mistrust the Russian, and consequently hail the English as the patron of the former and the enemy of the latter Power. At Uruspieh in the Baksan Valley we were kindly received by Prince Ismail and his brother, installed in the building set apart for guests, regaled with delicacies two or three times a day, and provided with porters for the ascent of Elbruz. These Uruspieh porters are the raw material of first-class guides, are not afraid of ice, thoroughly appreciate the use of Alpine Club paraphernalia—ice-axes, cord, and snow-spectacles, and indeed use 'crampons' themselves. Lastly, they will walk as fast on either mountain or plain as even a member of the Club will care to lead them.

We had now had a month's pretty continual work in the mountains, upon somewhat poor food, bad accommodation, and attended by much unavoidable anxiety. We were therefore quite ready to enjoy the luxuries of Pätigorsk, the Capua of the Caucasus, and the fashionable retreat of invalided Russian officers. It took us, however, two hard days to reach it from Uruspieh. On the first day we rode down the Baksan Valley, to the Tcherkess village of Atashkutan, a march of near fifty

miles. The second day we cleared about the same distance, in somewhat casual fashion, now walking, now taking turns on the single horse we had succeeded in hiring, now taking a lift in the *charette à bœufs* we had chartered for the baggage, and for the last eighteen miles into Pätigorsk packing ourselves into the well-known and much detested Russian post-cart. We reached the little town in a sleepy condition about 11 P.M. and found the hotel in a truly magnificent building, adorned with a classic portico. We had arrived exactly at the fashionable supper hour, and though we created some consternation among the elaborate swells at table by our dusty apparel, peeled faces, and thick shooting boots, we were accepted by the Italian young lady who presided at the bar as a decided novelty, and promptly regaled with that supper and bottle (or bottles) of champagne we had so often yearned for during the progress of our tour.

A detailed description and historical sketch of the watering places of the Caucasus I omit, though the subject is an interesting one, partly because this paper is long enough as it is, and partly because it will be done greater justice to in the published account of our wanderings, which I have every reason to believe will appear in the course of the season.

We had now but one task, and that a comparatively easy one, to accomplish before our return to Tiflis. After four pleasant days at Pätigorsk and its vicinity, spent in visiting the various springs, replenishing our exhausted commissariat, and regarding with a lazy interest the great dome of Elbruz, sixty miles away, that had so lately been beneath our feet, we started for a last plunge into the Caucasian range, before we finally quitted it. We reached Naltchik without other difficulties than those caused us by a heavy flood, which by sweeping away the bridge of the Lower Baksan, obliged us to abandon our carriage, and continue our journey on horseback. The Tscherek and Uruch Valleys, in which we spent a charming ten days, if not so gorgeous in colouring, or so choked with vegetation, as the valleys of the Zenis-Squali and Ingur, are rendered even more impressive by reason of the lofty forests, the rugged cliffs, and the almost unfathomable gorges with which they abound. No gorge in the Alps—Via Mala or other—can compare with the cleft cut by the Tscherek through the limestone range which bars its journey towards the Northern Steppe. On every vantage ground of ledge or cranny hang great oaks and beeches, and stretch their arms over the fearful chasms which, through the breaks in their thick foliage, are here and there revealed to the traveller in all their depth.

We found the hospitality of Baksan more than equalled by the kindly Mahometans of Balkar, by whom money remuneration was accepted with reluctance, while the photographs of the party, which, taken at Constantinople, were of course highly orthodox, were hailed with great delight, and I have no doubt will be exhibited to the next English traveller who penetrates these unfamiliar scenes. A reconnaissance of the splendid Kosch-tan-tau group at the head of the valley, resulted in our presently 'passing by on the other side,' from a very different motive, however, to that of the proud Levite. If accessible at all, the great peaks of this neighbourhood must be assailed from Bezeengi, in the W. branch of the Tscherek Valley. Crossing a fine col of some 10,000 ft. in height, baggage-horses, and all, to the Uruch Valley, we were met by a Cossack, who had been sent up to aid us by the direction of General Loris Melikov, Governor of the Vladi-Katkaz District, an act of attention on the part of the Russians which, as our horsemen hired at Naltchik showed signs of insubordination, was fully appreciated by us. We left the Uruch Valley by a gorge almost as splendid as that of the Tscherek, rode through the dripping forests of Tuganova, and fording some ugly streams, soon reached Ardonsk, from whence two stages (in the second of which our crazy Russian cart, as usual, came to pieces) brought us in safety to Vladi-Katkaz on the line of the Dariel road. A day's halt was here necessary, till the Tiflis road, broken by the floods, was again open to traffic. We stopped an hour or so at our old quarters, the station-house of Kasbek, where we were received with enthusiasm, and pushing on reached Tiflis without mishap. Our journey in the Caucasus was over, for our homeward route by Borjom and Achalzich, on the Russo-Turkish frontier, scarcely finds a proper place in a paper on the Caucasian chain. Suffice it to say, that owing to the fortunate accident of a glorious day in crossing the mountains that bound the Rion to the S., we had the privilege of identifying the whole of our route from Kasbek to Elbruz, and could now attach both names and ideas to the snowy peaks eighty miles away, which a few months before had seemed to us clothed in mystery such as we could scarcely hope to solve.

I would add a few words as to what, in the section of the Caucasus explored by us, is still left to be accomplished, and a few hints may not be out of place as to how to set about it. From what has been said previously it might be concluded that there were no considerable peaks in the chain which are not also immensely difficult. This is not, however, entirely the case;

there are, I think, a good many interesting points of view which may be reached without serious difficulty. Such are Zilga Choch, situated on the watershed, just where the ridge of Kasbek abuts on the main chain; Tau Burdisula, a bold peak projecting between the E. and W. branches of the Rion, and thus in one of the finest positions for a view in the whole Caucasus; a fine panoramic point, Schoda, rising in the chain on the opposite or southern side of the West Rion, and easily accessible from Gebi; and Tau Tötonal, the glorious snow cone above Adisch, in the Ingur basin, are all undoubtedly feasible for the practised mountaineer. A tour that should include these peaks, and should miss little or nothing of the beautiful scenery visited by us, might easily be arranged. The best starting-point, for many reasons, is Tiflis. The fullest information attainable, and the officials who have the greatest power to aid, are to be found there. It possesses the most comfortable hotel, the Hôtel d'Europe, and by far the best shops, in the Caucasus. It is the residence, too, of a Russian artist, some of whose Caucasian pictures we were glad to secure; and finally, the indispensable Ordnance map is only to be purchased in the Staff-department of that place.

While availing himself of governmental aid as much as possible, the traveller will do well to avoid putting himself into the hands of Russian officers in the matter of making bargains with the natives. Whether the Russians themselves pay high, or think that Englishmen are made of money, I know not; but the inevitable result of his trusting to them for making arrangements with horsemen or porters, is that he will have to repudiate the bargain altogether, or pay three times the sum at which he might have hired them for himself. It is also better to engage Caucasians by the job than by the day; their imagination is excited by the idea of a round sum, though less than half what they would get from the aggregate of days; and secondly, it becomes their direct interest to hasten instead of to waste the traveller's time.

In conclusion: throughout this paper I have addressed myself as to men who may, and in some cases undoubtedly will, visit the scenes I have attempted to describe. The Caucasus is too glorious a country to be left to the savage races who, as a rule, are its only inhabitants, or to Russians who cannot understand its beauties. If this paper has heightened the desire of a single member of the Alpine Club to follow in our footsteps, or has removed a single difficulty from his path, it will have accomplished the object for which it was written.

THE RENFER JOCH. By the Hon. RODEN NOEL.

AN ardent lover of climbing, though inexperienced, after one or two preparatory excursions I thought myself, about the end of last September, sufficiently initiated to attempt something more ambitious, in the shape of a new pass between Rosenlauri and the Grimsel, about the feasibility of which I had been reading in Mr. Ball's admirable 'Alpine Guide.' I was then at the Reichenbach Hotel; and on making inquiries as to the best Meyringen guide, I learned that Andreas Jaun was possibly to be had, but had hurt his foot some time back, and might be unable to accompany me. However, he came, and professed himself eager to try the route in question, saying that if I took a second guide he thought I might safely try it. I engaged, therefore, Johann Tännler, who proved an excellent second. As for Jaun, I could not have chanced upon a better man, for he knew thoroughly the neighbourhood of the route I wished to take, and had, indeed, accompanied Mr. Stephen when he opened a passage between Rosenlauri and the Grimsel, by crossing the Weitsattel. It was then that Mr. Stephen had seen and pointed out that it might be possible to connect the two places by a more direct route, which he proposed to name the Renferjoch, lying between the Berglistock and the Renferhorn.

Leaving Reichenbach in the afternoon, we passed the night at Rosenlauri. It was excessively cold after sunset; and I was glad to get to bed, after a solitary dinner. Jaun insisted that we need not start before 5, which was a mistake, as he afterwards admitted. The days being now short, getting to the Grimsel in one day was out of the question; and so we had sent on a porter with provisions and a blanket or two, to the highest châteaux of the Urbach Thal. At 5, then, we set out, the weather being a little misty, but as fine as we expected, and in about half an hour reached the glacier. After keeping to our left for some way further, we got on to it; but at this part the surface was so muddy, engrained with stones and rubble, that, except for occasional crevasses, we should not have known we were walking on ice. In about an hour we reached a part requiring the rope; but just before, the mists suddenly divided, and, as it seemed, at an immeasurable distance above us, shone out vast ramparts of pure ice, all rose-glowing with sunrise. The effect was startling and sublime, but of short duration, for the curtains of mist drew speedily together again. This revelation was the more

impressive from an accompaniment of long-rolling thunder of avalanches somewhere in the mist not far above us. We took a pull at the flask before commencing serious operations, and then roped. The ice-wall we now ascended is the same as that ascended by those who have reached the summit of the Wetterhorn from Rosenlauh. It is hard ice, and requires good step-cutting with the axe. Unfortunately I am unable to give the inclination either here or elsewhere, any more than the precise heights of different points; but it is certainly much steeper than the Strahleck wall, and, according to Jaun, even than the sharp outer peak of the Wetterhorn. If that be so, it inclines between 60° and 70° . But there is no sort of difficulty in this kind of ascent, provided the ice be hard and good steps be cut. The danger here, as Mr. Ball remarks, ('Alpine Guide,' Central Alps, p. 121,) is in the stones 'which are continually detached' from the upper regions, and 'come bounding down the declivity.' They whistle by your ears like cannon-balls; and having to stand still in the steps cut, or move cautiously forward in the line of them, you cannot avoid the stones except by ducking a little to one side or another. Late in the day the place is impassable; but before the sun has much power to unfreeze the stones from their beds, there is less risk. I was only hit on the arm by a very small fragment. About 8 o'clock we had got over this place, and sat down to breakfast and consult just at the base of the Tossenhorn, a very steep rock. Here it has been usual to turn eastward toward the ridge between the Tossenhorn and Stellihorn (the Weitsattel route), and so to reach the Urbach Thal and the Gauli glacier. Our design was, if possible, to go straight forward toward the Renferhorn. But Jaun, after examining the upper part of the glacier through the glass, pronounced the crevasses too wide to be traversed at this late season of the year—the snow-bridges having melted to a formidable degree. Our only plan, therefore, was to ascend the Tossenhorn, keeping along its west flank. There were two spots in the course of this climb, all of it very steep, where I confess, without a gentle tug from Jaun's part of the rope, I should have been baffled. But to see him (a heavy man) crawling up these places, extended like a caterpillar, where there were really no inequalities of surface available for holding by, was something marvellous. The exertion of straining all the muscles without intermission for so long was certainly severe, for we dared not stop except just to breathe, seeing we did not know how long a time precisely we might be out, and the day was short. Jaun at one time

felt faint in consequence of having been ill, and not having exerted himself for so long; and the thought of what we should all do if he broke down was not agreeable. It was then about half-past 11 o'clock, and we halted a minute for him to take some brandy. At this point we had hoped to get down upon the Wettereismeer; but again we found it impossible, and therefore were forced to continue our side-long ascension, which we did till we were not far from the top. We had crossed two snow-couloirs which required good step-cutting. They lay at a very steep angle, and were smooth, and fouled from the constant passage of rubble and stones down them. This was a source, indeed, of constant annoyance until we left the Tossenhorn completely behind us. At one spot on the rocks, a stone of considerable size came flying straight at us. Jaun called out, and ducked behind a projection. I lay flat on one side, and Tännler did the same; but not quite in time, and the stone bounded off his knapsack down the precipice. Had it been his head, he certainly would have fared badly! About 12.30 we managed to climb down to the glacier, and walked fast along a gently inclined snow-slope, where, however, I should have slipped a long way more than once had it not been for the rope. But we only encountered one formidable crevasse—when we had to jump down on a narrow ledge of ice, and then climb up a bit of ice-wall. The jump was from a narrow ice-isthmus, and on either side were abysses the eye could not fathom. I might have felt this rather ticklish, had not such a feeling been completely swallowed up in sheer wonder and admiration. I do not believe any lover of beauty could have felt nervous here—one had almost the longing to plunge into such an abyss of loveliness. How exquisite that polished white porcelain of the crevasse-rims clearing softly into cliffs of aquamarine or sapphire, fleeced here and there in the heart of the crystal, with flaws of cloudier ice, in the depths where they insensibly approach, holding between them for atmosphere the very spirit and essence of aerial green or blue! How delicious those mysterious musical murmurings and whisperings far down, as of mystical communion and never-ending confessions of transparent babbling waters, as they fling themselves in sunlight down emerald walls into a jewel twilight of subterranean ice-palaces! The pools of water, also, lying here and there on the surface of the glacier, are exquisitely beautiful. Lying in a hollow of emerald, they look themselves like liquid gems fringed round with delicate lace-work of pellucid ice. I had to be reminded more than once by patient but prudent Jaun that I

must not linger. Just before mounting the stone-haunted ice-wall, we had obtained a very fine distant view of the Titlis range and the Rigi-Pilatus district, as well as (I think) of the Sustenhorn and Spitzliberg, and it had been fine for some time after; but now, as we marched along a vast expanse of névé, it clouded over, beginning to blow and to snow. This great rolling plateau was desolate in the extreme, as we could get no distant view (which ought here to have been very fine), and made one think of the Arctic regions. We could now only just distinguish the Renferhorn on our left, and the Berglistock on our right, which alone enabled us to steer truly. The pass lay not far before us, a gradual slope leading up to it; but the wind being high, we sat down upon the snow before reaching it to eat our dinner, and drink some tea mixed with wine, which seems to be on the whole the best and most refreshing beverage for these excursions. It was very cold, and the snow drove in our faces; besides, we were still uncertain how far we might have to go, so we did not linger above ten minutes. Rather before 2 o'clock we were on the summit of the Renfer Joch, not a little pleased to be there. Jaun, judging by the heights around, reckoned this at about 10,000 ft. I had supposed it would be all plain-sailing henceforward, but it was not exactly that yet; for we found ourselves on a sharp arête or knife-edge of rock falling precipitously over to the Gauli Glacier, at the depth of many hundreds of feet beneath us; whereas these rocks, from the gentle slopes of névé on the other side, had looked merely like a few black scattered teeth bedded in the snow, and suggested an equally gentle continuance of shelving névé beyond them, so that this abrupt falling away of the rocky steep from the crest whereon we stood was startling in the extreme. We had one short patch of semi-frozen snow to cross, which lay at a most disagreeably perpendicular angle; and we could see that it was thin, and that the rock shelved in under it. We crept over it very cautiously, Jaun kicking slight steps; and here I must own that I doubt, if one of us had slipped, whether the others could have held him with the rope.

For travellers intending to go direct to the Grimsel without sleeping at the Urner Alp, it would be the more direct, and also probably the easier course, to keep more to the right, under the Berglistock, in which direction there is, so far as I could distinguish, a broad space in which there are no rocks to descend, though certainly the maps do not indicate this. But the circuit would have been far too great for us, and we had no choice

but to descend; and I believe we chose the best spot. We got on fairly till we came to a part where not only I but Jaun and Tännler were baffled for at least a quarter of an hour. We were about sixty feet above the glacier, and the crag fell sheer away from where we stood, without any inequalities of surface at all, into a widish crevasse that protected this natural fortress as far as we could see. Jaun, indeed, by way of doing something, managed to slip down on to a notch in the stone which we had not at first perceived, and insisted on my doing the same. I own I did not like it; but there we stood, and I rather fully expected then that we should soon make a much more rapid descent than we wished. The only thing was not to think about it, but neither I nor the guides saw our way out of it. At last an idea occurred to Jaun:—Tännler had a good footing about five feet above us. ‘You must let us both down,’ said Jaun, ‘there is no help for it.’ I protested against this strongly at first, as I thought it must be destruction to Tännler, who would have no one to let him down. They hesitated a little, but at length concluded that when we were once down we might probably manage his descent somehow, and then there was nothing else to be done. So Jaun knotted the rope tight round him and laid himself spread eagle-wise on the rock, letting himself slide, and pressing the stone with the sides of his feet and fingers. The strain on Tännler was severe, for Jaun was very heavy. However, the latter lighted safely on a ledge which happened luckily to afford footing at no great depth within the crevasse. Next I slung myself with the rope in the same way, and found this mode of descent, on the whole, rather amusing and easy; but now for poor Tännler. He did not half like it, and I fancied this coming part of the day’s adventure least of all, feeling very uncertain of the result. I climbed up on to the other side of the crevasse where there was fair footing, and proposed to hold the rope there while Tännler slung himself to the other end. They thought this a good plan; and Jaun, for his part, managed to wriggle up to another little notch in the rock, invisible from above, and there stand to break Tännler’s fall. With encouragement from below he let himself slide, pointing upward just before, and saying ‘One will hold me.’ He came with a thump against Jaun, who managed to stop him, and then both slid down to the crevasse pretty easily. Tännler, by the way, had let down the knapsacks before he came himself, and there was only the bottle of tea broken: it was amusing to see them come floundering down. Here we were then, all difficulties over, as the glacier at this point did not seem to present any. We

all felt uncommonly thankful to have conquered the Renfer Joch without the slightest misadventure. Nothing but our clothes a little torn by the gneiss against which we had rubbed, a bottle of tea broken, and my watch-key lost in the crevasse! We made extremely merry with the wine and the rest of the provisions, and at 4.30 started again—the little crevasses only affording a series of amusing little jumps; at some parts there was névé, and we glissaded standing; we were glad of the rope, however, as the guides went into a hidden hole here and there.

It was getting rapidly dark when we got off the glacier on to a heath and shrub-mantled spur of mountain, and the goat-tracks you have to follow close to the châteaux would have been disagreeable if night had fully set in, but we had just light enough. We looked a little blue when the *jodelling* shouts of Tännler were not answered from the huts, and made somewhat half-hearted jokes about the Senn (herdsman) not having come up from the lower huts and there being no means of getting in or lighting a fire, for the snow about the summit of the pass had been soft and deep, and we were well wet through, though I cannot say I was very tired. However, when we got pretty near, Tännler's jodel was re-echoed this time, not by mocking desolate crags, but by another human voice. The Senn had been cuddling over a cheerful blaze with closed door, and the wind was blowing from him. The hut did look snug after our long walk, though it is roughly built with loose stones which do not pretend to keep out all the wind. The beds are heaps of hay. We changed our wet things, and the Senn set himself at once to boil our milk and make our tea in a kind of saucepan. Bread and milk and tea are delicious after a good day's walk, and chocolate is not to be despised. We got in about 6. Soon after tea I went to bed, though not to sleep. The fleas were only partially to blame for this; but you do decidedly get rested, even by the mere lying down, if you do not get sleep. The Senn and guides sat for a while longer round the blaze, smoking short pipes—picturesque enough with the ruddy glare on their dark faces and over certain portions of the rude wooden smoke-blackened table, stool, and upright posts supporting the roof; they talked over the day's adventures, discussing also the localities round, and various chances that had happened there to herdsmen, chamois-hunters, and others. But most of the villanous patois was Greek to me. One word, though, kept recurring in the Senn's talk and strangely haunting my unquiet doze—the name of the Hangendhorn, which he pronounced

‘Hungendehörrn,’ and which, as he spoke it, sounded weird and eldritch, as if it must in the nature of things belong to the weird solitudes of that dreary region.

The rest of the route between this and the Grimsel by the Gault Pass, the Lauteraar Glacier and Abschwung, is well known. The weather was doubtful, and my time was limited; so, after some hesitation, I resolved to return to Meyringen by the beautiful Urbach Thal next morning (7 hours’ walk); and this I did, the chief object of my excursion having been most prosperously accomplished.

I have only to add that the pluck and cheerful endurance, the acute experienced judgment, the prudence and consideration for my own inexperience, displayed by both my guides, were things most agreeable to witness.

MONT BLANC FROM THE GLACIER DE MIAGE. By
FREDERICK A. G. BROWN.

I HAD heard from Genoese friends of mine, who, though not members of any of the Alpine clubs, took an intelligent interest in mountain walking, that Courmayeur was not such an utterly uncivilised place as was generally supposed, for that if it could not, like Grindelwald or Chamouni, boast of a score of average guides and one or two celebrities, it was not at least utterly devoid of good men, for Julien Grange lived there. Now this was news to me, and promised to save me some trouble; for the last time I had visited Courmayeur, intending to make it the starting-point of my four weeks’ holiday, I had thought it wise to import a foreigner to help me over the Géant, and go on with me from Chamouni.

So, on arriving at Courmayeur, the first thing I did was to ask for Julien Grange. Alas! he was beginning to be known — was with Mr. Walker at Chamouni, and no one knew when he would be back. As I afterwards found out, he had accompanied Mr. Walker and Melchior Anderegg to the Grandes Jorasses, and had gone round to Chamouni with some of their party by the hum-drum route of the Allée Blanche and Bonhomme, on a hint from Melchior that, if he behaved himself, he might be treated to a turn at the Aiguille Verte.

It did not much matter, however. I was to stay a month at Bertolini’s comfortable inn, and did not hope for more than a walk or two, for which I had plenty of time; there was the Cramont and most beautiful Saxe, the rarely climbed Mont

Favre, the grand Ruitor Glaciers, the curious *trou des Romains* (an old copper mine I suppose), and endless strolls along the Dora over the meadows towards St. Vincent, or at the foot of the huge buttresses which keep Mont Blanc from toppling over into Italy.

What can an idle man better do with his time than find his own way up the Chétif (avoiding breaking his neck by attempting to shorten that way overmuch), and when he has reached the topmost knob lie down on the short grass between the broken rocks, and turn from Courmayeur at his feet to look at the Jorasses, at the ice avalanches falling over the *Heisse Platte* of the Brenva, then raise his head, and, as he watches the slanting sunlight round off a little pure white knoll high up in the blue sky, acknowledge that Mont Blanc is yet the monarch of mountains? Unless he has seen Elbruz, of course; but then you don't want your revolver on Mont Blanc, which to quiet people is an inducement.

But all this is digression. To while away the time till Grange should come, I went up the Cramont with a brother-guide of his, who quite bore out the character given to Courmayeur guides in general. He took me too far to the right, and we had a scramble just sufficiently severe to prove him a mule-driver, whose absurd ambition had led him to forsake his native valleys. I had done the same thing before, and ought to have known better; so I now note, for the benefit of the stranger to Courmayeur, that in going up the Cramont from thence direct, a moment's examination of its furrowed face from the base of the final peak will show a buttress well to the left, grassy at the bottom, but steep and bare higher up, which leads straight up to the top.

On Grange's return I went to see him, and found a rough, tough, ugly, stumpy, red-haired, good-humoured, hot-tempered, broad-shouldered pocket-Hercules of a fellow, who hung his head and blushed, and put his thumbs in his waist-coat-armholes when you spoke to him. We had a good walk and talk by the Lac de Combal, up towards the Aiguille de Chevannes, and home by the Col de Chécruit—an excursion which I can strongly recommend—and discussed our future plans. He had a well-founded admiration for the Grandes Jorasses, and I had a fancy for the Grivola; and I may as well say that we gratified our respective longings within the next few days, and that these fine excursions revealed him to me as an excellent guide of the Christian Michel class, not equal to Almer or Anderegg in the choice of a route, but a first-rate hand on rock or ice, and a right good fellow to boot.

On one of these walks he opened his heart to me. He had been up Mont Blanc by the Chamouni route; he had cut his way by the Monts Maudits to the *corridor*, and he had gone as porter as far as their sleeping place, with Messrs. Walker and Moore, on their bold and successful attack on the monarch from the Brenva Glacier. But his pet plan was to attack him by the Glacier de Miage and the Dôme; if, indeed, it proved impracticable, to make straight running for the Calotte itself. Who could help falling in with such an idea? A new and possibly short route up Mont Blanc was worth trying for, anyhow; so we put on our considering caps and looked up the maps.

Thanks to M. Reilly the western face of Mont Blanc is no longer a vague desert, enlivened with the Mountains of the Moon. The Miage Glacier, singularly flat and easy, led for miles into the heart of the great mountain mass, then split into three branches, of which the southernmost came down in a few bounds from the Calotte, and was utterly impracticable; the middle one led straight to the Dôme; and the farthest to the ridge between the Dôme and the Aiguille de Bionassay.

Mr. Tuckett had suggested the possibility of the latter route, but it was a long way round, there was a big ice-fall certainly, and other obstacles in all probability; so that, on the whole, it was likely that one would get to the top of the Dôme just at bedtime; and although there is plenty of room there, it is on the whole decidedly an exposed situation.

For the middle course there were several reasons. First of all, was it not said, 'in medio tutissimus ibis'? then Messrs. Grove, Macdonald, and Buxton had actually come down that way from the Dôme. It is true they did not do it on purpose, and had not a very pleasant time of it; but still they had passed, and we, going up, should have the advantage of inspecting our route beforehand. Finally, Grange would have it so; he had planned it for years, and was quite unmoved when I read him, from the second volume of the *Alpine Journal*, snatches from that interesting narrative yecept the 'Glacier du Dôme,' or Mr. Moore's opinion that 'no one is ever likely to reach the top of Mont Blanc from the southern Miage.'

What delighted him, though, was the picture of the western face of Mont Blanc (vol. ii. p. 97). We should go right up the middle glacier therein depicted, to the foot of the rocky tooth coming down from the Dôme which divides its head into two branches, leave this to the left, and find our way from thence as best we might.

We settled to try it, and went into the details of the scheme. And here we met our first *mauvais pas*. Need I say that the guide-system turned up and nearly upset the whole plan? Courmayeur, like Chamouni, has her *bureau des guides, règlements*, and appliances to keep the best men from being constantly employed by travellers, and to remove all inducement to the lazy fellows to work their way up. Now I did not mind how many men I took to the sleeping place; I like to be comfortable, and to have lots of blankets, food, and firewood, and the more the merrier in a camp out; the luxury is not expensive, moreover, as each man counts but one day's portage. But for the work to come when the camp was broken up, I had a strong fancy to be one of a cord of three. Two guides are quite enough to help the Alpine mountaineer up or over anything, to cut his steps, to carry his knapsack, to pull him up and let him down, to keep him from going into danger where his ignorance would probably lead him, and to make him think he is a very fine fellow on the strength of what they have enabled him to do.

But Courmayeur would not listen to reason on the matter; and it was only after a protracted struggle that I was able to limit the number of my body-guard to a guide and a porter besides Julien Grange for the ascent, and two more porters as far as the *gîte*.

I was a little ashamed of myself as, at 10.20 A.M. on July 24, 1868, I followed my retinue through Courmayeur, and could not help feeling they ought to have carried me on a palanquin. But the weather was lovely, the *guide-chef* had cheered me up a bit by taking me aside and asking me confidentially where we really intended going, that he might send out to search for us if we did not come back (which I answered truly, that we intended to try for the Dôme, and if we got there early in the day, should *turn to the right*); and as we got clear of the houses, and went towards the grand portal formed by the Saxe and the Chétif, all little annoyances gave way to the delicious feeling that we were fairly off on a grand course.

We were stopped half an hour by the torrent from the Broglia, or, as I believe it should be called, the Brouillard Glacier, but managed to throw a couple of pine-trees across, and reached the Brouillard Alp at half-past one. Here we collected firewood, dined in the middle of the Miage Glacier, and walked straight up it in the shade of the enormous cliffs culminating in the Aiguille de Trelatête, from which séracs and showers of stone kept pouring down at five-minute intervals, and passing the fine ice-fall by which the Glacier du Dôme

joins the Miage, came at length to our first crevasses. These were great splits lengthwise with the glacier, and cost us some time, as we had to cross them to get off the ice at the base of the buttress forming the right bank of the Glacier du Dôme, which is very well shown in the picture of the western face of Mont Blanc. Indeed I conclude this must be from a photograph, for even the crevasses I mention are to be seen at the foot of the buttress, and the place where we spent the night is distinctly visible, on the rocky corner where the buttress narrows, as it trends up towards the Dôme.

As we mounted this (my men called it the Aiguille Grise), Grange pointed out the extraordinary spot below the Trelatête, where a mine was worked for many years, in spite of a yearly loss of life by ice-avalanches in reaching the desolate hut, which still stands, but will probably never again be visited by man, for the gradual shrinking of the ice which has so curtailed the grand proportions of the Miage Glacier, where it reaches the valley, has here, at its head, cut off altogether the dangerous way that once led to the mine.

At 5.15 we reached a cave, or rather a hole under a big stone, which would have done very well as a sleeping place. The position was lovely; we faced right down the Miage Glacier, at the foot of which the Lac de Combal was visible, and beyond it Mont Favre and the Ruitor; on our right the most beautiful Aig. de Trelatête, furrowed with surprisingly steep couloirs, which kept firing off whole parks of artillery in the way of stones and ice; to the left were rocks leading up towards Mont Blanc, and still farther round was the Dôme, apparently quite practicable for some way below the summit, but then came a monstrous ice-cliff, with which we were next day to make close acquaintance.

The beauty of the view was nought to practical Grange, who wanted to see his way up; so he pushed forward whilst the porters, who thought they were far enough, threw off their loads, and I posted myself as a vidette to watch his movements. He soon appeared yelling on the top of a distant rock, and after bawling in my turn to the men, I followed the scratches he had made across a branch of the glacier, mending the way carefully for my own use as I went, scrambled up the rocks, and joined him in about half an hour.

The advantages of the *gite* were evident in one respect; our route for the next day was to a great extent before us, and though the ice-cliff looked if anything rather worse than it did below, there was no other very serious obstacle in sight. It was evidently easy to get on to the glacier at our feet, which

was fairly even, and the smooth slopes near the top of the Dôme were all right. As a sleeping place it might have been better, for a flat rock, sheltered on the west by a wall of granite 20 ft. high, but completely exposed overhead and on three sides, did not promise much comfort for a night to be spent on an ice-surrounded island some 9,000 ft. above the sea, and the porters when they came up grumbled at the change from the comparatively comfortable hole below. There was water handy, which was a great point; a nice little stream from melting snow above, filtered to purity through the granite chips, and which only had one objection, namely, that stones *would* come down and whiz pass one while the water trickled feebly into our copper pan, involving a precipitate retreat and a great spilling of the water, to the annoyance of the water-carrier, and the delight of his comrades safely perched on the rock above. After supper we built a wall to keep off the north wind and by way of warming ourselves, and turned in, or rather lay down side by side, for one short night. I don't know how the men got on, but there were plenty of blankets, so I dare say they did pretty well. As for me, I was perfectly warm and comfortable: I had the inside place, and, knowing Grange's restless and encroaching habits by past experience, I had laid a trap for him in the shape of a knubly rock between us; and with a flannel shirt pulled over my wide-awake, and a dressing gown over my clothes, I had crept into a sleeping bag which I can confidently recommend, and which is very simply made by sewing up a railway wrapper, with the help of a packing needle and a long bit of string. N.B. Make the folds double at the feet, and take off your boots before you get in. What joy is equal to a pipe in this position, with the stars twinkling overhead and an untrodden glacier to be explored the next day?

Grange and I were stirring early, boiled a bottle of wine to help down our cold mutton breakfast, and at 3.50 A.M., on July 25, we said good-bye to the porters, and scrambled down the rocks in the dark, roped together, for ten minutes would take us on to the *névé*, and the crevasses were wide and deep. They did not give us much trouble though, when it became light enough for us to make them out clearly, and a chamois track helped us to pick out the best bridges, and thread our way through the great yawning rifts. Since the public-spirited resolution of the Courmayeur hunters to give up their hunting to the king, the chamois is beginning to appear more frequently on this side of Mont Blanc where they once were plentiful, and as Victor Emanuel, like a true sportsman, spares them while they are

few, their number increases rapidly. This fellow had come down the glacier, and we were often forced to go a long way round where he had passed with a single bound.

We were soon at the foot of the rocky tongue which splits the head of the glacier into two bays, and saw no reason to change our previous opinion that the northernmost of these would not do. It looked simply impossible to pass that way, which had the advantage of narrowing our field of action to the little southern plateau, on which we now entered. And here we saw fully for the first time the work that was cut out for us. Surely a more extraordinary spot is not to be found in the Alps. The whole plateau, half a mile wide, was filled with fragments of the ice-cliffs, which hemmed it in on every side. One of these blocks attracted our attention, from its enormous size; it had fallen from below the Bosse, and splitting into cubes, had left a single mighty mass, some sixty feet high, standing alone and square, its upright sides shining in the morning sunlight. From a distance we had settled to try straight for the Bosse, but now we were near it we could make nothing of it at all; so we floundered over to the left, through avalanche débris, which had crossed each other in all directions, and made for the side of the rocky spur which bounded our plateau on that side. It did not look very good; there was but one way through the ice-cliff, and that was guarded by the usual bergschrund with an overhanging upper lip; then would come a steep scramble, evidently exposed to stones; and, worst of all, the arête leading to the main ridge near the Dôme might prove awkward, for the ice looked jagged against the sky. So that I was not surprised when we had crossed the plateau to see Grange look back towards the Bosse. That was better certainly; the upper part was a little exposed to avalanches, but passable, and as for the lower—— ‘Let’s go back and look at it again.’ But when we reached our old friend the great block, he too evidently was intended as a warning of what came down that way, and we gave it up, and things began to look blank. But time went on, every minute was precious now the sun was beginning to warm the mountain-tops, and Grange began to be tired of asking my opinion and finding that I invariably agreed with him. So off he went straight for the Dôme. I looked ahead, and really could not guess where he meant to go, and when the slope steepened, and I found he was leading straight up to a monstrous blue wall of ice, I thought it right to tell him that I would follow him wherever he went, but did not wish him to run us into danger for my sake. We reached the wall, and turning to the

right kept along it for about fifty paces, during which I could have touched it with my left hand, the object of hugging it so close being to allow any fragments falling from above to shoot over our heads, so that as long as the wall itself stood we were safe, and then turning up again entered a place which I knew enough about mountains to consider a good deal queerer than the ice-cliff itself. This was a broad, flat, steep couloir running up out of sight towards the Dôme, on which no sérac could form, for the constant avalanches planed them down to a uniform level, and even the rocks which cropped up at intervals were worn down nearly to the proper slope. If anyone is fond of crystals he will find plenty in these rocks, but I should not advise him to spend the afternoon there. Up this high road we scrambled as fast as we could, till we reached the top of the ice-precipice, then passed along it to the left, crossed another couloir, disentangled ourselves from the complicated crevasses formed in the ice as it nodded to its fall, and were soon on the smooth snow-slopes which we had looked up at longingly from the *gîte*. Here we took a few minutes' rest, which was wanted by all, for we had not stopped since we started, and it was now 7.20 A.M. Grange had of course cut the steps and done all the work, but the prospect of success, now that our chief difficulty was over, made him too eager to let us lie long in the snow, and he was soon plodding on again for the Dôme, which we reached at 8.50 A.M., and wandered over its vast swelling mass, trying in vain to find the true top.

Here we dined and looked up at the calotte, some 1,600 ft. above us yet, but within our reach if the weather would but last fine. At 9.40 A.M. we started again, one of the Courmayeur heroes leading this time, and I second, as I had been all the way up; but under the Bosse the leader was going so slow that I was sent to the front, and thus had the honour of being the first on the top of Mont Blanc, which we reached at 12.50. We had been a long time coming from the Dôme, but the snow was now softish and knee-deep.

Here I lay down my pen; for what boots it to describe the well-known top of Mont Blanc? Tiresome as it is to many, to me it is a fairy spot, and so I believe it will appear to anyone who has fine weather and reaches it by a new way. I had seen it before, but was not then in good training, and—must I admit that I was the last on the top, although I was the middle man of a rope of three?—it had not struck me so much. Does it not seem to be the top of an egg-shaped world, and the spot nearest the blue heaven?

It would have been the height of fool-hardiness to attempt

in late afternoon the way which we had passed in safety before the sun had loosened ice and rock ; so we gave up the idea, and made our ascent into a col by going down to Chamouni by the ordinary route. Glissading was out of the question, for the snow was now very soft, and the Grand Plateau became a bore before we had floundered through it ; but once over the Bossons, we sped down at a great pace, and reached the comfortable Hôtel de l'Union, at 8.15 P.M., not a little pleased at having solved the problem of an ascent of Mont Blanc from the southern Miage Glacier.

CORSICA. By the Rev. W. H. HAWKER, M.A., F.Z.S. Read before the Alpine Club on May 5, 1868.

IT is not necessary for me to begin this paper with a rhapsody on the beautiful outline of Corsica, as seen from the shores of the Riviera, for the simple reason that this has been frequently done already, and for the additional reason that, from the sea shore at Mentone and Nice, the island is in reality entirely invisible, and is only seen by the medium of refraction or mirage.* It often is so seen, and still better, is bodily seen from the heights above those towns ; and it is undeniable, that dream-like in beauty is the sight often presented at early morn of the far-off island rising Venus-like out of the sea, her many snow peaks, like a diadem of pearls, catching the rising sun, and her base clothed with sleepy haze. Unless one is high above the sea level, the glimpse vouchsafed is generally short, for as the sun rises the gauzy atmosphere of the sea soon curtains it from view. From the higher mountains, however, the sharp irregular outline may be often seen clearly throughout the day until the sunset glow changes the pearl diadem for a tiara of rubies.

It was but natural that the frequent sight of this lovely vision acted with powerful attraction upon myself and some of

* The following is a simple form for ascertaining the height of a mountain whose summit is just visible to the eye at the sea level ; multiply the distance in English statute miles by itself, and two-thirds of the amount will give the required height in English feet. Thus if Monte Cinto, which is not only the highest mountain in Corsica, but the one nearest to the above-named towns, be reckoned as distant 118 miles from Mentone, then $118 \times 118 \div \frac{3}{2} =$ about 9,283 feet, which is the height the mountain should be, in order to be visible from the sea level, but in reality it is only 9,078 feet high.

my friends who were passing the winter at Mentone; the result being that, on March 14, 1866, a party of us, seven in all, including three ladies, sailed from Nice at 8 P.M. in the Valery Company's steamer *Princess Clothilde*, bound for Ajaccio.

She was a smart-looking screw-steamer, well fitted and furnished, and, moreover, very clean, but unfortunately empty: as the breeze freshened into a gale she rolled frightfully; so as the night, soon after starting, promised to be a very 'dusty' one, there was nothing for it but to admire for a short time the phosphorescence of the innumerable jelly fish alongside, and then turn in.

Steamers of this Company sail from Nice every Wednesday evening for Ajaccio and Bastia alternately, arriving at their destination about 9 or 10 A.M., and returning to Nice on the following Saturday evening from whichever port they have gone to. There is a regular service, too, between the island and Marseilles. And lastly, one can also go to or get out of the place by means of the boats, which run between Leghorn and Bastia. In approaching Corsica by this last-named route, which is generally the calmest unless there is a sirocco blowing, the sea passage is all performed by day, and is throughout beautiful, as when the mainland with the mountains of Carara and the distant Apennine range recede from view, the rocky islands Elba and Capraja, and then Pianosa and Monte Cristo claim notice until the bold outline of Corsica itself absorbs the passengers' attention.

The vessel might have been our own private yacht, the only three other first-class passengers being two Englishmen, one of whom was an acquaintance of mine, and a Belgian friend, Baron Snoy, who joined us in a second expedition to the island.

Nothing can surpass the exceeding beauty of the island when approached on the Ajaccio side in fine weather, such as we had on our second visit, when we saw it radiant with all the splendour of southern colouring. The coast line is as bold as the most indented part of the Corniche, with the additional merit of looking wild and uncultivated from the highest summit to the very water's edge. A glance at the map will give some idea of the marvellous sinuosities of the west coast, though, after all, only a general one, as there are numberless little creeks and bays the details of which cannot be indicated, but which add greatly to its picturesqueness.

The gulf of Ajaccio is a grand basin, about ten or twelve miles in diameter, open to the S.W., and entered through a

reef of small rocky islands called the Iles Sanguinaires, which run out from the northernmost point. On threading these we were immediately in calm water and skirted the northern shore, where we were much puzzled by the first apparent habitations which consisted of a number of curious-looking, diminutive houses, built very square and plain, and with tiny walled gardens round them. These are the cemeteries of different Ajaccio families. A small promontory runs out of the town of Ajaccio, on which stands the citadel, and on rounding this we found ourselves in the port, which is roomy, deep, and has a good anchorage.

We were soon surrounded by a number of shore boats, each carrying a bright tricolour, and on landing, our luggage was at once seized by an irascible and vociferating multitude of men and boys, who began carrying it in every kind of wrong direction, until they were collected by a self-elected chief and driven to the Douane.

There were three hotels, all of which we tried in turn, and found wretchedly bad. Since then a new one, the Hôtel de Londres, has been opened, which I hear is good and clean; it is therefore probably not kept by a Corsican; and as from the moment you land till the instant you leave the island, you are subjected to small intrigues of all kinds, I recommend anyone landing at Ajaccio to insist on being conducted to this hotel, and not to yield a too implicit faith to assertions that it is shut up, or burnt down, or that the landlord is dead, or that its name has been changed, all of which he is likely enough to be told by the intelligent tout of some other inn.

The lions of Ajaccio are the house where Napoleon was born, a museum, chiefly of pictures and sculptures, left by Cardinal Fesch one of the Buonapartes, and a handsome mausoleum of the same family. The town is clean and bright, the public buildings large and handsome, the principal street, the Corso, is wide, and has an avenue of tall orange trees along it; and I was surprised and charmed at the simple honesty of the street boys in sparing the ripe and abundant fruit, until I found that the trees were of the variety named after the town of Seville! Most of the women and children were employed in making cigars outside the street doors, and all the men appeared to be occupied in waiting until the cigars were made and dried, and then they smoked them—just as I have observed, at the Zoological Gardens, half-a-dozen gulls waiting patiently round one of their congeners who was in the act of laying an egg, which, upon the completion of the process, was pounced upon and devoured.

With good hotel accommodation Ajaccio would be a charming place to spend a portion of the winter in, and some comfortable villas have been built to the west of the town, in the hope of tempting English families to settle there. They are well furnished, but have not let very readily as yet. There seems to be a difficulty about water, and it might hardly be safe to remain in them late in the spring, as I heard a whisper that the malaria then reaches them.

There are many lovely walks about the place. One along the north shore of the gulf to the old Greek Chapel can scarcely be surpassed for beauty, including as it does a view of not only the gulf, but also of the amphitheatre of mountains formed partly by the main chain, and partly by a great spur of scarcely less elevation, which, starting from Monte d'Oro, the culminating point in the landscape, sweeps round the gulf to the north-west, and affords shelter from the dreaded mistral. Crosse and I walked up one day to a point about 1,200 feet above the Greek Chapel, and called Pointa Petacea, whence the view to the south is still more extensive, showing a series of headlands overlapping each other, and Sardinia rising boldly in the far distance beyond the last promontory.

As, however, we had no intention of remaining an indefinite time at Ajaccio, we set about discovering what means of locomotion exist for exploring the island: the following is the result. A diligence runs regularly from Ajaccio along the coast by Sartene to Bonifaccio, the southernmost point of Corsica, thence by Porto Vecchio and Solenzara to Bastia; thus making a circuit of more than half the coast line of the island. Another diligence starts in the opposite direction, and runs in a north direction along the coast from Ajaccio to Vico. A third goes obliquely in a north-east direction right through the island by a splendid road made by Napoleon through Bocognano, Viggio, and Corte to Bastia.

The first of these routes tempted our fellow-passengers; they accordingly started for the south, intent on sketching and shooting. But one great object of our visit to the island was to see as much as we could of the renowned pine forests, for which Corsica has been famous from the earliest times, and which lie in the northern district. Theophrastus tells of a large ship built by the Romans with this timber, and we read that Sextus Pompeius having seized the island, drew from its forests the means of maintaining his naval supremacy. Even since its annexation to France, some of the finest masts in the French navy have been obtained from the Forest of Vizzavona. But that 'wooden walls' have ceased to be, and even masts are

made of iron, one might be tempted to regret that administrative stupidity in which we are unrivalled, and which muddled the business when the island attached herself spontaneously to the English Crown: but there was a job to be done, an ever-recurring Elliott to be promoted; so he was made viceroy, and a very short spell of well-intentioned mismanagement lost all Corsica, with her splendid forests, her commanding position in the Mediterranean, and her fine harbours, to the English Crown for ever.

These forests are of Pine trees, principally of two species, *Pinus maritima*, generally called pinaster, which is chiefly useful as yielding great quantities of turpentine, but whose wood is not durable; and the famous Corsican pine, which supplies some of the most valuable timber in Europe. It is wonderful what mistakes are made by people about this tree. Dr. Bennet, the resident physician of the Pension Anglaise at Mentone, has published an account of an expedition he made to the island, and in a glowing description of the forests says: 'Above the range of the chestnut tree we meet with the *Pinus maritima*, and above that, along with it in some regions, the *Pinus larix*, or larch. This tree is a native of Corsica, and in no part of Europe does it grow to greater luxuriance and perfection. . . . Above the pines come the beech, then the birch, and then—the eternal snows!' Now all this is very grand, but it is altogether incorrect.

The error, which several writers have copied from each other, seems to arise either from an ignorance of French, or from an imperfect knowledge of the subject. The fact is, there are two trees whose scientific names are:—

1. *Pinus larix*, which we call larch, and the French *mêlèse*, or rarely *larix*.
2. *Pinus laricio*, which we call Corsican pine, and the French *Pin larice*.

No one who has ever seen the Corsican pine could possibly mistake it for a larch, as the tree is an evergreen, and resembles a Scotch fir, and moreover, I do not believe that there is a single specimen of a larch in the island.

Well, we had heard of the fame of these Corsican pine forests, and we wished to see something of them. This desire was soon increased, for in one of our walks along the harbour of Ajaccio we saw some fine baulks of the timber which had been brought down by mules from the interior, and were remarking that they must have been supplied by good large trees, when, to our amazement, we found that many of them were only *quarters* of trees. Our reverence for *P. laricio* was greatly augmented, so

was also the desire to see that monarch of European trees in a living state. We luckily stumbled upon the proprietor of the forests whence these trees came, Monsieur Folacci, and he subsequently proved exceedingly kind and useful to us.

Talking of large trees, there was close by, in an avenue of trees, which runs along the harbour, one which attracted my attention from its size and age and untrimmed look. It was an extraordinarily large specimen of *Celtis Australis*—no less than 11 feet $4\frac{1}{2}$ inches in circumference: it was the oldest tree in the avenue, and on it, in the days of the Revolution, they used to hang the royalists. It is a weird old tree, with gnarled trunk and stumpy, wicked, gallows-looking boughs; it has long been hollow, and the middle has been filled up with masonry to support it, which gives it a stony-hearted look, quite in keeping with its disreputable history.

The day before starting for the forests we took a preliminary afternoon drive of 5 miles over the small range of conical hills which protect Ajaccio from the N.E. and E., to the sulphur baths of Caldaniccia, a wretched building with a few baths attached to it, much frequented in summer by the *élite* of Ajaccio, but no one dare stop there after sunset, on account of the malaria, so it has never been worth while to build a good establishment. It is situated in the plain called Campo d'Oro or Campo del Oro, through which runs the river Gravone, which, rising at the foot of Monte d'Oro, flows into the harbour of Ajaccio.

I mention this drive because it gave us our first bandit story; we afterwards heard them at every turn and I do not remember half of them, but as this one is illustrative of the Corsican character I may as well give it.

It seems that at the last civic election, a few months before, at a village called Alata, one of the natives who had settled at Ajaccio and become a well-to-do hatter, returned and meddled with 'la politique.' This led to his having some words in the town hall with the Maire, into whose shoes he was probably anxious to step. The argument becoming warm, the worthy hatter speedily produces a pistol, takes a shot at the Maire, and decamps. After playing hide and seek for some time, the gendarmes tracked him into a house, which was pointed out to us, and surrounded it. The officer, who happened to be one of his personal friends, called to him to surrender quietly, saying that as, fortunately, the Maire was only wounded, he would probably have but a short imprisonment. The man appeared armed at a window, in some melodramatic phrase said he preferred a glorious death as a bandit to the dishonour of a

prison, and on his friend the officer advancing he shot him dead. Of course he was instantly riddled with the bullets of the gendarmes; and both bodies were carried back to Ajaccio, where honest people mourned the loss of a brave and intrepid officer, while the amiable Corsicans added another to the list of savage brutes whom they dignify with the rank of national heroes.

And now, before we start for the mountains, I must give, in as few words as I can, some idea of the geography of Corsica.

The structure of the island, whose length is 124 miles and its greatest breadth 52 miles, is altogether mountainous, and a glance at the map will show that there is a considerable simplicity in the general arrangement of the mountains.

In the first place, we have a main chain, which is the backbone of the island, running from top to bottom of it, and culminating at about the centre, where it has received a great twist, but, notwithstanding this, it is never absolutely broken, inasmuch as all the cols and passes across it are very high, the only carriage road over it being by the Col de Vizzavona, nearly 4,000 feet above the sea.

This main chain then takes three principal directions. Commencing in the N. at the promontory of Capo Corso, where the mountains rise to over 5,000 feet, it soon takes a S.W. direction until it reaches Monte Cinto, which has lately been discovered by the French engineers to be the highest mountain in the island. Just after Monte Cinto it takes the sudden twist I have mentioned, the direction being from N.W. to S.E. until we reach Monte Renoso, after which it runs pretty straight from N. to S., the last high mountain to the south being Monte Incudine (6,768 feet).*

The district which forms the nucleus of the system, is a very elevated tract of country,—an alpine and forest region combined. Here are the highest mountains and the largest forests, the former consisting of Monte Cinto (9,078 ft.) just mentioned; Paglia Orba (8,700 ft.), once considered the highest, and certainly by far the most remarkable peak in the island; shaped like a huge shark's tooth, its magnificent precipice is conspicuous with the naked eye from above Mentone, and always excited our utmost admiration; it divides the forest of Aitone from that of Valdoniello: Artica (7,921 ft.), dividing the forest of Melo from that of Valdoniello; Monte Rotondo (9,068 ft.), the most massive, and Monte d'Oro (8,704 ft.), the most beautiful of all.

* These heights, excepting Monte Cinto, are according to Marmocchi, the new Ordnance measurements not being yet published.

This region, which is very wild and picturesque, has been not inaptly called the Switzerland of Corsica, and to it, on both visits, our attention was principally directed.

To complete my rough description of the geography of the island, as far as is necessary for our purpose, I must add the noticeable feature, that, as a rule, the chief spurs of the main chain—and they are many and great—are thrown out on the western side, each of them forming at its extremity a bold and lofty promontory, washed by the Mediterranean. These successive ridges inclose beautiful and fertile valleys, with deep gulfs and bays running inland. The reason of this is, that the spurs are, like the main chain, all of primitive rocks, including some of the most beautiful granites known.

The eastern side of the island, on the other hand, presents minor ranges of calcareous formation, which, by more rapid disintegration, have formed considerable plains, through which the rivers, finding a slow and sluggish outfall, have created on their way marshes and lagoons of great extent, renowned for eels, wild-fowl, and malaria.

And now behold us starting forth on our adventures, in a couple of small open vehicles, drawn respectively by two mules and two ponies.

The road to Vico, our first sleeping-place, does not call for much remark. Like all the west coast, when the road was not rising in order to surmount one or other of the spurs I have mentioned, it was descending it on the other side, only to mount again as soon as the narrow valley or plain had been traversed. The views up these valleys were always very fine, as the eye ran up to the main range.

On the first long ascent we had to make, we in the first carriage had a curious and marvellous escape, for, as we were passing beneath a quarry of very beautiful red granite, from which had been hewn the pedestal for the recently erected monument to Napoleon in the Place at Ajaccio, I happened to see, high over our heads, an immense boulder detach itself, and start bounding down directly in front of us. I shouted to the driver to stop, which he seemed in no hurry to do, until, guided by my gestures, he looked up, and saw the mass of rock coming straight at us. He then did utter a dismal howl at his horses, which made them give so frantic a start forward, that crack went all the traces. When the rock was a dozen yards from us, at the end of a bound of about 150 feet, it most fortunately struck against another boulder, which checked its velocity; and, getting another check at the side of the road, it came to a halt between the fore and hind wheels of our

carriage : one roll more, and it would have completely crushed us.

On our way we passed a great extent of real wild untouched Macchia, or Macquis, a thick tangled brushwood of all kinds of prickly shrubs, mingled with *Laurustinus*, myrtle, wild olive, and *Phyllyrhæa* : the edge was gay with *Cyclamen repandum*.

This macchia covers a great portion of the island, and is where the bandits generally hide. Often they will be within a few feet of the main road, taking care not to make any track into the road itself, and their friends knowing the spot, as they pass along, throw them over provisions.

At Vico we halted at the inn (Pozzo di Borgo), where the diligence stops, and found a hearty English-looking landlord, who bustled about, and, with his wife and daughters, did his best to make us comfortable.

There is hardly a place one comes to in one's wanderings, where one does not find a specimen of the variety ' bore ' of the human species. Even Vico was not, by its remoteness, exempt from the nuisance, for, on emerging next morning from the inn, I was pounced upon by a garrulous old individual, full of ignorant conceit, who, seeing my vasculum, insisted that I was a medical herborist, and harangued me upon the useful and nourishing properties of several plants which I knew to be virulent poisons. I conclude the old gentleman's practice had ceased to be extensive, as he must soon have outlived his patients. It required some contrivance to shake off my pedantic friend without giving him offence; clear of him, we were accosted by another man, who told us, with much mystery, that he could show us a mine of antimony. He had spied an ice axe among the luggage, and concluded we were prospecting for minerals.

From Vico, where we stayed a couple of nights, we made an afternoon expedition to the baths of Guagno, where there is a large establishment, much frequented in summer by the French residents in Corsica. It was a dreary, dismal-looking place, giving one the general idea of a decayed house of correction, that had been bought cheap, and wanted many repairs and much whitewash.

From here a pass leads over the main chain by the Bocca della Scoglia to Corte : the chief interest of this pass is on the other side, and I shall mention it again when we get there.

Starting at 8 A.M. next morning, we drove in about three and a half hours from Vico to Evisa. The drive took us over a high barren tract, with occasional clumps of magnificent *Ilex*, and crossing another great spur by the Col de Sevi (nearly

3,800 feet), led us into the first chestnut district we had yet seen. We passed through the village of Cristaniccia, where the people are said never to taste bread, but to live almost entirely on chestnuts. The children looked sickly and starved, and the mothers pale, and the whole place had a poverty-stricken air of utter misery.

Evisa stands at the head of a magnificent gorge of red granite cliffs, which runs down to the little marina or gulf of Porto, whence it gets its supplies by sea. The descent of about 2,900 feet to the sea is very steep, and the gorge narrow, and we set out to explore it, but were driven back by a thunder-storm.

We found here a small new inn, with a bragging landlord, who tried to cheat us. Several morose-looking women were hovering about the place, wearing the peculiar Corsican costume, which is singularly unlike that worn on the stage, when Corsican brothers give the British public an insight into the manners and customs of that romantic island. The usual costume, which is of great antiquity, consists of a cloth, generally black, and called the 'mandile,' which covers the forehead, and is wound round the back hair, so that all the hair is concealed; besides this, they wear a long black garment called a 'faldetta,' the hinder end of which is brought over the head, and gives it a nun-like look to the wearer.

The resources of the inn in the way of edibles were limited to a few potatoes and a sheep's head, and as, on our arrival, they turned us all into the kitchen, we improved the occasion by preparing our own dinner with preserved soup and vegetables, throwing in the sheep's head for stock. Not till dinner was nearly ready did they let us go up-stairs to a decent salon.

Crosse and I soon learnt from one of our men, that this delay was caused by the fact that a 'vocero' was taking place in the house on our arrival. Now a vocero, being an exclusively Corsican custom, is worth mentioning: it is that when a man dies, the relations, and all the women in the place, gather together in a room; they then put him on the table, and one by one the women sing improvised dirges, called voceros, round the corpse. If he has distinguished himself at all in the vendetta line, he has deserved well of his family, and he now gets full credit and glory for his meritorious deeds. If he ever, or his father or grandfather before him, received any affront which has not been thoroughly squared off, now is the time to remember it. Old sores are never forgotten in Corsica, nor forgiven; and now is the time to rip them up, and excite with taunts any male representative of the dead man to revenge.

It appeared that we had interrupted a festive and peaceful gathering of this nature, and as it would never do for the house to lose the custom which our caravan suggested, the proceedings were suspended until our departure on the morrow. But what were they to do with the gentleman upstairs? Our company commanded the door, staircase, passage, and every outlet, and as it would certainly have scared some, if not all of us, to see a dead body carried out of the *salle-à-manger*, it was necessary to stow him away somewhere *pro tem*. It must have given them some trouble, but we understood that they contrived to bundle him up, and stuff him into a cupboard, in front of which Crosse and I took care to sit during dinner, though not without mortal dread, suggested by sundry ominous creaks behind us, that the fastenings might give way, and the corpse come rolling out into the middle of the party.

Next morning we had hard work to get off. The mules had to come up from Porto: nobody ever hurries in Corsica; to-morrow would have suited them quite as well as to-day, or rather better, for they would have been paid a day for doing nothing: the poor man in the cupboard had been smuggled out during the night, so there was nothing to make our departure desirable to them. Such a thing as a side-saddle does not exist in the whole island, for the women of every degree ride '*en cavalier*;' consequently pack-saddles had to be arranged, with cloaks and impromptu stirrups, for the ladies. We were amongst true Corsicans here, who, as proud of their blood as Spaniards, consider it *infra dig.* to work, and left us to do most of the packing ourselves. Surprised at the number of mules brought, we found that some of the men meant themselves to ride, and an extra mule or two had to carry chestnuts for the rest to eat.

At length, after a wrangle with the landlord, who charged us at the rate of Willis' Rooms for our dinner off the sheep's head, we managed to get away in detachments. I stayed to see the luggage on its way, and not having quite recovered from a slip on some rocks at Mentone, had to ride. My mule, finding itself last, set off at a gallop to overtake the rest, and my vasculum rattling on my back, frightened the animal so, that it became unmanageable, especially as it had only a halter on, which I dared not pull, as it would have guided it down a ravine to our mutual extermination. It needed no guiding, however, for the creature evinced a fiendish propensity to go over the side, when at a critical moment I fortunately contrived to hit the brute hard in the left eye, which drove it into a quarry on the opposite side, where we finally both got bogged. It was wonderful how soon my leg got well after that!

The weather was dull and threatening when we started, and as we entered the famous forest of Aitone it began to rain; this soon turned to snow, which we found many feet deep at the top of the pass, where of course all riding was impossible, and it was a matter of some difficulty to get the mules over at all. The trees at first were chiefly a young growth of maritime, and then of Corsican pine: but by degrees we got glimpses of larger trees of *laricio*, which, from having been injured or become decayed, were not thought worth cutting: they looked, however, very grand, looming through the heavy snow storm.

The pass is the Col de Vergio (5,026 ft.), on the main chain between Capo alla Rufa on the south, and Capo alla Cuculla on the north, and leads into the district of the Niolo, passing close by the source of the river Golo.

We rested for lunch at the wooden barrack of the people employed in collecting turpentine, and cutting the timber of the forest of Valdoniello, and not till long after dark did we reach Calacuccia, wet, weary, and hungry, only to find nothing to eat but a few eggs, and the accommodation filthy and insufficient. But for the good-nature of the gendarmes, who gave some of us beds at their barracks, we should have had a dismal time of it; even as it was, existence did not present many extenuating circumstances that day.

In fine weather the passage of this col from Evisa must afford some of the grandest scenery in the island, and the next morning being perfectly clear we were rewarded by a view of great interest and beauty, comprising, in the amphitheatre of mountains which surrounded us, many of the peaks visible from the Corniche. Temptingly close to Calacuccia rose the grand mass of Monte Cinto, rendered inaccessible by the fresh snow, and near it the most extraordinary collection of peaks imaginable, rising up to the number of five like the fingers of a gigantic hand. These are the 'Cinque Frati,' or 'Cinque Gabi.' The snow reached down almost to our level, which I suppose is about 2,500 feet above the sea, and, had we waited till to-day, we should have found the Col de Vergio impassable.

Not long after leaving Calacuccia we entered the gorge of the Golo, a very fine bit of savage rock scenery, the path in many places being simply a staircase hewn out of the steep face of the cliffs. On reaching its débouchure into the main valley below we crossed the river to its right bank, ascended to the village of Castirla, and had to rise to a considerable height in order to cross by the Col San Quilico (1,820 ft.), the watershed between the rivers Golo and Tavignano. Once over it, we soon reached Corte (1,340 ft.).

The town of Corte is picturesque in the highest degree, especially from the entrance to the valley of the Rostonica. And it is by far the best place in the island to make one's headquarters, being within easy reach of the highest mountains and the most beautiful scenery. The next day we explored it, and having made the acquaintance of the French Commandant, he took us over the famous citadel. Here a large number of Arab prisoners are quartered; most of them are the chiefs or the renowned warriors of their respective tribes, and are kept as political hostages by the French Government, to insure the good conduct of their relations in Algeria. Not being common criminals, and it being utterly impossible for them to escape, they are allowed a good deal of freedom, especially under the kind-hearted Commandant M. de Saussol, who, having served long in Algeria, understands how to manage them. Many of them were remarkably fine, handsome men, and their swarthy faces and white bournouses, as they stalked about the town, looking down with calm contempt upon the irascible Corsicans, whom they term 'Les Kabyles de la France,' added an unusual element of picturesqueness to the place.

We were here rejoined by our fellow travellers in the steamer, who had made the southern circuit of the island. They had met with very indifferent success in the sporting line although they had joined one or two battues, but were charmed with the scenery of the coast from Ajaccio to Bonifaccio, and had of course, like us, heard plenty of vendetta stories. One of them is perhaps worth telling. A girl had been involved in a love affair with a man who at last married her. After living some time together he deserted her and her baby, but was induced by the threats of her family to return, and the same night he murdered the mother and child in a very barbarous manner, and took to the macquis. The brother, as her next friend, assisted by the gendarmes, made a long search for him. Had they discovered the murderer, the avenger would, by an excellent custom, which satisfies the national sense of honour, and at the same time furthers the ends of justice, have been allowed to have the first shot at his enemy. He was some months absent, and returned unsuccessful, and worn out with the hardships he had undergone. This was, however, the reverse of a satisfactory conclusion for the family of the murdered girl, who could by no means speak with their enemy in the gate as long as the stain remained unavenged. In vain the brother urged that he had done his utmost, during his long absence, to find the man, and should he ever turn up he would of course settle accounts with him. 'That is true,' said the amiable relatives, 'but if

you cannot find the man himself, you are bound to take his nearest relations instead,—there are his two brothers.’ ‘His brothers, indeed,’ pleaded the man, ‘Why! they are my friends and companions.’ ‘What does that matter,’ was the retort, ‘when it is a case of vendetta?’ In this way the entire family led the wretched man the life of a dog. It is true that this exciting to murder by nagging and taunts, which is called giving a man the ‘rimbecco,’ is in reality a punishable offence; but who could prosecute his whole family for henpecking and biting their thumbs at him? At length, one day the man took his double-barrelled gun, found the two brothers of his sister’s murderer digging potatoes close by, and killing them both with a right and left, walked straight to the gendarmerie and gave himself up. He was sentenced to a short imprisonment, which was now at an end, had returned to the bosom of his adoring family, and was pointed out to our friends, taking an active part in the battue.

(To be continued.)

ALPINE LAKES, AND THE GLACIER EROSION THEORY.—Sir Roderick Murchison has written to the Editor of the *Alpine Journal*, expressing some dissatisfaction that the writer of the Review of Favre’s *Recherches Géologiques*, which appeared in the *Journal* for August last, had not included his name among the opponents of the theory ‘that glaciers had ever ‘scooped out the cavities now occupied by lakes;’ and has forwarded to us a copy of a review of the same work, written by himself, and published in the *Geological Magazine* for April 1868. Our reviewer regrets that he had not the advantage of perusing this paper before the publication of his own, which, though it did not appear till August, was written some months before, or he would otherwise have been glad to fortify, by an additional authority, of such weight as Sir Roderick’s, the view for which he was able to adduce that of Lyell, Studer, Ball, Omboni, and Favre.

REVIEW.

BALL’S ALPINE GUIDE.*

Reviewing a guide-book is notoriously one of the most difficult tasks which can be imposed on any critic. The compiler is *ex hypothesi* specially well acquainted with the country he professes to describe, so that his reviewer need be almost competent to write the guide-book himself before he can detect many errors or omissions, defects of fact

* *The Alpine Guide*. By John Ball, M.R.S.A., F.L.S., &c., late President of the Alpine Club. Part I. The Western Alps. 2nd edition. 1866. Part II. The Central Alps. 2nd edition. 1866. Part III. The Eastern Alps. 1868. London: Longmans & Co.

as distinguished from method. All he can do, without such special knowledge, is to scrutinise the principle on which the writer has constructed his work, and, if that be fairly satisfactory, to take the facts for granted. Some praise is due to the worst specimen of the class, provided it be honestly compiled and not filched from previous works—praise for industry and perseverance, for courage in undertaking and carrying through a most difficult and complicated task.

Were this all that could be expected of us in reviewing Mr. Ball's 'Alpine Guide,' our task would be simple, and might easily be performed with a pair of scissors, wherewith to extract some sentences from the preface and introduction, and from the various journals which have gone through the process before us. But in the present case this resource is denied us. The Alpine Club stands in a double relation to this book, which renders the task of reviewing it analogous to riding on two horses at once. Our very *raison d'être* as a society is the possession of that special knowledge which may enable us to pronounce with something like authority as to its merits; and we may reasonably be required to express our opinion openly and fully for the benefit of those who do not possess that knowledge. On the other hand we have an obvious and avowed interest in the book, which might lead readers to suspect us of puffing. When a man praises his own son, listeners require no great training in scepticism to deduct a large percentage for paternal partiality. And though Mr. Ball, as the first president, ought perhaps rather to be regarded as the father than as the son of the Alpine Club, yet the moral is much the same. Moreover, although Mr. Ball is responsible for the entire plan of the work, and has contributed a large amount of personal knowledge, besides the vast labour of consulting the many books in which information might be supposed to be hid, and the still heavier task of extracting truth and consistency from the enormous mass of materials, good and bad, scanty and voluminous, printed and manuscript, available for his purpose, yet much of the information rests avowedly on the authority of individual mountaineers, nearly all of them members of the Alpine Club. The present writer, like most of his brethren, must plead guilty to the charge of having sent Mr. Ball many and heterogeneous notes; and neither he nor they (for in the pages of the *Alpine Journal* one must be supposed to speak the mind of the Club, however unworthy to do so) have any desire to praise the accuracy of their own knowledge. But the other horse must be ridden fairly in its turn. Let us ignore for a moment having contributed any information, or being responsible for any statements, and speak in our other character of the traveller who has tested the value of this guide-book in various parts of the Alps, high and low, familiar and almost untrodden. We do but add our voice to the uniform *consensus* of all reviewers when we express the opinion that the 'Alpine Guide' is, as a whole, not merely an eminently creditable work, but one which stands alone among guide books, as regards the difficulty and complication of the task undertaken, and the success with which it has been accomplished. That Mr. Ball has in every instance thoroughly conquered every difficulty, we should hardly venture to affirm, but the problems with which he had to deal were

some of them insoluble. The present writer has before now tried to work out a different plan for describing this or that particular corner of the Alps with which he happened to have made intimate acquaintance, but never could convince even himself that he could improve on Ball, taking into account all points which a guide-book must deal with. But such attempts have only tended to strengthen his sense of gratitude to Mr. Ball for having persevered in the face not merely of difficulties inherent in the task, but also of the many and serious personal obstacles to which he refers in the short preface to the 'Eastern Alps,' the last published portion of the work.

Some credit for the 'Alpine Guide' may fairly be ascribed to the English nation as a whole, since it has furnished nearly all the explorers of the regions most difficult of access in a land not their own, and has thereby both created the demand for such a guide-book, and enabled the demand to be satisfied. This remark, we ought to observe in passing, applies rather to Switzerland and the Western Alps than to the Eastern Alps, where the labours of our German brethren, among whom Colonel von Sonklar deserves especial mention, have left comparatively little untouched. But this in no way detracts from the merits of Mr. Ball, who has really written a new and original work. The author of a cursory and popular history may content himself with comparing the writings of previous labourers in the same field: a real historian goes to the original documents, and constructs his work on them only. On the same principle Mr. Ball has gone through all the original authorities for the facts he wants to set forth, and extracted their essence with a patience and discrimination which very few of his readers are in a position to appreciate. Probably the best way of establishing our case in the eyes of people who require us to prove that Mr. Ball merits all our praise, will be to state the special features of the 'Alpine Guide' as a whole, and to attempt to explain the nature of the great pervading difficulties of the undertaking.

In planning the structure of his book, Mr. Ball began, as a traveller from a distant country naturally should, but as guide-book writers have not been in the habit of doing, by setting aside all considerations of political boundaries, and looking primarily to physical features. The Alps are, permanently and essentially, the great watershed of Europe, in which rivers find their source that flow to all quarters—to the German Ocean, to the Euxine, to the Mediterranean. It is only accidentally that they form also the frontier line separating different States; and, indeed, the two do not always coincide exactly, even where, roughly speaking, different countries lie on opposite sides of the mountain range. One cannot wonder that natives of the countries through which the Alps pass should have fixed their thoughts on the regions which concerned them most, and not explored, or not described, beyond the frontier. As regards map-making especially, it is obvious that no Government would dream of surveying any but its own territories. It is well if private enterprise of this kind does not occasionally meet with attention the reverse of flattering, as in the memorable case of Messrs. Brown, Jones, and Robinson. But to the traveller the southern valleys of the Pennine Alps, for instance, are as

interesting as the northern; he is, at any rate, just as anxious to obtain accurate information about them, more than likely to wish to include both in the same tour. For this Mr. Ball's 'Guide' gives every facility; indeed, we are not quite sure that he does not occasionally go a little too far in the opposite direction, and omit to call attention to the political frontier—a thing not to be ignored so long as *douanes* exist, except, by the way, on high glacier passes, for the Italian Government has not yet thought it worth while to put custom-house establishments on the Col du Géant and the Weissthor. Moreover, the 'Alpine Guide' describes the whole Alpine region; far more than is commonly included under that name by a public which supposes the Alps to be co-extensive with Switzerland, which has very hazy ideas about the nationality of Mont Blanc, and would deem it a contradiction in terms to talk of the Tyrolese Alps. From the western extremity, where the Maritime Alps begin to rise from the borders of the Mediterranean behind Nice, Mr. Ball traces the whole vast range, with its countless ramifications, until it sinks into the Hungarian plain almost in the longitude of Vienna. His three parts are by no means equal in bulk, but the dividing lines, the Rhone valley and Simplon Pass, and the valley of the Adige and Reschen Pass, were the only ones that could be chosen with any eye to geographical correctness. The divisions are not of perfect convenience to the traveller, who rarely confines his attention to the Pennine Alps without going north of the Rhone valley, and who does not like to find the Orteler group in a different volume from the rest of Tyrol. But whatever boundaries had been chosen, the same objection would certainly have held good; and if the inconvenience were greater it ought to be pardoned on the geographical ground, just as having two or three volumes at all is the inevitable result of our obtaining so vast a mass of information. After all, those who do not carry their own luggage find it no hardship to have two books with them instead of one; and the pedestrian who carries everything for himself is sure to resort to the obvious expedient of taking out the sheets he wants, and leaving the rest behind.

The special purpose of the 'Alpine Guide,' without which it would have been scarcely necessary to produce a rival to the familiar Murray, was to give information for mountaineers, to describe not merely the beaten tracks, but also the glacier passes and the great peaks—so far, at least, as to show clearly what had been done and could be done again, and to give an approximate idea of the time requisite. And inasmuch as the mountaineer requires information about high roads and inns, the portion of the guide-book devoted to the high Alps was so much of pure addition to the bulk of a Murray. (We use the name of Murray as representative, by no means as implying that Murray is innocent of high Alps, or that he actually does exactly what we ascribe to him, but merely, that this is what a non-mountaineer's book would naturally do.) There are three classes of travellers—those who drive and ride, those who walk, and those who climb; and, on the whole, it may be said that with one exception Murray gives all the two former can need, and Ball supplies in addition what the third class wants; for the few glacier expeditions described by Murray may be set off against the

various routes which, though involving no climbing, lie so far off beaten tracks as to be within Ball's scope only. That one exception is, however, a matter of considerable importance. Mountaineers know pretty well where and how, and to what extent, travellers who scarcely can be ranked among climbers may be introduced to the wonders of the glacier world; and this information Ball, writing from the mountaineer's point of view, adequately supplies, whereas a Murray is apt to insert merely such expeditions as that to the Jardin, which have become the established things to do. But the necessary increase of bulk is not the only difficulty which besets the compiler of a guide to the high Alps. The complication of the task is increased in a ratio infinitely greater. Take an outline map of any country, and mark on it the railways only; it is no easy matter to devise the best mode in which to dissect it, for purposes of description. But if you add every known road, and set yourself the task of giving an account of every one, the complication becomes bewildering. A concrete instance, however, will best illustrate the case—an ounce of fact is worth a pound of general reasoning in other spheres than law. Place yourself at Zermatt, and compare the tasks which are there imposed on Murray and Ball respectively. Murray has to describe the route to the Gornergrat, the Hörnli, the Mittelhorn, and the various smaller and less definite walks, as, for instance, in the Findelen direction. He further thinks it worth while to give a clear idea of what an ascent of the Cima de Jazi involves; and inasmuch as all the great peaks are seen from the Gornergrat, he gives a few scraps of information about them. It now becomes necessary to quit Zermatt. The only way for the non-climber, except down the valley to Visp, is over the St. Théodule; and these two routes his guide-book faithfully describes, adding perhaps a cursory notice of the easiest and best established glacier passes in other directions—the Weisather to Macugnaga, the Col d'Hérens to Evolena, and possibly also the Trift and the Alphubel. What has the mountaineer's guide to do, under the same circumstances? He must not omit Hörnli and Mittelhorn, but he must also give detailed accounts of the ways up the Dom, Alphubel, Rymfischhorn, Monte Rosa and its minor peaks, the Lyskamm (two, to say nothing of the Gressonay arête), the Breithorn, Matterhorn (two), Dent Blanche, Gabelhorn, Weisshorn, besides lesser mountains like the Théodulehorn, the Twins, or the Stralhorn, and peaks like the Rothhorn and Dent d'Hérens, accessible from other sides, but belonging to the Zermatt panorama. So far all is simple though laborious; but when it comes to getting away, matters are infinitely worse. Instead of the straight road down the valley and the one pass of the Théodule, there are about thirty passes leading into ten different valleys. There are five glacier passes into the Saas Valley, besides the Ried, which starts from St. Nicholas; there are three to Breuil, without counting the possibility of going over the summit of the Matterhorn. There is one leading straight to the Val de Lys, and one straight to the Val d'Ayas, besides two which may be made to serve for either, and a way to the latter from the top of the Théodule. There are four passes to Zinal, not including the Brunegg Joch, which belongs more

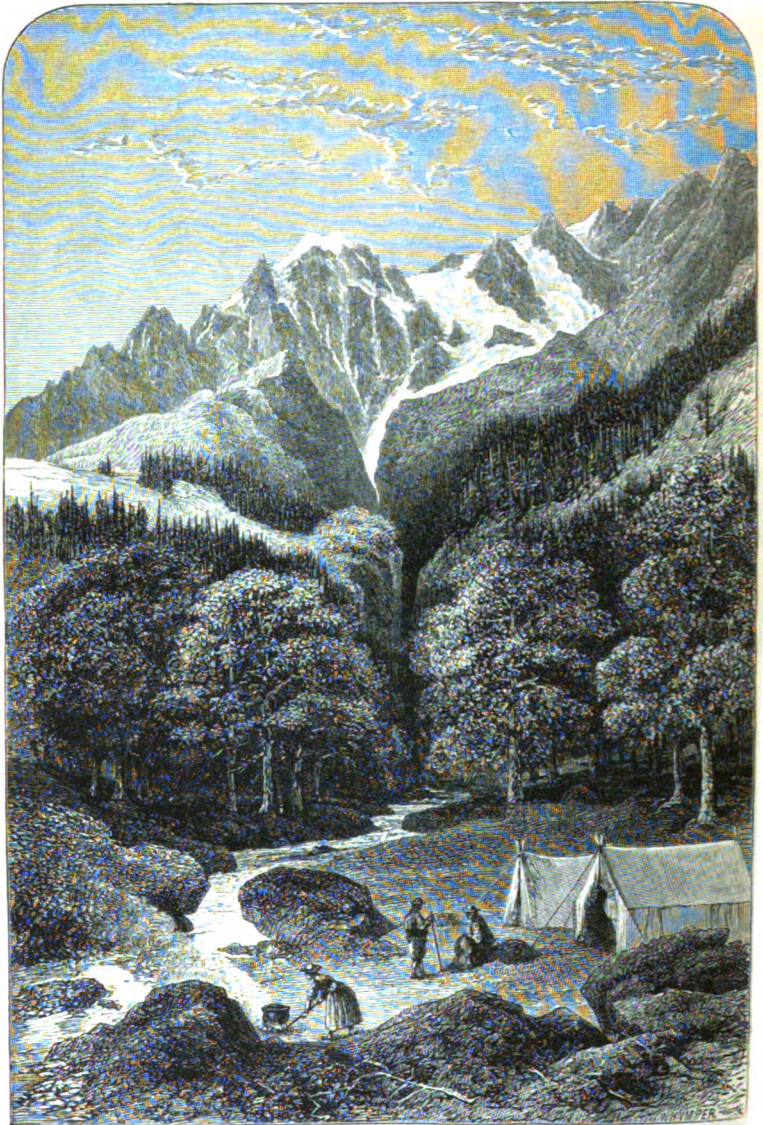
properly to St. Nicholas. There are passes from the head of the Zmutt Glacier into both the Valpellina and the Val d'Hérens, and just beyond each of them one can strike across to a second col, and so reach Arolla. Add to these the various ways to Macugnaga, and the passes to Alagna and Turtmann, and the total is sufficiently bewildering. Repeat the whole process at Saas, at Macugnaga, at Breuil, at Chermontane, at Zinal, and the complications increase in geometrical proportion. The result is like a mass of snow when in the best condition for mountaineering—the attachments of the particles are in all directions, and infinitely numerous.

Another most serious difficulty resulting from the 'Alpine Guide' being calculated to serve the needs of all classes of travellers is the question of how things are to be described. As a mere matter of language, it is hard enough to give a faithful idea of the nature of any given route, even if the description be intended only for the one set of readers for whom Mr. Ball primarily writes—the mountaineers. So much depends on the season, the state of snow, and other circumstances, that what is accurate at one time is very wide of the mark at another. Difficulties found serious on a first ascent are avoided on a second, when the party knows of them beforehand, and seeks a slight variation of route in consequence. But when it comes to writing for those who are not already possessed of mountaineering experience—and even the best climbers must begin, and most want a guide-book when beginning—then different language would seem to be necessary. The writer of a guide-book is bound to give clear warning to novices of the difficulties they will have to encounter, and there appears to be no available mode of doing so except by applying strong adjectives, with as much discrimination as possible, but still of a strength considerably above the trained climber's standard. Mountaineers say, and with truth, that Mr. Ball makes things out to be far more difficult and dangerous than they find them; but here Mr. Ball's contributors must step in, and take their share of the responsibility, inasmuch as he has had to depend on their descriptions of the nature of the obstacles to be encountered, and very often there have been no repeated ascents, so as to enable him to compare the estimates formed by different mountaineers. Moreover, if error is to be committed at all, it is obviously better to err on the side of over estimating dangers and difficulties; and, inasmuch as Mr. Ball's standard is on the whole very steady, climbers can easily after a little experience, calculate the deduction to be made for themselves personally. We believe that if it were possible to devise a kindynameter (for the sake of our many thousands of lady readers we ought perhaps to hint at the existence of a Greek word signifying danger), Mr. Ball would be admirably qualified for estimating the *relative* dangers or difficulties of various expeditions; the *absolute* standard it would be hard to fix, but this would not be important, as the novice ought not to incur more than a very slight amount of risk, to be increased slowly and carefully. Such an instrument is unfortunately as impossible to invent as it would be to measure the distance from midday to the cross on St. Paul's; or else how much trouble and how much space would be saved if a peak could be sum-

marised in this sort of way :—Schrambelhorn, 56,789', WE. face slopes of broken névé, 15° kind., and rock arête, 18° kind.; NS. face rock wall, 88° kind. Similarly mountaineers will at first be disposed to think that Mr. Ball might curtail his work materially, if he would print round the margins of his pages, after the fashion of advertisers in railway time-tables, a few elementary maxims, such as: There is no royal road to mountaineering—Better pay a guide than come to grief—Local knowledge saves much time—and omit references to such matters in his text. Most of these involve differences of degree rather than of kind: it is obviously the writer's duty to say where paths exist, or where they do not, but a climber scarcely needs more. Every man may choose for himself whether he will have the way shown him, or risk trouble and loss of time in finding it himself. But this is only true as regards mountaineers already experienced, a class not very extensive in numbers, to say the least, and not so much needing to have their wants and interests consulted in a guide-book, inasmuch as they are fairly competent to take care of themselves. The best men, while they are learning their trade, are glad of every available scrap of information; and it is for those who want, not for those who already possess knowledge, both local and general, that a guide-book is written.

We have hitherto made no reference to the introduction, which is a separate little book in itself, giving ample and well-arranged information on all the subjects connected with Alpine travelling—not merely practical hints and instructions as to modes of travelling, guides and inns, railway and postal communications, and the like, but also some account of the scientific interests involved, of the flora and fauna, of the phenomena of the snow region, and notably of the geology of the Alps, and very full lists of Alpine books and maps. So complete is this introduction, that we are unable to discover a single topic omitted; all that can be learned theoretically, without the aid of practice and observation, of the mountaineer's trade, may be well learned from Mr. Ball. The one difficulty of composing the introduction, to a person who, like Mr. Ball, has a wide acquaintance with all the subjects comprised, was merely how to convey the largest amount of information in the smallest number of words, and this Mr. Ball has done admirably. In fact, from beginning to end of the 'Alpine Guide,' his merits are his own; his shortcomings, small and slight as they are, are those inevitable from the nature of his task. We have found it hard to express adequately, without the use of language that would sound hyperbolic to the reader who has not been for years acquainted with the Alps, the overwhelming difficulties of compiling such a guide-book; it is easier, and more pleasant, to state our conviction that no one alive but Mr. Ball would have been capable of achieving it.

. *A detailed Review of the third part of Mr. Ball's Guide to the Eastern Alps will appear in the August number of the 'Alpine Journal.'*



OUR CAMP AT TRAGONE.

FROM A SKETCH BY BARON SNOY

THE
ALPINE JOURNAL.

AUGUST 1869.

CORSICA. By the Rev. W. H. HAWKER, M.A., F.Z.S. Read before the Alpine Club on May 5, 1868. (*Continued from* p. 282.)

WHILE we made an expedition to the snow, which was, however, too soft to admit of our doing much, our friends, excited by our description of the scenery, rode to the gorge of the Golo. They overtook on the road the Mayor of a neighbouring village, who gave them some interesting information; for instance, on their passing through the village of Castirla, they remarked on the quantity of linen hung out to dry, and inferred great cleanliness on the part of the inhabitants. 'But certainly,' answered the Mayor with much self-satisfaction, 'we always in Corsica make a point of washing our linen once a year!'

The next day, Saturday, we all drove together to Bastiai, sketching and botanizing *en route* to our hearts' content. Here some of the party, who were bound for Rome, waited for the boat to Leghorn, while the rest of us returned, in one of the most violent gales ever known in Europe, to Nice.

I paid a second visit to Corsica at the end of April, the party on this occasion consisting of nine persons, including five ladies. We left Nice about 8 P.M., and as the sea, for the only time during the four occasions that I have made the *trajet* behaved well, we went early on deck, and the view of the island from 5 A.M. until we reached Ajaccio, was one of exquisite beauty, and we were all struck with the softness as well as the clearness of the colouring, combined with the peculiar green of the landscape, and vivid reflection in the water. We landed a little after 9 A.M., and as the wind was favourable, one may take about 13 hours as the average fair-weather time for the passage, although they profess to do it in 10 hours.

We devoted a few days to exploring the neighbourhood of Ajaccio, and then wishing to travel slowly and enjoy the scenery, chartered, *faute de mieux*, a vast charrette, which took most of ourselves and all our luggage and started for the mountains, halting the first night at Bocognano. The drive is one of much interest, at first through the plain of the Campo del Oro, the views ever increasing in merit as one approaches the mountains. I did not see a great deal of it, however, as it fell to my lot to make the journey in the closely packed *intérieur* of the diligence and a stifling four hours I had of it, only saved from being utterly choked with the dust by consuming oranges the whole time. Of these we had fortunately laid in a great store of the best I ever tasted, at a place called Santo Biaggio, near Ajaccio.

The conversation of my fellow-passengers turned nearly the whole time upon the recent exploits of some bandits, from which it appeared that the 'last' of these worthies whose history has been pathetically recorded in a recently published account of a visit to Corsica, must have had his teeth sown: at any rate, a very respectable crop of these gentry was just then in existence. I gathered from my fellow-passengers, and was afterwards able to verify, the following particulars.

Two brothers, whose family name was Bonelli, but who were universally known by the nicknames of Bellacoscia and Bellagamba, had been outlaws for some years, and had gathered around them a considerable following, and took up their quarters on and about Monte d'Oro. It was generally believed that Bellagamba was dead, but the other was in such strength that, at the moment of our arrival, a considerable armed force was occupied in besieging the mountain in which he was supposed to lurk. Bocognano itself was crammed with gendarmes, and a detachment of them had been encamped for several weeks on a high crest called 'Pentica,' adjoining Monte d'Oro; while another was endeavouring to get at the bandit from the opposite side. The singular thing was, that these bandits held one or two passes which the gendarmes, even with the help of troops, could not force. Beyond these passes they had their flocks, and even cultivated the ground. It appears that Bellacoscia owed his safety mainly to an enormous dog which, it was said, had saved him twenty times at least from ambuscade or attack by giving him timely warning. When on the move, the dog ever went in front, and acted as a scout. He catered for himself, killing his own mutton or goat, and always choosing the best of the flock, and would eat from no man's hand but his master's. He was sent by a trusty hand to the Exhibition at Ajaccio, and

won a prize, causing much excitement by killing every dog he could get at. The gendarmes, however, began to ask questions about him, so the man let him loose, and the intelligent animal ran straight back to his master on Monte d'Oro. He was about 6 years old, and a reward of 600 francs was offered by the Government for him, as it was considered that if he could be killed, the bandit would fall immediately.

A terrible instance of vendetta, connected with this bandit, had just occurred at Corte. It appears that a man named Suzzoni of Orezza, had a brother who was in some sort of partnership with Bellacoscia. They had a difference about something, and Bellacoscia killed him. The brother dared not track out the murderer in his fastness, amongst the wilds of d'Oro, and had to wait his time. Meanwhile, Bellacoscia seems to have sent him messages, taunting him with not avenging his brother's death, and saying that he was not fit to be a bandit. At length, one afternoon, four days before our arrival, Suzzoni found three men who were remotely connected with Bellacoscia, drinking in a wine-shop at Corte, and charged them with their relationship, which they seem to have repudiated, saying, that Bellacoscia and his quarrels were nothing to them. Suzzoni, however, produced some weapons, and the others being unarmed, shot two of them, and stabbed the third, killing all three. Then, appealing to the rest of the company in the wine-shop, that he was now worthy of being a bandit, he coolly reloaded his weapons, and marched out in the broad daylight; nobody moving a step to arrest him, or sending any word to the gendarmes, until he might be supposed to have got well clear of the place. Our hero, a short distance outside the town, met a wealthy inhabitant of Corte, riding home on a valuable horse. The bandit, for I think we may now accord him the coveted title, stopped him, and requested the loan of the horse. The rider demurred, whereupon, up went the gun; and from his own account, the proprietor seems to have descended from the steed with more speed than dignity, and the bandit taking his place, rode slowly away. The Commandant of Corte told us he had sent a large force of troops to assist the gendarmes in trying to find the ruffian, but, up to the time of our leaving the island, nothing more was heard of Suzzoni, or the horse, or, alas for the proprietor! the new saddle and bridle, with which it was caparisoned.

Now all this, although romantic in the extreme, was disagreeable to a still greater extreme; for here were we, arrived at Bocognano, from which Monte d'Oro might, under favourable conditions of the snow, undoubtedly be ascended, and we

find our mountain under martial law and in a state of siege. There could be no doubt about it, for there were the white tents on Pentica, a couple of thousand feet above us, and here was Bocognano, the head-quarters of the beleaguering force, crammed, in every hole and corner, with gendarmes.

I had been advised at Ajaccio, that if we really meant to ascend Monte d'Oro, we had better not be seen talking much to the gendarmes at Bocognano, as everything got reported on the mountain. The warning now assumed considerable significance, for it was of course possible that, if we went up, our intentions might be misinterpreted by the *Roi des Montagnes*. We therefore decided against attempting the ascent from this point.

Bocognano is a village, consisting of not much more than a single street, with a church, and picturesque detached campanile, on an eminence. It is embosomed in magnificent Spanish chestnut trees. Two that we measured were between 30 and 40 feet in circumference. Crosse and I went down to the river with our rods, but caught scarcely anything. An exceedingly brigand-looking old man joined us, and gave us two or three small trout which he had taken, and I showed him my fly book, and gave him a few hooks which won his heart. He had a girl with him, whom he sent off up the rocks across the river, and who presently returned with some honeycomb of strangely perfumed flavour, almost as highly scented as that from Cephalonia. I asked him to come back with us to the town, where I could have found an interpreter of his patois, but he altogether declined to approach it, which made us suspect that he might be 'wanted.' The girl was fair and very handsome, and we had afterwards reason to believe that she was the niece of the renowned Bellacoscia, and we may very possibly have been talking to the bandit himself.

The accommodation at Bocagnano is of the dirtiest, and the annual wash must have been near at hand, but to any traveller who arrived subsequently to that auspicious anniversary there might be some inducement to stay a day or two, in order to make the ascent of Monte Renoso. There is also a pass leading southward in about 3 hours, to Bastelica, where are made the rough goat's hair capotes worn by the shepherds and bandits, and called the Pelone. You leave Bocognano by the Vivario road, turn to the right, and reach, in about an hour, a mountain pasture or Alp, named Morte Cinto, thence to Bastelica, by a rough path, in a couple of hours. The return can be made by a better road, which crosses the bridge lower down by Scarella, and occupies about the same time as the other.

In the opposite direction, viz., to the N., an expedition may be made over ground of greater merit, as regards wildness, and the picturesque, to Guagno. This, however, would be a long day's work of nearly 40 kilomètres, and involving that most detestable element, of having to cross two ridges, and make two passes, unless one broke the journey, by endeavouring to rest or sleep at Crotene at the foot of the first pass over Monte Rosso. Perhaps, however, the best plan would be to return to Bocognano the same day from Crotene.

Monte d'Oro may be ascended from Bocognano in a 4 or 5 hours' scramble with a good guide, but, I strongly advise the ascent being made by the N. or forest side.

The point which looks like the second summit of d'Oro is called la Piscia, and that to the left of it, beyond a cascade, is Miliarello.

We were unfortunate in having a cloudy day for crossing the col and forest of Vizzavona, and merely got occasional glimpses as the wreathing mists gave momentary openings, of the crags of d'Oro sprinkled with fresh snow. But on our return it was fine, and we were able to appreciate its great beauty.

It is a drive full of varied scenery, but that part of the forest is of young growth, all the large trees having been cut down. This is an imperial forest, and is far better managed with a view to the future growth of timber than the communal forests, in which the young trees did not seem to me to be properly looked after. There were great disputes between the communes and the Government, as to their respective forest rights, which the present Emperor has settled in a spirit so liberal to the communes, that he has become very popular in consequence in these districts. The roadside was gay, on the ascent, with lovely dwarf light-blue *Veronica repens*, *Stachys Corsica*, and *Hyacinthus fastigiatus*, all peculiar to the island; and, lower down, *Borago laxiflora* and *Orobis variegatus*. On the top of the col were large beds of *Berberis Aetnensis* and dwarf juniper. Near the road is a fortified barrack of the gendarmerie.

Our quarters at Vivario were better than at Bocognano, but still very indifferent, and everywhere we found the accommodation very limited, but rooms for gentlemen can always be got near at hand. We got provisions and everything ready over night, for a start next day with M. Folacci, who had kindly offered to show us the heart of the forest on Monte d'Oro of which he has the lease; some of us intending to ascend the mountain, and all of us to camp as best we could at a wooden *maisonnette* which he had built there, and which he placed at

our disposal. The morning, however, was wet and misty, and the weather altogether so unsettled that after having waited some time, in hopes that the glass might rise, which it didn't, we were obliged to give up the tempting plan of a bivouac in the forest, under the good auspices of the proprietor; and as we could not retain our rooms which were all bespoke for some troops who had already arrived, there was nothing to do but to pay the rather exorbitant bill, and start for Corte, which we did at 1.15 P.M. with a return charette in addition to the one we brought with us.

Before long we arrived at the picturesque gorge of Vecchio, with the Ponte Vecchio spanning the river at a great height. Here we halted for lunch. The rocks were rich with rare plants, amongst them tufts of *Saxifraga cervaria*, large patches of narcissus, and an abundance of cyclamens and orchises. For the sketchers there were the ruins of a house which had met the fate of nearly every solitary house in the island: the bandits had set it on fire, and murdered every man, woman, and child belonging to it.

About half way between Vivario and Corte we stopped for a few minutes at a village named Seraggio, or as it is also called, probably from some Moorish antecedents, Seraglio. Prettily situated among splendid chestnut woods, and within easy reach of some very wild forest scenery, with an abundance of gorges and small cascades, and affording some good trout fishing, this place would not be a bad one to stay a few days at, especially as there was a new clean hotel just opened, the people of which were civil, and looked decent and tidy.

At 5.30 we reached Corte and drove straight to our old quarters, the Hôtel d'Europe, kept by Cervioni. Hitherto our board and lodging had tested the ladies' powers of roughing it, not to mention our own, to the utmost stretch; but now, we assured them, all hardship was at an end, the hotel possessed a large and comfortable private salon, with four bed-rooms opening into it, and separated from the rest of the hotel. Here we would recruit ourselves, and feasting on trout, green peas, asparagus, and roast lamb, await resignedly until the perfidious elements thought better of it and turned over a new leaf. Imagine, then, our utter dismay on finding the whole town in a turmoil. Everything seemed to be going on at once, annual inspections of gendarmerie, and of everything liable to inspection at all; and our rooms were actually in the possession of a rough lot of contractors for supplying a portion of the army in France and Algeria with bedding. Reasoning and entreaty were alike in vain, and produced the universal answer in

Corsica in every dilemma, 'Mais—que voulez vous,' uttered close to one's chin with a shriek. What I 'vouleed' at the moment is of no particular importance, and I was returning to break the cheering intelligence of 'no room' to the company, when up came, with a warm greeting, our old friend the Commandant. With French precision he soon mastered our difficulty, begged us to wait one moment, clanked up the stone steps, in a few moments clattered down them again, with the landlord and the whole establishment at his heels, bringing chairs for the ladies to descend by; we were escorted with ceremony into the salon, out of which the 'commis voyageurs' had been suddenly routed; and after all we did dine, not to mention other luxuries, on trout, green peas, asparagus, and lamb!

Some more partially wet days confined us to the town and its environs. In one charming walk the Commandant took us to the ruins of an old Moorish palace, near the banks of the Tavignano below Corte, containing probably almost the only remains of ancient architectural decoration to be now found in the island, which is singularly destitute of interest in this respect.

The palace bears traces of having been a fine building in its day, and may have been the country-house of the Moorish king Nugalon, whom Hugo Colonna, after taking Aleria, totally defeated at Mariana, and forced all the heathen people in the island to be baptized. Among its damp ruins I collected a fine series of a handsome snail called *Helix raspailii*, which is peculiar to Corsica.

At length an exquisite morning announced a change for the better in the weather, and all was bustle for an expedition to the mountains. At 9 we started up the valley of the Tavignano for the forest of Melo, which lies high up on the ridge dividing this valley from that of the Golo. The forest has been sadly stripped, but a few magnificent pines still remained, and it improved as we went on. At 12.40 we halted for lunch at a clear spring of delicious water called 'La fontaine d'argent,' surrounded by some grand trees of *maritima* and *laricio*, through the great boughs of which we had a peep of a curious great mass of granite, rearing its head out of the forest on the opposite side of a small side valley we were now in. The heat was very oppressive after so much rain, and we were subsiding into a sleepy state of subservience to the guides, who assured us that it would take nearly three hours to get to the pass called the Bocca di Fontana Rinella, on the other side of the point we were looking at, and which is called the Punta del Pruno, when they resorted to a detestable habit, in which they

indulged on every possible occasion, of producing their pistols and practising with them. As the penalty for being found in the possession of any firearm whatever is three months' imprisonment, the pastime is not a safe one to follow except when far away from the inhabited region. The horrid din they now made soon aroused us to a consciousness of the fact that we had as yet done nothing; so three of us started up at 2.15, and taking an unwilling guide, gave him a bit of a breather: we made the Punta del Pruno at 2.45, in clambering round the skirts of which I found *Draba olympica*, *Daphne glandulosa*, *Viola parvula*, and other rarities. We arrived at the col at 3.15, and in 40 minutes more reached a point beyond called Pignerolo, from which we were rewarded by a magnificent view, including Rotondo, Artica, and especially the strange form of P'aglia Orba, visible from base to top. Cinto was partially clouded. Calacuccia lay at our feet in the valley, and the path over the col leads to it by the village of Casamaccioli.

We left the top at 4.35, reached our silver spring at 5.28, in about an hour overtook the rest, and got back to Corte between 7 and 8.

The next day, May 4, being still fine, we determined to make a serious attack on Monte Rotondo. As we intended to camp out in the forest, the preparations for so large an expedition took a good while to organise, and it was 10.30 before our cavalcade filed out through the town. On quitting it the path follows the left bank of the river Rostonica, passing by some grey marble quarries: some fine chestnut trees grow in the lower part of the valley, and on the rocks opposite the whole mountain side was speckled white with the handsome and fragrant blossoms of *Panocratium Illyricum*; near the path, too, we gathered the rare fern *Notholana marantæ*.

All these valleys are beautiful, and it is quite impossible to imagine a more perfect succession of mountain scenery than is presented by this one. Rotondo, with a deep skirt of snow, was facing us the whole way, and the mountains on each side consisted of magnificent reddish granite cliffs and peaks of endless variety of form, with long grey patches of lichen streaking their weather-beaten sides; and amongst all, and topping all except the snow, some of the finest old primæval trees of Europe, mingling with the general forest, or perched singly here and there on inaccessible crags, and cutting sharply against the sky line: * to add an element never met with in the Alps,

* The tallest *P. maritima* that we measured was 116 feet high; and the largest *P. laricio* was close to the path on our way up, it was 136 feet

where the torrents resemble in colour the contents of a mason's bucket, the rushing stream at the bottom is of a deep clear blue, and swarming with trout.

After lunching at the entrance of a lovely glen, where I gathered *Mercurialis elliptica*, we reached in due time the place where one has to quit the main valley for the ascent of the mountain. Here we found an open glade near the river side, covered with grass and dotted with rocks and trees—just the place, in short, for a camp; moreover in a kind of natural cave, formed by the overhanging of a great fallen rock and called the Grotto del Tragone or Dragone, we found a fine picturesque old shepherd, whiling away the time till the goats returned for the night, by reading Ariosto. As he was very civil, and said we were welcome to anything he had to offer, we soon decided to camp there. And now everyone had to work hard. The tent-poles had got broken by the rough carelessness of the guides, and we had to cut *laricio* saplings to take their place. A capital site was found partly sheltered by rocks and within a stone's throw of the cave and the river; the old man built us a fire-place, kindled a fire and lent us a great marmite, while we gathered a supply of fern and heather and tops of pine branches, to supply the place of mattresses.

The ladies were indefatigable in making preparations for dinner, and concentrated their talent and energies upon the marmite, into which beef, potatoes, and all sorts of good things seemed to go, and out of which we were promised a good stew in due course; there was a filet, too, cooked in some fashion, and I made some Julienne soup with the well-known portable materials. All this, however, took time, and the shades of evening had changed into bright starlight before we were summoned to table with cold noses and the sharpest of appetites.

Perhaps I ought to pass over the adventures which followed, but candour compels me to state that our amateur parlour-maid, actuated by the purest motives, upset the soup just as it was about to be helped; I do not remember much about the filet; but when with triumph the marmite was brought before

high and 24 feet round; but there were many larger ones in the forest, perched on places where it would have been difficult to measure them. A baulk of *laricio* timber was exhibited by Monsieur Folacci at the Ajaccio Exhibition the previous year, for which he deservedly got a prize, as the labour of getting it out of his forest must have been enormous. It measured, when properly squared, 8 feet square, and was over 160 feet long!

our hungry eyes, to our general horror nothing would come out of it! Some one had forgotten to supply water, some one else to stir it, and the contents had got baked so hard on the sides of the pot as to be with the greatest difficulty removed at all. I have a distinct recollection of receiving this time, without any slip, a liberal help of a mass of toughness that tasted a good deal like nothing at all that I know of, well smoked.

We all know how difficult it is to keep the spirits up when the thermometer keeps going down, especially after a rather long and very hot day; but I did not expect that anyone would have been so unfeeling as to suggest that although the soup couldn't be helped, the stew had been made a hash of; and when some one present requested the culprit to give us none of his coarse jokes, and the hardened ruffian replied, In course he wouldn't, the lowest depth of moral depression was reached, and we all voted it was time to go to bed.

The tent for 'nous autres hommes' consisted of one of Whymper's Alpine tents, which had already in the Alps done me good service; that for the ladies I had constructed myself somewhat on Whymper's principle, but with expanding powers which enabled one to bulge out the sides, and with the waterproof floor movable, so that one could use the tent by day; a space, too, was left between the occupants' feet and the door, in which a barricade was made of all the luggage. Our people betook themselves to the fire at the cave, round which they talked each other to sleep with vendetta stories, which were not altogether inappropriate, for on the very stone slab which formed their bed a terrible tragedy had been enacted. Two gendarmes, who were tracking a bandit, stopped to rest at the cave, when the man who was on the watch, creeping up, killed each of them with a single stab as they slept. We, however, having nothing to fear, all made ourselves as comfortable as we could in our respective tents; the nocturnal luminaries were extinguished, and everybody wished everybody else 'felicissima notte.'

Amongst our followers I had begun to discover that we possessed one good fellow, Jean Baptiste Montera, of Corte, short, thick-set, reddish hair, blue eyes, and fair though freckled and sunburnt complexion. He might have passed for a Welch drover or a Scotch gillie, and yet he was of the boasted 'vrai type Corse,' of whom we met with several specimens in remote districts, descended perhaps from families which had remained for centuries undefiled by mixture with black Saracen or swarthy Italian blood, or at least throwing back to the original stock, and the counterpart probably of those fair-complexioned rugged

men formerly exhibited for sale at Rome, and whom no one would buy because their insular pride rendered them perfectly useless, as they preferred starving themselves to death, to working as slaves.

Between 3 and 4 A.M., this individual began to busy himself, after the fashion of a Swiss guide, in lighting a fire, putting water on, cleaning the plates and generally getting things ready for breakfast; all the while humming low a dirge-like 'Vocero' which partially woke one only to lull the more to fresh slumber. This was rudely broken by the sudden and almost deafening sound 'ba-a,' uttered close to our ears by a perplexed and enquiring old he-goat, who evidently couldn't make out what it all meant. Sloth was shaken off, and we roused up. The ladies were all ready by six, but not until long after did we get under weigh; the guides, as usual, causing one delay after another, and throwing every possible obstacle in the way of our starting at all. We crossed the river at length, and ascended a very steep and picturesque gorge in the forest, almost the only spot in it which showed no mark of the axe, the Corsican pines increasing in size as we mounted up, until they came to a sudden termination at the limit of the forest zone; the views, on looking back at intervals through the boughs, or over the gnarled tops of these splendid trees, were exceedingly beautiful. In one and a quarter hour we arrived at some low stone huts occupied in summer by the shepherds and called the maisonettes of Timozo; we had been advised to sleep at these, and thankful we were not to have done so, as they were scarcely better than pigsties, and not a whit cleaner. Here the mules had to stop, and two of the ladies, not caring to wade through the snow which was now close by, decided to remain with them till our return. In about two hours from this spot we reached a col named Bouche de la Specie, estimated at a rough calculation to be at an elevation of about 6,600 feet, and found ourselves upon a ridge, from which we looked down the ravine of the Rivisecque which joins the Rostonica lower down, and by which the mountain can be also ascended, but it looks less interesting than the route we took. At this point the clouds began seething up and whirling about from different quarters, affording us only snatches of views during which we observed Monte Cardo E. by S. of us, rearing its symmetrical cone of snow to a height of 8,202 feet. To the N.W. was a fine sharp snowy ridge and a peak called Pegoraja, and a lift in the clouds showed another summit named Pointe de Moufflon. All these different points were

connected with the actual summit by various arêtes and form part of the 'massif' of the mountain.

We had hitherto ascended over several snow slopes in excellent order, varied by easy rocks; but it now became a question whether the ladies should advance any further, and, finding a sheltered nook in the cliff, we gathered a quantity of dwarf juniper, lit them a fire, and made them comfortable: when, however, we started forward again, they would not be denied, and we all pushed on vigorously together along the arête. I have read an account of an ascent of Monte Rotondo, by a French gentleman, in which he describes that the snow was so slippery that the foot caught no hold, but that they managed to get on by cutting steps with a large stone, which process reduced them to a very exhausted state! We were spared any such labour, as the snow was always in good condition, the chief danger being that of twisting an ankle by slipping into holes among the loose rocks. There was now no more stopping, till we reached, at 1.30 P.M., by a steep direct rocky ascent, the easternmost summit of the mountain, well named in the ordnance map, Monte Oriente. We again found a snug place under the lee of the rocks, lit another fire, for the cold was intense, and had lunch. The actual summit was within easy reach of us, and only a little higher; but the weather rapidly got worse, the wind rose, an occasional flake of snow warned prudence, no more view was to be got, and if we did go there, we should, after all, not be upon the highest point in Corsica; so at 2.30 we began to descend, and reached the maisonettes by help of some capital glissades in less than two hours. Here a most welcome cup of tea, prepared by the kind forethought of the ladies we had left behind us, awaited our return. Another hour took us to camp, where we arrived about 6 P.M.

The increasing astonishment of the guides, throughout the day, was a thing curious to see. Not one of them, even for a moment, believed that any of the ladies would put a single foot on the snow; great was, therefore, their surprise at finding that they took to the whole thing as a matter of course; this feeling was increased at witnessing their powers of endurance, for my wife, for instance, whose mule had casually rolled down a steep slope with her the day before, naturally preferred walking the whole distance. On the ladies going to their tent to change their wet things, 'Ah,' said the guides, 'they may well go to bed, they must be utterly fatigued.' But their wonderment amounted almost to superstitious terror, when the said ladies in a few minutes emerged in fresh toilettes, and at once set about

helping to cook the dinner. 'Well,' one of them remarked with emphasis, 'we thought that the shepherds were the best men on these mountains, but certainly you other ladies are their masters!'

Our dinner this time turned out, I am glad to say, a more successful affair than the last, the soup was excellent, and did not get upset, and although I regret to say that the stew again failed to earn a 'cordon bleu,' there was a good honest roast gigot to fall back upon. We needed no bad jokes to send us to bed to-night, and were all, I think, pretty glad to turn in.

The following day, May 6, was Sunday, and quite fine but very hot, so we resolved to spend it quietly where we were, and walk down in the cool of the evening to Corte. Accordingly we found two grand old Corsican pines of over 100 feet high, whose gigantic boughs and rounded tops gave them something of the outline of deciduous trees (this appearance is accurately rendered in the accompanying sketch by Baron Snoy): under the shade of these we had our service, while a large eagle, probably *A. imperialis*, of which I had seen a caged specimen in the forest of Valdoniello, soared over our heads. A lamb was toasted on a forked stick for our lunch, and at about 4 o'clock the tents were struck, the mules laden, accounts settled with the old shepherd (whose name is George Caviglioli), and after a hearty shake of the hand with him all round, our heads were turned from the scene of our pleasant camp at Tragone.

On my first visit to the island, we made an expedition up this valley for a considerable distance further, and in order to get a good view of Monte Rotondo, we climbed up the crags on the opposite side until we reached a ridge which forms a portion of the arête of Punta delli Castelli; the snow then reached far below Tragone. The Rostonica, however, does not follow the valley to its head, but turns to the left, as one looks up, and is found to emerge from the Lago d'Orientale, which is fed by the snows of Rotondo. The main valley runs some miles further, ascending gradually to the three lakes Nielluccia, Melo, and Rinoso, the stream being now called the Ruscello delle Grotele, and a pass continues beyond the lakes to a col over the main chain, called the Bocca della Scoglia, and leads to the baths of Guagno.

A few days after, a detachment of five of us started off for the forest on Monte d'Oro: the proprietor was away, but his 'homme d'affaires' had received instructions and did his best to supply our wants. There was a small bedroom in the maisonette for the two ladies who accompanied us, and we three

men slept on the floor of the kitchen. On our way through Vivario, we had ordered a mule, and guide to follow us, as Crosse and I meant to have a try at d'Oro, if the weather permitted, while the rest explored the forest. The next day was fortunately fine, and we started at 5.30: for 50 minutes our route lay along the course of the Vecchio, until near the spot where it divides, one stream being fed by the snows of Monte d'Oro, and the other by those of Rotondo; we here turned to the left, and gradually worked our way up through the timber tracks, which however, were much clogged with the limbs and débris of the felled trees.

At 8.15 we arrived at a lovely alpine pasture with a few scattered trees about it, and bounded by high crags; here we tethered our mule, and soon got to a ridge which led us straight towards our mountain. After following it for about an hour, we opened the distant sea on each side of us, including a view of the picturesque island of Monte Cristo. Our ridge now became a somewhat rocky arête, with a steep snow slope on one side, and a precipice on the other, which helped, with another jagged ridge opposite us, to form a deep semicircular crater. From that point until we reached the summit, the work got gradually harder: the arête became a formidable kamm, with huge and sharp granite pinnacles starting irregularly out of it, which had to be turned with more or less difficulty. At last our arête joined that which connects the two tops of the mountain: here we had to turn over on the Bocognano side and skirt the precipice which forms the summit until we had passed the top, when we were able to climb over some great boulders from which a sort of *cheminée* led us to the summit. The last half hour gave us some difficulty, from the fact that our way lay along the thin strip of snow which clings to a sort of sloping ledge at the foot of the precipice which forms the actual summit. This snow was at so steep an angle as to be conspicuous, even from the valley below, and as it was in a very dangerous state we had to use the utmost caution, for a slip would have sent one down to Bocognano. Our companion, for I can hardly call him a guide, was the most wonderful man I ever saw on rocks, but he would have nothing to do with the snow, where he could possibly help it, but, wherever there was a chance, clambered like a bear along places where we should both have been sorry to follow him.

The mountain derives its name from a metallic rock, of yellow colour, which crops out close to the top, but this was covered deep with ice and snow, so we could not examine it.

We reached the top at 12, and saw on the one hand the sun

shining brightly on Ajaccio, which lay plainly visible on its tongue of land in the lovely bay, and the great lagoon of Biguglia lying still and dead on the other. The view, though interrupted by gathering clouds, was very beautiful; to the N.W., however, Rotondo rearing its great mass, and to the S. Monte Renoso scarcely less bulky, on the other side of the Col de Vizzavona, prevented one seeing much in those directions of the general aspect of the main chain, except that a vast number of peaks peeped at us over the shoulders of their big brothers.

After enjoying the view for three-quarters of an hour we began to descend, but as much care was necessary at first, as in the ascent, and we did not reach the place where we had left the mule till 3.30. Here a surprise awaited us. The mule, which had been most securely tethered, was gone. Our man became a good deal disturbed at this, but at length begged us to stay just where we were and started off in search; but, instead of going where one would have expected an animal to stray, he took to the rocks and went right up a couloir in altogether the most unlikely direction for a mule to take. However, after half an hour's absence he returned, leading the mule, gave very short answers to my enquiries, and ended by suggesting that nothing should be said about it down below. There was undeniably some mystery in the affair, which, added to other incidents, led to the conclusion that we had probably been in very close vicinity to the gentleman who was so much 'wanted' by the soldiers and gendarmes camped down below. The mule had no doubt been abstracted, in order to obtain information from the guide as to what our object was. As Englishmen, however, we were perfectly safe, for these people are only political outlaws and do not plunder strangers, and the delay was welcome to me as it enabled me to gather several very rare plants, among them *Potentilla crassinerva* and *Helychrysum frigidum*. We got back to the maisonette without further adventure soon after 6, and the next day drove to Ajaccio and joined the rest of our party.

The following evening, after witnessing the famous annual pony fair, we all embarked on our return to Nice, in the teeth of another terrible gale, which caused the passage to occupy nearly 30 hours instead of 10.

The Corsicans are, on the whole, like most inhabitants of the south of Europe, a very disagreeable set to have anything to do with, and I found that most of those with whom I had any dealings, possessed all the bad qualities and very few of the good ones generally attributed to them. I have never been in

any place where patience and self-control were more necessary or more difficult to exercise. Such is their irascibility and ferocity that, amongst themselves, the most trivial matter may become in a few moments seriously dangerous.

One may judge a good deal of the character of a people by the temper of the children, and we had an example of this just after landing at Ajaccio. Two boys were struggling, at first amicably, for a stick, when the smallest, getting the worst of it, whipped out a knife, and made at his opponent in such murderous fashion, that he, not being similarly armed, was obliged to relinquish at once the fruits of his victory.

Their vindictiveness is the theme of plays, novels, history, and their own wild *voceros*. One of their principal men, next whom I sat one day at dinner, was telling me of a journey he had made two years before in an Italian railway, when his countenance lowered as he added that he had been robbed of his purse, by a respectable-looking man who sat next him, and who had pretended to be friendly to him; 'but I shall know him again,' he continued, 'if ever I see him in my life.' I remarked that it would be no use to have the man taken up so long after. 'I shall not have him taken up,' he said slowly, and with a very disagreeable imitation of a smile, 'I shall kill him at once;' and, drawing the butt of the weapon from his pocket, he added grimly, 'je porte toujours le pistolet.' He'll do it, if he meets his man, and I only hope he won't mistake somebody else for him.

They are more than indolent, for they have an utter contempt for work of any kind, thinking it dishonourable, and get all their field work done by Italians. I once asked a muleteer to carry my wife's parasol for her, when he got immediately angry, and said he was 'déjà trop chargé:' he had her light alpenstock in his hand and a gourd of wine slung at his back! We met, it is true, among the mountains some pleasant, willing fellows enough: on one occasion Crosse and I slept at the house of a man who boasted that he was the son of one of the most celebrated bandits, and that he had, when a boy been 'out' with his father. We sat up late and listened long to his stories, which were very interesting, and told with less of brag than is usual with them.

When I went to bed, he came with me, showed me that the lock of the door was in good order, and then offered me the key, which I, of course, declined with thanks. Another time a boy who had held a mule for me while I made a sketch, refused with much natural dignity some money I offered him. And one day a lad who came with the mules, and to whom at lunch-

time we gave some cold chicken, at once opened his own poor little store of provision—some dry bread, a chestnut or two and a tiny bit of cheese, and, with an innocent grace that was rather touching, offered us a share of what *he* had got. These pleasant traits were, however, very exceptional. Their characteristic qualities of jealousy, ambition, and vindictiveness, when combined with a certain amount of education, and curbed by discipline, fit them in an eminent degree for administrative posts, especially those of Police, and I was informed that a large number of the chiefs of Police (especially the secret Police) throughout France, and also many of the *Prefôts* of departments, are Corsicans. It is however said of them, that they make bad comrades in the army, for, from the moment they join a regiment, they commence scheming to rise over their fellows, and, regardless of all the common rules of gratitude and good fellowship, care not whom they overthrow provided that a step is hereby supplied by which they may mount higher on the ladder of ambition. They may well be proud of the First Napoleon, who was, I imagine, the most typical specimen that ever existed of a true Corsican, allowed to develop himself to the highest perfection of which his nature was capable. He is the only one of them who has ever had the full bent of his will accorded him, and he exercised it till he shook the world.

We all suffered more or less from the climate, on both visits. The air was very depressing and made one feel always tired and languid, and even of a morning we all looked as if we had just received bad news. To be sure the weather was provokingly bad, and, of course one's spirits become in time proportionately affected; but even on bright days the air ever felt moist and relaxing, and, excepting very early in the morning, the same sense of lassitude was experienced on the mountains, and even on the snow there was none of the elasticity one feels on the Alps, when the brisk fresh air pours, sparkling like soda-water, into one's lungs.

This character of the climate, which I have never seen noticed, will, I think, prove infinitely valuable to those invalids, of whom there are great numbers, who find the air of the Riviera too dry and exciting; and I have no doubt that the Corsican climate in winter will be found to resemble very nearly that of Madeira.

But if the climate is relaxing, and the inhabitants irritating, the artist is abundantly rewarded by the amazing loveliness of the scenery, and there is enough at every turn to make a naturalist go wild with delight; for there are, I should think,

few places of equal size so richly furnished with interesting species.

As regards the zoology of the island, bears have ceased for about a century; wolves never seem to have existed there, neither can I find any record of lynxes; and excepting the bats, amongst which there is something to be done, the fox marches at the head of the division. It is the black-bellied species, *Canis melanogaster*, so common about Rome, and it is said to be large, which is singular, as the one found in Sardinia is described as being smaller than the Roman specimens.

The great merit to a naturalist of an unsophisticated island fauna is the diminutiveness of the specimens. This is eminently carried out in Corsica, as the sheep are the tiniest sheep, the cows are almost as small as the Breton breed, and the ponies are the little, slight, active animals, so popular in the basket carriages of Nice and Mentone. But the natural vanity of the Corsicans, like that of most islanders, leads them to imagine that there never were such gigantic specimens as they and their island can offer. I have heard that it was one of Napoleon's hardest battles, the realising that he was not quite six feet high; and our chief muleteer, an intelligent man, apropos to geography, told us he was well up in it, and that the greatest countries in the world were France, England, Corsica, Russia, Germany, and China! I may, therefore, have been misinformed about the size of the Corsican fox.

The wild boar, *Sus scrofa*, attains, I believe, a good size, but then food of all kinds suitable for it is so exuberant, and the natural appetite of the animal is so large, that I imagine the poor brute can't help it. I was delighted to find that the *Cyclamen*, the acidity of which renders it a great favourite with pigs, who regard it, no doubt, as a kind of pickle, and which obtained the old-fashioned English name of 'sow bread,' is here called 'pain de cochon.'

Among the mammalia, however, the most interesting animals are the Corsican deer and the moufflon.

The deer, *Cervus Corsicanus*, is, I believe, altogether peculiar to the island, and is supposed by some to be a variety of the red deer, *C. elaphus*: if so, we have here again the diminutive island type, as the animal is much smaller, and more compact than the red deer, but there are also differences in the colour of the fur, and in the branching of the horns.

It is remarkable that in Sardinia this species is not found, but the true mottled fallow deer, *C. dama*, is very common there.

The moufflon, *Ovis musmon*, is the supposed progenitor of

the domestic sheep, and I was very anxious to get some of the horns of this animal, of which the Corsicans are very proud, most of them believing that it only exists in their island (it is found, however, in Sardinia, in Murcia, and in some of the Greek islands); I made many enquiries on the subject, and was perpetually buoyed up by hopes of obtaining the coveted trophies, as I got further into the heart of the country. At Ajaccio I was told Vico was the place, 'so near the great mountains;' at Vico they recommended me to enquire at Guagno, where I found that they eat moufflon as often as they do chamois on the Wengern Alp, with the same singular fatality of always mislaying the horns and skin. I tried again at Evisa: there I was given to believe that I could have the pick of a mule load of specimens at Calacuccia, where there were so many hunters who frequented the haunts of this game; I drew blank, however, once more, and at Corte the Commandant told me he had been for years trying to get a specimen, and he showed me the result—a small square piece of skin that might have come off a calf: finally, I had to wait till I returned to England, when I ignominiously derived my experience of the moufflon from the British Museum and the Zoological Gardens.

A great deal is said about the sport to be had in Corsica, but this is a great delusion: game, in our sense of the word, i.e. excluding tomtits, nightingales, and thrushes, is exceedingly rare; the wild boar about Sartene and Bonifaccio, although no doubt abundant, are very wary, the macquis is difficult to beat, and the usual result of a day's battue is, that a gendarme of the party, who has been posted some way off, produces a slain pig, which is carried home by the whole party in great triumph.

As I have heard of this process being repeated more than once, and as the tame pigs are apt in their wanderings to mingle with the wild ones (I have seen a brindled herd which could not have been distinguished from wild boar), I have a lurking suspicion that they keep a half-bred bagman always ready for the eminent foreigners who have battues ordered for them by the Prefêt. And after all, a lean pig of any kind, cooked in wild rosemary, would taste about the same.

Of birds there were a great many. On our first visit, *raptors* abounded in the plains, driven down, no doubt, by the snow from the mountains; every village, too, had its permanent pair of kites. On our second visit we all enjoyed watching the noisy flight of a flock of bee-eaters, and listening to the song of the Orpheus warbler mingling with that of the nightingales, which were very numerous near Ajaccio. In the forests I

observed, among other species, the black woodpecker and Cornish chough.

In the way of reptiles Corsica is said to possess only two species of snake; if this is the case, which I doubt, I may consider myself fortunate in having seen both kinds; for near Corte I saw a large black snake, about five feet long, on some marshy ground by the banks of the Tavignano; and at Ajaccio one day, while climbing up some very steep rocks, to try and get at a falcon's nest, I had drawn myself up by a tuft of strong grass, when I found my face within a few inches of a thin green snake; for a moment the temptation to commit suicide by letting go was rather strong.

There is a rarity too in the way of salamanders. *Salamandra Corsica*, of which I think I obtained two specimens, is something like that handsome yellow and black one, *S. maculosa*, which is so common in Switzerland and Germany, and which, when vivaria began to be the fashion, the dealers used to sell to scientific ladies at about ten shillings apiece with the assurance that they came from Japan! I also got a couple of curious newts; one of them turned up under a rock as we were pitching our tents at Tragone, and the shepherds flew at it with shrieks and stones and cries of '*Tarantula!*' and were horrified at my snatching it up with my fingers and putting it into a box.

There are also specialities in the land molluscs; two fine species—*Helix tristis*, and *H. Raspailii*, being peculiar to the island: the latter is a handsome shell, differing in some respects from the general European form of *Helix*. An allied species, *H. Pouzolzii*, which I found at a great elevation, connects the island with the fauna of Albania, and Montenegro.

In its botany the island is exceedingly rich, and, as might be expected from its position, it shares a multitude of species with the countries which form the rim of the Mediterranean basin. At the same time, however, it has a special flora of its own, which it does not share to any great extent with even its next-door neighbour, Sardinia. It would be impossible for me to attempt to describe in this paper all the interesting plants which came under my notice, especially as I had the good fortune to stumble on about 100 species, either of excessive rarity or peculiar to the island. Amongst the most remarkable, as giving a distinct character to the vegetation, I may mention, in addition to those I have already named, *Heleborus lividus*, *Cistus Creticus*, *C. Corsicus*, *Lamium Corsicum*, *Stachys glutinosa*, *Pteroneurum Græcum*, *Euphorbia semperfoliata*, *Barbarea rupicola*, *Calycotome villosa*, *Asphodelus ramosus*,

Crocus minimus, *Arum pictum*, *Allium pendulinum*, *Serapias triloba*, *Ornithogalum arabicum*, and *Leucojum roseum*. I must not forget to mention that the ferns embrace a very wide scope, descending from the ordinary Alpine species, such as *Asplenium viride*, *A. Septentrionale*, and *Allosorus crispus*, to the southern forms *Pteris Cretica*, *Cheilanthes odora*, *Scolopendrium hemionitis*, *Notholena marantæ*, and the very rare *N. Vellea*.

Since my visits, the island has been increasingly frequented by English tourists, and Ajaccio is fast growing into a regular winter resort. The demand for accommodation, and for the comforts of civilised life, will speedily attract the usual speculative vultures from the main land, who will at once treble the prices, so that those who wish to economise by a winter in Corsica must go soon, otherwise they will find that 'mêmes prix qu'à Nice,' and 'mêmes prix qu'à Londres,' are there, as on the Riviera, the established rule for living and dying; but it will be a very long while indeed before the country loses that romantic wildness which is its chief charm.

ON SOME WINTER EXPEDITIONS IN THE ALPS. By A. W. MOORE. Read before the Alpine Club, on June 8, 1869.

FAMILIAR as the Swiss Alps are to us, they are so only under their summer aspect, when every valley is thronged with a jostling crowd, and no peak or glacier is secure from intrusion. Of the Alps in winter—in a state of nature, so to speak—when the valleys are left to their own inhabitants, and when tourists cease from troubling and glaciers are at rest, few persons have any experience.

It was a desire to see something of our old haunts at this unaccustomed season, which led Mr. H. Walker and myself to the valley of Grindelwald in the winter of 1866. We arrived at Interlachen on the evening of December 15, under rather unpromising conditions of weather, dense clouds enveloping everything. Rain fell all night and during the next morning, without much sign of a change; and, under such circumstances, Interlachen was decidedly depressing. All its hotels, save the 'Casino,' and wood shops were shut up and deserted, and its rank, fashion, and beauty represented by one small boy, who stared open-mouthed at us as we played cricket with a stick and a stone in the empty street, a form of amusement which, in summer at any rate, is strictly 'verboten.' In the afternoon we started for Grindelwald, with a

vague suspicion beginning to arise in our minds that we had made a horrid mistake, and that our expedition would turn out an ignominious failure. The Lutschine, both in colour and force of current, more resembled an English trout stream than the roaring muddy torrent which in summer dashes along so furiously, and it was evident that its supplies of glacier water were almost entirely suspended. Below Zwei-Lutschinen the road was quite bare of snow, but above that place it was lying, though to no great depth. Thick mists and falling snow concealed all distant view, and there was nothing to attract attention but the immense icicles which fringed the precipitous rocks on the north side of the road. It was dusk when we reached the hospitable portals of the 'Adler' at Grindelwald, and the warmth of our reception by Herr Bohren and his excellent wife, went a long way towards raising our drooping spirits. During the evening, we had a consultation with Almer and Peter Bohren as to our plans. We had no very defined programme, our object being generally to see as much as possible of the country, but we hoped to get a little chamois-hunting, and a little mountaineering. For a few days, at any rate, neither was to be thought of. About three weeks before, there had been an extremely heavy fall of snow, which had been succeeded by a spell of fine, cold weather, until within the last few days, when rain and warmth had set in, reducing to a great extent the quantity of snow, but leaving it in such a dangerous condition on the mountains that it would not do to venture on them at present. Almer, therefore, suggested that we should amuse ourselves with hare hunting, for which fine weather was not indispensable, while we should be getting into training for harder work.

Snow fell heavily all night and more or less continuously during the next day, which we passed pleasantly enough, toiling through the deep snow on the traces of hares, which led us fruitlessly first towards the base of the Mettenberg, and then past the tail of the lower glacier in the direction of the Wengern Alp path. We were on the point of turning home after a blank day, when we stumbled on the tracks of a fox, who, after a long and toilsome chase, was at last brought to bay in a picturesque ravine, surrounded by snow-streaked, pine-clad cliffs, and there—I almost blush to confess—shot! Although in the village there was not more than a foot and a half of snow, on the hill sides the quantity was enormous, and every step of our devious way through the pine woods, led us through scenes of such fairy-like beauty as I am quite powerless to put before you in words. Any description would seem

overcoloured, while it would quite fail to give the least conception of the exquisite reality. During the afternoon, the weather showed signs of clearing, and, as we reached the hotel door, the mists melted away from off the peak of the Wetterhorn, revealing the upper part of the mountain laden with dense masses of snow, and crimson with the last rays of the setting sun. By nightfall, every vestige of cloud had disappeared from the valley, and the great peaks surrounding it stood out sharp and distinct in the keen, frosty air under the brilliant light of a nearly full moon. Our anxiety on the subject of weather was finally dispelled, and, during the remainder of our stay, we were blessed with a succession of cloudless days and moonlight nights. The frost was always severe, but owing to the entire absence of wind, the cold was never disagreeable, and the climate was most enjoyable.

The two succeeding days were similarly passed in hare hunting, without much result in the way of game, but to the great improvement of our condition. From morning till night, we were pounding steadily over pastures and through pine woods, all deep in snow, and the exercise was so severe that the vice necessarily resulting from a sedentary life was quickly driven from our limbs. The difference in the temperature on the hillsides and down in the valley was very remarkable. In the village, on which the sun shone but for a very brief period, the frost never 'gave,' and to be warm it was necessary to keep moving; while, on the slopes on the north side of the valley, which had the benefit of the sun's rays for many hours, the heat was often oppressive, and, walking in winter clothing, we were often glad to take off coats and waistcoats, and even then could sit down for half an hour at a time with comfort. The glare from the snow was quite as great as on the glaciers in summer, but its effect on the face was not so painful, though more permanent. At the end of ten days we were browner than I have ever been after a six-weeks' tour in summer, and the effect was much longer than usual in wearing off: we were, in fact, gradually scorched, instead of being hurriedly roasted.

By the 20th, chamois hunting was considered practicable, and on that day we started, a large party, for the Eis-meer hut, where we were to pass the night, the Mettenberg being considered the likeliest spot for a find on the morrow. We reached the hut in three hours. As far as the point where horses are usually left, there was little difficulty, but, beyond, our way was of rather a sensational character. The path, as everyone knows, is carried along a mere shelf in the cliffs

which enclose the glacier, and the snowdrifts along it had first thawed and then frozen again, so as to form an iceslope of considerable steepness, and breaking off abruptly at the edge of the precipice. Steps had to be cut nearly the whole way, and we passed roped and with every possible precaution, as, although the 'abyss' on our right was not 'fathomless,' the glacier was sufficiently far below to make us by no means anxious to try the effect of a fall on to it. The wall of rock on our left was fringed with icicles, often as clear as crystal, and 20 or 30 ft. in length. The hut looked the reverse of inviting as night quarters, having a good deal of snow inside, in addition to 2 or 3 ft. on the roof. Some of the men were left to set things a little to rights, while the rest of us descended on to the glacier by a wall of snow completely burying at a great depth the long wooden ladder, which in summer affords a way down the smooth, iceground rocks. The quantity of snow on the Eis-meer was very great, and the ordinarily uneven and dirty surface now showed as a perfectly smooth plain of spotless purity, unbroken by either moraine or crevasse. We went along the Zäsenberg side of the glacier as far as the foot of the Strahleck icefall, and returned to the hut late in the afternoon to find the interior tolerably clear of snow, but very wet and uncomfortable, the fire, which was a necessity, causing a perpetual drip from the roof, which was too general to be dodged. After dinner we established ourselves for the night on the least saturated planks we could find; but, what with the hardness of the floor, the shower-bath from above, and the cold, sleep was impossible, and we were delighted when, at 1.0 A.M. on the 21st, the men began to move.

We started at 2.0 in most brilliant moonlight, and followed in our steps of the previous afternoon until 3.0, when we crossed to the right bank of the glacier, and began ascending the steep slopes which form the base of the Mettenberg. For the first hour, the way was over an immense tract of avalanche débris which had come down from above, a collection of frozen snowballs of every size and shape, and anything but agreeable to traverse. Smooth slopes succeeded, up which we climbed steadily, keeping near the base of a steep ridge of rocks on our left. At last we turned up a steep couloir in this ridge, lined with snow in what seemed to me a rather unsafe state, and at 6.40 stood in a narrow gap in its crest, locally known as the 'Halb-Mond.' As we gained the ridge, the first signs of dawn were appearing in the sky, and the scene was wonderfully impressive. From our feet a broad ravine fell away,

backed by other spurs of the Mettenberg, beyond which we looked down the narrow opening, through which the glacier pours, to the valley of Grindelwald and the plain of Switzerland. Over the basin of the Lake of Thun, and the flat country between it and Berne, lay a low canopy of mist, above which peered the tops of the hills on either side of the lake and in the neighbourhood of the city. Near at hand the grand forms of the Schreckhorn and Finsteraarhorn, the 'cirque' of the Viescherhörner, the Mönch, and the Eiger, stood cold and grey in the gloom.

Almer and a hunter named Wenger were with us, but the remainder of the party had been sent by a different route, in order to drive up towards our position the chamois who had been seen the previous night in the ravine at our feet. It had been calculated that the animals, when disturbed, would make for the upper part of the mountain, and, ignorant of the ambush prepared for them, would pass, in the natural order of things, within easy range of the ledge on which we were perched. Soon after our arrival, the cries of our beaters were wafted up to us from below, but the sound was so faint that it was evident that we had far outstripped them, and should have some time to wait. This was unlucky, as, meanwhile, we were exposed to cold more severe than I ever remember to have felt. The sun rose, and peak after peak was lit up with a ruddy glow, but we remained in shadow, and, to preserve the circulation, were compelled to keep up a noisy process of kicking and thumping, at the precise moment when perfect silence was necessary. There was no help for it, as the acquisition of any number of pairs of chamois horns would have scarcely compensated us for the loss of our own hands or feet; but the natural result was that, after two hours' waiting, we had the pleasure of seeing our intended victims right away on the opposite side of the ravine, out of shot, and making as fast as they could for the top of the Nessihorn, the next step in the ridge above the Mettenberg. A council of war succeeded as to what should be done. Almer was anxious to cross the ravine, and go in search of another herd which was believed to be in that direction. To gain the desired point, it would be necessary to make a very awkward *traversée*, and especially to cross a steep and narrow ledge, coated with snow, above really frightful precipices. In the event of the snow giving under our feet, nothing could save us from destruction, and, in spite of Almer's confident assertion that the snow was quite safe, we considered that the risk was not one which we should be justified in running, and therefore put a veto on the attempt.

It was the first time that either of us had ever refused to follow where Almer consented to lead, but we felt that, at the moment, the enthusiasm of the sportsman had overcome in him the prudence of the guide.

We finally settled that he and Wenger should follow the chamois up towards the Nessihorn, and endeavour to drive them down again in our direction. It was 10 o'clock when they started, by which time the sun had reached us, and our perch was so deliciously warm and comfortable that we were glad to sit in our shirt-sleeves. Time passed, and after exhausting the details of the view, as revealed under the full light of day, we became torpid from the heat and effects of a sleepless night, and dropped into a doze, from which we were aroused by the sound of two shots fired high above us. We remained on the look-out for some time, and at last saw the herd descending rapidly, but again, unfortunately, out of range. So soon as all had passed, as we supposed, we relapsed into our previous happy state of oblivion, and, on again recovering consciousness, had the satisfaction of seeing an animal's footprints in the snow at our feet. Crusoe's surprise on discovering the footmark in the sand could not have been greater than ours, as the tell-tale tracks met our eyes. The horrid truth flashed upon us instantaneously—during our slumbers a chamois, which, judging from the marks, must have been a very large one, had passed within ten yards of us! We scarcely knew whether to be most amused or disgusted, but when the two men returned at 1.30, and had the evidence of our remissness before them, we certainly felt rather small, and I am afraid that my readers will have as low an opinion as they had of our sporting capabilities. Two morals may be deduced from our misadventure, for the benefit of those who may follow us: do not start on such an expedition too early in the morning, unless you have limbs impervious to cold; and, when once placed in position, keep your eyes open—if you can!

We turned to descend at 3.15, after a stay of $8\frac{1}{2}$ hours, in the course of which we had experienced remarkable extremes of cold and heat. On the way down Wenger told me a cheerful story of a friend of his who, early one spring, had been hunting on these very slopes, and, on his way home, had been surprised and smashed by an avalanche, in which he remained buried many months. After this, I was not sorry to be once more on the glacier, out of harm's way, although in such weather there was not the slightest risk of a similar catastrophe. On reaching the hut we were delighted to find Melchior, for whom we had sent over to Meiringen. It was

dark by the time we started to go down to Grindelwald, and the first part of the way required great care, but after passing the worst places, we rattled through the woods at a good pace, and were at Grindelwald by 7, tired enough, and with little to boast of from a sporting point of view, but nevertheless well satisfied with the expedition.

The next day the men were anxious to have a hunt on their own account, and as they were, not unnaturally, inclined to attribute the previous failure to us, and we *did* feel a little guilty in the matter, we gave them leave, and went ourselves on an excursion to Lauterbrunnen. We ascended the valley as far as Stechelberg, but the effect of the snow on the scenery was less striking than in the valley of Grindelwald, perhaps owing to the quantity not being nearly so great. The Staubbach was in no way remarkable—there was very little water, and our expectations of seeing the fall converted into a gigantic icicle were disappointed. In the evening our men returned without having so much as seen a chamois—a circumstance which, I don't mind confessing, did not greatly afflict us, as, had the hunt turned out successful, we should never have heard the last of it, or of reflections on our own shortcomings. After dinner we joined the villagers in an amusement to which they were exceedingly partial. This consisted of sliding in the little sledges, used for carrying wood, down the long steep descent which the road makes from the inn to the Wengern Alp path. The snow had been beaten perfectly smooth by the traffic, and the road was like ice; so that the pace, when once the machines were started, was very great. The guiding was done with the heels, which were generally carried in the air, but were allowed to lightly touch the ground on one side or the other, according as it was desired to incline to the right or left. The turns of the road are very sharp, and no small skill was required in order to make them without a spill, which was apt to be unpleasant, not only from the violence of the shock, but from the probability of being run over by some of the other performers, a dozen of whom were sometimes going at once. The general rule was for each man to travel in his own little sledge, but the most exhilarating and exciting form of the entertainment was certainly to go down six together in a large sledge, steered by Peter Bohren, who was unanimously voted the ablest pilot, and who took us down at a pace of nearly twenty miles an hour. The only drawback to the absolute perfection of the amusement, which we kept up to a late hour, arose from the obvious fact that it was impossible to keep going down for ever, and that from the bottom of the hill the sledges had to

be dragged to the top again, an operation of some delicacy when attempted to be performed in slippers.

Our expedition to the 'Halb-Mond' having dissipated the fears of avalanches which had lingered in our minds, we were now anxious to see something more of the upper ice-world in its winter guise than had been possible on that occasion. Our original design had been to ascend some one of the great peaks which look down upon the valley, and our thoughts had rather inclined to the Eiger; but we had seen enough to realise that any ascent involving much rockwork was out of the question, and this was, of course, fatal to the Eiger, as its lower rocks, though easy enough in summer, would be very formidable obstacles when well glazed with ice. The same objection applied to the Wetterhorn and Schreckhorn; so that we were obliged to give up all idea of peaks, and content ourselves with passes. The range of selection being thus narrowed, we had little difficulty in determining on the Finsteraarjoch and Strahleck, as the passes most suitable for our purpose, not only on account of their comparative freedom from rock difficulties, but because they were capable of being combined in a single expedition. As most persons are probably aware, both routes lead from Grindelwald to the Grimsel, and meet at a point on the Finsteraar glacier, about three hours distant from the latter place. We calculated that in twenty-four hours we could cross the Finsteraarjoch, descend to the point of junction, and, turning round, return by the Strahleck to our starting-point. It would, of course, be necessary to walk all night, but we were in excellent condition, and, with a full moon, progress would be as easy by night as by day. Neither Almer, Melchior, nor P. Bohren received the project, when first broached, at all enthusiastically. The idea was so novel, and so far removed from their ordinary experience as guides, that they thought it necessary to suggest all sorts of difficulties, and did nothing more than acquiesce in the attempt when they found that their objections did not shake our determination. The general population of the village had some difficulty in realising that we were serious in our proposal, and when, at 3 P.M. on the 23rd, we started with our three men, we were regarded as destined beyond all doubt to perish miserably.

The steps being already cut, we reached the Eis-meer hut at 5, where the men proposed a halt until the moon rose from behind the Eiger; we, however, thought it better to keep moving, and not run the risk of getting chilled and sleepy, especially as for a long distance no difficulty was to be anti-

culated on the glacier, and there would always be sufficient light to enable us to pick our way. Keeping under the Zäsenberg, we turned, by means of snow slopes, one or two points, which present *mauvais pas* in summer, and, at 7.45 halted for supper, before tackling the steep rocks, which have to be climbed in order to get above the central ice-fall. By 9.10 this difficulty had been left behind, and we emerged, in full moonlight, on to the snow plateau which lies at the foot of the ascent to the Strahleck and the ice-fall below the Finsteraarjoch. The snow was in such excellent order that we did not sink into it much above our ankles, and by 10.30 we were at the base of the icefall, the towers and pinnacles of which, gleaming in the moonbeams, presented a spectacle of quite unearthly beauty, such as I can never again hope to enjoy. The fall is one of the steepest and most broken in the Alps, and, in summer, it is usual to climb to a certain height up the slopes of the Strahlgrat on its right bank, and then traverse them at a level until it is possible to drop down upon the upper snow fields. But this course seemed, at first, scarcely necessary now, and we plunged at once into the tangled maze of séracs, diving into chasms where all was literally 'blue,' crawling round pinnacles transparent and weirdlike in the moonlight, and crossing snow bridges over gulfs, the depth of which seemed more than ever unfathomable. Every step revealed a new beauty, but our progress was slow, and it was eventually thought better to escape from this region of enchantment on to the more commonplace slopes on the right side of the labyrinth, and follow pretty much the route taken in summer. At twenty minutes after midnight, when the last crevasses had been fairly left behind, we halted for a quarter of an hour, and, then pushing steadily on, stood on the Finsteraarjoch at 1.15 A.M. The night was perfect; there was not a breath of wind, and the moon was so brilliant that the faintest pencil memoranda were legible with ease. Our boots were frozen as hard as iron, and vigorous blows with the ice-axe made not the slightest impression on them, but, strange as it may seem, our feet inside were quite warm and comfortable, although, an hour or two earlier, they had, for a brief space, been painfully cold. As may be imagined, the scene was exceedingly grand. In front stretched the long reach of the Finsteraar glacier, backed by the 'cirque' of the Oberaarhorn; on our right towered the colossal pyramid of the Finsteraarhorn, while, behind, the view was closed by the threatening crags of the Schreckhorn, rising grimly beyond the Grindelwald glacier.

The doubts and anxieties of the men were by this time at an end, and, in the excitement of the moment, they actually proposed that we should change our plans and climb the broad snow couloir between the Agassizhorn and Finsteraarhorn, and then regain Grindelwald by the Grünhornlücke and Mönchjoch. The great couloir which, at that time, had not yet been scaled, looked so easy and tempting that, for a moment, we almost inclined to the venture; but the recollection of the immense extent of snow field which would have to be traversed at the head of the Aletsch glacier, and the alarm which would be excited at Grindelwald by any considerable delay in our return, caused more prudent counsels to prevail, and, giving up the seductive idea, we turned our faces to the Grimsel, after a very few minutes' halt. Skirting the bases of the Finsteraarhorn and Studerhorn, we met with no difficulty until just about to descend on to the level glacier at the foot of the Oberaarhorn, when some large crevasses caused us a good deal of trouble, and so much delay, that it was 3.20 before we reached the entrance of the long ice valley leading up towards the foot of the Strahleck. During the two hours which had elapsed since leaving the col, a good deal of the enthusiasm there exhibited had had time to evaporate, and Peter Bohren in particular had for some time been showing signs of having almost had enough of it. Now that we were almost in sight of the Grimsel Hospice, he seized upon the opportunity to dilate upon the charms of that establishment, assuring us that, great as were its attractions in summer, they were tenfold greater in winter, and winding up by suggesting that we had much better make for it, and leave the Strahleck alone. Finding us deaf to his arguments, he came to a full stop, and, with an air of perfect seriousness, begged us to knock him on the head and bury him where he was, as he should never be able to reach Grindelwald. This would certainly have been a rough and ready way of settling the matter, but there were obvious objections to its adoption; so we laughed our good-humoured follower out of his depression, and ruthlessly turned our backs upon that haven of rest which seemed so attractive to him. The next two hours were indeed rather trying, as the walking was heavier than it had been, there was little to interest, and, though our limbs were unwearied, we all began to feel the want of sleep. Walker babbled nonsense, as he put one leg in front of the other in a state of only half-consciousness, and fairly dropped asleep as often as we halted to change leaders, as we did at intervals of about ten minutes. I was scarcely in a more responsible state,

and not a dozen connected sentences were spoken between us, until we neared the foot of the famous wall, when we all woke up, and Melchior and Almer commenced a lively discussion as to the route which should be taken. It was carried on in an almost incomprehensible patois, but we could make out that the point at issue was, whether it would be better to ascend by the snow or to take to the rocks, as is usually done in summer. Almer was in favour of the former course, Melchior of the latter, fearing apparently that we might bring the snow down with a run. We took no part in the dispute, but the idea of the snow-covered rocks was certainly disagreeable to us, and we were therefore not sorry that Almer chanced to be leading at the critical moment when we passed the scarcely perceptible bergschrund, and was thus at liberty to adopt his own course. A very few steps showed that there was not the slightest danger of creating an avalanche. The snow, in which we sank nearly to our knees, bound perfectly under us, and the steps were as secure as could be wished. We mounted steadily by short zigzags, and near the top actually found the snow so hard that steps had to be cut. The last ascent occupied exactly an hour, and at 6.40 we reached the col, just as the day was breaking. The moon was still high, although its light was paling, and the sky was quite cloudless, so that we saw the view, which to my mind is surpassed by few of its kind, to perfection. We made no halt on the col, but cut steps down to the first rocks, and, having descended them for a short distance, halted for breakfast, just as the great peaks by which we were surrounded received the first rays of the rising sun. I need not linger over the remainder of the descent to Grindelwald, where we arrived at 1.0 P.M. on the 24th, after an absence of twenty-two hours. The expedition had been less arduous and far more successful than we had ever ventured to anticipate; indeed, merely the passage of the icefall by moonlight, and the midnight view from the Finsteraarjoch, would have been ample recompense for very much greater discomfort and fatigue than actually fell to our lot. The only member of the party who experienced the slightest ill effects was Peter Bohren, who kept his bed for a couple of days, the prolonged exertion at an unusual time of year having been a little too much for his rather advanced age.

We were not sorry to spend Christmas Day quietly, but on the 26th strolled leisurely up the Faulhorn, and slept there, the landlord very unwillingly going up with us to open the inn. There was little snow on the actual peak, except

behind the house, where it had been sheltered from the sun and wind, and during the night, which was rather cloudy, the thermometer never sank below 28° Fahrenheit, showing only 4° of frost. I imagine that in the height of summer there are few nights when the temperature is equally high, and the circumstance was probably exceptional. This was our last excursion, and it had been made just in time, as when we quitted Grindelwald the next morning the weather was obviously on the turn, and rain fell before we reached Berne in the evening. We were received with enthusiasm by Herr Kraft, the excellent but humbuggy landlord of the Bernerhof, who hailed us as the authors of a new discovery, and the forerunners of crowds of winter tourists. Doubtless, visions of a crowded hotel from year's end to year's end floated before his mind's eye—visions which, I am afraid, time has dissipated.

The success of the whole expedition had been so great that, when the winter of 1867 came round, I was anxious to repeat the experiment in some other part of the Alps. Grindelwald is such a luxurious place that a stay there could not, under any circumstances, be otherwise than agreeable, and I wished, on the second occasion, to fix myself in some place where creature comforts would be less easily obtainable, and where, therefore, the amount of enjoyment to be got out of the mountains in winter would be more severely tested. With this view, I finally resolved to establish my head-quarters at La Grave in Dauphiné, on the Lautaret road, as a place where, with accommodation enough for reasonable people, an excess of luxury was not to be feared, while as a mountaineering centre it was all that could be desired. Walker was unable to join me, and I was not fortunate enough to secure another companion. Everyone to whom I spoke regretted exceedingly that he was unavoidably prevented from joining in an expedition which he felt sure would be most delightful, and in which he wished me every success. I therefore started alone on the morning of the 4th December, 1867, for St. Michel on the Mont Cenis road, where I expected to meet Melchior and Almer, to whom I had written. On reaching that place at noon on the 5th, neither of the men was forthcoming, and my expedition seemed to be stopped at the very outset; but, not without some hesitation, I resolved to persevere, at any rate as far as La Grave, and see what could be done with only local aid. Crossing, that afternoon, the little Col de Valloire, I slept in a very primitive inn in the village of the same name. On the top of the col I met a 'Commis-Voyageur' on his way back to St. Michel, who, naturally

surprised at meeting a stranger in such a place at such a season, enquired for what purpose I was travelling; on my responding '*pour plaisir*,' he threw up his hands, and, with a glance round at the dreary, snow-covered landscape and the gathering clouds, exclaimed in a tone suggestive of his own intense antipathy to his surroundings, '*que diable de plaisir!*' and then fled down to St. Michel and civilisation, as though he had been escaping from a dangerous lunatic.

There are two passes leading from Valloire to the Lautaret road—the Col de Galibier and the Col de Goléon. The former is the easiest and most frequented, but the latter is the direct route for a traveller bound to La Grave, and had a further claim to preference on the present occasion, in that I had already crossed the Galibier in 1864. Very much as I had expected, public opinion at Valloire was against the practicability of either pass at this season, and the Goléon, at all events, was voted quite out of the question. There was a lively discussion on the subject during the evening over the kitchen fire, but my enquiries failed to elicit that anyone had lately tried the passage, so that the difficulties to be encountered could be only matters of speculation. Starting at 7.20 the next morning, I walked up to the hamlet of Bonnenuit, and ultimately found two hunters who consented to take me over the Goléon, though they demanded for the service a price equal to what we give in Switzerland for a stiffish glacier pass. The distance from Bonnenuit to La Grave can be traversed in summer in six hours; now, at half-past eight at night, after eleven hours of the severest work I ever did, we only found ourselves at the little village of Les Hières, still an hour distant from La Grave. The weather turned bad, the snow on either side of the pass was very deep, and I never had a more exhausting walk. The two hunters used snow shoes—small hoops of cane with cord stretched across, strapped on to their boots—which seemed thoroughly efficient; they scarcely sank at all into the snow, into which I plunged heavily above my knees at every step during the seven hours which it took us to reach the pass. The ascent is long and, at last, rather steep; but, though the men professed to be afraid of avalanches, there did not seem to me to be the slightest cause for alarm, in spite of the badness of the weather and the fresh snow which fell heavily throughout the day. The path down from Les Hières was reported so covered with ice as to be dangerous in the dark, and we therefore passed the night in the house of a peasant, a friend of one of my men. There was no meat to be had, and an omelette was the

only thing obtainable for supper—rather lenten fare after a day of starvation; but I was lucky enough to find a coarse but clean bed in an adjoining outhouse, to which I was glad soon to betake myself.

When I opened my eyes next morning, none the worse, the sun was shining in a cloudless sky, and the towering form of the Meije stared me in the face beyond the Romanche. Rattling down to La Grave, I found a fair bedroom, with a stove, in the Hôtel Juge, and, during the day, constituted Alexandre Pic my 'guide-chef.' This man has, at different times, been rather hardly dealt with by various members of the Club, myself amongst the number. He is a great talker, and, like most such, is unwilling to admit ignorance on any point which may be raised. He really knows a good deal about some of the neighbouring glaciers, and, no doubt, speculates as to the relative position of others which he has not actually visited; unfortunately, he has acquired a habit of taking for granted that his ideas on such subjects necessarily represent the real state of the case, and thus by retailing as absolute facts what are only guesses, he has obtained a character for *deliberate* mendacity which is not wholly deserved. I found him a very agreeable companion, and capable of discussing with a good deal of common sense many subjects rather beyond the range of an ordinary guide. As a mountaineer, he is thoroughly reliable in places with which he is quite familiar, and where the difficulties are not excessive; but on ground new to him, and in positions of real danger, he is too nervous to be of much use.

Although La Grave is situated 1,500 feet higher than Grindelwald, the quantity of snow in the immediate neighbourhood of the village was not so great as at the latter place, but the cold seemed to me quite as severe. The weather, during my stay, was generally fine, though not so uninterruptedly brilliant as during the previous winter. We had some delightful walks along the top of the cliffs on the north side of the Combe de Malval, in the course of which I had good opportunities of examining the peak of the Meije, almost the only summit of the Alps, exceeding 13,000 feet in height, which remains unscaled. I was anxious to detect some weak point which might offer a chance of a successful attack in summer, and, at the outset of my observations I was sanguine of finding one; but the more I looked at the mountain, the less hopeful did I become; and in the end I signally failed to discover any line of approach at all promising. The final peak resembles the Aiguille du Dru, and even to reach its base would be no easy task; still, so much might, I think, be ac-

complished, and it may chance that the last rocks, when approached, may prove less smooth and precipitous than they appear from a distance—though I doubt it. I hope that some enterprising person will, at any rate, go and give the mountain a fair trial; if successful, he will have the satisfaction of vanquishing one of the noblest and most formidable of Alpine peaks; while, even if the crown of actual victory be denied to him, he is sure of an interesting and exciting climb. We had a pleasant walk to Monétier over the Col d'Arsines, past the source of the Romanche at the foot of the Col du Glacier Blanc, and returned the next day over the Lantaret. From a point on the road about half an hour below the Col on the La Grave side, I had a glimpse for a few minutes of the summit of the Écrins, the highest of the Dauphiné Alps, which I had ascended with Walker and Whympfer in 1864. From the top of the peak we had observed a small piece of the Lantaret road, and I was therefore on the look out, but neither Pic nor any one at La Grave was previously aware that the mountain could be seen from any part of the road.

When Melchior and Almer failed to meet me at St. Michel, I had almost given up hope of being able to accomplish any glacier work; but, after a few days, I ventured to mention to Pic the idea, which I had always secretly meditated, of crossing the Brèche de la Meije to La Berarde. This pass is, in appearance, one of the most formidable in the Alps, and had been left undisturbed since its first passage in 1864, by Walker, Whympfer, and myself, with Almer and Michel Croz. The exploit had, at the time, created some astonishment at La Grave, the population of which, comprising, as it does, men who describe themselves as 'les plus grands chasseurs du monde,' had unanimously voted the thing impossible. Not one of them had ever followed in our steps, and I was therefore quite prepared for Pic's emphatic refusal to entertain my proposal for a moment. I ascertained, however, in course of conversation, that his pet excursion in the neighbourhood was the Col de la Lauze, a pass exceeding 11,500 feet in height, which leads over the eastern end of the great Glacier du Mont de Lans to St. Christophe in the valley of the Vénéon. I proposed to him that we should ascend to this Col, and, instead of descending to St. Christophe, traverse the whole length of the glacier to Le Dauphin in the Combe de Malval, some ten miles below La Grave. After some persuasion he consented to try this, and on December 12, with two other men, we carried the plan into execution with the most complete success. The weather was perfect, and the snow in such excellent condition that we

traversed the whole distance from the Col to the extreme western end of the glacier in less than an hour, and without seeing a crevasse. Until it was necessary to descend, we kept throughout along the brow of the cliffs above the Vallon de la Selle; and the névé, all the way, was so hard and even that, without any exaggeration, a carriage and four might have driven over it with ease. There are few finer passes in the Alps than the Col de la Lauze, whether as regards scenery near at hand or distant views. During the ascent the Meije is a stupendous object, while the cliffs of the Rateau are comparable to those of the Jorasses above the Glacier de Léchaud. The view, too, from the Col of the huge precipices of the Écrins and Ailefroide in one direction, and of the Graian Alps, backed by Mont Blanc towering above everything, in the other, can scarcely be surpassed in the better known parts of the Alps. We left La Grave at 2 A.M., and at 4 P.M. were at Le Dauphin, many hours earlier than we had expected. Pic was half drunk with excitement, and so elevated in his own estimation, that on my taking advantage of his humour to suggest that we might do the Brèche after all, he acquiesced at once, and scouted the very difficulties which he had painted as so formidable a few days before.

The result was that, at 5.45 A.M. on the 14th, we started on the adventure, with a man named Froment, of inferior powers, and a rough, black-bearded chasseur, named Salaman, at least fifty years of age, but one of the most active fellows and best cragsmen it has ever been my good fortune to meet. The glacier which descends from the Brèche falls towards the valley in two branches, separated by an exceedingly steep buttress of rock; the eastern branch is a continuous icefall, and, in 1864, we had gained the pass by climbing the rocks for about an hour, and then taking to the western branch, which offers no serious difficulty. We should have done well to have followed the same route now, but old Salaman had an antipathy to ice, and therefore led us to the very top of the rocks, where they merge in the upper snowfields. This involved $4\frac{1}{2}$ hrs. of climbing, which would have been difficult under any circumstances, and was made dangerous by the snow on the ledges, and, more so, by the extreme timidity of Pic and Froment. In one or two places of special difficulty, eminently calculated to test the adhesive qualities of our eyelids, they were so nervous that I was in fear every moment of an accident, and the relief was immense when we were fairly on the snowfields with all serious difficulty below us. The great bergschrund below the last slope was turned with ease, and at 2.10 P.M. we stood in the narrow gap, between the last

rocks of the Meije and the Rateau, which forms the Col. The whole population of La Grave was collected in the road watching our progress, which excited special interest in their minds, owing to some of their own members taking part in the expedition, which had not been the case in 1864.

I was the only one of the party who knew anything about the descent by the Glacier des Etançons, which is of the most straightforward character. The glacier is at all seasons smooth and little crevassed, and the snow was now so deep that it was impossible to tell the exact point where we quitted the ice for terra firma. The same cause made the walk down to La Berarde less toilsome than I had expected, the mass of stones and débris which renders the Vallon des Etançons a very 'abomination of desolation' to the eye, and painful to the feet, being happily covered up. Although the cliffs of the Meije look from this side almost more tremendous than from the north, I have a notion that, if ever the mountain is successfully assailed, it will be from this direction. The final peak will always present equal difficulties from whichever side it may be approached; but I think that the preliminary obstacles may be found less formidable on the south side than on the north—appearances notwithstanding. We reached Rodier's house at La Berarde at 7.30 P.M., having spent nearly 14 hrs. in the passage, for which 8½ hrs. had sufficed in 1864. The accommodation afforded by Rodier is not extensive; nothing more substantial than an omelette was forthcoming for supper, and I passed a most wretched night in a sort of underground stable, in company with specimens of *almost* every known domestic animal, and, as I believe, *every* known insect in the habit of preying upon the human body. The next morning it was snowing fast, and I had a wet walk down the long valley of the Vénéon to Bourg d'Oysans, where I dismissed my train, who set off home in a wonderful state of exaltation, partly produced by satisfaction at the previous day's performance, but in an even greater degree the result of the potations in which they thought it necessary to celebrate the same. I, for my part, went on to Grenoble by the night diligence, and on the evening of the 17th was once more in London.

I hope that I have said enough to show that mountaineering in mid-winter is not quite so impracticable a thing as it might seem at the first blush, and to induce others to go and judge for themselves. That the winter will supersede the summer in popular favour is neither to be expected nor desired; but it is no uncommon thing for a man to find himself with a fortnight's leisure at Christmas time, and I can imagine no change more agreeable

than, from the exaggerated sentimentality and dreary festivities considered orthodox at that season, to the Alps under their most unhacknied aspect. Fine weather is, of course, even more essential than in summer, but the chances of it are at least as good at one season as at the other, if my experience in two successive winters in widely separated districts can be relied on. The shortness of the days is an obstacle to any very considerable excursion, except when there happens to be a moon, so that it is advisable to study an almanac before fixing the date of starting. But to my mind, one of the great advantages of the winter is that a mountaineer who wishes for a little excitement, is not compelled to seek it in expeditions of the first class; a mantle of snow wonderfully exaggerates the height of the lower peaks and passes, and many of these, which in summer a man is apt to look on as 'grinds' and comparatively void of interest, become very agreeable climbs, and can mostly be accomplished between 7.0 A.M. and 5.0 P.M. —no slight merit in the eyes of those who, like myself, consider the perpetual business of getting up in the middle of the night a considerable drawback to the pleasures of a summer tour. That long and fairly difficult expeditions are feasible I have shown, and I do not believe that they involve any appreciable risk beyond what must be run in the same excursions in summer. Especially do I disbelieve in any greatly increased danger from avalanches; on the contrary, I have a strong opinion that, in the middle of December, the snow on the high mountains is in a very much safer condition than early in June, when some gentlemen are in the habit of beginning their campaigns. At both seasons there are certain slopes upon which it may be unsafe to venture immediately after bad weather, and in such places the same amount of caution must, of course, be exercised, either in summer or winter. Finally, I believe that the Alps in winter offer as great attractions to the dilettante tourist who, in all sincerity, considers that going to the top of a mountain is a mistake, as to the enthusiast who cares more for the climbing, pure and simple, than for the picturesque. No one could have seen Grindelwald as we saw it in the winter of 1866, without carrying away imperishable recollections of beauty, even though he had confined his walks within a very short radius of the village. Let no one fear, therefore, that time or money expended in such an expedition as I have attempted to describe will be thrown away; given fine weather, I am satisfied that anyone who may try the experiment will return, as I did, anxious to repeat it at the earliest opportunity.

NOTES ON THE STRAITS OF MAGELLAN AND THE ANDES OF CENTRAL CHILE. By W. E. HALL, M.A. Read before the Alpine Club, May 4, 1869.

IT will naturally be expected that a paper upon the Andes and the Straits of Magellan should be full of interest and full of information. Let me then at once acknowledge myself to be an impostor, lest expectations excited in the beginning may turn in anger and rend me when I finish by disappointing them. I have indeed passed through the Straits, and I have looked upon some of the mightiest of the Andes, but I have brought back very little which I can hope to be of peculiar interest to the Alpine Club. It was hard to be obliged to say to myself—

Partes dum sese versat in omnes
Invenit mea Musa nihil;

for I confess that I had before my eyes the terrors of a possible paper—the terrors of that paper to which I find myself now committed. And, moreover, I looked upon it as a duty on the part of a member of the Club, fortunate enough to be amongst mountains so little known, and hitherto explored by no mountaineer, not to return without attempting at least to climb some considerable peak. Unluckily, I found it impossible to make any such attempt consistently with the more immediate objects of my journey and within the time which I had at my disposal. Reluctantly therefore I abandoned the idea, and I can only speak of the Chilean Andes with so much or so little of knowledge as the early Alpine travellers of last century obtained when they penetrated to the valley of Chamounix. Of the Straits of Magellan I know still less. It is hardly necessary to say that I did not stay there, for had I done so it would not improbably have been under circumstances which would have effectually precluded me from being present at this or any other meeting of the Club; but it may be as well to warn the reader that my passage only occupied two days, and that consequently my opportunities of observation were of the most slender, and my view of the most rapid kind.

It was on a bleak morning of last October—in other words in the beginning of last summer—that I entered the Straits of Magellan at the rate of two-and-twenty miles an hour, on one of those fierce tides so peculiar to the place, and so dreaded before steam had robbed them of their peril. Flat sandy plains, barely thirty feet above the water-line, stretched over vast

spaces to the south, where in the extreme distance low ranges of humpy hills showed themselves above the horizon; to the north, like plains spreading for a while were bounded ten miles off by the level topped ridge of Gregory's Heights, which marked the bitter climate of the country by showing two hundred feet of snow on a total elevation of a thousand. Had it not been for the wild and the terrible associations of the place, I should have thought the scene one of the least interesting upon which my eyes had ever fallen. In truth, even with Patagonians to my right, Fuegians to my left, a rushing tide of twelve miles an hour below me, and all the memories of Magellan and Sarmiento in my mind, it was difficult to realise that anything so utterly commonplace could be environed by so wonderful a halo of interest as that which surrounds the Straits of Magellan. But presently the scene began to change. Boldly formed peaks, snowy to the point where they met the horizon, rose one after another into view, gradually connecting themselves into a long chain, which by and by as we rushed past the race at Elizabeth Island extended on either side as far as the eye could see, sometimes coming forward in accentuated promontories, sometimes receding into remote distance, sometimes pierced by deep fiords and mighty branches of the Strait. The foreground also had changed. Rolling hills covered with deciduous beech varied the aspect of the northern shores, while the deep mouth of Useless Bay hid the monotony of the land towards the south. Already the scenery was becoming fine; and as the day went on it assumed characteristics continually grander. At night we anchored under the shadow of Mount Tarn, a hill of the shape of a depressed cone, and only 2,850 ft. high, but so draped in thick snow to within six hundred feet of the water's edge, that it swelled in seeming to twice its actual size. Great parallel bands of storm cloud, tinged with deeper purple than I ever before saw, and bringing up one of the true strait squalls, mounted high behind the peak into the frosty sky. The water below rolled in waves of the colour of a glacier stream. And to complete the imaginative impressiveness of the picture we lay in the harbour of Fort Famine, a place which has earned its evil name by the terrible fate of the colony which died there in the end of the sixteenth century. Twenty-three ships left Spain; five reached the Straits; at the end of two years Cavendish and Meyricke found each one man, sole survivor of the founders of two cities.

With the earliest dawn next morning we commenced the passage of the western limb of the Straits. Thenceforward the nature of the scenery was entirely altered. The general

features of the country, the vegetation, the prevailing winds, the very weather of the particular day, change suddenly with the doubling of Cape Froward. One leaves the flat lands of Patagonia and penetrates into the defiles of the Andes; and the remainder of the Strait consists, in fact, of an intricate series of interlacing branches, formed by the valleys of a great mountain system being filled up to a certain level with water, so that they present a geography as complicated as would Switzerland, were it depressed some five or six thousand feet below its actual level. The mountains, as a rule, are not high. The culminating points of the Fuegian group, Mounts Sarmiento and Darwin, fail to reach 7,000 ft.; Mount Burney, the loftiest summit to the immediate north, is only 5,800 ft. high: and the remaining peaks seldom rise much above, and as seldom sink far below, 3,000 ft. But the climate, though not rigorous, is such that there is little difference between winter and summer, and while fuchsias and arbutus grow freely on the edge of the water, great masses of snow clothe the slopes, and feed glaciers in the upper valleys. Though it was the beginning of summer when I was there, the maximum temperature of the day was 46° (Fahrenheit). Deep beds of snow descended to the very edge of the forests; and when the clouds began to lift after a snow storm with which the morning opened I found myself encircled with hills not higher than those at the English lakes, but not one of which was wanting in a robe of perpetual white. The scene had a certain likeness to one of the wilder Scotch lakes in winter. The forests of Winter's-bark and of beech, which in this part of the strait is evergreen, correspond in colour to the fir; great surfaces of lichen-covered rock mixed with patches of emerald green vegetation recalled the russet and gold of bracken and the bright verdure of mossy grass; islands of every size from that of a mere rock to an extent of some square miles were scattered thickly about; and the hills, though draped more completely with snow, possessed the semi-mountain character of Ben Cruachan or Snowdon, rather than the true arête formation. But as the day went on the scenery became more grand. The forests disappeared; the forms became wilder; huge masses of bare rock were but partially relieved by stunted scrub and doubtful grass; bold cliffs broke into the sea; the strait itself narrowed to a breadth often not greater than two miles, and though the clouds which swept along the upper slopes prevented the higher névés from being visible, except through some occasional rent, the glaciers which streamed from them sufficiently attested their depth and their magnitude. These glaciers were by far the purest and

the most exquisite in colour that I have ever seen. Without a trace of moraine or of dirt, their ice gleamed at the distance of a mile with blue as deep as that which one sees inside a peculiarly fine crevasse in Switzerland. Some were mere overflowings from a great plateau; but of two at least, and perhaps of more, the volume was considerable. That which I saw most fully showed an ice fall as broad as, and much higher than, that of the Rhone glacier. They were all steep and greatly broken. One descended abruptly for probably a couple of thousand feet through steep slopes at its head and two ice falls to within a few feet of the sea; another had no less than three ice falls in the portion which I could see in passing.

So soon as the glacier belt is passed the interest of the Straits begins to diminish. The channel widens out. The mountains of the Land of Desolation are marked by high but somewhat monotonous cliffs; those to the north retire more and more into the distance; and by-and-by the strait ends at the magnificent precipices of Cape Pillar.

I had escaped the invariable gale with thick weather on a lee shore at the eastern entrance of the strait; I had hardly expected the good fortune of escaping the equally invariable gale amongst half-seen rocks on another lee shore at the western entrance of the strait. It was pleasant that evening to look upon the Pacific, rolling indeed with a heavy sea, remnant of a past storm, but windless and without prophecy of wind; for I was not in a vessel in which I would have much cared to face the gales of a region about which Alva dryly remarked that, 'if a ship only carried out anchors and cables enough for her safety against the storms in that part of the world she would go well laden;' and the storms of the Atlantic, about which he knew, are but as the ripples of the Pacific. The names which in going through the Straits meet the eye express aptly in their crescendo of ill-omened sound the progress of inhospitableness and of danger. La Punta de Nuestra Señora de Gracia and Port Gallant must have been christened, I should suppose, before the Straits earned their reputation; but Anxious Point, Goback Cove, Port Famine, Harbour of Mercy, and Land of Desolation, indicate each a different kind of peril. Devil Isle must have been named by some one whose endurance had been sorely tried; but it is only when the extreme western end is reached that the Four Evangelists, the Twelve Apostles, Westminster Hall, and the Judges, all appear at once in one constellation of horrors.

It was on the fifth day after this, on looking out of my

window the morning after my arrival at Valparaiso, that my eye rested on a considerable peak rising conspicuously in the direction of the Andes. It had large patches of snow upon it, but, on the whole, it was rather a rock than a snow mountain; and as its contour was not precipitous this, together with the extraordinary degree to which its details were distinctly visible, made me suppose that it was some outlying buttress of the great chain. I gazed at this mountain all day without the idea entering my head for a moment that it might have claims to be of higher importance. In the evening I chanced to be on board the English surveying ship, the 'Nassau,' and there to my astonishment I learnt that my poor secondary peak, my mere buttress, was nothing less than Aconcagua itself. I had been staring all day from ninety-five miles off at a mountain of 23,600 ft., through an air so disagreeably harsh that I was able not only to draw the outline accurately but to mark the exact forms of snow and rock; and while seeing so clearly I had observed nothing either in shape or quality of surface to induce suspicion that I was looking at the highest of the Chilean Andes.

It was my first great disappointment in Chilean scenery. It was not, I am sorry to say, destined to be my last. The plains, or rather the broad flat-bottomed valleys, for strictly speaking there are no plains in Chile, are rich in agricultural produce, but pauper in picturesqueness or beauty. They bear no trees save Lombardy poplars and occasional willows, with still more rarely a solitary maiten; even the olive from being cultivated almost exclusively in the neighbourhood of widely parted villages fails to give character to the general landscape. The bounding hills, arid and denuded of soil, are fruitful of nothing but thorny mimosa and thornier cactus. Often, it is true, the eye may wander away to the great range of the Andes themselves, and their height, together with the extent of view permitted by the transparent atmosphere, affords an element of grandeur which can never be destitute of effect. But I know no distant view of mountains so little striking as, on the whole, are those of the Andes from the Chilean plains. One alone is remarkable. The superb dome of Monte Plomo, sixteen thousand feet above Santiago, looks down upon the city from a distance of only thirty miles, through a valley washed by the poplar-edged waters of the Mapocho; and every evening the dainty-footed Santiaguinas, as they stroll up and down the Calle de las Delicias, can watch the rose tints on the snow through the intervals of spreading trees, or can look at the harsher colours

which dye the rocks of two minor spurs pushed down from the great chain till they almost overhang the town. But commonly the Andes present neither such isolated forms nor such excellent grouping. The range is straight; it has no elbows like that which the Alps form at Monte Rosa; it has no sinuosities, it has no ganglions of high mountains like the Oberland clump, from which branches issue in diverse directions. Except where a huge peak, some eighteen or twenty thousand feet high, breaks through the monotony of the ridge, this straightness is unrelieved by any considerable inequalities. The general height of about fourteen thousand feet is so maintained, that often for considerable spaces no separate mountain can be distinguished. Huge and precipitous rocks serrate the crest, but from a distance they produce no more effect than broken glass on the top of a wall. Even where the highest summits occur, and they are very few in number, they do not dominate over their fellows with an authority proportioned to their height, except when seen from an extreme distance; because, instead of being the culminating points of the ridge, they are all, I believe, pushed up on the inner flanks of the chain, and are therefore retired behind it and partially based on the plateau which intervenes between the eastern and western Cordilleras. Moreover, being extinct volcanoes uncarved by the action of ice, their forms are naturally poor in comparison with those to which we are accustomed in the Alps. The subordinate ranges which lie between the higher mountains and the plain exhibit to a large extent like peculiarities. They tend to parallelism; their summits are not deeply cut; and though they spring with extraordinary abruptness from the level land, they seem rather to be exaggerated hills than true mountains.

If the aspect of the Andes from a distance is unsatisfactory, not less so is the scenery characteristic of their recesses. On two occasions I saw this to a certain extent. A week or so after my arrival in Chile, I set out to make a preliminary acquaintance with the mountains and with the country folks with whom I hoped to have to deal in future expeditions, by crossing the Cumbre, a mule track which passes the main range at a height of 12,500 ft., and which serves during the five months of the year in which it is open as a channel for the greater part of the commercial intercourse which is carried on between Chile and the Argentine Republic. Unfortunately an attack of that dysentery from which strangers in Chile very commonly suffer compelled me to return to my bed at Santiago without finishing even this small trip. But I saw something of Andean land-

scape ; and I saw more of it during a week which I spent at Cauquenes, a bathing-place in the valley of the Cachapual, the position of this part of which relatively to the main chain I can only so far define as to say that I was able in a short ride over a chain of hills behind the baths to see the last mountain wall rising at my feet from a valley in which also flowed the Cachapual, and in a long day's ride to follow the course of the valley itself for a considerable distance. A sketch of one such ride will perhaps be the best vehicle for conveying an idea of the nature of the Chilean Andes.

One morning I started from Cauquenes on one of those marvellous little Chilean horses, which go at a scrambling canter over ground where an English horse would simply refuse to move, and with a wild-looking fellow, three-fourths Indian in blood, for guide. At first the path lay over a bare hill side, where a few goats found scanty herbage, tall cactuses grew unbranched to a height of a dozen feet, and orange-coloured lilies, and multitudes of flowers of more modest tint, sprang from beneath every stone. Every here and there we would come to some deep quebrada, or water-cut ravine, where the horses climbed at their will down the rotten earth, or over jutting bits of rounded rock, at inconceivable angles of inclination. Then succeeded a stretch of upland pasture ; and then a loose wood of scattered trees, in effect not unlike cork trees, beautiful in their unchecked growth, but in the aggregate destitute of that impressiveness which only thick and lonely-looking forests possess. I almost seemed to be travelling in a finely-timbered grassless park. Presently again the wood thinned still more, and from a gap in the hills I looked over at the snow mountains on the far side of a two-branched valley which sank deep below me. The scene was large, and in its largeness grand ; but to an eye trained to look at mountains in the Alps, there was a strange want of the finer elements of mountain landscape. There were huge precipices, long slopes of débris, vast spaces of pasture, all bigger than like things in the Alps ; but as the eye travelled up and along continually, sated with repetition of the same features, it longed to arrive at some point where the order of nature would be different, and where scale would be marked and emphasised by the presence of glaciers and the evidence of perpetual snow. I take it that one chief source of the impression which a great snow mountain makes upon us is, that we recognise in looking at it that we are separated from its summit by a great space in which we could not permanently live, and in which the order of nature is in every way different from that which regulates

the world of our habitation. This source of effect is entirely wanting in the Andes. So far as I could learn—and I have spoken on the subject to Professor Domeyko, whose authority is greater than that of any man except Señor Pissis—there is no such thing as a glacier in the Andes of Central Chile. Probably the first which occurs in going south is a flattish aggregation of ice, which lies under the Volcan de Chillan, and is apparently something like that in the Segnes Pass. Perpetual snow there of course is, varying greatly in quantity from year to year, and existing, it would seem, down to levels differing much in different places. But lying as it does mainly in the dips, blown off from even the blunter projections, failing to send down in streams of ice the evidence of its force, it is hard to realise its permanence, and the imagination is affected but slightly. Before I left Chile, that is to say, by a time which corresponds to the end of July in Europe, I noticed that a blunt round shoulder close to the top of Monte Plomo (17,825 ft.), and, consequently, about 17,000 feet above the sea, had become entirely denuded of snow. This, too, I would remark, was after the most snowy winter that has been known for very many years. I have little doubt that I saw the Andes under peculiarly favourable circumstances, and that the poverty of snow which was so conspicuous in December and January last would be evident to a greater degree and more early in ordinary seasons. Indeed I was told that Aconcagua is often nearly absolutely bare, and even when I left the quantity of snow up it was so small as to be surprising in the extreme. One of my reasons for supposing, when I first saw it, that I was looking up a comparatively inconsiderable hill, was that although its angles of inclination were not severe, no great fields of snow existed upon it at any part. Yet, when I first saw Aconcagua, spring had so barely merged into summer that the first strawberries were only just ripening, and I need hardly again recall to remembrance that this was after a very snowy winter. It would be sufficiently curious in any case that a mountain more than 23,000 ft. high should be so exceptional in character; but I was still more surprised to find before long that all the higher summits were not merely snowless by comparison with those of Europe, but that elevations of more than 15,000 ft. were at that time of the year less snowy than a belt from that height down to perhaps 12,000 ft. There was a distinct line of snow along the flanks of the Andes within the limits I have mentioned, while above, about 15,000 ft., the mountains told as rock peaks. The difference was greatly lessened in the course of a couple of months by the melting of

the lower snows ; but it is clear that during the winter less snow existed in the great than in the small mountains. No one was able to give me an explanation of the phenomenon, and I am therefore driven myself to offer a theory, very simple and obvious, but which I put forward with some hesitation, because I found that it had not suggested itself to the minds of people on the spot, and that when suggested to them it received an assent rather of civility than belief. It is evident from the small quantity of snow existing in the Andes relatively to their elevation, that the snowfall is not large, and even the rainfall on the lower lands of Central Chile is extremely slight ; it seems to me therefore that nearly all the moisture present in the atmosphere becomes exhausted before the higher levels are reached ; that, in fact, Aconcagua and Tupungato may be said to be beyond the limits of precipitation.

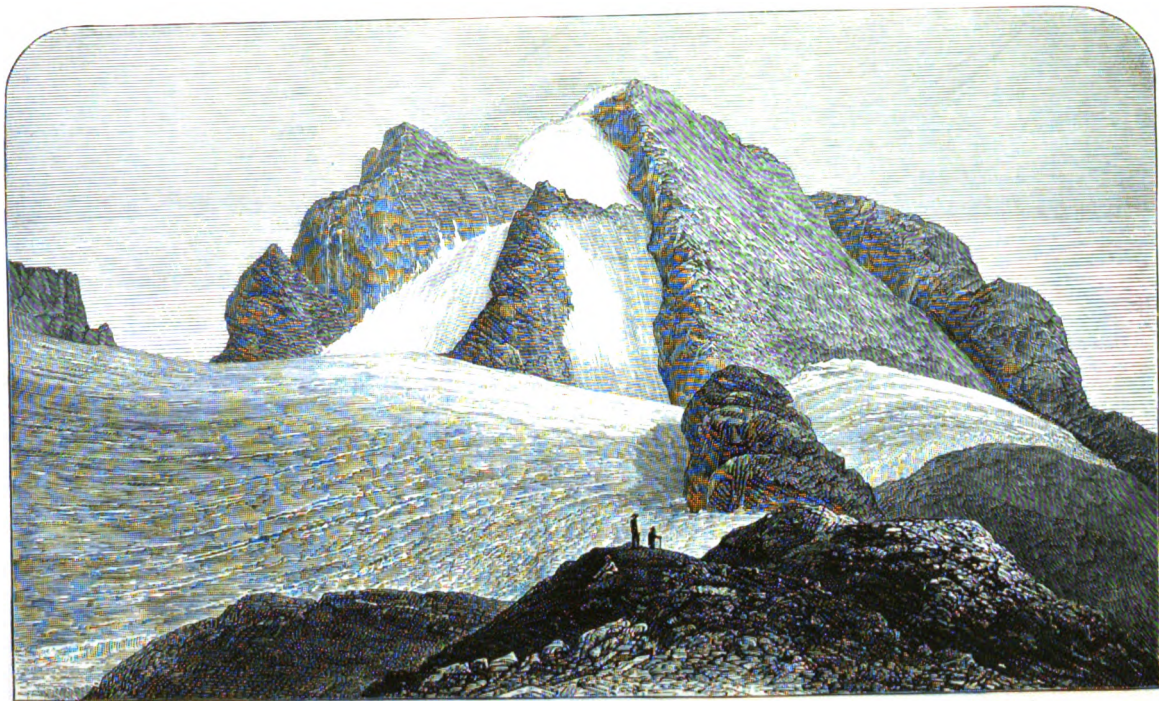
But however this may be, and whether or not the great peaks of the Andes are condemned to everlasting dryness, it is clear that I have wandered into regions of arid theory far from those humble elevations which I set out to traverse when I left Cauquenes. If I may be permitted to return to them with an apology, I will suppose that my horse has carried me, while my wits have been wool-gathering, far down into that valley of which I spoke before ; and I will resume my description at the moment of leaving an hospitable mine owner, who spoke French and gave me English ale in an isolated shanty of two rooms. From this last outpost of civilisation onwards, the scenery grew wilder and wilder. Generally we rode not far from the boisterous river—sometimes a couple of hundred feet above it, on eighteen inches of sloping track just traced in the crumbling cliff—sometimes over bits of sward—sometimes through dense underwood, out of which stood every here and there a well-grown tree, peopled with innumerable parrots, discussing in solemn parliament the invaders of their land. Once or twice we passed huts of wattled sticks, in which the shepherds of the upland pastures live ; and at last we came to the term of our journey in a bold and savage spot. The great cliff which had always overhung us, the long slopes of débris stretching unendingly up the mountain sides, the glimpses of snow above, the snow-topped wall in front, were all there still, but brought closer and more grandly together ; and from an unseen gulf below came a great roar of water. Presently we began to descend a gully so steep that we were obliged to dismount from even Chilean horses ; then the gully became a water-course, where a cataract had fallen in wet weather, and even Chilean horses had to stop. Finally, by what was almost

a scramble, we arrived at a bridge made of two poles stretched from one rock to another, which came forward to meet it. The Cachapual tumbled along 150 feet below. The cliffs went down almost sheer; from under the bridge they receded. The steep banks above, covered with flowering brushwood, rose so high and so narrow that one could only just catch the projections of the mountains over them. It was by far the grandest scene that I saw in Chile, and it was at the furthest point of my penetration into the mountains. If I say more I shall have to come down to meaner things. Here, therefore, I shall end that unmountaineering account of high mountains, which, to my sorrow and to my own disappointment, I am only able to give. I would fain have been more amongst them; but it is a consolation to me to think, and I am glad to say to them who might otherwise pine for travel in the Andes, that I only lost in not doing more those pleasures of life in an uninhabited country which can be got in many places. The scenery, as I have said, is not extraordinary; the peaks are, as mountains, uninteresting; and the difficulty of organising an expedition would be excessive. The natives of Central Chile are afraid of the mountains; and if anyone proposes to climb its peaks, he will have to bring down miners from the northern provinces—scoundrels, probably, but fearless and accustomed to rocks.

To the Editor of the Alpine Journal.—Sir,—If the pass named by Mr. Noel, in the narrative of his expedition published in the last number of the ‘Alpine Journal,’ the Renferjoch, is the same as the Wetterlimmi pass of the Federal map, he was preceded in that route by my friend Mr. A. Johnson and myself, accompanied by the guides Nägeli and Kaspar Blatter, and a porter, who was hired to carry our knapsacks, as we had thoughts of going on to the Grimsel. We started at 3 in the morning of August 8th, from the baths of Rosenlauri, and made a considerable portion of the ascent to the plateau of the Rosenlauri glacier, over the rocks of the Dossenhorn, which in one place we found difficult to climb. On reaching the névé we proceeded to cross it to the rocks of the Wetterlimmi, and, descending by them to the Gauli glacier, made for the Urner Alp, where we rested awhile, and then went down the Urbachthal to Hof, arriving at 10 in the evening. I am, sir, yours obediently,

R. N. HAYWARD.

. *The Review of the Third Part of Mr. Ball's ‘Guide’ will appear in our next Number.*



MONT PERDU, FROM THE LAC DU COL.

THE
ALPINE JOURNAL.

NOVEMBER 1869.

THE MONT PERDU. By JOHN ORMSBY.

A MOUNTAIN so famous among the mountains of the world as the Mont Perdu may perhaps, of its own right, claim a space in the 'Alpine Journal,' albeit only one of the Pyrenees, short of 11,000 feet, according to the latest measurements, and climbed so long ago as 1802. But I prefer to plead the more practical argument, that since the new route has been discovered the ascent affords one of the best and most varied of the *grandes courses* of the Pyrenees, and what even the most staunch partisan of the Alps would, I imagine, admit to be a very fine expedition. As Gavarnie is, probably, not quite as familiar to all the readers of this journal as Zermatt or Grindelwald, a word or two may be given to the geography of the neighbourhood. The Cirque de Gavarnie may be roughly described as a horseshoe, the toe of which points nearly due south. Over the western bend is the Brèche de Roland, and over the eastern rises the Pic de Marboré. From the latter there projects, in a south-easterly direction, a huge buttress, out of which rise the two summits of the Cylindre and the Mont Perdu. It is to this arrangement that the French name of the mountain is due, and, as Ramond says, 'since names were first given to mountains, never was one better named.' It is hidden from France by the main chain of the Pyrenees, or at least is only visible from a few elevated points on the French side, such as Pic du Midi or the Pimené; and consequently, in the early days of Pyrenean exploration, there was a vast amount of confusion and contradiction as to its exact position. The Spanish

name is not less significant. It is, to be sure, known in Spain as the Monte Perdido; but that is merely a translation from the French, and *there* a positive misnomer, for, from almost every point on the south side commanding a view of the Central Pyrenees, the Perdu is a most striking and conspicuous object. The true Spanish, or, to be more correct, Arragonese title, is *Las tres Sorellas*, 'The three Sisters,' and refers not to the Perdu alone, but to the *tria juncta in uno*, the entire mountain buttress already mentioned, composed of the Pic du Marboré, the Cylindre, and the Mont Perdu. The name is not an inexpressive one for the trinity of peaks, standing out from and over-topping the chain of the Pyrenees, as it is seen from such a spot, for instance, as the esplanade of the Aljaferia at Saragossa. From this point, allowing for the difference of distance, the *Tres Sorellas*, both in form and arrangement, reminded me strongly of the group of the Eigher, Mönch, and Jungfrau, as seen from Berne; sufficiently strongly, at least, to make me register a vow (as they say in novels) to cultivate a closer acquaintance with the Mont Perdu the first time I should find myself in its neighbourhood; and the opportunity for redeeming that pledge presented itself in the autumn of 1868. To return, for a moment, to topography. Following the curve of the cirque, the next point after the Pic du Marboré is the Pic d'Astazou, and between the two is the notch in the ridge known as the Brèche d'Astazou. To any one with a good map before him, the Brèche d'Astazou would at once suggest itself as the right route for the Mont Perdu from Gavarnie, for it lies precisely in the direct line from the village to the summit; but to any one looking at it from the opposite side of the cirque, the passage would seem hopeless. 'Une fenêtre ouverte sur le plus affreux des précipices,' is Ramond's description of the Brèche on this side. The rocks below it are apparently absolutely perpendicular, and the glacier below them as nearly so as the habits of a glacier will permit it to be. The recognised route up the Mont Perdu remained, therefore, the old circuitous one through the Brèche de Roland; and round by the southern slopes of the Marboré and Cylindre, to the Gaulis hut, where the night was spent. Recently, however, the Passets of Gavarnie made the discovery that the Astazou was not so bad as it seemed, that there was no difficulty at all about the glacier, and that the rocks, ugly as they looked, were quite practicable. The route is, indeed, set down by Count Henri Russell, in his admirable mountaineers' Guide,*

* *Les grandes Ascensions des Pyrénées.* Hachette & Co.

as 'course assez difficile: plusieurs mauvais pas,' and it certainly is a good deal more difficult than the old route; but then it gives far more genuine snow and glacier scenery, and occupies about one-third less time, so that travellers who have an invincible repugnance to camping out or sleeping in a small smoky hut can, if so minded, return to Gavarnie the same night. I was fortunate enough to secure as guide the younger of the Passets, Henri, who, on rock, ice, or in bivouac, is all that could be desired as a guide and comrade; and I willingly agreed to his proposition, that, partly because the days were growing short, partly for the sake of variety, we should return by the old route, through the Brèche de Roland.

Another of the merits of the Astazou route is, that you get to work very soon. The ascent begins almost immediately after leaving the village, and the first 'mauvais pas' is reached in about an hour and a half after starting. This is the spot called Rochers Blancs, a long slope of smooth limestone overhanging the precipice on the eastern side of the cirque. The precipice here is certainly not as deep as it is farther on in the neighbourhood of the cascade; but 'tis enough, 'twill serve,' should any hapless wight lose his footing, and go over in crossing the slope, which, though not inclined at a very terrible angle, might, with advantage, be less steep. Nor is it altogether one of those places where a slip can only occur through carelessness or clumsiness, for the few and small crevices there are in the rock scarcely afford purchase for the point of the bâton, or the boot-nail; and, indeed, I incline to the belief that the traveller here would be better without his boots, and, if luxuriously inclined, with a pair of alpargatas, the hempen-soled sandals of the Spanish peasant, which are the most comfortable chaussure ever invented for smooth rocks. Above this point, the rocks grow rapidly steeper, but more honest, affording good foot and hand hold, and are, after a while, succeeded by an incline of sliding shingle, leading up to the foot of the glacier below the Brèche. This glacier is rather steep; but, being on the shady side, it was, when we came upon it, in good condition, and required only moderate step-cutting. The upper part runs up into a funnel-shaped couloir on the right of the Brèche, at the foot of which, according to Count Henri Russell, is a 'très-mauvais pas.' On this occasion, however, the passage from the ice to the rocks was not difficult, and we were not saluted by any of those discharges of stones down the couloir, which, according to him, are among the agréments of the spot. After this, there only remain a few minutes of very stiff climbing, and a few more of scrambling, bearing

rather towards the north-east, to reach the Brèche, which, though from a distance appearing a mere notch, is in truth more in the nature of a col. Here was a complete change of scene. Up to this, the view had been bounded by the range of battlements surrounding the cirque; on the left, the Pic d'Astazou, in front the Pic du Marboré, and the cluster of pinnacles overhanging the source of the cascade, and on the right the long line of the Marboré wall, with the Tour and the Casque for turrets, and the Brèche de Roland gaping like a huge embrasure. As we rose, the cirque itself sank away under our feet, till it looked at last like the mouth of a vast, dark, bottomless pit, a valley of the shadow, while the snow-streaks round its rim spread out, step by step, into broad snow-fields, lying on 'monstrous ledges,' that

' Slope, and spill

Their thousand wreaths of dangling water-smoke,
That like a broken purpose waste in air.'

And here I may note one great advantage of the Astazou route, for the ascent at least—for there is of course the corresponding disadvantage in the descent—that being on the eastern side of the cirque, you mount upwards in grateful shade, while on the opposite side the full blaze of the sun is beating upon the track up to the Brèche de Roland. At the col the whole expanse of the Perdu Glacier, the finest, perhaps, in the Pyrenees, except that of the Vignemale, comes into view, sloping down eastwards to the Spanish valley of Bielsa, of which it is indeed the head. It lies in an oval basin some mile and a half long by a mile wide, bounded on the right hand or S. side by the Cylindre and Mont Perdu, and on the left by the Pic d'Astazou and the long ridge called by Ramond the 'Tuque-rouye,' from which he obtained his first near view of the Perdu, so admirably described in his *Voyages au Mont-Perdu*.* As I have already compared the position of the Perdu to that of the Jungfrau, I may follow up the comparison by putting this col as the representative of the Mönchjoch, but the parallel holds good only as regards situation. The glacier basin at its foot may indeed have a certain resemblance to the upper basin of the Aletsch in form, but the square top and russet cliffs of the Cylindre have nothing whatever of the character of the Mönch about them, nor is there

* The frontispiece of this scarce book (of which the Club possesses a copy) shows the wall of the 'Tuque-rouye' from the French side, with the top of the Mont Perdu appearing over it.

any reminder of the Jungfrau to be found in the appearance of the Perdu. If the latter on this side resembles any Alpine summit, it is perhaps Mont Blanc, as seen from the Col du Géant; but, of course, a liberal discount must be allowed for difference of bulk. It is a dome of snow rising above a range of precipices, against the base of which the glacier leans. Between it and the Cylindre is a col, approached from the glacier by some steepish rocks, and from this a jagged arête, perfectly precipitous on the glacier side, and, from a distance, perhaps a trifle ugly to look at, runs right up to the foot of the final snow. This col is the meeting-point of all the routes now recognised, and Ramond's instinct led him to cast an eye upon it when scrutinising the Mont Perdu for the first time. But he seems to have had doubts about the rocks below it, and when he did make his final attack, it was from the other, the eastern side of the mountain, from the Col de Niscle, in the ridge dividing the Bielsa Valley from that of Fanlo. I may observe here, parenthetically, that Ramond was not, as is generally stated, the first to ascend the Mont Perdu, and he himself admits as much. The philosopher is always pleased to find the same popular legends repeated in nearly the same form in different countries; and here in the Pyrenees it is interesting to come upon another version of the old Alpine tradition of the 'Chamois Hunter,' so familiar to explorers in the Alps. But they order this matter better in the Pyrenees. The hunter Ramond was told of had reached the summit 'à l'aide du diable, qui l'y avait conduit par dix-sept degrés.' The rationalist will perhaps say that these were merely steps cut in the snow with a material hatchet, but the diabolical terraces on the S. side of the Mont Perdu, of which there are four or five still remaining, will furnish a much more satisfactory explanation to the mind of the true believer. The glacier on the farther side has crevasses on a scale sufficient to convince any sceptic that the Pyrenees, when they try, can come out in that line quite as strong as the Alps, and above them it slopes upwards with such rapidly increasing steepness that it seems as though it must inevitably have turned over but for meeting the rocks. Just below the col we overtook a party of three, which had preceded us, and turned out to be the Rev. E. S. Frossard, chaplain to the Consulate at Bordeaux, one of the most energetic members of the Pyrenean Club, the Société Ramond, with the guides Hippolyte Passet of Gavarnie and Joseph Barrane of Cauterets; so that the final attack on the Mont Perdu was made in some force. Count Henri Russell says that, though a 'piéton sans peur'

may follow the arête before mentioned, which joins the col with the top, it is better to ascend by the steep slope farther to the right, where a fall would not be fatal. I cannot say I agree with him—if I may venture to differ with so experienced a mountaineer. The slope in question—we tested its quality in the descent—is composed of that aggravating species of débris which gives way in a miniature avalanche under every step, and makes progression a most disheartening labour. It is a sort of slope common in the Pyrenees, and of which the best—or worst—example in the Alps is, perhaps, that abominable one at the head of the Kien Thal, just under the col of the Furke; a sort of slope that reminds you of the old problem, in which you are given a snail going up a wall under the peculiar conditions, as well as I recollect, of sliding down two feet for every foot he crawls up, to find how soon he will reach the top of the wall. Whatever the answer may be, on a spot of this sort, it is impossible not to sympathise with that snail. The arête, on the other hand, though perhaps it may have some slight claim to the title of ‘difficult,’ does not, I think, fairly deserve the character of dangerous; that is if, as I think it ought to be, the term dangerous be reserved for places where, in spite of due care and precaution, an accident *may* happen. There are, perhaps, some ill-favoured spots, but there is everywhere plenty of hold for hands and feet, and nothing whatever to justify a descent on the glacier. Anyone particularly liable to giddiness, or with a congenital tendency to suicide, would perhaps exercise a wise discretion in fagging up the slope, but there is no reason why anyone else should avoid the arête.* At the top of the arête all trouble is over, and a few steps cut in the hard snow landed us on the summit of the calotte, in about seven hours from Gavarnie, exclusive of halts, which, I presume, was fair going, as it is only half an hour over the time given in the *Grandes Ascensions*, the author of which, as he himself admits in his preface, travels at an uncommonly good pace. On the extreme top there is a little bare scalp of loose stone, the highest limestone in the Pyrenees, and, I suppose, in Europe, which we found comfortably aired and warmed, and such an agreeable lounging-place that we did not quit it for more than two hours. A dome-shaped top has one advantage over a peak or a pyramid, at least if its curves are sufficiently bold and regular to hide the lower portions of the

* The arête is shown to the left in the sketch, the slope immediately to the right of it. The view is taken from the shore of the little lake just below the col, on the south-west side.

mountain, that it gives a complete sensation of lofty isolation that adds very much to the effect of the view. Thus, seated on our patch of shingle, we might, but for its hardness, have fancied ourselves upon that famous travelling carpet of the Eastern tale. We seemed suspended in mid-air, without any connection with the earth below. Solidity, as far as we were concerned, seemed to terminate a few yards beyond the toes of our boots, and the nearest object in space was the huge cliff of our neighbour, the *Cylindre*. The view is necessarily a fine one. Standing out as it does from the main chain, and just at the centre of the central Pyrenees, the *Mont Perdu* commands an unbroken panorama of all the finest portion of the range. All the great peaks are in view, from the *Nethou* in the E. to the *Matterhorn* of the Pyrenees, the *Balaitous* above *Panticosa*, on the W. The most striking are, I think, the *Posets* and the *Vignemale*, the latter of which, with its great expanse of glacier, is perhaps the finest object in the view. The differences between a Pyrenean and an Alpine panorama are of course very considerable. The mountain forms in the former are, I think, more varied, but one misses the vast wastes of snow over which the eye travels from an Alpine height; and still more the long lines of glacier serpentine down the valleys; for all the glaciers of the Pyrenees are of the hanging glacier order, except the one below the *Perdu*, and even that may be rather said to fill a basin than descend a valley. Of the French side, of course there is nothing seen except the tops of a few peaks, among which that grandest of little mountains, the *Pic du Midi de Bigorre*, shows nobly. Of the Spanish, on the other hand, the view is most extensive, but at the same time most monotonous. In every direction it is the same vast expanse of bare brown sierras, all as like one another as waves. If I had not had the evidence of my own eyes for the truth of it, I should have set down as a myth the story about *Saragossa* being within the range of vision from the *Mont Perdu*; for not only was the city invisible, but even the valley of the *Ebro* seemed to be screened by intervening mountains. Almost the only striking object was an odd-shaped mountain to the SW., which somehow seemed familiar to me, and which the map and compass proved to be the *Peña de Oroel*, near the town of *Jaca*. Nothing could be simpler than the descent by the S. side. Below the col there is a succession of terraces, forming a sort of giant staircase, by which the *Gaulis* plateau can be reached in about two hours. Any tolerably practised mountaineer might, without the least difficulty, make the ascent on this side without a guide. He

has only to steer for the col between the Perdu and the Cylindre, ascending from terrace to terrace by any practicable passage he can find, and then turn off to the right up the arête. We found the Gaulis hut untenanted, and therefore unprovided with wood, so we had to descend some forty minutes more to a lower hut, where we found the solitary of the mountain, the Spanish shepherd who lives up here for about two months of the year, when pasturage has become scarce lower down. Alexander Selkirk was hardly more out of humanity's reach on Juan Fernandez. The nearest human habitation is at Fanlo, some eight or ten miles down the valley, and there is not a sign of the existence of man, not even a distant curl of rising smoke, to be seen within the limits of that mountain wilderness. The hut here is more roomy than that higher up, and is perfectly waterproof overhead, the roof being a slab of limestone, about eight feet thick on a moderate calculation. We found it, on the whole, tolerably comfortable quarters, and so, apparently, did the smoke, which, declining to face the cold night air (or it may have been the wolves), always turned back from the door and rejoined our circle round the fire. The consequence of this was, that when the sun rose upon our party next morning, we showed much more like a party that had just come down a chimney than one that had been up a mountain. The floor, too, might with advantage have been softer, or, at least, more accommodating in its projections and depressions to the moulding of the human form, and somewhat less favourable to the study of practical geology. Granite, I believe, has not been observed to crop up anywhere on this side of the Mont Perdu; but this I know, that some rock, harder than any limestone ought to be, was cropping up into me the whole night long. All of us, it appeared on comparing notes in the morning, had made the same discovery, except the shepherd and the Cauterets man, who, all through the night, had contended in alternate strains of snore, like a couple of Arcadians in an idyll.

Had we stopped at the upper hut we should probably have tried a route for the Brèche de Roland recommended by Count Henri Russell, which leads under the summit of the Cylindre, and then along the top of the wall of the Marboré—a route which must give the most noble views of the chain and of the cirque. But we had descended rather too low for such a détour, so we followed the ordinary line along the Millaris plateau. The Brèche de Roland and the descent into the cirque have been too often described to justify another description: suffice it to say that by noon we were at breakfast at

the cosy little hotel at Gavarnie, and engaged with a dish of trout, the recollection of which makes me wish I were putting the finishing touch to the expedition instead of to the account of it. It is one which, I think, may be safely recommended to anyone desirous of making a 'course' in these mountains as the compactest and completest he can well make. It affords views of the very cream of the Pyrenees, and includes the passage of three of the highest cols in the range, besides the complete tour of the Cirque de Gavarnie, an amount of variety greater than is generally to be found condensed within the limits of a single expedition.

THE TERGLOU AND MANGERT* IN CARNIOLA.

By ELIOT HOWARD.

AS the peaks and valleys of the Western and Central Alps get well trodden, the question arises—What sort of country is to be found farther and farther eastward, beyond the limits of Switzerland, and even of Tyrol?

The desire of settling this question for oneself is increased in the mind of anyone who has read Messrs. Gilbert and Churchill's delightful book, which gives so thorough and so pleasant a description of a great deal of this district; and I think that few who make the experiment will have cause to regret it.

I will not, however, be too certain. There are some ardent lovers of the Alps whose admiration appears to be almost confined to glaciers and snow, and to whom the most majestic rock scenery or the richest valley combinations of meadow, wood, and water scarcely offer any attraction.

Such travellers as these I should recommend not to come much farther east than the Gross Glockner, and not to weary themselves with reading this article; but for those who may wish to know what mountaineering in Carniola is like, I propose to give a sketch of a few pleasant days spent there this year; and they must pardon me if I sometimes am led by agreeable reminiscences more into detail than they may think needful.

Towards the end of last May I joined Mr. F. F. Tuckett and his guide, Christian Lauener, of Lauterbrunnen, at Saltzburg, and spent a very pleasant ten days exploring some of the valleys of Western Styria, emerging on the evening of June 4 at Klagenfurt, in Carinthia. From thence, sending

* Slovenic names 'Triglav' and 'Manhart.'

our heavy luggage to meet us at Cortina d'Ampezzo, we started to cross the Karawankas range by the Kotschna pass (about 5,200 ft.) into Carniola.

We drove across the valley to Windisch Feistritz in about two hours; there picking up the village shoemaker as porter and guide, we walked up the Bärenthal, one of the most beautiful valleys of the Karawankas range, enclosed by the Stou (7,326 ft.) and the Kotschna (6,862 ft.); two of its principal peaks, and an outlying spur terminating in the Matschacher. The former mountain is a favourite point of view among the German tourists, and appears to be fairly easy of access. The usual plan seems to be to sleep at a chalet room kept for the purpose at the Bärenalp, and to go up to see the sunrise.

Our pass lay between the Stou and the Kotschna, and from the top we obtained a fine view, backwards, of the valley of the Drave, with the tall church towers of Klagenfurt and various valleys and ranges beyond, and forward (which commanded most of our attention) of the central range of the Carniolan Alps crowned by the Terglou.

This summit is so protected in almost all directions by large outlying buttresses that it is difficult to obtain a view of it except from some point from which you command the whole range, from its richly clothed base to its ragged pinnacles, where even the snow can only find footing enough to form a single glacier.

In the month of June, two years ago, we had spent some time in the district without the weather allowing us even a glimpse of the summits; our satisfaction was therefore the greater at the likelihood that we should at last be able to make the nearer acquaintance of this peak, of the difficulties of which we had heard such fabulous accounts. Christian Lauener's contentment was also great at the prospect of having at last some work more worthy of him than most of our Styrian travels had proved.

From the pass we made our way quickly down through thick woods watered by an abundant clear stream, a great rarity in many parts of Carniola and Friuli. After passing various signs of iron-working industry, at 3.30 we reached Jauerburg in the Save Valley, a village busy with the furnaces of Baron Zoys, the great iron-master of the district.

Into the garden of this gentleman's château we found ourselves most unintentionally straying, having mistaken the instructions of a native who directed our search after refreshment; we at last, however, found the desired beer in the lodge, and paying off our porter, shouldered our luggage and started for Veldes.

A good carriage-road turns off a little above Jauerburg, crosses the Save and winds up a steep hill on the south side of the valley, through beech woods, emerging into an exquisite park-like glen, which, in course of time, leads you down to the Radoina stream (a name corrupted by the Germans into Rothwein), and thence through meadows and past orchards to the pretty village of Veldes, on the lake of the same name. This charming little lake lies almost in the corner formed by the junction of the Wurzen and Wochein Saves; on its west and north sides rise the final crags of the Pokluka—a tableland outlier of the Terglou, and on one of them is perched the castle, nearly 400 feet above the lake, while on a solitary island in the middle is the picturesque pilgrimage church of Maria See. It produces a curious effect, on a first visit, to the traveller surmounting the low ridge which bounds the lake on the south, to see the Wochein Save (or Savitza) flowing only 400 yards distant, and at a level some 150 feet lower than the lake. The beauty of the little lake itself and the grand views of the mountains round make it a very favourite place of resort, and entitle it to its name of the 'Gem of Carniola.'

We pushed on past the more modern and pretentious hotels in spite of the ominous suggestions of Christian that we were leaving the last house of the village behind us, and were getting a little doubtful about the correctness of our own topography, when turning a corner we came in sight of the hamlet of Seebach and Petran's homeish inn. Very pleasant was the friendly greeting of the kind hostess, and very great was the temptation to spend the rest of the golden evening lazily sitting in the garden by the lake feeding the shoals of fishes and looking at the view; but we had still work to do, and after hurrying through Mrs. Petran's good dinner and making sure that we should find something to eat at our next stage, we mounted in a Zweispänner and started in the twilight to drive up the valley of the Savitza to Feistritz. The number of places or streams with this name is very confusing—we came to no less than three in as many days. The original Slovenic name 'Bistrica,' doubtless has some apposite meaning; but it is difficult to find out, for if you consult either a native or a dictionary, you learn that it means 'Feistritz,' which leaves you as wise as you were before.

The name of the *Pusterthal* (between Brixen and Lienz) is perhaps derived from the same word, carrying us back to the time when the Slovenic population covered much more of the South of Austria than it does now.

We were trotting briskly up the entrance of the valley

when one of the light waggons of the country, loaded with iron rods, came quickly down towards us. The driver, being evidently drunk, took no notice of us, and we only escaped a collision by the horse turning a little aside of his own accord. We had hardly time to congratulate ourselves on our escape when a loud crash made us look round, and we saw the waggon, load, and horse upside down in the meadow, which lies here some feet below the road, and the driver apparently lifeless, with his head cut open, beside them.

The horse, in avoiding us, had gone too near the edge of the causeway for his own safety, and was now on his back, struggling to get free, while every plunge threatened to throw the load of iron on to the prostrate body of the man.

We, of course, made our driver stop (these fellows never seem to think of stopping in such a case), and in a few minutes had cut the horse clear, dragged the broken waggon out of the way, and shaken the driver back into extreme bewilderment to find himself in such a condition in the hands of foreigners, not one word of whose language he could understand. Using our driver as interpreter, we urged him to take his horse home and come back with assistance the next day for his load; but finding our advice useless, and our time being very short, we were obliged to leave him in that state, and, for all that we know to the contrary, he may be still contemplating his prostrate load and broken waggon, but, at any rate, he was out of danger of further injury.

We were amused at Christian's *one* remark, 'Das Pferd ist gerettet:' we suppose he thought the man deserved all he might get for his carelessness.

The gorge of the Savitza is said to be very fine, but we cannot speak much from our own observation. It is represented in our minds by a great idea of weariness and wishing to get to the end, and a certain fear that our driver might be equally sleepy with ourselves, and make us share the fate of the Slovenic waggoner.

At last we reached Feistritz, and after driving right through the village in a way most provoking to weary travellers, at last pulled up before the inn, which lies quite on the farther side. Here we found better quarters than we had hoped for, as it turned out to be a favourite stopping-place for visitors to the Wochein Lake, and the waterfall of the Savitza at its end, one of the few which this district can boast. Feistritz is also a centre of the iron manufacture, having several blast furnaces and other works.

The next morning we were awaked by the church bells.

We noticed that the hour was struck twice, by different bells : at first we thought it was from two churches, but as far as we could find out afterwards, it appeared to be a variety of the plan commonly adopted with Italian valleys of striking the hour twice, in case anyone should not count the first time, only here they repeat the strokes on another bell.

On the opposite side of the road to the inn runs a bright clear stream ; by its side is a pleasant shady sort of arbour and bowling alley, where we spent a quiet morning, writing letters, &c., and watching the peasants going by with their handsome costumes. The men, tall good-looking fellows, with long boots halfway up their thighs, and silver-buttoned waist-coats ; the hats ornamented with a tassel, or perhaps a very small feather—(we found our Styrian black cocks' tails quite out of the fashion here). The women wear white sleeves and a richly coloured kerchief over their heads and another crossed over their shoulders ; the elder ones have a head-dress not unlike some old-fashioned bonnets, terminating with a kerchief instead of a 'poke' at the back. The long tight boots of the men look very well when they are drawn full up for state occasions, like going to church, but as this is doubtless very hot and confining to the knees in walking, they generally turn the tops down in a cavalier sort of way, revealing short breeches and a gap at the knee filled by an untidy vision of loose drawers, more or less white. Their boots are probably home-made : the leather seems not unlike Russia leather, soft and strong.

The Terglou group stands in the NW. corner of the district inhabited by the Slovenic population. The *extreme* limit, including the parts in which Germans and Slovenes are intermingled, extends somewhat farther, viz., into the lower Gail Thal as far as Hermagor, the northern boundary following the basin of the Gail and Drave eastwards.

Southwards from the Terglou runs the division between Slovenes and Italians, but no exact line of demarcation can be drawn, as in the valleys and along the Adriatic coast both nationalities are found living together, more or less amicably.

Southwards and eastwards from these boundaries the Slovenes have the country almost to themselves, with the exception of isolated spots, the chief of which is the district of Gottschee, a desolate region on the almost waterless plateau NE. of Fiume, where an industrious German population maintains itself.

These Slovenes are a shy, retiring people, liking to keep out of the way of the outer world, and preserve their old customs and superstitions. They remind the English traveller of

the Welsh character in their jealous preservation of their distinctive national characteristics against quiet obliteration by their more numerous and governing neighbours; and in other points, among which may be mentioned their attention to religious observances.

While we were in the neighbourhood, some quarrel at Laidach, arising, as far as we could learn, out of their jealousy of German teachers in the schools, had given rise to a riot with fatal consequences. Since then, our readers may have noticed in the newspapers that misunderstandings between the Slovenes and the Italians on the Adriatic coast have led to 'rows' rather similar to those which are just now so popular between the Welsh miners and the Irish labourers living amongst them. Much of their present restlessness may probably be due to the intrigues of Russian 'Pan Slavism.'

Here, among the mountains, however, you see the Slovene in his very best phase. There is something in the Alpine life which seems to raise the character of the inhabitants, whether they be Germans, Slovenes, or Himalayans. Is it not that the self-reliance, and yet need of mutual help which such a life renders habitual, make men feel more self-respect and look to their fellows in a more genial way than the more monotonous existence of the plains?—and surely the uncertainty and danger, and the frequent escapes which every mountaineer can tell of, often lead him to think of a Power above his own, in whose hands he must be content to trust himself and his affairs.

Be all this as it may, those who best know the population of this district speak highly of their true hospitality and kindness, which even exceeds what may be found in more frequented parts, where those qualities are too often exchanged for purely mercenary politeness.

As far as our little experience goes, we certainly found our guides very pleasant fellows, who supplemented our mutual lack of a conversing medium by a wonderful talent for pantomime, often answering equally well, and certainly far more amusing.

But to return to our inn at Feistritz. In the course of the morning, our guide, Schest, made his appearance. He is an old Jäger of Baron Zoys', a spare little old man, with grey hair, getting rather past heavy work or very fast climbing, but still an excellent guide on rocks, and thoroughly at home on his ground. After an early dinner, which he preferred to partake of bashfully sitting at a separate table, we shouldered our luggage and provisions, and started at 2 for Mitterdorf, Schest's

village, where we were to pick up his son as porter. An hour's walk over an intervening hill brought us to Schest's house, his son was found, and while he made his preparations we walked in, to escape from the heat and look about us. The house was a fair specimen of the mountaineer's residence. You go through a sort of place half barn half storeroom, walled in by rough boards, and enter the little living-room, with a white stove in the corner, a bed by it, a seat running round the rest of the room, and two or three deep small windows. Sometimes these windows are double, forming a cage for birds; in this house there was a pet bird, but he was loose, and while the daughter, a sturdy girl of some fifteen years, was busying herself for her father and brother, he made his escape by the open door. She did not seem to break her heart over his loss, however, and after a short chase returned and consoled herself with a lump of black bread from the cupboard in the storeroom. There would probably be a little garret over this long room, warmed by the heat from the stove, and this would complete the accommodation of the house. They are built here of stone plastered white, and covered with wooden shingles.

At half-past 3 we were ready, and made a fair start, young Schest, in knee-breeches and long boots, taking the best part of our luggage and provisions, Christian the remainder, while old Schest judiciously selected the wine-bag, an india-rubber receptacle holding some five quarts, so that he at least was well provided for, whatever became of us. Tuckett and I carried our convenient Styrian 'Rucksäcke,' with spare clothing, &c.

We began to mount right behind the village. The way lies up a long spur of the mountain, past an alp marked on the map as Luskouza. The afternoon was oppressively hot, and we strolled up leisurely, halting with a party of peasants for our guides to have a chat, and overtaking a bevy of girls returning from the village to their alps, with their week's washing in baskets on their heads. They were not beautiful, but they looked very graceful and comely with their white-sleeved arms and shoulders and neatly-fitting dresses. There was one especially who might have sat for an Alpine Dorothea, tall, upright, and active, with a face not pretty but full of good sense and decision; she was evidently a favourite with all, and fully able to hold her own in the good-humoured war of words that enlivened our journey. It was in that afternoon's walk that we found the unlimited utility of a single word of a language. We had learned from our guide the day before that 'Dobra dan' meant 'good day,' and this word 'dobra,'

in various tones, was made to serve almost all purposes of conversation between Schest and ourselves. If we gave him a drink of wine, he stroked himself and said 'Dobra' (in a satisfied tone); when we wanted to know what he thought of the weather, we looked up and said 'Dobra?' (in an inquiring tone), and he replied 'Dobra' (in a reassuring tone); when any arrangement of luggage was made satisfactorily it was 'Dobra' (in a decisive tone), and so on through every contingency. On the other hand, his knowledge of German was chiefly confined to the word 'fest,' and it would be difficult to find a single word more useful to a guide. To be sure he stretched its meaning rather, as 'Drei Stunden fest' meant a *long* three hours, and so on. Fortunately his son knew a little more German, and with the assistance of signs we never had any real difficulty.

The weather appeared to have made up its mind *not* to be 'dobra,' and before long we had all to take shelter amidst much laughing and chaffing under a shed, which we happily reached just in time to watch the storm come driving across from the Mali Drasky Vrh,* with very dismal forebodings for the morrow. Before long, however, the sun again shone out, and taking up our respective bundles we set forth, Dorothea offering to relieve Schest of the wine-bag, but he could not be brought to part with it. In course of time we reached the châteaux, and one of our companions took us in to refresh ourselves with abundant and very welcome draughts of milk, besides bread, butter, and cheese. When young Schest asked him, by our request, what we should give, he entirely declined payment, answering simply that he 'had enough'—one of those instances of unaffected hospitality which are so pleasant to meet with.

But we had already lost so much time that we could not linger here long. From this Alp two paths lead up to the Belpole ('Whitefield') Hut, where we were to sleep, one on the left side of the spur up which we were going, and the other on the right. Schest this time chose the latter as more 'commodious'; but on comparing Tuckett's experience two years before (when he was prevented completing the ascent from bad weather), it appears very considerably the longer. Our companions were now all left behind at their respective châteaux, evening was drawing on, and we pushed steadily upwards. We came to a pasture at the head of the valley, with a few horses

* 'Vrh,' sometimes written 'Verh,' and pronounced in an indescribably guttural way, means a peak or summit.

grazing (marked Kouschiza on the map). Beyond this is a steep ascent over rocks and grass, up which young Schest led the way, in spite of his really heavy load, at a pace quite as fast as we cared to keep up with. The old man was left far behind; but we felt quite easy about him, though perhaps not equally so about our wine. Almost the only creatures to be seen were numbers of quaint little black newts (which Christian called *Regenwürme*), looking like a mixture of a black slug and a lizard, which took a suicidal pleasure in getting under our feet, and by their slimy, uncouth appearance reminded one of a certain marvellous and repulsive animal called 'Kokodrillo,' of which I had heard wonderful accounts in a former visit to the upper Gail Thal. All our investigations, however, as to who had seen the latter creature only revealed one man, who believed he had seen it—'in an engraving!'

We soon reached the ridge of the spur, and stopped to look round at the view, made all the more grand by the driving mists round us, while away across the *Wochein* valley we could see heavy banks of clouds lying along the hills in a way by no means 'dobra.' After we had gazed enough, regained our breath, and wasted some of it in trying the echoes round with ringing 'jodels,' we again pushed on, now almost horizontally, round the shoulder of the *Drassberg*, that provoking outlier which always hides the *Terglou* from this side.

After about half an hour of silent steady walking, we came to a little hut on the mountain side, and the *Schests* tried very hard to persuade us to spend the night there; but as *Tuckett* had been to the *Belpole* hut before, and knew that it lay still farther on, we were determined to adhere to our plan. Finding we were decided they again pushed on, young *Schest* certainly showing no signs of fatigue, but taking us along the rocky path at a breakneck speed. The evening was getting dark and the mists above us thick, when at last we began to descend, plunging over soft patches of snow or slipping among loose rocks, for some 500 ft. into the basin where the *Belpole* hut lies (5,430')—the most wild situation imaginable, utterly solitary, desolate, embosomed among the crags of the *Terglou*. The hut is built for the *Jäger*, and is very small, but comfortable except for the smoke, which forms a gradually descending canopy, almost unbearable when you stand up in it. At the end opposite the door is a shelf, and in front of this is just room for a raised hearth and seats on each side.

The door opens straight towards the peaks of the *Terglou*, which look imposing enough in the evening and morning twilight. To the right rise the crags of the *Drassberg*, and to

the left those of the Kaniauz, while behind the ground rises some 500 ft. above the alp, thus enclosing it almost entirely.

We had made special enquiry before leaving Feistritz whether we should find cooking apparatus; for what situation is more desolate than to arrive at a *châlet* and find that you can neither make soup nor boil milk? What then was our despair to find that the principal pot had a large hole in its side! The cooking in these parts is chiefly done in earthen pots bound round with wire, which stand heat very well, but are subject to some of the infirmities common to earthenware.* Fortunately we found a smaller one which had survived the winter, and with this and the broken one contrived to brew an excellent soup with Liebig's extract and Chollet's vegetables, and after sitting some time round the fire, smoking and conversing as best we could, we turned into our shelf with our heads towards the fire, and submitted to be smokedried till dawn.

The morning was pronounced doubtful, but not altogether forbidding, so after concocting some tea in the infirm pipkins of the establishment, we turned our faces resolutely towards the line of cliffs before us, at 4.30 A.M. Passing by the goat-herds' *châlets*, still unoccupied, and looking as dreary as empty *châlets* usually do with the rank growth of docks and weeds round them, we soon reached the end of the Alp, and by 5.20 had ascended to the Kerma Pass (6,332'), a depression between the Terglou and the Drassberg, leading over to the Wurzen Save valley by the Kermathal, down which our return route lay. Here we deposited all that could be left of our luggage, and foolishly our rope also, at Schest's suggestion, hiding them behind a bush lest some wandering 'Raubschütz' (poacher) might appropriate them. From this point, bearing rather to the left, we climbed quickly over grass and 'Geröll' to the rocks at the foot of the Klein Terglou. These being steep and rather loose, of course require ordinary care, and a slip as described in Captain Holsmay's narrative might well make a traveller nervous, but they are not worse than one meets with in almost any day's walk in the High Alps. By 6.40 we had reached the gap in the wall of precipices known as the 'Thor des Terglou' (Gate of the Terglou). Being early in the season, there was a bank of snow on one side, so that we climbed very conveniently between the snow and the rock, and in a few minutes were landed on the narrow ridge of the

* A small saucepan or kettle is a very useful addition to the traveller's equipment in this district.

mountain where the real climbing begins. Christian began rather prematurely to express great contempt for the Terglou as rather a humbug; we recommended him to reserve his judgment, and by the time he returned to the same spot he certainly had more respect for the three-headed king of the Carniolan Alps; in fact, he confessed that for actual difficulty it was quite equal to Monte Rosa. A steep hand and foot climb brought us to the top of the Klein Terglou by 7.7. While we were securing our hats against the cutting wind, and old Schest was replacing his by an old nightcap which he had fished out of a corner of the Belpole hut, we looked round at the beautiful view, but naturally our chief attention was directed towards the centre peak whither our road lay. The arête looks rather doubtful, especially towards the other end, where it is very narrow, but on the other hand it is all plain sailing—there are no gaps and no intercepting rocks to climb round. The peak at the end certainly looks forbidding, and the general effect of things suggests a feeling which self-respect forbids me to call fear. But then Ball's Guide says it is not so bad as it looks, and as no one proposed to turn back, we stepped forward, leaving our axes behind us—'laying down our arms, but *not* as a sign of defeat,' Christian remarked.

It reminded me of boyish adventures in walking along the tops of the garden walls; but though the wall here was some 1,500 ft. high, and very nearly perpendicular on each side, there are many places where an active guide like Christian or young Schest can find foothold on little ledges just below the summit and give one a hand over any place where one is not sure of the footing. It would be absurd to deny that there is difficulty in such an arête, but a little mutual assurance of this kind is all that is needed even on the narrowest parts, and *this* only because one is not sure whether the rocks one is stepping on may not be loose, or one's boots slip on the smooth surface. I was certainly very glad to be safely over this part, though what follows may look even less tempting. Fortunately the peak rises in a succession of gigantic unequal steps, so that after each spell of really hard work, with the precipice below one, there follows a few steps of easier ground before the next piece of nearly perpendicular begins. The rocks, too, to a careful climber afford very fair hand and foot hold, and we did not suffer from having our hands cut, of which some former travellers have complained. For the enjoyment of absolute insecurity of hand and foot hold, and for rocks which cut like lancets, we would refer the enquiring traveller to some of the Dolomite peaks farther west.

After some time of the kind of climbing just described, there was a check and a consultation, with rather ominous head-shaking on the part of old Schest, especially directed towards a snow-covered ledge to the right. From all this we gathered that that was the orthodox way, but was impracticable owing to the fresh snow. To an inexperienced climber like myself, it was certainly depressing to hear Christian remark, 'If I had known it was so bad, I should certainly have brought the rope,' and one began to think what an indescribable fool one was to be there at all, and to wonder what could be the use of going any farther; but looking at the rock in front it did not seem so much worse than what had been already conquered, and being ashamed to give in after coming so far, I set my teeth and followed Schest and Tuckett, who were troubled with no such questions. After climbing on for some time through that frozen mist which every mountaineer knows so well to his cost, it was with the most hearty pleasure that we saw the top just before us, and were soon all gathered on it (9,371') at 7.35. The view was almost restricted to the vision of old Schest throwing stones at the mist, and suggesting, in pantomime, that Tuckett should get rid of it as he had seen him conjure away coins or eggs for our amusement the night before in the hut.

Our experience on the top, though a cheerless one, was pleasant compared with what happened to a certain Captain Bosio, an Austrian engineer, who ascended the peak in 1822. We may, perhaps, be allowed to give the account in full, as related by Schaubach. 'At nine o'clock the desired peak was reached, but clouds and masses of mist surrounded the summit. Bosio, waiting for a clearing in the weather, occupied the time in making a nearer examination of the summit. The whole surface is of weathered, ferruginous limestone, and, therefore, possesses a strong power of electrical attraction. After Bosio had been warned by the guides of the approach of a storm, all left him but two guides and an assistant, with whom he stayed still longer. In turning over the ground they found a bottle with papers, on which were the names of those who had made former ascents. Instead of becoming clearer, it became continually darker and colder; at 4 o'clock the thermometer only showed one degree of warmth. Black thunderclouds drew near, and another of the two guides left their company, which now only consisted of the assistant and one guide beside Bosio. They determined to pass the night on the summit under a tent. Soon the flashes of lightning began to play, followed by fearful thunderclaps, amidst the raging storm. All three held each other tightly, when a violent electric shock flung

them asunder. Bosio and the guide were not so much stunned, but the assistant sat speechless on the ground, pointing to his mouth. On his forehead was a mark as of a burn. By rubbing and pouring wine down his throat he was restored to his senses, but a new flash stretched all three senseless on the ground. However, they all quickly recovered, sprang out of the tent, and flung themselves into a hollow of the rock, dragging the canvas of the tent with them, and wrapping themselves up in it in order not to see the horror of their position; yet even here the lightning found them, and Bosio was the worst struck. He uttered frantic cries, and was for some time unconscious. The crown of his head and left cheek were decidedly burnt; in his legs he felt great pain and difficulty of movement. The guide, who had at first been opposed to descending, beside himself at this occurrence, wished now to escape from this diabolical place at any cost, and left the others, who, although expecting certain death, stayed by each other. At length the storm moved away, after both had been surrounded with flame for some time. They now again approached the pyramid, and found, to their horror, the last guide struck by lightning in his flight.'

After a halt of three-quarters of an hour, without any such exciting adventures, we started at 8.20 cautiously for the descent. This, as usual, required more care than the ascent. Old Schest led the way with Tuckett, who needed no help. Christian followed, then I, and finally young Schest, who, unlike many of the guides in the Eastern Alps, was attentive and assiduous in giving assistance. So much so, that Christian felt bound to interfere sometimes lest my incipient climbing powers should be spoilt by too much nursing. By 8.45 we had descended the highest peak, passed the arête, and regained the Klein Terglou. We were now again quite clear of the mist, which hung over the summit only, and we waited a few minutes to enjoy the view. Then another short spell of careful climbing brought us to the Terglou Thor, where the beauty of the view again stopped us. Old Schest, whose spirits were very high at the success of our expedition, amused us by explaining the sensations of various travellers who reached this point in the ascent, and decided to go no farther. The fact that this was all done in dumb show added much to its piquancy. By 9.55 we were again at the Kerma Pass, where, after lunch, we parted with the Schests with mutual good feeling, they being very well satisfied with five gulden (10 francs) apiece for their two days' work. They then returned by the same way as we had come, while Tuckett,

Christian, and I, dividing our luggage between us, started, pretty heavily laden, to find our way down the Kerma Thal to the Wurzen Valley. Some scrambling and a long glissade brought us to the Upper Kerma huts, the sleeping-place for parties ascending from this side, and at about the same elevation as the Belpole. We foolishly neglected the only spring at the head of the valley, which issues rather lower down to the right, and kept on our way down the steep path to the valley bottom, where the white stream bed promised, at a distance, a more abundant supply. The stream is, however, a delusion, being even at this early time of year only white dolomite *débris*, and throughout its length the beautiful Kerma Thal is a very thirsty land and very dry—as dry, kind and long-suffering reader, as this description through which you are toiling with such exemplary patience. Near the lower Kerma Alp we at last found a little stream which led into a cattle-trough, and hailed it like an oasis in the desert.

Some distance farther on, the Kerma Thal, joined by another Terglou valley from the westward, turns off sharply to the south-east, the stream henceforward going by the name of the Radoina, or Rothwein, mentioned already, which runs parallel to the Save almost to Veldes before it finally joins it. At this point our road leaves the valley, and lies over a low wooded pass direct into the Save Valley, at Moistrana. Crossing the river here, we mount on the opposite side, and at last, at 3.15, very hot and thirsty, arrive at Lengenfeld. Searching for the inn, I put my head into a little shop, and was confronted by a small Slovenic boy, who replied to my best German with so stupid a stare, that I broke into plain English, and told him to fetch some one who *could* talk. What was my amusement when he at once complied, and trotted off to fetch his elders.

The inn, when found, did not offer much in the way of refreshment. Pushing by two or three very drunken men, we found the hostess, who had apparently nothing for us to eat but the usual bread and possibly raw sausage. A happy thought suggested hot milk, and we were soon satisfying hunger and thirst over a huge tureen of smoking milk and bread. An affable neighbour of the name of Gregor Legat sat by, who turned out to be a convenient sort of parochial officer, whose business it is to make himself useful to strangers, such as government officials in want of lodgings or assistance of any sort. He makes his living by the appointment, under the title of 'Gemeinde-Diener,' or parish servant.

This man gave us many bits of information, and said that he had made several ascents of the Terglou with Austrian engi-

neers and the painter Pernhart, of Klagenfurt, who is probably going to bring out a panoramic picture of the view from the summit. He busied himself to get an 'Einspänner' to take us to Ratschach, and we were soon jolting along behind an excellent horse up the beautiful valley of Wurzen, best known to Englishmen by the love which Sir Humphry Davy bore for it in his later years, so that we cannot do better than refer our readers to his own allusions in the 'Consolations of Travel.' Although the places were not new to us, the beauty was entirely so, for on our former visit it was all obscured by pouring rain, which kept us weather-bound two days at Wurzen, and only ceased by changing to a deep snow—a contingency for which the traveller must be prepared occasionally up to the end of June.

One great charm of this part of the valley consists in the succession of views up the short lateral valleys leading up to the precipices of the various mountains between the Terglou and Mangert.

At about 6 we arrived at Ratschach, a village situated just at the watershed of the valley; a few hundred yards to the east we had passed the source of the Wurzensave, while from the other side of the village a tributary of the Drave flows westward, nearly to Tarvis, where it joins the Schliza Bach, and runs NE. into the main river, thus forming the extreme western boundary of the Karawankas. Our driver pulled up at a little house with the quaint sign of the Apostles at Emmaus, and the superscription (in Slovenic) 'Lord abide with us, for it is toward evening,' which is so common in these valleys. The signboard further informed us that it was the residence of Peter Kirchmejer, and as he was the man whom we sought, we unpacked ourselves from our couch of hay and sacks, and walked in. Peter himself is a sensible-looking man, rather small, and improves on acquaintance. There was, besides, a grandmotherly body, whom we afterwards found to be Mrs. Peter, and a neat little Kellnerinn. We were very much pleased with the little inn. Our hosts did everything in their power to make us comfortable, and the second day, when they had had time to exercise their powers, the result was so luxurious that we were in the danger (rather uncommon in our wanderings) of having too much to eat. The sleeping accommodation seems precisely similar to that at the inn at Raibl, described by Messrs. Gilbert and Churchill, *one* comfortable room, and a large rough landing, where the family appears to sleep. The next morning, having decided to take an easy day, we strolled up the range of hills behind the house, and in about 1½ hour reached the top of

the Petsch Vrh—an excursion which we can most highly recommend to anyone visiting the valley who is not inclined for higher ascents. To the south you have a magnificent view of this end of the Terglou range, including the top of that mountain itself, the Prisingig, &c., with the Mangert right opposite you, and farther to the west its rival, the Jof di Montasio, or Wischberg. On the other side is a fine view over the Drave Valley, with the Dobratsch rising opposite, its flanks scarred by landslips, and farther still the snowy peaks of the Gross Glockner range. Returning to our inn, Tuckett amused himself and the natives, while dinner was preparing, by exhibiting a few simple conjuring tricks—a very easy means, by the bye, of producing an unlimited amount of pleasure to these simple mountain folk, and well repaying the little trouble it gives by setting us at once on the best of terms with all, whether groups of picturesque Italians lighted up by the blaze of the kitchen fire while we cooked our unfailing soup, or good-tempered villagers like these strolling into the inn to have a look at the strangers. The result here was most amusing. A jovial old fellow, who had been very conversational all the morning, was one of the most attentive observers, until, seeing the third or fourth egg produced in the box, and apparently swallowed, his feelings were too much for him, and lifting up his hands he exclaimed, ‘Jerusalem! steht zwei paar Stund von Bethlehem!!!!’—a statement difficult to deny, and which seemed to ease his mind. His delight was complete when a small coin was melted on the lukewarm stove, restored to its original shape by being blown upon, and finally presented to him to refresh himself withal.

After dinner, having despatched our knapsacks to go over the Predil, and meet us at Flitsch, we started with Kirchmejer to take up our quarters at the ch[^]alet above the Weissenfels lakes, the nearest starting-point we could get for the ascent of the Mangert next day. On the way he gave us his own history and his opinions on various subjects. He was by birth a K[^]arntner, had served six years as post-boy at Wurzen, and then the present Mrs. Peter being left a well-to-do widow, with the inn on her hands, required a husband to carry it on, so he was elected to the vacant post. ‘So you see I have married an old woman. But what would you have? She is industrious and sensible, and, in fact, we get on very well together. Some people,’ he said, ‘told him that he ought to build a great hotel for visitors to the Weissenfels lakes and the Mangert, but for his part he did not approve of going faster than he could see his way for.’ Doubtless before long the

number of visitors will enormously increase. Here, as in *every other* principal valley in Austria, we saw the stakes marking the future position of the railway; it is wonderful what has already been finished in the last few years in making new lines, and still more so what is undertaken. If all the lines are carried out which seem likely to be, all the Austrian Alps will be traversed by a network of communications. This is one of the symptoms of that energy for developing home resources which the traveller notices now throughout Austria, and which cannot fail to produce great results if she can keep clear of foreign troubles.

Our way lay up the little lateral valley in which are the beautiful Weissenfels lakes, probably so called from the white cliffs of the Mangert, which are reflected on their pure surface. As we went along, Peter told us stories of his hunting adventures, pointing out a spot on the rocks above where they had had an exciting struggle with a bear one or two winters before.

Not long ago there was found in this secluded valley a remembrance, in the shape of a Turkish horseshoe, of the Moslem hosts who penetrated in the latter half of the fifteenth century into every corner of these Alps, until overthrown in the neighbouring valley at the battle of Villach. We asked Peter what was done with this relic. 'What does a peasant do with such a thing?' he replied; 'he most likely makes a nail of it to mend something with!'

In about 2 hours of very easy walking from Ratschach we reached the See-Alm hut, and made our preparations for the night. The water being at some distance from us, and we having only brought one cooking-pot with us, Tuckett struck upon an ingenious device for bringing water, which deserves record. We had a bit of Macintosh cloth, about 18 inches square, in which we packed some of our provisions to keep them dry. Tying four strings to the four corners, this served as a bucket to bring up a supply of water, and by making fast the strings to the head of an upright ice-axe, the store was kept for use as we required it.

The hut is remarkably airy in its structure, the winds having free scope to enter as they please. The Senner not being there, we could not get into a tempting end room, which was locked up, but found a sheltered place in a shelf under the roof, to which we climbed after our evening brew of chocolate, and slept, to dream of bears, and find it was only a stray sheep which was creeping close to the hut for company. Long before dawn we were stirring, and at about 3 were loading up

for a start, Peter being alone outside, when to our surprise we heard voices. Presently, through the open doorway, the light flashed on bright barrels, and the next instant the said doorway was occupied by two figures in uniform fully armed. Thinking they were Jäger or gardes champêtres, who had come to warm themselves by our fire, we began to chaff them, and asked them if they would go with us; but we soon found their business was more serious, for while one with fixed bayonet occupied the doorway, the other with the like armament stepped inside. It was certainly startling to wake up to the fact that we were in the clutches of the 'Austrian bayonets,' of which one has heard so much. Fortunately one, at least, of us was no stranger to the sensation, Tuckett having been arrested and nearly shot, near the Stelvio, in 1866, on suspicion of being an Italian surveyor, while we both knew what it was to have our bedrooms invaded by gendarmes in search of passports. We therefore quietly awaited his message, and when he demanded our 'Reisedokumente,' produced our well-worn passports. Here was another fix, which was near ending in our being marched back to Kronau. The worthy man had never seen an English passport, and could hardly be persuaded of its nature. But fortunately, just as he was wavering, our invaluable wine-bag came to our assistance, and a treaty of peace was sealed by a cup of Kirchmejer's good wine and a pipeful of English tobacco; and then it came out to what we were indebted for the honour of this visit. It appeared that the Bürgermeister of Ratschach, who had been drinking at Kirchmejer's inn all the previous day while we were there, and had never asked us our business, took mortal offence because Kirchmejer was chosen as our guide instead of his parochial self, and revenged himself by the petty piece of spite of sending down to the police station at Kronau, and having these poor fellows turned out for a 3 hours' forced march in the dead of night, in hopes, doubtless, that our documents might not be *en règle*, so that he might see us brought back in disgrace. Poor man! he happily did not hear the showers of abuse which his chief victims, the gendarmes, dealt out to him when they found what a fool's errand they had come on, nor the choice epithets selected by Peter, who, after grumbling about it the whole morning, at last wound up, some hours after, during a halt in the snow, with 'Er ist ein Lump, ein unnütz, ungeputzter Sauerkopf!' (He is a ragamuffin, a useless, unadorned sourhead!)

In spite of these delays, we got off at 3.5. We soon began to climb, and at 3.25 reached the lower foot of the Alp at the

base of the Mangert cliffs, a place so remote and lonely that it bears the name of Mirnig (peaceful). As we passed along in the twilight we heard the call of a blackcock not far off, which stirred the spirit of our two keen hunters, Peter and Christian, and caused a little delay while they tried to decoy it within the range of Peter's rifle. Shortly afterwards (at 4.15), as we reached the base of the buttress to the right of the Mangert, up which we were to climb, another halt was caused by a chamois, which bounded away over the snow-fields towards the rocks, turning round to give a defiant whistle every time we shouted after him.

A steep and almost dizzy sheep-path leads up this buttress (called by Von Pavich the Traunik); at one place it is a sort of rough staircase up a cleft of the rock. After passing the steepest part we halted at a spring, and then keeping straight up the alp, reached (at 5.30) the col leading over to the Predil Pass. The glorious view was a good excuse to wait a little here, but at 6.15 we again set to work, for now the real work begins. Hitherto we had avoided the magnificent perpendicular cliffs which are the principal feature of the Mangert, by climbing an easier buttress to the right of them; now we must, after a short distance up the shoulder, cross the face of the mountain just over the top of them, and then, turning up rather to the right, reach the lower peak, and from that the highest.

The whole climb requires care. There are places where it 'does not do' to remember how extremely splendid the cliffs looked from below, along the edge of which you are now creeping, but there is a sort of path all the way, and in some places the rocks have actually been blasted to make the ascent safer. At the time of our visit there was a good deal of snow, which bothered poor Peter sadly. His spirits had been very low about it the day before, and it was evidently with some effort of determination that he led the way over the steep patches, carefully treading steps with his 'Steigeisen.' Like most of the mountaineers of the Eastern Alps, he was thoroughly at home on rocks, but on snow was out of his element; so that where Lauener felt in comparative security with rope and axes, he was evidently nervous, urging us to make haste, 'Sonst bekommen wir *malheur*.' We only found one local guide this year who took readily to the use of the rope and the axe, and that was Santo Siropaes of Cortina d'Ampezzo, a name 'when found to be made a note of.'

Owing to the snow, we missed the path near the top by turning up to the right too soon, and made our way up some par-

ticularly smooth and steep rocks. At 7.58, however, we were safely on the summit in a calm, pleasant air, and fully enjoyed the view all round. There were plenty of distant ranges, plenty of neighbouring peaks, many of them as yet unscaled, but none was more majestic than the mass opposite us of the Wischberg. It evidently rises very nearly to the height of the Mangert; we could even believe that it overtopped us, but not having a level, we could not decide the point. The usual measurements give an advantage of a few feet to our peak. On one of the spurs of this mountain is the pilgrimage church of the Luschariberg, much frequented by the people of all the countries round for purposes of devotion to a certain wooden image of the Virgin, and well worth a visit on account of the view it commands and the amusement of coming down again in a sledge. It possesses one peculiar interest, from being a sort of corner boundary between Germans, Italians, and Slovenes, all of whom flock together here, and even apart from their languages, the national distinctions are said to be strongly marked as they worship; the 'sangeslustigen Slaven' delighting in melodious hymns, the Italians loudly chanting their litany, while the Germans are much more quiet and absorbed than either.

The most exquisite part of our view was perhaps the two little Weissenfels lakes lying right below us, brilliant as emeralds in their setting of rock and forest.

After a long halt in the pleasant warm air, we started for the descent at 9.40; the rocks, though requiring care, were wonderfully soon passed, and by 10.20 we were over almost all the difficulties. At the col we parted with Peter, satisfying him with three gulden: he explained that some 'Herren,' who required a *great deal* of help gave him four gulden. He of course shared our food throughout the expedition. Our way appeared quite plain; we could see the path along the side of the mountain, and far below, at the end of the valley, the windings of the Predil road. But thick mist came on, and we got for a time utterly lost, and I know not where we should have gone to without wonderful pathfinding instinct on the part of Christian, aided by the fortunate accident of our hearing a man, invisible, far below, calling his sheep.

Very splendid the cliffs of the Mangert looked as we descended, with the thunderclouds clustering among them; but our admiration was tempered when these clouds discharged abundantly upon us, and as our way lay down a very narrow path through dripping beech-woods, we had a 'very damp time of it,' until at last we emerged into the Predil Pass at the top

of the zigzags. Descending these by a very precipitous short cut, we took refuge at a little inn at Mitter Preth just in time to escape a still more tremendous downpour.

When this was over, we drove down that desolate valley of the Coritenza, finding the road in places almost blocked, even for our light carriage, with masses of mud, gravel, and débris, washed down from the mountain side by the storm.

We found comfortable quarters at Flitsch, where our luggage awaited us at the 'Post;' in the street opposite there is a parochial warning to incautious smokers which deserves to be commemorated:—

'Tabak- und Cigar-Rauchen ist bei trokener (*sic*) und windiger Witterung unter Straffe (*sic*) gegen 2 Gulden verboten.'

NEW PASSES IN THE MISCHABEL RANGE.

By G. E. FOSTER, JUNR.

THERE is an old proverb which says 'It is an ill wind which blows nobody any good.' Still, though the wisdom of our ancestors is in it, few mountaineers recognise its truth, for all winds aloft are a bore. In the summer of 1868, I too lost all faith in it; for on arriving at Visp, intent on the Matterhorn, I heard that poor Mr. Elliott, whose sad death we all so much deplore, had made the first ascent from Zermatt since the accident. As if this were not bad enough, the next morning I found all the peaks covered with fresh snow, as a further damper to my hopes. Yet to that ill wind, to that snow-storm, I owe the passes of which I am writing: need I add, I am now a staunch believer in the proverb's truth? Compelled to wait for the fresh snow to melt, I turned aside to Saas, and during a glorious day over the Mischabeljoch, my guide Hans Baumann and I examined closely the tremendous precipices of the Mischabelhörner, and thought we discovered at least one way in which they could be passed. Unable to try it then, I resolved to attempt it, if possible, in the coming year, and accordingly, with Mr. Horace Walker and our guides Jakob Anderegg and Hans Baumann, found myself at Saas on the evening of Thursday, July 15. Much time was spent, '*more Alpino*,' in discussing the weather and the possibility of first trying the Weissmies. Our men, however, would only guarantee one fine day, so, on the bird-in-the-hand principle, we decided on the pass; and the dull inn at Saas offering no great inducement

to sit up, we retired early, to prepare for the work of the morrow.

Beautiful as the view from Saas is, it is only from the Fee Alp that the Saasgrat can be seen to advantage. Here you are not only facing the range, but you see how the rocks you are standing on divide the great mass of the Fee Glacier into what in the Oberland would be called the 'ober' and 'unter' glaciers. The lower descends from the Mischabeljoch in an almost unbroken ice-fall, cutting off all direct access from the snow-fields which skirt the great cirque formed by the precipices of the Taschhorn, Dom, and Nadelhorn. To the north of the Dom the arête between that peak and the Nadelhorn is broken by a rocky tooth, and the Nadeljoch lies between this tooth and the Dom. The huge rock wall which leads up to the ridge from the Fee Glacier is of the usual buttress and couloir pattern, one prominent buttress offering the safest line of ascent for the first half of the way, after which the traveller must take his own course.

Between the Dom and the Taschhorn the wall takes the form of an enormous couloir, very steep, lined with snow or ice, and topped by a formidable cornice. Over this passes the Domjoch. The two cols thus present very different appearances, the Domjoch being the stiffest to look at.

It was half-past 2 on the morning of the 16th, when we left Saas, a close oppressive morning, with here and there a threatening cloud, and Walker and I stumbled up the steep path to the Fee châteaux, more than half asleep, bathed in perspiration, and filled with gloomy forebodings as to what such weather would result in. About an hour and a half beyond the châteaux, the left branch, or Lower Fee Glacier, is comparatively free from crevasses, while a steep buttress of the Nadelhorn offers a way of turning the ice-fall above. Looking about from here, we made a very curious mistake. Whether we were half asleep, or whether the unusual density of the atmosphere produced a corresponding effect on our intellects, or whether the Saasgrat was somewhat shrouded in mist, I cannot say. I only know we reconstructed the range, and having determined that the Nadelhorn was the Dom, the Dom became the Taschhorn, while the latter was, singularly enough, overlooked altogether. Of course it followed that the Nadeljoch became the Domjoch, nor did we find out our mistake till too late to rectify it. Still, 'it is an ill wind,' &c., and as we gained two first-rate new passes instead of one, we had no cause to grumble.

Having settled our course thus, we crossed the glacier with-

out difficulty, and gained the buttress by the help of a crazy serac, which formed a precarious bridge over the usual bergschrund. The polished rocks left by the glacier as it sank demanded some care, but beyond these the buttress was easy climbing, and we soon passed the two little steep grass-slopes higher up it. With the upper one we became better acquainted afterwards. To our left the stream supplied by the glacier above poured down an impassable gorge, nor could we cross it till near the top of the buttress. Leaving the rocks here, we bore to the left up snow-slopes broken with a few rocky ledges. We had now risen above the greater part of the ice-fall, but the glacier was still too much crevassed to permit us to make straight for the pass. We therefore continued to mount the snow-slopes until we reached the foot of the secondary glacier descending from the Nadelhorn. This terminated in a great ice-wall, from which huge masses continually broke away. As it was still early, we passed safely along under the overhanging seracs for half an hour, till at length we could make straight running for the rock-wall leading to the col. We now put on the rope, fearing hidden crevasses, and, bearing strongly to the left, mounted easily to the foot of the centre buttress, which we had selected for our route. Once fairly on the rocks, we halted for breakfast, and had time to look about us.

We were already near the height of the Alphubeljoch, and the view would have been fine had not the peaks been shrouded with mist, while the snow, blowing in clouds from the ridge over our heads, made us afraid lest we should be defeated by the wind near the summit. It was now past 10 o'clock; so, hurrying over breakfast, we attacked the rocks which frowned 1,500 or 2,000 ft. above us, and proved stiff enough to demand careful climbing, though nowhere really dangerous. The buttress came to an end about half-way up the wall, but the rocks of the precipice above proved much of the same character, and after a long fatiguing climb we reached the ridge about 2 o'clock. As the mist hung thick about, and the wind was too cold to be pleasant, we halted only for a few minutes. Still we looked with longing eyes to the arête to the left, along which, had the weather been more favourable, and the time allowed, we could have reached the summit of the Dom. As it was, with an unknown descent before us, it was wiser not to try it.

On turning to descend, we trotted at first quickly down a snow-slope. Soon, however, it became steeper, while dead white patches in its surface showed the snow was thin, and

intermixed with ice. Jakob, who was leading, therefore turned to the right towards a small patch of rocks, beyond which the snow was less steep, and gave promise of easier access to the glacier below. At first these rocks went easy enough, but suddenly changed to one of the most peculiar *mauvais pas* I ever encountered. Instead of the easy broken rocks, we found smooth, almost polished slabs of a kind of slate, about 25 ft. long, and lying at an angle of about 30°. With an utter disregard of all propriety peculiar to themselves, they contrived to have all their ledges the wrong way, like those on a slated roof. As we had to cross them on the level, the rope became practically useless until you slipped, when you might hope that after a rough roll to the length of your tether, you might be pulled back, battered and bruised, to try again. Positions where there is nothing particular to stand on are familiar to most mountaineers; but these rocks added insult to injury, inasmuch as it was impossible to stand on what there was. How Jakob got over I don't know, for it was not till I tried myself that I fully appreciated the charms that lay before me. At length, finding that the more I looked the less I liked it, I contrived in a highly scientific manner to find the maximum of friction by half sitting, half lying on the rocks, and pressing my hands as firmly as possible against them, while with peculiar wriggles I generated motion in the direction of Jakob, who stood watching my progress with solemn interest. When once I reached him, I experienced the same feeling while watching Walker, who, to my great delight, took to the same system of progression, and afterwards agreed with me as to the extremely uncivilised nature of the rocks in those parts.

Once past this awkward place our difficulties were over. We descended quickly to the glacier, and soon found ourselves in the ordinary route used in ascending the Dom. This, as usual, proved most uninteresting, and loitering as we went in search of *Edelweis*, &c., we reached Randa at 8, and Zermatt at 9.30 without difficulty.

The next day was spent at Zermatt in compulsory idleness, and the Triftbach; but I cannot honestly recommend the latter to bathers. On Sunday evening we left for the Tasch châteaux,* and started the next morning before daybreak for the Alphubel. We were bent on the Domjoch, and our object in sleeping out was to reach the Fee Alp early enough for our men to go down to Saas, and return with provisions and wraps

* Permit me to take this opportunity of thanking the gentlemen who returned my pocket-book lost there, but without giving their address.

for the night, which we meant to spend on the buttress of the Nadelhorn, mentioned before. Accordingly, at 11 o'clock on Monday morning, Walker and I were lying on the alp, indulging in a pipe, while our men had gone as arranged, and our things were drying. Soon we got tired of this, and resolved to go to the upper of the two little grass slopes on the buttress, and look out for a sleeping-place. We crossed the glacier with little difficulty, but when we wanted to get on the rocks, we found our old friend the shaky serac had been taken worse, and fallen, making a very rotten bridge of ruin over the schrund. I was going first, when Walker suggested that as I carried the rope, he would have some difficulty in getting me out if, as seemed not improbable, the bridge should cave in under me; while if he went in, there would be the rope to help him out again. I suppose, under the circumstances, the prudent course would have been to put the rope on. As it was, he led, and we both had a roughish scramble across, and up the polished rocks beyond, and were not surprised to hear afterwards we had not taken the easiest way. Thanks to our own guidance, the climb up the buttress to the upper grass slope was rather amusing; but when we found, on reaching it, that there was no water but the glacier stream, and that our dinner must consist of bread and cheese, washed down by that unpalatable beverage, we confessed the system of guides had its advantages. After dinner we commenced an active search for a cave to sleep in, but without success. One small ledge, with a projecting rock above and a precipice below, we worked at for half an hour, and thought it might hold two at a pinch; but the guides, as soon as they saw it, rejected it with contempt, to the probable saving of our necks. An attempt at a nap on the grass revealed the fact that the slope was far too steep to lie on, and that sleep would most likely end in a short roll and an almighty smash. Beat in this, we turned our energies in the direction of firewood, as we should clearly have to camp completely in the open, and soon gathered an ample supply of rhododendron-bushes. All this, however, was finished by half-past 5, and remembering our unsatisfactory dinner, we looked through my telescope in every direction for the guides. This proceeding we had ample opportunities to repeat, as they did not reach us till half-past 7, having found no cooked meat in the hotel. We had told them to bring up anything good that was eatable; so they produced in triumph a cold omelette, which they had carried in a basin, and really it did not go down badly with the help of some sour wine. The night which followed was certainly not comfortable—not

even Walker's ingenuity in cutting a hole with his pocket-knife to accommodate his hip-bone, and prevent his slipping on to the glacier below, could make it so ; while things were not improved by a bitter cold wind which sprang up towards morning. Chilled through, we turned out willingly at 2, and, warmed by a good fire and sundry cups of hot coffee, started for the Domjoch at 2.45, with the prospect of a glorious day.

The first part of our route was the same as that of the Nadeljoch ; then, leaving that on our right, we bore more to the left up further snow-slopes, and at length reached the foot of the gigantic couloir, which fills up the gap between the Dom and the Taschhorn. This looked so steep, and the cornice above so threatening, that the guides recommended our proceeding farther, to where, about the middle of the couloir, projecting rocks offered a safer route for part of the way. About 7 we attacked these in earnest. They proved easy, and for some distance we mounted rapidly. Then steep snow-slopes intervened, demanding more time and care. Ascending sometimes by these, sometimes by rocks, we approached the ridge, till the snow gave way to still steeper ice, and still more care was requisite. The last slope was very formidable, and the ice so hard that it took three-quarters of an hour to cut up not more than 200 ft. We now found that in following the rocks we had gone too high, and Jakob attempted to pass along the face to the col. It was too dangerous, as the snow lay too thin on the steep ice to give foothold, and step-cutting was almost impossible from the hardness of the ice, and from the snow pouring into the steps ; so after a nasty slip he returned, and, fighting straight up, we topped the ridge at 10.45.

I don't know how to describe the view which burst upon us as we reached the summit. For hours our faces had been burning close to the snow, and in the latter part of the ascent the work had been too stiff to permit of any looking about, and now suddenly there opened before us a boundless prospect. Those who have been fortunate enough to get the view from the Dom on a cloudless day know it. To others I despair of presenting it. Before us, the Matterhorn, Rothhorn, Weiss-horn, with a sea of peaks beyond, and Mont Blanc—poor deposed monarch!—towering in the background, undismayed by his deposition. To the right, the Oberland range. Behind us, from the Weissmies to Monte Rosa, without a cloud. From the mere list of names the mountaineer can picture the scene to himself ; but its wonderful beauty was enhanced by the curious position we were in. On the top of a wall, too steep on either side to see from whence it sprang, we seemed

to sit straddling on a narrow bridge joining the Dom and Taschhorn, with a vast glacier stream flowing 3,000 ft. below us. But enough of this. Half an hour did not suffice to see the view, and would not suffice to describe it. The guides were not unnaturally anxious to proceed, and as it was too steep to descend from where we were, we scrambled, sometimes on the ridge, sometimes below it, till we reached the actual col. Then, turning down the steep wall, we descended in that hideous backward fashion, now kicking and now cutting steps, then climbing down crumbling rocks which soon forced us again on to the snow. Hour after hour passed by, and we seemed no farther from the ridge, no nearer to the glacier. The work was like some amateur concerts I have been to—first interesting, then tedious, and at last a decided bore. At length we reached a gully, enlivened by falling stones and ice, and leading to the glacier below. Towards the bottom the snow was thigh-deep, and one after another of us had to be dug out. The bergschrund, from the softness of the snow, bothered us a little, but at last, 3½ hours after leaving the ridge, we stood on the Kien Glacier.

One satisfied look at the formidable wall we had come down, and the next thing was to decide on our future course. In descending the precipice, we had been forced to the right under the Dom, and thus turned away from Zermatt. We had also seen Mr. Heathcote ascending the Taschhorn, and therefore hoped to find his track to the left. Both reasons drew us that way, and we decided without much hesitation to cross the glacier. To the present day I puzzle myself to settle whether we were right or wrong. The Kien Glacier is divided into three by two parallel ridges from the Taschhorn, and the difficulty of passing these ridges has driven those whose fortunes have led them on to this little-frequented glacier to keep strongly to the right. Our want of local knowledge left us in charming ignorance of this, and when, after wading knee-deep over the glacier, we struck Heathcote's track, and found it turned sharp back to the right, we voted Zermatt guides idiots, and continued our way. The consequence was that, after a little zigzagging among the seracs, we found ourselves on the top of the ridge, with the glacier 500 ft. below us. Going back at this late hour was out of the question, and though the precipice looked uncommonly steep, we determined to try and descend it. As usual in such cases, we got on swimmingly at first, but soon found the rocks get worse. Near the bottom the difficulty was very great; but as the axes had been hurled down, we were forced to go on, and

Baumiann, who was leading, got down somehow. Walker followed, and soon found himself balancing on the tip of his toes and frantically grasping at nothing with his hands, while Jakob informed him coolly he was 'ganz fest,' and exhorted him to jump. Jumping with a 10 ft. fall, and a bergschrund yawning below you, was easier said than done from such a stand-point—as I found afterwards; but Walker managed to do it, and I had to follow. Once on the glacier, we pushed quickly across it, cut our way down the little ice-fall it finished with, and then found ourselves below the third branch of the glacier, in a valley filled with moraine. Over this we ground wearily. Not even half a dozen chamois could enliven us, but when we reached the gap in the ridge for which we had been making, and found, instead of the easy access to the Tasch Alp which we had hoped for, a valley leading down to the Zermatt road, and that to this valley it was impossible to descend from where we stood, the grumbling became almost unparliamentary. Growling and slipping, we worked down the ridge, till at length a way opened to the valley. Here, of course, we lost some time in looking in vain for a path, till Walker and I insisted on descending straight down; and thanks to this we gained the road just as darkness set in. The six miles along the Zermatt road was an awful grind at the end of a twenty hours' walk, and we were unfeignedly glad to reach the Monte Rosa Hotel at half-past 10. Half an hour later, and we must have spent the night in the wood, like Heathcote, who did not reach the hotel till 3 the next morning.

Of the two passes the Domjoch is incomparably the finest, and, with the exception of the one *mauvais pas* on the Nadeljoch, far the most difficult. Its height cannot be less than 14,200 ft., while the spot where we struck the ridge is perhaps 300 ft. higher. It is unquestionably the highest *Swiss* pass, while there are few higher in the Alps. The Nadeljoch, though lower, is, I believe, about 13,500 ft. high, and would be a grand pass if it were not dwarfed by its rival. From either it did not look difficult to reach the Dom, but the Taschhorn is, I think, inaccessible from the Domjoch. It is possible to take either pass from Zermatt, though the routes from Saas must be always preferable, as the overhanging glacier on that side would be dangerous late in the day.

RECENT ACCIDENTS IN THE ALPS. By the EDITOR.

WE have the melancholy duty of recording two fatal accidents, which have taken place in the Alps this summer. The following letter, republished from the 'Times,' gives the fullest particulars of the accident on the Schreckhorn, of which Mr. Elliott was the victim.

FATAL ACCIDENT ON THE SCHRECKHORN.—*Times, July 31, 1869.*—*To the Editor of the Times.*—Sir,—I think it right to communicate to you at once some details of the fatal accident of yesterday, by which the Rev. Julius M. Elliott, of Brighton, was killed by a fall from the Schreckhorn. Mr. Elliott was travelling in Switzerland with my brother, the Rev. P. W. Phipps, with the object of ascending several mountains together. They were accompanied by Franz Biner, of Zermatt, Mr. Elliott's guide for the last four years, and by Joseph Lauber, of Zermatt, as porter. On Monday afternoon, the 26th inst., they left Grindelwald to sleep at the cave under the Kastenstein, taking with them Peter Baumann, of Grindelwald, as an additional porter.

Their intention was to separate on Tuesday morning, Mr. Elliott to ascend the Schreckhorn with Biner and Lauber, my brother to go over the Strahleck and back with Baumann. However, Tuesday morning proved so fine that Mr. Elliott advised my brother to change his plans, and accompany him up the Schreckhorn. This my brother agreed to do, on the stipulation that Mr. Elliott should still go as he had originally proposed, allowing my brother to follow independently with Peter Baumann, so that he might be no hinderance to Mr. Elliott's well-known rapid climbing.

The first half of the ascent was effected with comparative ease, the weather being perfect and the snow in first-rate condition.

As the rocks became more difficult, Baumann and my brother put on their rope. Mr. Elliott, however, declined to put on his, as he thought it unnecessary. He ascended very rapidly, and went on some distance in advance with his two guides.

When my brother and Baumann reached the Col at the top, Mr. Elliott, with Biner and Lauber, were about half-way up the final peak; they were just leaving the snow, and were cutting the last steps to reach the rocks of the summit; they were in great spirits at their success, and the two parties shouted in congratulation one to another.

At this moment it appears that in springing from the snow on to the rocks Mr. Elliott slipped and fell. Lauber was on the rocks, but not firmly placed, and could render no assistance. Biner caught him by the arm for the instant, but failed to hold him, and being unroped Mr. Elliott glided rapidly down the steep snow-slopes of the north-east face of the mountain, rolling occasionally over until he disappeared from their sight some 1,000 ft. below, near the Lauter-Aar glacier.

My brother urged eagerly upon the guides that some attempt should be made to descend after his friend, but it was declared by them to be utterly impossible. The only way, they said, by which the spot could

be reached was by returning to Grindelwald, and sending men thence up to the Lauter-Aar glacier by the upper Grindelwald glacier. One effort was made by joining the two ropes together and letting Baumann down as far as they would reach in the hope of his being able to see anything, but he could see only the furrow marked in the snow by the fall, and though he shouted repeatedly no answer came.

They then returned to Grindelwald as rapidly as they could, but the descent was rendered difficult by the then insecure state of the snow and by the rocks, and they did not reach it until five o'clock in the afternoon. My brother immediately applied to Herr Bohren, of the *Hôtel de l'Aigle*, who at once exerted himself with a promptitude and zeal which cannot sufficiently be praised, and which demand our grateful acknowledgment. He sent off directly six guides, under the direction of Peter Michel, to use their utmost efforts to discover the body of Mr. Elliott.

They took with them provisions for three days, and everything that could be suggested as of use, and they are to sleep at the *Gleckstein*.

Early this morning four more guides were sent, Biner and Baumann being of their number, and we may soon hope for some tidings as to the result of their exertions. My brother considers that no blame can attach to the guides for what has occurred.

Biner was Mr. Elliott's favourite guide, to whom he was personally attached, with whom he had made almost all his ascents (except that of the *Matterhorn*), and in whom he always placed the greatest confidence.

With regard to Mr. Elliott's disinclination to be tied, it must be borne in mind that there are two opinions as to the use of the rope under such circumstances; and Mr. Elliott's great experience in climbing would render him the best judge of what might be the most advisable course in each particular instance. I am, Sir, your obedient servant,

RAMSAY PHIPPS, Captain, Royal Artillery.

Grindelwald, July 28.

We add some facts from an account given in the '*Daily News*':—

On July 26, Mr. Elliott started from Grindelwald to ascend the *Schreckhorn*, usually considered the second most difficult mountain in Switzerland. Mr. Elliott had with him a porter from *Zermatt*, and another *Zermatt* man, Biner, his own guide, who had accompanied him in almost all his ascents. In this guide, Biner, Mr. Elliott had the greatest, and, it would appear, the most well-deserved confidence; and in recording in Biner's book his opinion of Biner's conduct during the last trip with him there is literally hardly an epithet of praise which Mr. Elliott has not employed. He especially describes instances in which Biner had succeeded when the local guides had failed or despaired of success.

After the accident, Herr Bohren, of the *Adler Hotel*, at once sent off six of the best guides, with three days' provisions, to cross by the upper Grindelwald glacier to the Lauter-Aar glacier, and to recover the body. Early the next morning another party of four, including the guides

present at the accident, followed in their traces. In eighteen hours this last party returned, having reached the spot where the body must have fallen, as marked by the furrow made in the slope above; but as they found no trace on the glacier, or the cave of the guides, it was evident that the first expedition had succeeded in recovering the body, and were engaged in bringing it, by some easier route, to Grindelwald. At last, fifty-four hours after the party of six guides had started, late at night, their lights were seen coming down the rocks by the side of the lower glacier. They had succeeded in finding the body at once. They had taken with them everything necessary for its transport, and had come from the Lauter-Aar glacier by the Strahleck pass. The pasteur of Grindelwald had kindly prepared a room in his house for the reception of the body, and it was placed there. It had sustained little injury, but it was evident that death must have been instantaneous. The spot where it had fallen had been quickly found; but the ice there was deeply crevassed, and it had been difficult to remove it. No sooner had the party withdrawn it to a more secure place, than an avalanche of rock and snow came down the slope on the spot on to which it had lain.

The funeral took place on the afternoon of July 30. Mr. Elliott's companion and his guide were the chief mourners, and the coffin was borne by the guides who had recovered the body. A very large number of visitors and guides attended, and the ceremony was most solemn and impressive. The Grand Duchess of Baden kindly sent a bouquet of Alpine roses, gathered by herself, to place in the coffin; and the pasteur of the village placed his church at the disposal of the English chaplain who performed the service. Before leaving the church the pasteur delivered an address in German to his parishioners, calling on them for their sympathy, and showing them the Prayer Book found on the body, with so many passages underlined, as a proof of the spirit in which Mr. Elliott had loved and sought their mountains.

Of the accident by which Mr. Chester perished on the Lyskamm we need only say that it was caused by a slip on a comparatively easy slope, which was, it seems, originally due to Mr. Chester's having attempted to save a dog which was with him at the time, and had slipped on the snow. The account hitherto given is not very easy to understand, and we shall refrain from decided comments until we receive the report of the official examinations. We may, however, remark that two things must have struck every experienced reader as singular, and that from some unpublished accounts which have been forwarded to us, we are convinced that further enquiry may throw a very different light upon the cause of the accident. It was strange, in the first place, that a gentleman slipping in an easy place should not have been easily held up by two experienced guides, to whom he was, or ought to have been, securely roped. Secondly, it is strange that if the guides fell with him over a cliff sufficient to cause his almost instant death, the guides

should have escaped almost unhurt. These circumstances may be susceptible of satisfactory explanation; but we wait for further particulars; such reports as we have heard tend to imply that there may be some important inaccuracies in the hitherto published statement.

We will now venture to add a few observations upon the general question of Alpine dangers as illustrated by these accidents. In the number of this Journal for June, 1866, a paper appeared written by the present editor, and entitled 'Alpine Dangers.' The main conclusions at which it arrived were as follows:—First, 'that the rope should be invariably worn on all difficult ice or rock slopes where a fall is possible.' The rope should be worn, it was added, 'not merely as a security, but as a guarantee that the danger anticipated is not unreasonably great.' Secondly, it was said that a good guide should be taken as leader in all difficult excursions, and never tempted to proceed against his judgment. And thirdly, mention was made of 'the essential importance of the traveller making himself competent by practice and training to take his full share of the work.' Let us consider shortly how far these considerations are confirmed or rendered doubtful by more recent occurrences.

In the last paragraph of the quotation from the 'Daily News' it is said, that the persons who advocate the use of the rope should remember that, if Mr. Elliott had worn it, 'two more lives would almost inevitably have been lost.' The Schreckhorn is almost exclusively a rock mountain, and, moreover, a mountain where the rocks are generally firm and present good hold. The accident took place where one guide was already on rocks, and Mr. Elliott jumping on to them from (apparently) a patch of ice or snow. We are not told what was Biner's position; but it was sufficiently firm to enable him to seize Mr. Elliott's arm and make some effort at saving him. If, then, the first guide had had a tolerable hold, and the party had been roped together, there would have been two men in comparative safety employed in holding a third who was himself a very active mountaineer. It is impossible to speak positively without inspection of the place; but there is certainly a very strong probability that the accident would have been rendered harmless. It is to be remembered that though the first guide could not help Mr. Elliott, from the insecurity of his position, it is one thing to help a man by catching him with your hand as he falls, and another and a much easier simply to remain in your position and wait for the strain of the rope. Let us, however, assume that as a matter of fact the

guides were so placed that even when roped they could not have resisted the fall. What follows? Surely, that under the circumstances they ought not to have been so placed. From personal experience of the Schreckhorn we venture to say confidently, that there is no place where a party of three competent mountaineers may not with moderate care retain such positions that two at least will always be ready to support the third. Granting everything which the writer in the 'Daily News' asserts, the only inference apparently unfavourable to the use of the rope is this, that three men may put themselves in such positions on a dangerous mountain that the fall of one will entail the fall of the whole party. This is perfectly true, and is, moreover, a very important truth; though it is equally true that they may with care render an accident altogether out of the question. And the inference is simply that the use of the rope is not by itself a sufficient safeguard, avoiding the necessity of skill and care. Undoubtedly it is nothing of the kind; it may be easily rendered a source of danger; and we are anxious to express this fact as emphatically as possible, in order to draw another inference. We will remark, however, in passing, that good mountaineers are often tempted to dispense with the rope on difficult rocks on account of the extra trouble which it frequently imposes. Yet there is no variety of Alpine climbing in which it can be made to afford more security, and we could point to a case where the life of an excellent guide with a first-rate mountaineer was saved lately by this precaution, when the sudden giving way of a pinnacle of rotten rock would otherwise have almost certainly led to a fatal fall. A rope should be used on a steep ice or snow slope, but it is even more essential on difficult rocks.

To return, however, to our argument. We have admitted that the use of the rope may in some hands be made a cause of danger; and we add that in mountaineering generally, there is nothing of more importance to remember than that no system of rules whatever can by itself afford perfect security. The difficulties to which one may be exposed are so various, the expedients by which they must be met are susceptible of so many modifications, that it is hopeless to give rules capable of replacing experience and skill. No book on strategy has hitherto rendered good generals unnecessary; and, in a small way, the art of mountaineering has many points of resemblance to the military art, and requires, though on a miniature scale, a similar combination of that presence of mind and fertility of expedients which cannot be taught by any cut and dried system.

It was for this reason that, after noticing the importance of a use of the rope, we spoke emphatically of the necessity, first, of skill in the guides, and, secondly, of a certain amount of careful training of the traveller himself. It is this last point which is most frequently neglected now-a-days, and which it is of most importance to impress upon novices in the art. For reasons familiar to every traveller, the dangers of the Alps are apt to be underrated at the first blush, and a man should not attack them till he knows how serious the dangers may be, and feels himself on good grounds competent to deal with them. Looking back upon the accidents that have occurred since mountaineering became popular, we find that they are all reducible to one of the following heads:—

Either the use of the rope has been neglected, or has been only half observed, as in the accident to the three travellers on the Col du Géant;

Or, travellers have ventured in a place where avalanches were known to fall, and resolved upon running a certain inevitable risk, much as if they had chosen to cross the line of fire at a rifle-ground when the red flag was hoisted. Such, for example, was the cause of Bennen's death and of the accident to Captain Arkwright on Mont Blanc.

And, finally, it is specially worth remarking that in (we believe) every case, except that of Mr. Elliott, there have been one or more inexperienced travellers in the party. The want of experience has either led to a neglect of established precautions, or to an accident in spite of precautions which would have been amply sufficient with moderately good walkers. If the details hitherto received have been accurate, this must have been the case with poor Mr. Chester; but it is possible that another cause of misfortune was not wanting. Experienced mountaineers have done many things which in cool blood they would find it hard to justify. There are probably few men, if the truth were known, who would not confess to moments at which they have vowed that once in a safe valley, they would never again tempt the risks of the mountains. Yet it is a fact that no accident has hitherto happened in the Alps to parties consisting exclusively of well-trained mountaineers so long as they observed the ordinary precautions. Indeed, we believe that we might almost go farther and omit the last qualifying clause, were it not for the accident on the Schreckhorn. Neither experience, indeed, nor any amount of skill can justify some of the risks which have been run by such parties, and they owe their immunity to good fortune as well as to good management; but the fact proves that the risk may be reduced to very small

proportions by a proper attention to the above-mentioned principles. We venture, therefore, to assert once more the conclusion drawn in the paper already quoted, namely, that a man ought to qualify himself, both in activity and in what may be called mountain-craft, before undertaking any difficult expeditions; but that with men so qualified the danger may generally be reduced to a trifle, especially if the command of the party be entrusted to its most experienced and judicious member.

One more remark seems proper to be made. It may be asked whether any blame should be attached to Mr. Elliott's party for not insisting upon the use of the rope. Theoretically, the guides were wrong; and the omission was an instance of a neglect of the principle just noticed, that the most experienced member of the party is entitled to have his opinion followed. But those who know the practical relations between a good walker and his guides, will be slow to censure men for not insisting upon a rule when their employer, who is an experienced traveller, distinctly objects to it. After all, the man who pays practically has the last word in a discussion, which is an additional reason for treating the opinion of guides with deference. Of Biner, we, or, to drop the awkward plural in such a case, I may say from experience that he is a thoroughly good and careful guide, though not of much physical power, nor equal in skill and experience to the first-rate men of the Oberland and Chamouni. I should be very sorry if he were injured by a misfortune, which I do not think can be fairly laid to his charge.

It is hard to blame the dead; and I should sincerely regret any severity of implied censure upon Mr. Elliott in the above remarks. The importance of the question to all mountaineers forbids me to avoid speaking the plain truth. I cannot but think that he was rash, and that the accident which we deplore would in all probability have been avoided by a strict adherence to the rules of prudence. But it must also be admitted with some degree of shame that there are few experienced mountaineers who have not at times been guilty of equal rashness, though from good fortune as much as from merit they have not had to pay the same penalty. If only those who are quite blameless should cast the first stone, few would be entitled to find fault with him; yet it is a duty to mountaineers to let it be known that in the general opinion of the most experienced climbers, such accidents as that on the Schreckhorn are not the necessary result of their favourite pursuit. If they were, the pursuit could hardly be defended.

REVIEW.

A GUIDE TO THE EASTERN ALPS.*

The author of the general notice of Mr. Ball's *Alpine Guide*, which appeared in the last number of this *Journal*, very justly adverted to the peculiar difficulty of criticising a work of this character. How much more arduous, then, must be the task in the case of the present volume, which not only relates to a part of the Alpine chain less frequently visited by tourists than almost any other, but also has had the advantage, in addition to the editor's own very extensive knowledge, of being scrutinised during its passing through the press (as the preface informs us) by Colonel Karl von Sonklar, Dr. Ed. von Mojsisovics, and Mr. F. F. Tuckett; that is to say, by three of the most competent judges that could be found. It is, then, perhaps, almost superfluous to state, that after having carefully examined the parts relating to the districts best known to ourselves, we find them thoroughly accurate, and as complete as the limits of the book can possibly allow.

'The *Alpine Guide*' has one advantage over most others with which we are acquainted; namely, it is more distinctively scientific in its plan and treatment. The ordinary guide-book mode of conveying scientific information is either to indulge in vague and high-sounding generalities, in which verbal sesquipedalia mask ignorance or suggest error; or, when the editor is faintly conscious of his own inability, to interlard the pages with heterogeneous scraps and clippings, which are often useless or unintelligible, apart from their context, and produce on the ordinary reader much the effect of pebbles in a sponge-cake. On the contrary, when Mr. Ball writes about physical geography, geology, or botany, he does it as a man who thoroughly understands his subject, and tells you plainly and simply what you want to know. We think, however, that the part of the Introduction relating to the geology of the Eastern Alps is rather too scanty. As in some respects this region is more interesting to the student than any part of the other two sections, we think it deserves a rather fuller notice. At any rate it would be a great improvement to add to each paragraph references to the pages in the body of the work when the special points of interest are described more in detail. It is rather wearisome, for those who want to get up a general idea of the geology of a district, to be obliged to pick it out from among the descriptions of routes. The same may also be said of the botanical information, the value of which would be much enhanced by references appended to the article on that subject, which also strikes us as capable of considerable improvement at the expense of no great addition to its bulk. Perhaps, also, it might be

* *A Guide to the Eastern Alps.* By John Ball, M.R.I.A., F.L.S., &c., late President of the Alpine Club. (Vol. III. of the '*Alpine Guide.*') London: Longmans, 1868, pp. xxiv. and 640. With Seven Maps and a Panorama.

well if any information of a scientific character, such as a list of plants or a description of a section, instead of being incorporated as at present into the description of a route, were placed in separate paragraphs at the end; and the existence of this information notified in the text by a mark of reference, attached to the name of the place which it concerns.

We think that we shall best perform our task of reviewing this work, if, instead of entering minutely into its details, we sketch out briefly the mode in which the editor has accomplished his undertaking.

A glance at the geological map appended to the 'Eastern Alps' shows that the district comprised in this volume is divided into three broad zones of very different rock; and a closer examination will prove that these petrological distinctions corresponded with as many marked orographical boundaries. The northern zone—composed almost wholly of sedimentary rocks, ranging from the Trias to the Eocene, and limited on the south by those parts of the Inn, Salza, and Enn valleys which have a general east and west direction, and lie in an almost unbroken trough line—is noticed in Sections XLII, XLVII, and LIV. It may be roughly described as a series of mountain chains of from about six to nine thousand feet, corresponding generally with the strike of the principal strata, and traversed by a series of transverse valleys, through the more important of which the waters of the above-named streams escape towards the north. In it are included the exquisitely beautiful lakes of the Saltzkammergut, the less famed but very lovely Achensee, and those Bavarian Highlands about Partenkirchen, which Mr. Boner's pleasant work on 'Chamois Hunting' has made so familiar to lovers of Alpine literature. The most important line of division in this region being of course that of the valley of the Inn to the north of Worgl, Mr. Ball uses this in order to separate the northern range into two convenient groups which he calls the Suabian and the Salzburg Alps, and again subdivides into the sections mentioned above. We do not doubt that when this region, every part of which can hold its own against the corresponding districts of Switzerland, becomes better known, it will be a favourite place of resort for those travellers who love to enjoy fine scenery undisturbed by the 'tourist' horde, and prefer the quiet simplicity of a German village inn to the feeble imitations of Parisian splendour unhappily becoming so common in the neighbouring country. Such travellers will find Mr. Ball's book an invaluable companion. We have tried it in the parts which we know, and not found it wanting.

Between the line of valleys mentioned above, and the yet more clearly indicated trough occupied by the Etsch, Eisack, Puster, and Drau or Gail Thals (which, except for the flexure at Botzen, runs for some two hundred miles from west to east) lies the great crystalline mass of the Eastern Alps. The narrower and more western portion—Sections XLVIII. to LII.—is described by Mr. Ball under the title of the Central Tyrol Alps; the wider spreading and more irregular Eastern *massif*—Sections LIII. to LVI.—being called the Styrian Alps. In the former are comprised the high tabular mountain masses and icefields which surround the Oetzthal, the ridge of the Zillerthal Alpen, and the

fine peaks of the Venediger and Gross Glockner districts, whose outline reminds the traveller of the bolder parts of the Graian Alps. As it happens, we can speak from recent experience of a portion of this district, and we gladly bear our testimony to the careful and thorough manner in which Mr. Ball has done his work. We may remark, by the way, that the path on the south side of the Nieder Joch is now a good and well-marked one; and, unless the glacier is one that varies much in different seasons, we should hardly think guide or rope absolutely necessary in settled weather.

The third and remaining mountain zone is divided, though by a line necessarily somewhat arbitrary, into the South Tyrol and Venetian, and the South-eastern Alps. In these the author has described the district made familiar to the public by Messrs. Gilbert and Churchill's 'Dolomite Mountains.' Without quite endorsing the high praise bestowed upon this region by the authors of the above admirable work, we will say that it is one that no student of physical geography or lover of fine scenery should leave unvisited. Though at times he may complain of a certain monotony caused by the absence of important snowfields and glaciers, he will be to a considerable extent compensated by precipices more tremendous and peaks more strangely shaped than can be found in other regions of the Alps, except perhaps in one or two of the wildest parts of Dauphiné. To the geologist this zone is especially interesting, owing to the presence of large deposits of dolomite, and the extensive underlying and interbedded masses of augitic and feldspathic porphyry and volcanic art between the Etschthal and the Val d'Agordo. Both afford very fine scenery: the former constituting the peaks and precipices mentioned above; the latter sometimes soft and smiling, with cliffs of richest purple, as in the neighbourhood of Botzen; sometimes dark and gloomy, as in the ravines near Caprile. The major part of the sedimentary rocks in this district belong to the Trias, and the correlation of the Hallstadt beds with the abundantly fossiliferous strata near St. Cassian have added greatly to our knowledge—previously so imperfect—of the fauna of that epoch. Most of these topics, and the various theories on the origin of dolomite, are noticed incidentally by Mr. Ball; and having ourselves known the inconvenience of visiting some parts of this district without a good mountain guide-book, we can more thoroughly estimate the boon that the editor of the 'Eastern Alps' has conferred upon future travellers. It is hardly too much to say his work on the Alps has made an epoch in the publication of guide-books; and we suspect that a good many of those compilers who have lived before this Agamemnon will find long oblivion speedily oppress them.

T. G. B.

ALPINE NOTES.

July 10.—George Edward Foster with Hans Baumann and Jakob Anderegg made the first ascent of the Gspaltenhorn. Spent the night at the same gîte as Messrs. Hornby and George did last year. Started at $\frac{1}{2}$ past 2, and reached the arête, where they were stopped, at 6.30.

Ascending by this, which was much serrated, and presented very considerable difficulties, reached the summit at 8.30. They stayed there only $\frac{1}{2}$ an hour, as the final arête, which was snow, was in a dangerous condition, and returned to our camp about 1.

July 12.—The same party, with the addition of Mr. Horace Walker, slept at the Stufenstein châteaux, and made the second ascent of the Jungfrau by the Roththalsattel. They found the couloir much more difficult than their predecessors had done, and did not reach the Sattel till 12, and the summit till 1.15.

July 31.—The same party left Montanvert at 2 for the second ascent of the Aiguille du Midi, and reached the summit at 12. In descending kept to the right after leaving the rocks, and descended to the Glacier de Bossons by a couloir, where they were exposed to great danger from the rottenness of the rocks and avalanches. Reached Pierre Pointue at 6.30, and Chamounix at 8.10.

To the Editor of the Alpine Journal.—Dear Sir,—Not finding in Mr. Ball's 'Guide to the Eastern Alps' any account of a convenient pass between the valleys of Matsch and Schnals from which the Weisskugel could be ascended *en route*, I enclose a short notice of an expedition made by me last year, which may, perhaps, be of interest to some of the readers of the 'Alpine Journal.'

Although I myself crossed from Matsch to the Oetzthal, the lower part of the Schnalsenthal might have been reached in the same time.

The descent from the Hintereis Joch to the Steinschlag Glacier presents also an opportunity for combining the ascent of the Weisskugel with the passage from the Oetzthal to the Schnalsenthal. I remain, dear sir, yours faithfully,

M. HOLZMANN.

Marlborough House, Pall Mall :

July 19th.

THE 'STEINSLAG JOCH.'—Having found tolerably fair night-quarters at some châteaux, called the 'Glieshof,' in the higher part of the Matscherthal, I started at 4.35 a.m. on August 31, 1868, with a chamois-hunter of Matsch as guide, and ascended to the upper part of the Matscher Glacier by the same route by which Messrs. Tuckett, Fox, and Freshfield descended in 1865. As there was only a very thin film of fresh snow on the hard ice, and as we were without a proper ice-axe, we left the glacier and climbed without difficulty some steep-looking rocks at the southern face of the Weisskugel up to within a short distance from the final ridge leading to the summit of the Weisskugel. The latter was reached at 11.5. We descended to the col named in Mr. Ball's Guide, the 'Hintereis Joch,' and to the upper part of the Hintereis Glacier. My guide being afraid to traverse the whole length of the glacier, we crossed the ridge separating it from the upper part of the Steinschlag Glacier (marked on No. 310 of Reymann's 'Spezialkarte von Deutschland'), and passed along the left side of the latter glacier, and over a very rough slope of 'Geröll' at the base of the cliffs running from the 'Inner Quell-Spitz' to the Hochjoch. We struck the track from Kurzras to the Hochjoch about five minutes

below the highest point of the pass, and arrived at Fend at 6 p.m. Time of actual walking $11\frac{1}{4}$ hours.

Dear Sir,—Though not a member of the Alpine Club, I take the liberty of writing to you to communicate to you the following notes which may interest you.

Col de Béranger (11,000 ft.)—At 4.8 a.m. on July 9, 1869, our party, consisting of a lady, myself, Christian and Ulrich Almer, and a porter from Contamines, left our bivouac (estimated at 7,000 ft.) above Contamines, and passing over the glacier named Gl. de la Frasse in Ball's 2nd Edition, reached the col between the Aiguilles de Miage and de Béranger at 8.45 a.m. The party ascended the Aiguille de Miage and descended to a point 15 minutes above the col. We left this point at 11.55 a.m., and descending a couloir filled with snow, which might be ice later in the year, passed a rather wide bergschrund, and descending carefully through a maze of concealed crevasses reached the level of the Gl. de Trélagrande in 50 minutes from the col. We walked down the glacier to the base of the Col du Mont Tondu, crossed that col, and reached Motets in the evening. The view from the col of the Aiguille de Trélatête is superb. A fine view of Mont Blanc is gained on reaching the Gl. de Trélagrande.

On July 17, 1869, the same party, with D. Ballay of St. Pierre, but without the porter, left their bivouac, 8,000 ft. high, considerably to the left of the usual route, and ascended a couloir of snow which landed them on a vast plateau at the foot of the Grand Combin, which was successfully attacked. This route is much shorter than the one commonly taken.

The St. Pierre guides intend to construct a hut on the ordinary route.

On July 24, 1869, with C. Almer and A. Ritz, I crossed the Sesia-joch for the third time. The time, actual walking, from the highest châteaux in Val Sesia to the summit of the pass, was 8 hours. There was very little snow. Towards the top we avoided the worst rocks by cutting our way up a steep ice-slope which was raked by stones, none of which, however, struck us. I cannot recommend this way to anyone. Time, actual walking from the châteaux to the Riffel Hôtel was 11.50.

On July 18, 1868, our party consisting of a lady, myself, C. Almer, Gärtch, and P. Roth, left the highest Oeschinen châteaux to ascend the Blümlis Alp. We followed the usual route to the glacier; but we then passed to the right of the Blümlis Alpstock instead of to the left as heretofore. No serious difficulty was encountered, but bad weather delayed us so much that we were unable to ascertain how much time was gained by this new route. We reached the col, and thenceforward followed the ordinary route to the summit.

Hoping you will insert the above in the 'Alpine Journal,' I am yours truly,

W. A. B. COOLIDGE.

Exeter College, Oxford:
September 1868.



THE CASTLE OF LA PETRA.
FROM A SKETCH BY MR. J. GILBERT.

THE
ALPINE JOURNAL.

FEBRUARY 1870.

THE PEAKS OF PRIMIERO. A Paper read before the Alpine Club on January 25, 1870. By LESLIE STEPHEN.

AT some distant period, when the Alpine Club is half forgotten, and its early records are obscured amongst the mist of legends and popular traditions, there is one great puzzle in store for the critical enquirer. As he tries to disentangle truth from fiction, and to ascertain what is the small nucleus of fact round which so many incredible stories have gathered, he will be specially perplexed by the constant recurrence of one name. In the heroic cycle of Alpine adventure, the irrepressible Tuckett will occupy a place similar to that of the wandering Ulysses in Greek fable, or the invulnerable Sivrid in the lay of the Niebelungs. In every part of the Alps, from Monte Viso and Dauphiné to the wilds of Carinthia and Styria, the exploits of this mighty traveller will linger in the popular imagination. In one valley the peasant will point to some vast breach in the everlasting rocks, hewn, as his fancy will declare, by the sweep of the mighty ice-axe of the hero. In another, the sharp conical summit, known as the Tuckettspitz, will be regarded as a monument raised by the eponymous giant, or possibly as the tombstone piled above his athletic remains. In a third the broken masses of a descending glacier will fairly represent the staircase which he built in order to scale a previously inaccessible height. That a person so ubiquitous, and distinguished everywhere by such romantic exploits, should have been a mere creature of flesh and blood will, of course, be rejected as an absurd hypothesis. Critics will rather be disposed to trace in him one more ex-

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ample of that universal myth whose recurrence in divers forms proves, amongst other things, the unity of the great Aryan race. Tuckett, it will be announced, is no other than the sun, which appears at earliest dawn above the tops of the loftiest mountains, gilds the summits of the most inaccessible peaks, penetrates the remotest valleys, and passes in an incredibly short space of time from one extremity of the Alpine chain to the other.

Fortunately, my readers know that Mr. Tuckett is a flesh and blood reality—no empty phantom of the imagination, but a being capable of consuming even Alpine food and being consumed by Alpine insects. Possibly, like Sivrid or Achilles, he may have one vulnerable point, though I am pretty sure that it is not his heel; but, if it exists, it has not yet been betrayed to his followers. When, therefore, I read in that great collection of facts and stories founded, it is to be hoped, on facts—Mr. Ball's 'Guide to the Alps'—that the mighty Tuckett himself, and the equally mighty Melchior Anderegg, had pronounced the peaks of Primiero to be inaccessible, I felt something of the thrill felt by

Some watcher of the skies
When a new planet swims into his ken,
Or like stout Cortes, when with eagle eyes
He stared at the Pacific, and all his men
Looked at each other with a wild surmise,
Silent upon a peak in Darien.

I stood silent before the peaks of Primiero, and saw in them a new land, still untouched by the foot of the tourist, and opening vast possibilities of daring adventure and deathless fame for some hero of the future. To me, alas! those possibilities were closed. I was alone (at 6.45 A.M. on a brilliant morning of last August) in the quiet street of the lovely little town of Primiero. I was prepared indeed for a day's mountaineering, but a day how unlike to those when, with alpenstock in hand and knapsack on back, with a little corps of faithful guides and tried companions, I had moved out to the attack of some hitherto unconquered peak! Before me, indeed, lay mountains most exciting to the imagination. Above the meadows of the Primiero valley there rises a long slope, first of forest and then of alp, to the foot of the mighty peaks which spring at one bound to a height of some ten thousand feet. The two conspicuous summits in front are called the Sas Maor, and resemble, if I may be pardoned so vulgar a comparison, the raised finger and thumb of a more than gigantic hand. Behind them, I knew, lay a wilderness of partially explored summits, with sides as steep as those of a cathedral, and surrounded by

daring spires and pinnacles, writhing into every conceivable shape, and almost too fantastical to be beautiful. Mr. Tuckett had made two passes through their intricate valleys and ridges; yet even Mr. Tuckett had shrunk, as I have said, from an attempt to reach their loftiest points. They seemed to be a kind of enchanted fairyland; some strange magic had held even the Alpine Club at a distance, and, what was more provoking, had cast a profound drowsiness over the dwellers at their feet, and almost prevented from raising their eyes to these wild summits, or bestowing names upon them. Yet I could not flatter myself that I should be the first to break the charm or to plant my feet on those daring peaks which had remained undisturbed since they first rose, by some strangely mysterious process, to break the softer scenery around them. I had a Spanish wine-bottle slung round me, a crust of bread in my pocket, and an axe in my hand; but alone, and determined to come back in one piece, I could only hope to open a path for more daring adventurers, and, like a church spire, to point to Paradise without attempting to lead the way. The present paper, therefore, must be prefaced with a warning to true mountaineers that they must expect from it no records of thrilling adventure, and that I shall not even assert (for the perhaps insufficient reason that it is not true) that at any given point a false step might have broken my neck.

My way led at first along a good road, to the foot of the castle of Pietra. I cannot imagine a more enviable dwelling-place for a baron of a few centuries back. From his rocky fortress he looked down upon the little village lying at his feet, and, having the power of life and death over its inhabitants, was doubtless regarded with universal respect. The most practicable road into this secluded country lay immediately beneath his walls, and must have enabled him conveniently to raise such duties as were compatible with the commercial theories of the epoch; that is, he could take whatever he liked. The rock is so precipitous that a few landslips have rendered it literally inaccessible without the use of ladders. But the most eligible part of the estate (to use the dialect of auctioneers) must have been that the lovely little side valley, the entrance to the col, was covered by the castle. This valley, called the Val di Canale, stretches north-eastward into the heart of the mountains. The stream which waters it, sparkling with the incomparable brilliancy characteristic of the Dolomite regions, flows through a level plain of the greenest turf, dotted with occasional clumps and groves of pines that have strayed downwards from the bounding slopes. In the comparison between moun-

tainous and lowland countries, it is an obvious advantage to the former—though I do not remember to have seen it noticed—that it is only amongst the mountains that you can properly appreciate a plain. Such a meadow as that I was crossing would have been simply a commonplace pasturage in Leicestershire. Contrasting it with the mighty cliffs that enclosed it on every side, it was a piece of embodied poetry. Nature had been a most effective landscape gardener, and had even laid out for the benefit of the lords of Castel Pietra a kind of glorified park. I apologise for the expression. I have, indeed, heard true British lips declare that one of the loveliest bits of Alpine scenery was really parklike, and serenely condescend to flatter the mountains by comparing them to the deadly dulness of the grounds that surround a first-class family mansion in our respectable island. Here, however, there was undoubtedly a faint resemblance; only it was such a park as we may hope to meet in the Elysian fields; a park as much like its British representative as an angel to a country gentleman. The difference lay principally in the system of fences adopted in the two cases. Here it was formed by one of those gigantic walls which almost oppress the imagination by their stupendous massiveness. I was evidently contemplating one of the great scenic effects of the Alps, not, to my taste, rivalling Grindelwald, Macugnaga, or Courmayeur, but yet in its own style almost unique. The huge barrier before me was the defence of that fairyland into which I was seeking entrance. The cliffs rose abruptly and with tremendous steepness, though their bases were joined to the valley by long slopes of débris that had accumulated in countless ages. It is impossible to paint such scenery in words, or to give any notion of the force with which the bare rocks, a deadly grey in some places, and tinged in others with the ruddy hue common in the Dolomites, contrasted with the rich Italian vegetation at their feet. The only comparison I can think of is somewhat derogatory to their dignity. I must ask you, however, to imagine a gigantic raised pie, such as sometimes makes the circuit of a table before any audacious guest makes an inroad into its contents. At last appetite gets the better of modesty: a sacrilegious hand is raised, and a few bold gashes with the knife make terrible rents into its solid sides, and heap piles of ruined paste in the dish below. Even so had some mysterious agent sliced and hacked the great Dolomite wall, and though the barrier still rose as proudly as ever along a great part of the line, there were deep trenches and gullies hewn through it at various places, masses had evidently given way at some distant

period, and others were apparently threatening to follow them. I was still in utter darkness as to the geography of the district, but on reflection I thought it best to enter the broadest and most accessible of these gashes, which lay immediately behind the Sas Maor, and is known as the Val Travitale. It was what would be called a ghyll in the English lakes, that is, a steep lateral gorge enclosed by precipitous rocks on each side, and it appeared to terminate at a distinctly marked col, from which there would probably be a descent to the other fork of the Primiero valley. By following this route I should at least pass through the very heart of the mountains.

My climb was interesting from the strangeness of the scenery, but not in any sense difficult. The Dolomite rocks have this disadvantage, that the débris are generally formed of small hard pebbles of dazzling whiteness, from which the water drains off rapidly, and which have therefore little power of cohesion. The foot rests on a bed of loose stones, which in other formations would give firm hold, but which here crumbles away, to the imminent risk of your equilibrium. Not a drop of water is to be had; the sun strikes down with tremendous force, and its rays are reflected with almost unabated power from the blinding stones. In the gully which I was speedily climbing, there was not a breath of air. I was in good training, but without the stimulating effect of company. I began to think of a passage in which Mr. Lecky has argued that a utilitarian moralist has no sufficient reason for being good in solitude; when no eye is upon him he may as well devote himself to his own selfish pleasures. I am a utilitarian. I began to think that there was a good deal of force in arguments which I had always hitherto repudiated as a gross misrepresentation of my case. What if I should sit down in the first bit of shade I could find, eat a crust of bread, and have a pull at my wine-flask, and then, with the help of tobacco, contemplate the beauties of nature? Why this incessant toil to rise, when there is nobody to race me, and nobody to expose my indolence? A languor stole over me, and though I resisted the tempter, I raised my feet slowly and sleepily; I groaned at the round, smooth, slippery pebbles, and lamented the absence of water. At length I reached a little patch of snow, and managed to slake my parched lips and once more to toil upwards. A huge boulder, in colour and form resembling a gigantic snowball, filled up the gully, and gave me a little amusement in surmounting it. A few minutes more and I entered a very remarkable grassy plain, of which I shall again have occasion to speak, and after about five hours' walk from Primiero, sat down on the

col I have mentioned to determine my future course. Here I was in the position of that celebrated gentleman who could not see the town on account of the houses. I was fairly perplexed and bewildered. On every side there were gigantic cliffs, soaring pinnacles, and precipitous ravines. They rose so abruptly, and apparently in such wild confusion, all perspective was so hopelessly distorted, that I was totally unable to get my bearings. The map in Ball's Guide—the only one which I had seen—is vague, and on a very small scale, and, as I had afterwards reason to think, is rather misleading than otherwise, though founded on the best authorities. I was at the foot of the promised peaks—nay, I might be halfway up them, but I could not even guess which was the right line of assault, and in which direction the main summits lay. I might descend the ravine which I saw plunging rapidly downwards amongst the roots of the mountains on the other side of the col, but by such a course I should see no more than I had hitherto observed. After some reflection and hesitation it became obvious that the single fact of which I could confidently rely was that the great mass of rock to the south, on my left hand, must intervene between me and the valley of Primiero. If it were possible to climb it, I should get a more distinct view of the mountains to the north, and might possibly find a short cut home across the ridge. With this plan I commenced operations by ascending a long snow-slope—and I must remark that I do not attempt to give precise indications of its geography because in the absence of good maps I should have to go into a mass of dry detail, whilst any mountaineer who follows me will immediately see for himself the only possible route. The snow was in fair order. I ascended rapidly, cutting a step or two in one place, and on reaching the head of the snow, I took to the ridge of rocks at a part where a very remarkable pinnacle of great height rises into a shape which a fanciful traveller may compare to a bayonet with the point bent over to one side. The rocks, though apparently difficult, turned out to be excellently adapted to my purpose. I topped the ridge, and bearing to my left forced my way along it in spite of one or two gaps which for a moment threatened my advance. It was growing late, and I had reason to suppose that my absence, if much prolonged, might cause some anxiety to those I had left at Primiero. I resolved that I would turn back under any circumstances at 2.30, but I made strenuous efforts to be as far advanced as possible at the fatal hour. My energy was rewarded. With still a minute or two to spare, I stood upon the top of the moun-

tain—of what mountain I could not possibly say. Had I the pencil of a Reilly, I should have instantly sat down in spite of my hurry to make some sort of outline of the view which presented itself. As it was, I drained the last drops of my wine-flask, eat my last crust of bread, and endeavoured to make a mental photograph of the scene before me as rapidly as possible. To the north rose the great mass of peaks at whose feet I had been clambering for hours. I shall presently describe more fully their singular character; for the present it is enough to say that in every direction they presented fearfully steep cliffs, and with the exception of a single glacier of trifling dimensions, scarcely one patch of snow. The summit upon which I was standing was part of the great ridge from which rise the singular peaks of the Sas Maor. I was divided from them by a deep cleft, and, so far as I could judge, was at a point about intermediate in height between those astonishing twins. More singular towers of rock are scarcely to be found in the Alps. At the time, I compared the ridge before me to some monstrous reef stretching out to seaward with a singularly daring lighthouse erected on a distant point, or rather, if such a thing could be imagined, growing spontaneously out of the rock and bending over as it rose. Or perhaps a more perfect likeness might be found to the head of some great monster extended at full length, and armed with a couple of curved horns like those of the double-horned rhinoceros. The monster was covered with all manner of singular excrescences, spines and knobs growing out of his stony hide; amidst which these two singular elevations towered in daring disregard of the laws of equilibrium. One could hardly believe that rock would shape itself into such strange forms, and that there was not some kind of muscular fibre to weave them into comparative firmness. I looked at them with a strong sense of wonder, though, to confess the truth, with a belief that somebody might possibly discover a route to the loftier of the two from the deep trench which divided them from me.

I was the more led to this conclusion from the singularly favourable nature of the rocks I had hitherto climbed. Even where they were most apparently threatening, a nearer inspection revealed abundant crannies and cracks where it was easy to obtain very good hold for hands and feet. If I had limited my reflections to the question of ascending the Sas Maur, I should have simply returned by the way I came. Another plan, however, occurred to me with irresistible force. The rocks were so good that I inferred the possibility of descending straight to the Primiero valley, i.e. by the opposite

ridge of the mountain to that which I had climbed. All my life I have suffered from an invincible love of short cuts. I suppose there is no propensity more common, nor more frequently leading to mischief. Short cuts to learning end in general ignorance; short cuts to wealth, in Pentonville Penitentiary; short cuts to political glory, in Leicester Square; and short cuts in mountain districts to a destiny not less disagreeable than any of these—namely, to the nearest churchyard. However, I yielded to the overpowering impulse. From my lofty perch, I could see the Primiero valley in its whole length, lying almost at my feet. If the ridge which descended straight towards it proved, as I thought the rocks indicated, to be easily practicable, I might reach the valley in a very short time, and save the trouble of descending the tiresome Val Travitale. Time was limited, and after one final glance, I committed myself to the ridge. This ridge, I must explain, lies between two deep trenches; that which I have already noticed as dividing me from the Sas Maor looked the most promising, if I could but effect a descent into it; and after a short climb, the sight of a few sheep which had evidently strayed up toward the ridge from the valley satisfied me that there must be a practicable route. Unluckily my impatience led me to violate a canon of mountaineering science which I commend to all persons travelling without guides. It is simply this:—Stick to the ridge; in nine cases out of ten an attempt to precipitate matters by an unnecessary desertion of the sharp edge will lead to difficulties. Tempted by an apparently easy route, I made a diversion towards the valley, and after some complicated scramblings, found myself at the edge of some tremendous cliffs, invisible from above, but, so far as I could see, impassable. There is a pleasure in these accidental discoveries which is some reward to the guideless traveller for his unnecessary wanderings. I was probably the first person who ever reached a place which is totally out of the proper route from any given point to any other, and it is probable enough that my performance may never be repeated. I might therefore flatter myself that I alone of the human race can enjoy the memory of one particular view—not, it is true, more striking in itself than many other views, but having the incalculable merit of being in a sense my own personal property. At such places too one feels the true mountain charm of solitude. If my grasp had suddenly given way as I was crossing over those ghastly crags, I should have been consigned to a grave far wilder than that ‘in the arms of Helvellyn,’ and which might as likely as not remain undiscovered till there was little left to reward the dis-

coverer. A skeleton, a few rags, the tattered relics of certain more coherent rags which just passed themselves off for clothes at Primiero, and perhaps the mangled remains of a watch and an ice-axe, would hardly be worth the trouble of a prolonged search. These cheerful reflections passed through my mind, and added considerably to the influence of the strangely wild scenery. They also helped to recall me to the propriety of finding my way home, with a skeleton still decently apparelled in flesh and blood—to say nothing of Mr. Carter's boots. Before long, I had returned to my ridge, and was fighting my way downwards. It was an amusing bit of climbing until just above the point which I had marked as offering an easy descent to the valley. I was interrupted by a sudden wall of rock. I managed at one point to creep so far downwards that if mattresses had been spread at the foot of the cliff, I could have dropped without fear; but there were only sheets—and those sheets of peculiarly hard rock. With some difficulty I discovered a means of turning this difficulty also. At one point as I was letting myself carefully down, a pointed angle of rock made a vicious clutch at the seat of my trowsers, and fatally interfering with my equilibrium, caused me to grasp a projecting knob with my right and let my ice-axe fall. With a single bound it sprang down the cliff, but to my pleasure lodged in a rocky chasm some hundred and fifty feet below me. In regaining it, I had some real difficulty. I was forced to wriggle along a steep slope of rock where my whole weight rested on the end joints of my fingers, inserted into certain pockmarks characteristic of this variety of rock, and, to be candid, partly upon my stomach. The last support gives very efficient aid on such occasions. Just beyond this place I had to perform the novel manoeuvre of passing through the rock. A natural tunnel gave me a sudden means of escape from what appeared to be really a difficult place. But, alas! what is the use of such descriptions? How can I hope to persuade anybody that I encountered any real difficulties?—the next traveller who climbs these rocks will laugh at the imbecile middle-aged gentleman who managed to get into trouble amongst them, and, to say the truth, the troubles were of no great account. With an active guide to hold out a hand above, and another to supply a prop below, I might have skipped over these difficulties like the proverbial chamois. As it was, I reflected that, whatever modes of progression I adopted, there would be no one to criticise; and taking good care to adopt the safest, I speedily rejoined my ice-axe, and stood at a kind of depression in the ridge, from which, as I had anticipated, there would be

an easy descent to the pastures below. I was in fact at the point where I had already seen the sheep; and it would be unworthy of an Alpine traveller to describe a route already traversed by such unadventurous animals. All that I need say for the benefit of my successors is this. The valley by which I ultimately effected my descent is that which descends from the col between the Sas Maor and the peak (to the north-west) which I had just climbed. The only difficulty in finding a route lies in the circumstance that the valley is broken by certain walls of rock which divide it into terraces at different elevations. It is rather difficult for one coming from above to discover the proper line. I wasted some precious time by following sheeptracks, under the impression that they led downwards instead of upwards. The route, however, will easily be struck out by reaching the valley as near its head as possible, and then keeping downwards by the left bank of the stream, or rather watercourse. I ultimately reached Primiero soon after dark, having had an interesting twelve hours' walk.

On entering Primiero I had the pleasure of meeting Mr. Ball. It is, I believe, not considered complimentary to a gentleman to describe him as a book in breeches; and it might be an equivocal compliment if I were to describe Mr. Ball as a guide-book on legs. I will, however, say that Mr. Ball's accurate and amazingly extensive knowledge of every valley and peak in the Alps is such as would infallibly swamp any feeble brain. Few people who know so much on one subject could afford to know anything on any other. I need hardly add that Mr. Ball is one of the few. He was therefore the very man before whom to lay my various geographical perplexities. We held a council after dinner in the passage of Bonetti's excellent inn, and my intellects were rendered considerably clearer. What, in the first place, could be the name of the peak I had climbed? Even Mr. Ball did not know, and the cause of his ignorance was speedily explained by an intelligent native. The fact was that the peak had no name at all. But, as our friend explained, Herr Suda, who, if I mistake not, held an official position in some way connected with the Government survey, had proposed to the editor of the map to bestow a name upon it; and that name, as I heard with great satisfaction, was the *Cima di Ball*. I sincerely hope that the name will be adopted. Yet I cannot say that it is in all respects appropriate. The mountain, it is true, has many merits, and amongst them the rather questionable merit of a retiring modesty. Of no mountain that I have ever seen of the same importance in a range is it so difficult to obtain a view. When it appears, it has a vexatious habit of looking

lower than it is, and still more provokingly, of passing itself off as the mere hanger-on of some peak of really inferior merits. Moreover, like the conversation of some of my acquaintance, it is totally deficient in point, and meanders carelessly away, until it may be said rather to leave off than to culminate. Its top is a rambling plateau, which cannot quite make up its mind to act like the summit of a respectable mountain, and nobody had even erected a cairn upon it previous to my arrival, when I threw up a hasty heap of stones. Yet it is distinctly a summit, cut off by deep and wide depressions from all its rivals, and moreover it has one merit which may make it less unworthy to be called after Mr. Ball. By its assistance, as by that of its godfather, I was able to gain a considerable insight into the geography of the district; and upon this rather dreary subject I must now beg to say a few words.

The valley of Primiero forks just above the village, and thus takes the shape of a Y. The main valley, watered by the Cismone, descends from the N., and is joined by a torrent from the NE., issuing from the Val di Canale. The ridge which I had crossed runs diagonally across the fork of the Y. It is a sharp and deeply serrated range, the principal elevations (beginning from the west) being the Cima di Ball, the Sas Maor, and a lower and apparently easily accessible summit called the Cima Cimedò. The two points of the Y are joined by a very singular ridge, which I shall distinguish as the grand plateau. At its eastern extremity this rises to the foot of the Cimon della Pala—an extraordinary peak, of which Mr. Ball says, that whilst its height above the apparent level (as seen from near S. Martino di Castrozza) is about equal to that of the Matterhorn from the Hörnli, the Cimon 'is undeniably the more slender and, so to speak, the more incredible of the two.' At the western end, the plateau rises to the foot of the Cima di Fradusta, an easily accessible peak of about the same height, of which I shall presently have more to say. These two great ridges, the last running about E. and W., and the other from (say) NW. to SE., are, as it were, the framework of the singular labyrinth of peaks. The second (that which includes the Sas Maor) is some distance south of the other. Between them, running from N. to S., is interposed the great mass of the Cimon della Pala, a lofty and apparently inaccessible mountain. It is joined by a series of sharp teeth to the plateau, whilst to the S. it abuts against the Cima di Ball, from which it is divided by what (in the absence of any known name) I must venture to christen the Col Travitale, that, namely, which I had reached in my first expedition.

There remains to be described a very singular formation, which strongly excited my curiosity. From the Fradusta a huge nameless buttress extends southwards, and therefore parallel to the C. della Pala, towards the Sas Maor, from which last it is divided by the deep trench of the Val Travitale. If I may compare small things with great, the geography of the district may perhaps be explained by a parallel with the range of Mont Blanc. Imagine the monarch of mountains to be supplanted by the grand plateau with the Fradusta towards the Aiguille de Goûté, and the C. della Pala near the Aiguille Péteret. The great range of the Géant and the Jorasses will then be represented by the Palle di San Martino; the aiguilles above Chamouni by the nameless buttress; the range of the Sas Maor by the Aiguille Verte; and the Val Travitale by the gorge of the Mer de Glace. The resemblance is indeed very rough, and to make it closer we must suppose that the rivers in the valley of Chamouni and the Val Ferret reverse their course and join somewhere about Martigny. My route would then be represented by supposing that I had ascended the Mer de Glace, and, bearing to the left, had crossed the range between the Verte and the Jorasse, and descended through the Val d'Entremont to Martigny. The region which now excited my interest was that which corresponds to the lofty snow plateau which is traversed in reaching Mont Blanc from the summit of the Col du Géant. Here, as I have hinted, I had seen a singular valley, upon which I had turned my back, but which looked in a cursory glance so strange and characteristic that I resolved to pay it another visit.

My absence, as I have said, had caused a certain degree of anxiety; and to avoid any pretext for such feelings, I consented to take a guide for my next exploration. The person designated for this duty by universal consent was one Colesel Rosso. Against poor Colesel I would say nothing. He is very poor and very deserving; he is willing, exceedingly cheerful, full of conversation, which I regret to say was imperfectly intelligible to his companion, a good walker, and a mighty bearer of weights. In short he has every virtue that a guide can have consistently with a total and profound ignorance of the whole theory and practice of mountain climbing. He followed me with much zeal till I reached what looked to be a rather difficult place, and was then content to sit down placidly, and assured me on my return that I was very brave. I did not deny the truth of a compliment which I had certainly not earned. If anyone wants a good porter in tolerably easy places, I can recommend poor old Colesel; but it would

be wrong to allow anyone to take him on a serious expedition. When I first saw him, I confess that in spite of previous warning I was struck with amazement. It was little that his height was not above 4 ft. 6 in., and that his general appearance might suggest that I was taking with me an animated scarecrow to frighten the eagles of the crags. Poor Coesel, I suspect, had been assigned to me out of charity, on the ground that he was one of the poorest men in a district where the people generally seem to enjoy a fair degree of comfort. Although this principle is scarcely compatible with sound views of political economy, I was glad enough to give my companion a good turn. But I was rather more startled by observing that he held in his hand a shillalah in place of an ice-axe, thereby increasing his general resemblance to a good-tempered Paddy rather more than usually out at elbows; and that he regarded my rope and axe with undissembled wonder. It has so rarely happened to me to walk with any Alpine peasant who could not easily beat me at every kind of climbing, that I still felt some faith in Coesel, and put my best foot forwards during the first part of my expedition, with the view of impressing him with a respect for my powers. The proceeding was quite unnecessary; my guide never showed the least propensity to give any opinion as to my best route, but followed me with great cheerfulness until I reached the glacier. Then, having no nails in his shoes, he was unable to make much progress; and he finally broke down when I came to a climb about equal in difficulty to the last rocks of the Brévent. So much I feel bound to say for the benefit of future travellers; but I repeat that I have good grounds for supposing Coesel to be an excellent porter. Anyone meditating an assault on the Primiero peaks must either go alone or bring guides from more satisfactory districts.

I now proceed to give a short account of my walk. I ascended the Val Travitale, turned to the right through the strange valley I have mentioned, thence climbed the Fradusta across the only glacier of the district, and finally crossing the whole length of the grand plateau at the foot of the Cimon della Pala, descended to S. Martino di Castrozza by Mr. Tuckett's *Passo delle Cornelle*. I returned to Primiero after about eleven or twelve hours' walking. Probably my time was rather faster than the average, as I was anxious to return at a tolerably early hour.

The walk deserves notice, because no other will give a more complete view of all the singular peaks of these most interesting districts. At no point is there the slightest difficulty,

except, it may be, in hitting off the right line of descent to S. Martino. A cairn of stones marks the place at which it should begin; but it is better to say that it lies through that one of two marked depressions which lies nearest to the Cimon della Pala. The valley to which I have so often referred as accessible through the Val Travitale was reached in four hours from Primiero. Ladies who do not object to a steady climb over grass slopes and a few very easy rocks, might easily reach it, and could ride from Primiero to the foot of the ascent. I make this remark, because I am sure that future visitors will do well to visit a spot so singular as, in my experience at least, to be almost unique. The valley lies at a height of some 7,000 ft.; the floor would apparently be almost level, but for the enormous piles of débris which have descended into it, and whose long slopes mask the foot of the cliffs. At times there must be a small lake in the centre; but the rock is of so porous a nature that the stream which enters it from the Fradusta glacier is speedily absorbed. When I was there, it was a dry and arid waste, with a few Alpine plants picking up a scanty subsistence. The peculiarity of this remarkable cauldron lies in the gigantic cliffs by which it is shut in on every side. Standing on the bed of the lake, the traveller looks up to the plateau in front, with the glacier trickling over its edge; the ascent to this direction is gradual. But on his left towers the tremendous wall of the Palle di S. Martino, which if not literally vertical, is as good an imitation of the vertical as even the Dolomite Alps can often produce. It is severed in various places by the deeply scored trenches which I have called ghylls, and which in the German Alps would be described as '*Klamms*.' It might be possible to scramble up some of these for a distance; but their heads are enclosed everywhere by the most forbidding of rock walls. Opposite to the Palle is the equally precipitous form of the nameless outlier of the Fradusta — corresponding so closely in character, that old-fashioned geologists would appeal to the usual convulsion of nature as having separated them in some inconceivable spasm of the remote past. Behind the traveller rise the more varied but equally precipitous pinnacles and rock-faces of the Sas Maor. Some path upwards may possibly lie hidden behind the turrets or in the deep chasms by which the cliffs are everywhere gashed and split. A more savage piece of rock scenery is not to be found in any mountains that I have visited. No undulating snowfields or bounding torrent of glacier break the tremendous monotony. Whichever way you turn, there is only the variety of blank vertical walls and daring spires of dolomite. If the narrow

gateway through which the watercourse of the Travitale descends to the Val di Canale were suddenly closed like the lid of a gigantic trap, you would be imprisoned to all appearance in a dungeon of the sternest inaccessibility. I believe that some geologists hold the Dolomites to be coral reefs gradually elevated to their present position. If this be so, the valley I am describing would once have been an atoll. The summit of the guarding wall is of very uniform level, and extends with only two considerable breaks all round the valley. Hence, if the sea were to rise nearly to the present ridge, there would be a little harbour enclosed by a nearly level reef, with one entrance above the opening of the Travitale, and another of less width above the col. Everywhere within the barrier there would be soundings of some 400 or 500 fathoms close to the edge, whilst outside the shores would plunge with almost equal rapidity to a far greater depth. I do not venture, however, upon such inscrutable problems. Rather I would suggest that some extinct race of giants once raised a tremendous fortress, whose rectangular keep or donjon-tower enclosed this singular hollow. With less variety and less of the charm of the distant and mysterious that belongs to most Alpine views, I have seldom looked upon one, every element of which united with such force to impress the imagination with the sense of stern savage power. There is a description in the 'Lord of the Isles,' quoted somewhere, if I mistake not, by Mr. Ruskin, which gives a description of the wild rock scenery of Loch Coruisk in the Highlands, worthy of a great landscape painter if not of a great poet. Though I spare you the quotation, I would willingly, if it were in my power, transfer some of its spirit to these pages. But the Palle di S. Martino, the Fradusta, and the Sas Maor are incomparably grander masses than any which rise amidst the Scottish highlands, and deserve a more capable poet-laureate to sing their praises. I can only beg some gentleman whose talents lie in florid description to visit this remarkable place, and extinguish my feeble portraiture by a free use of his most brilliant colouring.

And now I must say a few words on another region, almost equally striking, though in a different way—I mean the Grand Plateau. This curious wilderness reaches, as I have said, from the Fradusta to the Cimon della Pala; it must be about 9,000 ft. above the sea, and it took me (if I remember rightly) the best part of an hour to cross it at a pretty rapid pace. Its breadth must be nearly equal in one place to its length. The whole area is roughly level—I say 'roughly,' because the action of the various streams which ramble more or less

aimlessly across its surface have carved it into small depressions, whilst glacial action has rounded off the prominences above into dome-shaped swellings. The glacier which descends from the ridge of the Fradusta spreads out over its surface like honey poured upon a plate; and, so far as I could see, the meltings from the glacier appear to diverge in two or three directions. The watercourses, however, here, as elsewhere in the district, are generally dry; and what sets out as a respectable rivulet speedily retreats down some hidden channels. Some of the hollows were filled with snow, whose melting had produced small and probably temporary pools; but for the most part the plateau was a scene of the wildest and most barren desolation. There are fine views across it to some of the more distant mountains, though cloudy weather materially limited my prospects. But the impression which it made upon me most vividly was summed up in the simple reflection that of all places I had ever seen it would be the last in which I should choose to be surprised by a *tourmente*. On a tolerably clear day the neighbouring mountains supply sufficient landmarks; but if they were blotted out by cloud, and a driving snow-storm were to perplex the traveller's brain and numb his limbs, it would be a very serious matter to wander at such an elevation over this vast undulating plateau, where there is no shelter but that of some huge boulder, and no friendly ridge to break the force of the tempest. As it was, for I cannot avoid the inevitable subject, the day was changeable and uncertain. All the morning, as I climbed, a desperate battle had been waged between the clouds and the sunshine. A determined band of mists had stationed themselves under the cliffs of the Sas Maor. Sometimes they were almost dislodged, and only a remnant clung to the projecting ridges and fought desperately for existence. Just as I was congratulating myself on a final victory of the sun, I would glance at the great pinnacle of the Sas Maor, and see that, whilst I had looked round, they had received sudden reinforcements, were making a desperate sally down the Val Travitale, into the sunshiny meadows below, and were threatening to occupy the whole mountain mass from base to cope. Such scenes are really far more beautiful than unclouded weather; but they are vexatious to an explorer. Neither party could boast of complete success, but I was thankful to have sunlight enough left to find my way and to clear up tolerably the geography of the district. If my successors find many mistakes in my descriptions, I hope that they will charitably set them down to the bewildering influence of a mountain mist.

So much by way of preface—as a Scotch minister may remark, on reaching the *fifteenthly* of the *thirdly*. And now to come to the main body of my discourse, the description, namely, of the Peaks of Primiero; for under that name mountaineers will only reckon those summits which have not as yet felt the foot of human intruders. There are three principal peaks, each of which I have noticed shortly in the course of my paper. Of the Sas Maor I will say that though apparently the most difficult, it is the one which I should attack with greatest hopes of success. As seen from the Val di Canale or the Travitale, it is indeed almost ludicrously unassailable, and the prospect from Primiero is not much better. I fancy, however, that by ascending the valley which I descended from the Cima di Ball, and striking up to the right (that is along the eastern slopes), from near the head of the valley, a route may possibly be discovered. I venture upon this conjecture, not because I could trace any distinct routes, but because I found the neighbouring rocks of the Cima di Ball so much more accessible than they looked, that I fancy the Sas Maor may improve upon closer acquaintance. The two other peaks—the Cimon della Pala and the Palle di S. Martino—closely resemble each other. In each case it is obviously easy to reach a great height. They are huge ridges ‘like a shattered wall,’ as Mr. Ball says, scored across by gashes of tremendous depth and most unpromising aspect. It is easy to get to the end of the ridge, and it would be easy to go along it, were it not for the necessity of striding across these fearful chasms. Dr. Grohmann—a very successful and energetic mountaineer in these districts—had, as I was told at Primiero, made an assault upon the Cimon della Pala. He was only stopped (I quote from memory, and supply the figures from my imagination) by the necessity of crossing a notch with vertical sides some 90 fathoms deep, and 30 in breadth, and rising some 50 ft. above the point on which he was standing. Doubtless engineering science could supply expedients for surmounting such a difficulty, but to the ordinary mountaineer it is rather an alarming obstacle. The ascent of the Palle di S. Martino from the plateau end seemed to be opposed by a similar fortification. I regret that I did not examine it more closely; but the neck of the ridge (if I may adopt such an expression) looked from a distance as though its vertebræ had been divided by a few bold slashes, and reft at such distances that it would require 50-chamois-power to bound across them, to say nothing of the difficulty of balancing oneself on the sharp edge when once reached. It is extremely possible that a route may exist

through the strange maze of cliffs which I had seen from my col and the Cima di Ball. But the view from the valley I have described was certainly not promising. The highest block of the Palle seemed to be cut off by trenches too deep and too vertical to offer much hope to an assailant.

I am half inclined, therefore, to fancy, and have no scruple in ardently hoping, that the Primiero Peaks may remain inaccessible. I, for one, have no hope of climbing them, and I cannot say that I wish that glory to fall to anyone else. At no distant period Primiero will be invaded by the mob of tourists. The select few are already beginning to admire its singular beauties. It will be an additional claim to our admiration if, in this last fastness, the spirit of the mountains should make a final and successful stand, and keep at bay those daring adventurers whose success elsewhere has only been too complete. No one is a more loyal member of the Alpine Club than myself, if I may venture the boast. No one wishes more sincerely that it may flourish and spread, and that it may discover new fields of enterprise, and call forth fresh energy in the most perfectly delightful and innocent of all known amusements. But even my good wishes have their limit; I don't wish the Club to be universally irresistible; and I shall rejoice if at some not very distant day, when I hobble on aged legs (if my legs live to be aged) about the scenes of former exploits,—delightful at the time, and, if possible, still more delightful in the memory—I may still look up at one cluster of magnificent summits, and say proudly, I have been to the foot of those peaks, and nobody has been much farther.

NOTES ON PHOTOGRAPHY IN THE HIGH ALPS. A Paper read before the Alpine Club on Dec. 15, 1869. By the Rev. H. B. GEORGE, M.A., F.R.G.S.

IT is only within the last two or three years that it has become possible to do what I hope to persuade many members of the Alpine Club to do—take photographs anywhere and everywhere that the climber chooses to go. When I went round the Oberland on a photographing tour with Mr. Edwards, in the summer of 1865, his apparatus was deemed, by those competent to judge, a marvel of portability and neat adaptation. I forget its exact weight, but I remember that it was a heavy load for the stoutest of Oberland porters. The whole apparatus I carried during my tour of 1869 weighed rather less than four pounds, exclusive of the stand, which was

fitted to the handle of my axe. I suppose that I may assume in the present audience a knowledge of the mere outline of the photographic process—that a glass plate is covered with a chemical preparation sensitive to light, is exposed so many minutes or seconds in front of the picture which is to be taken, and is subsequently developed, that is to say, subjected to other chemical operations which serve to fix the picture on the plate, after which impressions are taken from it by a process analogous to printing. Further knowledge than this is not requisite even for taking photographs with the apparatus I use; it is only necessary to learn, in addition, some practical rules as to the length of time for which a plate requires to be exposed under varying circumstances. But even this small amount of theory is sufficient to make clear the importance of the first step on the royal road to photography—the introduction of satisfactory dry plates—that is to say, the discovery of a mode of preparing plates under which they should not need to be used within a few minutes, but might be used after any interval of time, provided they had been kept carefully from the light in the meanwhile. It then became possible to dispense with all the paraphernalia of dark tent and ill-smelling chemicals; for the plate can equally well be kept after the picture is taken, provided always that no daylight gets to it, until it is convenient to perform the after processes. Some of my most successful pictures of this year were taken on plates a year old, and were developed nearly two months after the picture was taken. The importance of dry plates consists, however, not merely in the saving of a great deal of apparatus, for, after all, one can have things carried almost anywhere, if one does not mind paying for it. For instance, Mr. Edwards' kit was carried over the Lauteraarjoch in 1865, under glacier conditions of very special difficulty. A still greater gain is being able to dispense with water, which is required in great abundance for the ordinary, or wet, process. On an open glacier one can usually obtain plenty of water; but, as we all know by thirsty experience, there is seldom any to be found above the snow-line, nowhere certainly in sufficient quantities. Thus dry plates alone render photography in the High Alps practicable. The second step, which opens photography to everyone who is willing to take a small amount of trouble, was the perfecting of a method of enlarging pictures taken on very small plates. It is not my business to explain the nature of the process by which this is done; I adhere to the principle of requiring no detailed knowledge of the photographic art. But it may be worth while to say that there

are two possible methods, each of which has its advantages:—(1) the original may be photographically copied on a new plate of the required size, after which prints are taken in the ordinary way from the new negative; or (2) the enlarged print may be taken directly from the small original. The latter method gives the most perfect results, but it requires sunshine to work it—an article not too abundant in our climate; and therefore long delay may occur before one can get the enlargements done. The former method is the more expeditious, and for a number of copies the cheaper; but the results are not as good, and inasmuch as there is an extra stage to be gone through, there is an additional chance of imperfection. It has, however, the advantage of improving pictures that have been under-exposed, which the method of direct solar enlargement cannot accomplish. It is needless to say that these magnified copies cannot be expected to be all as good as pictures taken on large plates, with a larger lens. Every little defect, the trifling unsteadiness caused by a gust of wind at the wrong moment, the blurring of outline occasionally produced by the sun on a snow sky-line, the motion of a cloud or a branch while the picture is being taken, will of necessity be exaggerated in the enlarged picture, and become blemishes, though they would hardly be discoverable in the original. But, after all, this process is capable of producing some very satisfactory results. At the worst, these pictures are better than nothing; and they can be obtained wherever a tripod can be made to stand, at any place a mountaineer can reach, for a very slight expenditure of time and trouble.

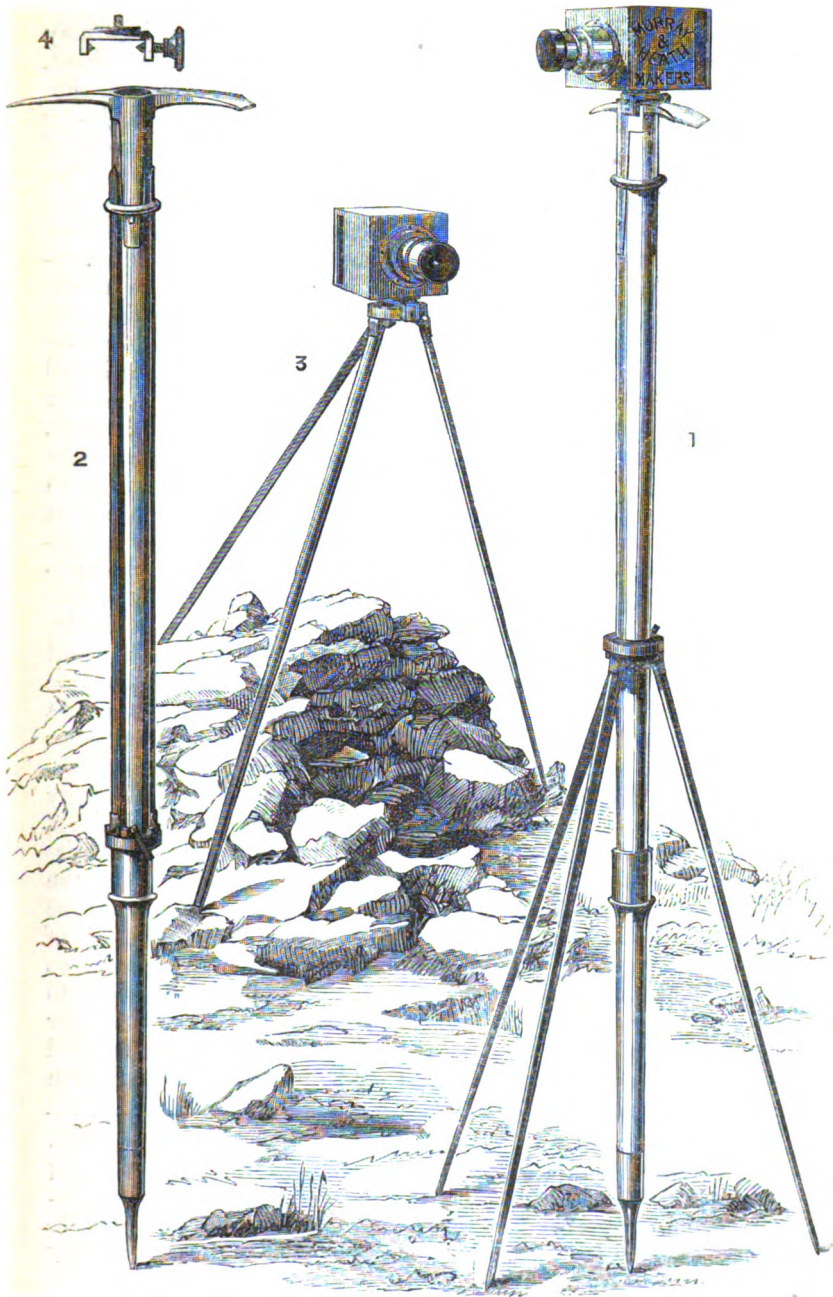
The camera is a cube of about $3\frac{1}{2}$ inches, and the ordinary landscape lens fits inside it when the apparatus is packed up. The dark slide in which the plates are carried contains two plates back to back, on each of which two pictures can be taken. My own experience is, that two such slides, or eight pictures, are amply sufficient for a day's work; but on this point everyone must judge for himself. A bit of black velvet to cover the camera while a picture is being taken is the only other thing necessary to be carried during the day; for the store-box of plates, out of which the slides are filled at night, and into which they are returned after use, will of course remain in the traveller's portmanteau. Mountaineers, however, who are apt to part with their portmanteau for several days at a time, will find it convenient to have a small store-box, to hold about a dozen plates, which they can carry with them. I had one made of zinc, as lighter and more compact than a wooden box, in spite of remonstrances from the manu-

facturer, who thought that metallic dust would be scraped off in putting the plates in and out, and would injure the pictures; and certainly I found nothing of the kind happen. Such a box, when full, weighs some 18 ounces, and furnishes, with the two dark slides, an ample provision of plates for several days; it cannot be exhausted under four days, and will on the average suffice for a week. The camera, slides, and zinc box I carried in a square leather case (measuring $7\frac{1}{2}$ in. by 4 in. by $7\frac{1}{2}$ in.) without quite filling it; in fact, there is room in the case for the extra luxuries which I have yet to describe. The first of these is a second lens, with which pictures can be taken instantaneously if necessary. The ordinary lens is certainly better for landscape purposes, but is useless for portraits, and not perfectly adapted for buildings. Moreover one often sees cloud effects, for instance, which it is hopeless to attempt to record on a plate that requires four minutes of exposure, but which might well be pictured if a few seconds would suffice. When on the summit of the Gross Venediger, I found myself in sunshine surrounded by a ring of the most wonderful cloud-masses, whose beauty, to my mind, compensated for their concealing the vast panorama. Pictures of them would have been absolutely unique, worth any trouble that might be needed for obtaining them; but I had no second lens with me, and I vowed then and there that I would never again go mountaineering without one. The second additional luxury is an invention of my own, suggested by the desire I felt at several points of view to obtain something like a panorama, more, at any rate, than could be included in one picture. To do so, I had to shift my camera-stand, and it is manifestly impossible, especially on a rocky mountain top, to get exactly the same level again. Accordingly, I invented a little device, to be inserted between the stand and the camera—a cone turning in a socket, which can be fixed in any position by means of a set screw, and, when the screw is loosened, can be turned quite smoothly. The edge of the socket is graduated, so that it is unnecessary to displace the dark slide in order to look at the second picture through the camera: one can always ensure the second view fitting on to the first. This contrivance has the further merit of enabling one to set up one's camera without troubling about the direction in which the view is going to be taken, since the camera can be readily pointed afterwards—no insignificant advantage on a pile of loose rocks at the top of a mountain, where it is hard to get one's tripod to stand at all. The third extra is a little plate with a groove along it, by which, if desired, a pair of stereo-

scopic pictures may be taken, by placing the camera first at one end of the groove and then at the other. It is for each traveller to judge for himself whether he cares to have all or any of these appendages to the camera; no one need be deterred by the weight, for the case containing all that I have described—camera, two slides full, zinc box full, extra lens, and the other fittings—weighs but $5\frac{1}{2}$ pounds.

It remains to describe the stand with which this miniature camera is used; and this is the point at once of most importance to the mountaineer, and on which I can, from my own experience, speak most decidedly. In 1868 I used, with a camera of slightly different and, I think, inferior make, an ordinary wooden tripod, the legs being so shaped as to form segments of a solid pole, and being held together with a brass ring. Such a composite pole may, to a certain extent, take the place of an ordinary alpenstock, but is not the sort of instrument one would like to carry for a serious mountain expedition. Moreover, most climbers like an axe, and it becomes a real encumbrance to drag about a second pole of any sort; the practical result to me in 1868 was that I several times left my camera behind when going up a mountain. Accordingly, I set about devising something more portable, and, after one or two not altogether successful attempts, hit on the plan of making my axe itself the stand.* A saddle-shaped clamp screws into the bottom of the camera, and is placed across the head of the axe, being fixed there with a set screw. The axe stands upright, and is steadied by a small brass tripod, the top of which, instead of being a solid plate, is a ring fitting loosely round the handle of the axe, and capable of being firmly clasped round it by means of a screw. I consider it an absolute *sine quâ non* that the tripod shall not be in any way attached to the axe, so that when desirable either may be used separately. When the axe has to be turned to its special work of step-cutting, the tripod will necessarily be an encumbrance; but it is better carried loose than in its place on the axe, spoiling its balance, and getting its own screws bent and broken. And the tripod is very convenient without the axe, the clamp being placed across the ring which forms its head. There are many places, especially on rocks, where it would be difficult to set up an upright

* The cuts on the opposite page show the tripod in its various positions. Fig. 1. The axe serving as camera-stand, with the tripod steadying it. Fig. 2. The tripod shut up and in its place for carrying. Fig. 3. The tripod apart from the axe. The little clamp into which the camera screws is also drawn, separate, at the top of Fig. 2.



pole, surrounded by the tripod, but where the three legs may always be made to stand firm. It is obvious that this tripod, weighing as it does two pounds or more, is a serious addition to the weight of an axe. All I maintain is, that it being necessary to have a camera-stand, this is the easiest mode of carrying it. Put on the right way, however, which is that shown in the drawing, it is less cumbrous than it looks. But the best evidence in its favour is from practice. I carried my axe, with the tripod on it, throughout every mountain excursion I made in 1869, and I fully intend doing so on every future expedition. For the photographic success of this stand I need only say that not one of my pictures was injured by any want of steadiness, and this although they were taken in all sorts of places, often much exposed to wind. It is hardly necessary to add, that it will suit an alpenstock equally well, provided it has a flat knob at the top over which the clamp may be fixed. Lest I should seem to be claiming the merit, such as it is, of this device entirely to myself, I ought to state that when I first went to Messrs. Murray & Heath's, the instrument-makers, to see about having a stand made according to my own ideas, Mr. Murray showed me the model of a similar contrivance which he was making from the instructions of Mr. Marshall Hall. In this, however, the axe-handle was a good deal cut and grooved, thus not fulfilling my primary principle of not interfering in any way with the axe; and I believe that Mr. Marshall Hall has since fully recognised the superior convenience of having the axe and tripod completely separable.

The one matter on which knowledge is essential before any traveller can take photographs successfully by this, or, indeed, by any process, is the time during which, under different circumstances, the plate* is to be exposed. Inasmuch as the traveller who brings his plates home for development can have no idea whether he has succeeded or not, it is manifestly of great importance that he should obtain as much information as possible before starting on a tour, unless he is prepared to have all his labour wasted. The apparatus required for developing is not bulky, and the process is both easily learned and requires less practice and skill in manipulation than

* The plates I have used have been those of the Liverpool Dry Plate Company, with which I have every reason to be satisfied, as I have scarcely had one faulty plate. Those of other makers perhaps require greater or less time, so that the little I can say on the subject must be taken with some grains of allowance, as tested only with these particular plates.

preparing a plate by the ordinary wet process: anyone willing to develop his own plates in the evenings would find the materials no encumbrance worth considering. But most men would prefer having it done for them, and nothing will dispense with the necessity of understanding the right time for exposure. The rules are tolerably simple in outline, though it is as impossible to reduce them to a formula as to give precise instructions by which to make a picture artistically excellent. The operator must determine the exact time required for each separate picture by his own instinct, just as he determines exactly what shall be included in it. The general principle is, that the greater the amount of light received on the lens, the more rapidly will the picture be printed. That is to say—

(1) A distant view requires less time than a near object.

(2) An object light in itself, or brilliantly illuminated by the sun, requires less time than a dark object.

(3) The amount of light varies considerably with the time of day, and the amount of cloud in the sky.

The first rule is but a particular case of the second, as students of Ruskin are well aware. I need only refer to the paragraphs in his volume on *Mountain Beauty*,* in which he demonstrates the extraordinary lightness of very distant objects, such as mountains a few miles off; but the whole chapter is worth attention for the purpose of judging of the exposure required for a photograph. I have also found that as a matter of fact, as one goes higher, the time necessary for a picture tends to diminish. To take extreme cases from my own experience, a view from the top of a pass 10,400 ft. high, of a mountain a mile or so distant, taken at 9 A.M. in bright sunlight with a snow foreground, was a trifle over-exposed in two minutes; and a plate exposed on the summit of the Antelao at noon on a cloudless day was burnt up altogether in $2\frac{1}{2}$ minutes. On the other hand, for a picture taken in the gorge of Sottoguda at 9 on a dull morning, $4\frac{1}{2}$ minutes proved barely sufficient, and the same exposure at 5.30 on a dull evening in the Ampezzo valley failed to produce any picture at all, though the view was a very distant one. There is no avoiding the ever-present difficulty that near and far objects, foreground and background, require for perfection different exposures. All we can do is to assimilate them as nearly as possible. If there is a great distance to be taken, choose a brightly illuminated foreground; on a mountain-top, for instance, prefer snow to rocks. Disturb the snow a little if possible, to break its uniform sur-

* 'Modern Painters,' vol. iv. p. 39, &c.

face; but rocks will not print themselves distinctly till the distance is burned. Similarly, it is impossible to obtain a satisfactory photograph of what is to the eye most attractive, a mountain view framed in the branches of some closely overhanging tree; one must be sacrificed to the other. The scale ranges from a minute and a half, on snow, under a bright sun, for a very distant view—such for instance as one from the summit of Mont Blanc—to five minutes, or occasionally even more, for a deep ravine on a dull day, or a dark object very near at hand. In an open valley, with no very extreme distance, for instance in the valley of Grindelwald, the limits would be $3\frac{1}{2}$ minutes, if clear and near midday, to $4\frac{1}{2}$ minutes, if either early or late. With regard to the time of day, it may be stated generally, that morning is better than afternoon; the best hours are from 9 to 2; but with longer exposure one may get pictures at hours considerably before and after these. I got a very fair picture at 7 A.M. on August 14, and several at 4.30 or 5 P.M. But all rules resolve themselves into one: judge for yourself how much light there is on the lens, and expose a proportionate time, between the sort of limits that have been indicated. The only supplementary advice I can give is, when you are in doubt expose a little more. For if a plate is under-exposed, the picture is not there, and cannot be got at; if it is over-exposed, the picture is there, though more or less discoloured and burnt, and a little management in developing will correct much of this.

The mountaineer who intends to make a miniature camera his companion in a future tour, will doubtless prefer to try his 'prentice hand at home before going to the Alps, and will seek more detailed instruction on any points which do not seem clear. On these any photographer will be able to advise him; the best thing he can do will probably be to apply to Mr. Murray, of 69, Jermyn Street, the agent for the apparatus I have been describing, who knows every detail of my Alpine experience, besides understanding photography fully. My purpose is merely to call attention to the facility with which any traveller can enrich himself with memorials of a tour, and evidently add much to the general store of topographical knowledge; and, if possible, to save others from having to blunder to their experience through a variety of failures.

ON THE CONTRIBUTIONS OF THE REV. HENRY MOSELEY, F.R.S., TO THE THEORY OF GLACIER MOTION, AND THE PRESENT STATE OF THE PROBLEM. BY WILLIAM MATHEWS, JUNR.

- 'On the Descent of Glaciers.'—*Proceedings of the Royal Society*, April 19, 1855.
- 'On the Motion of a Plate of Metal on an Inclined Plane when dilated and contracted, and on the Descent of Glaciers.'—*Proceedings of the Royal Society*, April 11, 1861.
- 'On the Mechanical Possibility of the Descent of Glaciers by their Weight only.'—*Proceedings of the Royal Society*, January 7, 1869.
- 'On the Mechanical Impossibility of the Descent of Glaciers by their Weight only.'—*Philos. Mag.*, May 1869.
- 'On the Uniform Motion of an Imperfect Fluid.'—*Philos. Mag.*, May 1869.
- 'On the Descent of a Solid Body on an Inclined Plane when subjected to Alternations of Temperature.'—*Philos. Mag.*, August 1869.
- 'On the Mechanical Properties of Ice.'—*Philos. Mag.*, January 1870.

ALTHOUGH scientific men have been wrangling for nearly a century about the true causes of glacier motion, it is a disheartening fact that we are still unable to account for it upon rational mechanical principles. Since the brilliant contributions made to the controversy by Professor Tyndall ten years ago, the question appears to have gone to sleep, and to have been abandoned by physicists for more promising subjects of speculation. Now, however, that Canon Moseley has again entered the lists, and aroused us from our lethargy by the stirring articles he has recently published, it is a fitting opportunity to pass in review the part he has played in the discussion, to examine the present condition of the problem, and the direction in which we may look for a final solution.

Theories of glacier motion may be classified either according to the forces to which the motion is attributed, or according to the assumed physical properties of glacier ice upon which those forces are supposed to act. There are only two known forces capable of making a glacier move—gravitation and heat. If we take these forces as a primary, and the physical properties as a secondary basis of classification, glacier theories may be arranged as in the following table:—

MOTIVE POWER—GRAVITATION.

- | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------|
| 1. A glacier is a rigid mass of ice which slides along its channel in the same way as any other heavy body down an inclined plane. | } | Sliding theory.
DeSaussure.* |
| 2. A glacier is a collection of dislocated fragments of ice, with their under surfaces in a state of continual liquefaction. These fragments slide down the channel when the slope is less than that at which they would remain at rest if they were not deliquescent. | } | Sliding theory.
Hopkins.† |
| 3. A glacier is a mass of ice of a plastic nature, like mud or putty, the particles of which slide over one another without a solution of continuity. | } | Plastic theory.
J.D. Forbes.‡ |
| 4. When two pieces of ice with deliquescent surfaces are brought into contact, they freeze together (Faraday). The pressures called into play at various points of a glacier produce fractures in the mass. The fractured portions move into new positions, and are reunited by regelation. | } | Fracture and regelation theory.
Tyndall.§ |
| 5. The freezing point of water is lowered by pressure, and conversely, pressure when applied to ice converts part of it into water. The pressures produced at various points of a glacier liquefy portions of it, the water finds its way into new positions, in which the pressure is less, and where it is consequently reconverted into ice. | } | Pressure and liquefaction theory.
James Thompson. |

* De Saussure, 'Voyages dans les Alpes,' ch. vii. § 535. 'Une autre cause qui s'oppose avec beaucoup d'efficace à un accroissement excessif des neiges et des glaces, c'est leur pesanteur, qui les entraîne avec une rapidité plus ou moins grande dans les basses vallées, où la chaleur de l'été est assez forte pour les fondre.'

† 'Presque tous les glaciers, tant du premier que du second genre, reposent sur des fonds inclinés; et tous ceux d'une grandeur un peu considérable ont au-dessous d'eux, même en hiver, des courans d'eau, qui coulent entre la glace et le fond qui la porte.'

‡ 'On comprend donc, que ces masses glacées, entraînées par la pente du fond sur lequel elles reposent, dégagées par les eaux de la liaison qu'elles pourraient contracter avec ce même fond, soulevées même quelquefois par ces eaux, doivent peu à peu glisser et descendre en suivant la pente des vallées ou des croupes qu'elles couvrent.'

§ 'C'est ce glissement lent, mais continu, des glaces sur leurs bases inclinées qui les entraîne jusques dans les basses vallées.'

¶ William Hopkins, 'On the Motion of Glaciers.'—*Transactions of the Cambridge Philosophical Society*, vol. viii. p. 50.

‡ James D. Forbes, 'Travels in the Alps of Savoy'—*Occasional Papers on the Theory of Glaciers*.

§ John Tyndall, 'The Glaciers of the Alps.'—*Philosophical Transactions of the Royal Society*.

|| James Thompson, in *Proceedings of the Royal Society*, May 1857.

MOTIVE POWER.—HEAT.

6. A glacier is a mass of ice traversed by a vast number of fissures, into which water is infiltrated. When the temperature of the air falls below the freezing point, the water in the fissures freezes, and, expanding at the same time, forces the glacier in the direction of least resistance, forming a new set of fissures in the process. } Dilatation theory. Charpentier, Agassiz.*
7. A glacier may be considered as a pile of sheets of ice, which contract and expand under variations of temperature, just as a sheet of lead would do. As they lie upon an inclined surface, each contraction and expansion is accompanied by a motion down that surface of the centre of gravity of the mass. } Contraction and expansion, or Crawling theory. Moseley.

I have quoted Saussure's theory as it is usually given, although he employs language much more general, and even consistent with the sliding theory, in the form it assumed in the hands of William Hopkins, whose contributions to the science of glacier motion we have next to consider.

This distinguished man, who has left the stamp of genius upon every subject that he handled, was the first to point out that the objection commonly urged against the sliding theory—that it must necessarily result in an accelerated motion—was not a valid one. It next occurred to him that the inability of a rigid body to move down a plane of small inclination by its own weight alone, in consequence of frictional resistance, might not hold if the lower surface of the body were in a state of disintegration. He therefore devised and carried out the following experiment, the description and results of which I shall give in his own words:—

'A slab of sandstone was so arranged that the inclination of its surface to the horizon could be slowly and continuously varied by the elevation of one edge. The surface was in the state in which it had been sent from the quarry, and in which such stones are sometimes laid down as paving stones, retaining the marks of the pick with which the quarryman has shaped them, without any subsequent process for rendering the surface smooth. The slab thus presented a grooved surface (the grooves running in very nearly parallel directions) having some resemblance to those over which existing glaciers move, but having little of the smoothness of *roches polies*. The best measure, however, of the degree of its roughness is

* Charpentier, 'Essai sur les Glaciers,' § 11. Agassiz, 'Études sur les Glaciers,' ch. xii.

this: when placed at an inclination of about 20° , a piece of polished marble would just rest upon it.

'The slab was so placed that the direction of the grooves coincided with that of greatest inclination. A frame of about 9 inches square and 6 inches in depth, without top or bottom, was then placed on the slab, and filled with lumps of ice from a neighbouring ice-house, in such a manner that the ice and not the frame (which merely served to keep the ice together as one mass) was in contact with the slab. In the experiments in which the following results were obtained, weights were placed on the ice, such that the pressure on the slab was at the rate of about 150 lbs. on the square foot.

Inclination of the slab.	Spaces in decimals of an inch through which the loaded ice descended in successive intervals of 10 minutes.	Mean space in inches for 1 hour.
3°	.08, .05, .07, .03, .04, .05, .07, .06, .04	.31
6°	.09, .10, .09, .07, .08	.52
9°	.14, .12, .17, .14, .19, .20	.96
12°	.38, .34, .36, .37	2 00
15°	.43, .41	2.50
20°	The mass descended with an accelerated motion.	

'When the inclination was 9° , about two-thirds of the weight was removed; the velocity was diminished by nearly one-half.

'When the inclination of the slab did not exceed 1° , there was a small but very appreciable motion.

'On the surface of a slab of the same kind of stone, *smooth* but not *polished*, there was appreciable motion at an angle of $40'$. Nor am I prepared to say that either in this or the preceding case the angle was the least at which sensible motion would take place.

'When the surface used was that of polished marble, there was sensible motion at the smallest possible inclination. The motion, in fact, afforded almost as sensitive a test of deviation from horizontality as the spirit-level itself.

'In all these experiments the ice melted continually but very slowly at its lower surface in immediate contact with the slab. During the night the temperature descended below that of freezing, and the motion entirely ceased.

'The angle at which the accelerated motion just begins to take place is that at which the ice would just rest upon the inclined

plane, if the temperature of the slab and of the air were at or below the freezing temperature, so that no disintegration of the ice should take place. This angle appears to be nearly the same in the case of ice, on the grooved slab I made use of, as for that in which polished marble was the sliding body, and is that whose tangent determines the coefficient of friction between the slab in question and *solid* ice. When the slab was of polished marble, this angle was very small.

‘In the experiment above detailed we have these results:—

‘1. For all angles less than that just mentioned the motion was *not* an *accelerated motion*. This result was verified in every experiment I made.

‘2. For inclinations not exceeding 9° or 10° , the velocity, *ceteris paribus*, was approximately *proportional to the inclination*. This, I doubt not, would hold in all cases in which the inclinations should be sufficiently small compared with the angle of accelerated motion. It is manifestly equivalent to the assertion that the velocity is proportional to the moving force.

‘3. The velocity of the mass was increased by an increase of weight.’

This simple experiment is one of the most important contributions ever made to the theory of glacier motion. It was an experiment of an eminently *crucial* character, and one in which no extraneous forces were called into play, the loading of the ice merely diminishing the disproportion between the weight upon the slab, and that of a glacier upon its bed. An actual glacier, in some portions of its course at any rate, is in a condition very similar to that of the ice upon the slab: it is broken into numerous fragments, and its under surface, even in winter, is in a state of continuous liquefaction; the chief difference consists in the friction of the fragments against the sides of the channel, which would tend to give them an angular motion, and to throw the greatest velocity of translation into the centre of the course.

We may regard it, then, as conclusively established by ‘*Hopkins's experiment*’ that *sliding due to gravitation* is a real and very important element in glacier motion.

I have dwelt upon this experiment at so great length, not only on account of its intrinsic importance, but because it has been either ignored or misrepresented by subsequent inquirers, and also because I shall have to place it in sharp contrast to the speculations of Canon Moseley.

From Mr. Hopkins we pass to Principal Forbes, to whose researches on glaciers science is so deeply indebted. But with

respect to his theory, notwithstanding the ingenuity with which he has supported it, I fear a verdict of 'not proven' is the only one that can be returned.

Professor Tyndall's brilliant discoveries are too fresh in our minds to need any description here. His is the second great contribution to the theory of glacier motion. He has proved that ice, when broken by pressure, can be moulded by the same agency through regelation into any assignable form, without a trace of the original surfaces of fracture. Ice, in fact, under pressure, is as plastic as wax. But—and here Tyndall differs from Forbes—fracture is a necessary element in the process.

The views of Professor James Thompson are not so much an independent theory as a physical explanation of regelation. The liquefaction of ice by pressure, discovered by this physicist, is an undoubted fact, but its precise significance as an element of the problem has yet to be determined.

Having briefly described the theories in which the motive power is attributed to gravitation, I turn to those which have their origin in heat. Here we may at once pass over the dilatation theory of Charpentier and Agassiz as amply disproven, without caring to encumber our pages with the arguments that have disposed of it. This brings me to the theory of Canon Moseley, which is the main subject of the present essay.

In the autumn of the year 1853, Mr. Moseley's attention was directed to the extraordinary behaviour of a sheet of lead upon the roof of Bristol Cathedral, which had been renewed in 1851, but not having been properly fastened to the ridge-beam, had descended bodily 18 inches into the gutter. I continue the description in Mr. Moseley's own words in his first communication to the Royal Society:—'The sheet of lead which had so descended measured from the ridge to the gutter 19 ft. 4 in., and along the ridge 60 ft. The descent had been continually going on from the time the lead had been laid down. An attempt made to stop it by driving nails through it into the rafters had failed. The force by which the lead had been made to descend, whatever it was, had been found sufficient to draw the nails. As the pitch of the roof was only $16\frac{1}{2}^{\circ}$, it was sufficiently evident that the weight of the lead alone could not have caused it to descend. Sheet lead, whose surface is in the state of that used in roofing, will stand firmly upon a surface of planed deal when inclined at an angle of 30° , if no other force than its weight tends to cause it to descend.'

Mr. Moseley was not long in assigning a true physical

cause to this phenomenon. The roof had a southern aspect, and the lead in the daytime was powerfully heated by the sun, cooling again at night. It was consequently subjected to a continued succession of considerable variations of temperature. When it received an increment of temperature, the expansion due to that increment would be mainly in the direction of least resistance, so that the lower edge of the sheet would move down the roof farther than the upper edge would move up it. When, on the other hand, it sustained a decrement of temperature, the contraction due to that decrement would be mainly in the direction of least resistance, so that the upper edge of the sheet would move down the plane farther than the lower edge would move up it. The result in both cases would be a descent of the centre of gravity of the sheet, and therefore of the mass considered as a whole. Mr. Moseley investigated a mathematical formula applicable to the case, and substituting in it the known coefficient for the expansibility of lead, and the probable variation of temperature, deduced a result nearly corresponding with the facts that actually occurred. The motion of the sheet of lead, from its similarity to that of a worm, may be appropriately termed a *crawling* motion.

Mr. Moseley, not satisfied with having discovered the solution of an interesting problem, conceived that in the roof of Bristol Cathedral he had found a clue to the vexed question of glacier motion.

'Glaciers,' he urges, 'are, on an increased scale, sheets of ice placed upon the slopes of mountains;' 'ice has nearly twice the expansibility of lead;' the daily range of temperature in their vicinity is considerable; 'that they must from this cause descend into the valleys is therefore certain.' He applies to the Mer de Glace the same formula which had done such good service in the case of the sheet of lead, and deduces a rate of motion not very different from the reality. 'I have had,' he remarks, 'the less hesitation in offering this solution of the mechanical problem of the motion of glaciers, as those hitherto proposed are confessedly imperfect. That of De Saussure, which attributes the descent of the glacier simply to its weight, is contradicted by the fact that *isolated fragments of the glacier stand firmly on the slope on which the whole nevertheless descends*; it being obvious that, if the parts would remain at rest separately on the bed of the glacier, they would also remain at rest when united.'

It is curious to observe how the writer of this sentence deals with 'Hopkins's experiment.' 'The motion,' he says, 'which Mr. Hopkins attributed to the dissolution of the ice in

contact with the stone, would, I apprehend, have taken place if the mass had been lead instead of ice, and it would have been but about half as fast, because the linear expansion of lead is only about half that of ice.' Now, since the fragments of ice melted continuously at their lower surfaces, the temperature must have been above the freezing point, and could not have been instrumental in the slightest degree in causing the expansion of ice already at 0° Cent. The descent of the ice therefore could not have been due to its expansion, for no expansion took place. Moreover, Mr. Moseley's theory requires that the motion at night due to contraction from cold should be equal to that in the day due to expansion from heat; whereas Mr. Hopkins says, '*during the night the temperature descended below that of freezing, and the motion entirely ceased.*'

It is a pleasing feature of scientific controversies, to which the glacier question offers no exception, that whenever a novel speculation is ventured upon, someone immediately contradicts it. Not many weeks elapsed after the presentation to the Royal Society of the last-described paper, before Principal Forbes flung a lance at Canon Moseley. In a communication to the Royal Society read June 14, 1855, Principal Forbes pointed out that a glacier differs from the sheet of lead in having a much greater thickness in proportion to its area, and that the Canon had neglected to bring into proper relief a very important distinction between ice and lead, in their relation to heat. The former melts at 0° Cent., whereas the latter requires for its liquefaction a temperature more than three times that of boiling water. When solids expand under the influence of heat, their linear expansion is proportional to their increase in sensible temperature. This law, however, only holds *up to the point of liquefaction*; when that has been reached, each additional increment of heat is expended in changing the form of the substance to which it is communicated, not in expanding it or raising its temperature. Happily for the human race, the temperature of the air never rises high enough to change the form of lead, and therefore the range of air temperature may be assumed as approximately equal to that of a sheet of the metal subject to its influence. But with ice how great a difference! Variations of air temperature of wide extent may and do take place, without being the slightest guide to the range of temperature of ice; nay, without even affecting its temperature in the very smallest degree. It is in the hottest seasons of the year, when the disintegration of the ice is the most rapid, and when it often happens that the temperature of air in contact with the glacier never, for days together, falls below the freezing

point, that glacier motion is the swiftest. In calculating, by his formula, the motion of the Mer de Glace, Canon Moseley assigned to its whole mass a daily range of temperature equal to that observed by De Saussure upon the Col du Géant, where, during the whole of his stay there, the thermometer never fell below the freezing point; a range, therefore, as Forbes remarked, 'between limits absolutely incapable of affecting the expansion of the ice.'

Here Forbes left the question, but I think he ought fairly to have carried it one step farther. It is just conceivable, if we could be provided with a glacier having its lower strata many degrees below 0° , and capable of being infiltrated by surface water, that a warm atmosphere might be instrumental in raising the temperature of those lower strata. But before the crawling theory could be applied to such a glacier, its range of temperature must be determined by observations, not within the atmosphere, but in the substance of the ice itself. On the one hand we have the maximum of 0° ; what have we on the other as the minimum temperature of glacier ice?

The only observations I am acquainted with bearing upon this question are those made upon the Aar Glacier in 1840 by Agassiz and his companions. This physicist bored holes in the glacier of depths ranging up to 25 ft., and buried minimum thermometers in them, with the following results:—

At depths of from 8 to 25 ft. the temperature of the ice was constantly $-\frac{1}{3}^{\circ}$ Cent., whatever the surface temperature.

When the surface temperature was a little above 0° , the thermometers showed $-\frac{1}{3}^{\circ}$ Cent. at 1 ft. deep.

When the surface temperature was several degrees above 0° , the thermometers showed 0° down to 7 ft. deep.*

It follows from these observations that oscillations of atmospheric temperature affect a glacier to a depth altogether insignificant compared with its total thickness; and this agrees perfectly well with the low conductivity of ice, and with its known opacity to radiant non-luminous heat.

In his second communication to the Royal Society, read April 11, 1861, Canon Moseley further develops his theory, considers some of the objections urged against it, and describes the following experiment:—Having prepared a deal board 9 ft. long and 5 in. broad, he fixed it at an inclination of $18\frac{1}{2}^{\circ}$ against the wall of a house with a southern aspect, and placed

* Agassiz, 'Études sur les Glaciers,' ch. xv. Desor, 'Excursions et Séjours dans les Glaciers,' pp. 160, 184.

a sheet of lead upon it the eighth of an inch thick, weighing 28 lbs., with its edges turned over the edges of the board so as not to bind upon it. The lead was observed morning and evening from February 16 to June 28, 1858. The average daily descents of the lead were one-tenth of an inch for the month of February, and somewhat more than two-tenths for the months of May and June.

Mr. Moseley next describes the observations of Schumacher on the dilatation of ice, made upon a block 6 ft. 3 in. long and 6 by $6\frac{1}{2}$ inches in section, exposed to temperatures varying from $-2\cdot3^{\circ}$ to -22° R., from which the coefficient of expansion of ice for 1° R. was determined to be $\cdot00006466$. He urges that if this block had been placed upon the deal board, it would have descended twice as fast as the lead, if it had experienced '*the same variations of temperature*;' by which I understand him to mean variations equally great, *but all below the freezing point*. Such a block, he says, may be considered to be made up of thin plates parallel to its upper surface, each of which would descend by a motion proper to itself, and also by reason of the descents of those subjoined to it. If we had a block of varying instead of uniform thickness, it would descend with a differential motion, which on the scale of a glacier might become appreciable.

To bring Schumacher's block to the proportions of the Mer de Glace below the Tacul, Canon Moseley converts it into a slab 12 ft. long, 20 in. wide, and 2 in. thick. He then supposes it to be subject to *the same variations of temperature as the lead was*, reduces his slope to 5° , expands his slab to the actual dimensions of the Mer de Glace, and deduces a velocity twelve times as great as the reality; so that variations of temperature twelve times less than those of the lead might produce the actual motion.

In the act of descending, the slab of ice would be thrown into a state of compression in some parts and extension in others. The former might result in crushing, the latter in transverse crevasses. The rate of motion, by the reasoning above given, must diminish from the surface downwards. If the slab were thinner at the sides than in the middle, the surface motion of the middle would be faster than that of the sides, and the slab would crack obliquely to its axis. We thus have a physical explanation of the actual conditions of a glacier.

To the objections that had been urged against his theory, the Canon replies that the observations of Agassiz on the temperature of glacier ice are not to be relied upon; that ice, if

opaque to non-luminous, is transparent to luminous heat; that the latter cannot fail to dilate the ice to which it penetrates, and that it is precisely when the sun's action is the most powerful that the rate of motion is the greatest.

It is impossible not to accord to these arguments the merit of great ingenuity, but the following criticisms may, nevertheless, be fairly offered against them.

The whole superstructure of the crawling theory is founded on the hypothesis of the variation in temperature of the interior of glacier ice, and, until that hypothesis is verified by experiment, the theory cannot be translated from the region of speculation into that of reality. The observations of Agassiz point in the opposite direction: they may possibly be untrustworthy; if so, by all means let them be disproved; but until they are, they are entitled at least to a provisional acceptance.

The assertion that a glacier is permeable by luminous heat can scarcely be intended to apply to those portions of it which lie above the snow-line, nor even to the parts below that line which belong to the region of the *névé*. And yet these parts are not usually supposed to be exempt from the movement characteristic of the general mass. Even in the region of the glacier, properly so called, where its substance is actual ice, it may be doubted whether the sun's rays penetrate many inches below the surface. Every traveller has noticed the strong resemblance which that surface bears to the upturned edges of a pack of slates, and how opaque it becomes as it disintegrates under the influence of heat. Again, if the sun's rays be supposed capable of penetrating the substance of a glacier, they could not reach those parts of it which are covered by moraine and rubbish, except to the small extent which they might travel through them, when incident obliquely upon the unprotected ice. In all such parts—and in some glaciers they comprise a large area—the motion ought to be greatly diminished, if not entirely arrested.

Mr. Moseley identifies the motion of a glacier with that of a slab of solid ice, and the latter with the motion of a sheet of lead. If this identification be a true one, if the glacier expands as a whole under the influence of an increment of heat, at each such expansion there will be a point in its length where the motion will be nil. Above this point, if it be below the summit-level, the glacier will move up-hill, or be crushed in its attempt to do so; below it, each part will move with a velocity proportional to its distance from the point at rest. It is almost needless to remark how contrary to experience such a law of motion is, and how very greatly a real glacier differs

from the character assigned to it. If, on the other hand, it be compared not to a solid slab of ice, but to a cluster of dislocated fragments, each of these fragments will descend only with the motion proper to its own expansion, which will be inappreciable when compared with the actual march of a glacier.

Nearly eight years elapsed since the date of the memoir I have just been examining, before Canon Moseley again entered the arena, and, in the two next papers on our list, directed public attention to the unsatisfactory state of the glacier problem. In these papers, instead of attempting to strengthen his own position, he has adopted the controversial expedient of carrying the war into the enemy's country, and has endeavoured to demonstrate that the descent of glaciers by their weight alone is a mechanical impossibility. In the face of Hopkins's experiment, the enterprise must be pronounced a rash one. I proceed to describe the manner in which it is conducted.

If, says Mr. Moseley, a transverse section of a glacier were to be made, the ice would be found to be moving differently at every point of it. The velocity is greater at the surface than deeper down, and at the centre of the surface than at the edges. There is a constant displacement of the particles of ice over one another, and alongside one another, to which is opposed the resistance known as *shearing force*. By the property of ice called *regelation*, when a surface so sheared is brought into contact with a similar surface, it unites with it so as to form one continuous mass. Between the resistance to shearing and the force which tends to bring the glacier down there must be a mechanical relation, so that if the shearing resistance were greater the force would be insufficient to cause the descent.

Mr. Moseley supposes an imaginary glacier of unlimited length, lying on an even slope, and having an uniform rectangular channel to which it fits exactly, and which is of an uniform roughness sufficient to tear off the surface of the glacier as it advances. This mass of ice is conceived to be divided by an infinite number of equidistant vertical planes parallel to its central line or axis, and of other equidistant planes parallel to its bed, and thus to be cut into rectangular strips lying side by side and above one another. Each of these strips will move with the same velocity in every part, and will be continually shearing over two adjacent strips, and being sheared over by two others. If we consider the portion of one of these strips which moves in a day across any transverse section of the glacier, the work of its weight, for motion to be

possible, must be equal to the work of its shear plus the work of its friction.

Before the comparison can be made we must know the shearing force of ice, and to this important inquiry Canon Moseley next addresses himself.

In default of previous observations bearing upon this subject, he devised the following experiment:—

‘Two pieces of hard wood, each three inches thick and of the same breadth, but of which one was considerably longer than the other, were placed together, the surfaces of contact being carefully smoothed, and a cylindrical hole $1\frac{1}{4}$ inch in diameter was pierced through the two. The longer piece was then screwed down upon a frame which carried a pulley, over which a cord passed to the middle of the shorter piece, which rested on the longer. There were lateral guides to keep the shorter piece from deviating sideways when moved on the longer. The hole in the upper piece was brought so as accurately to coincide with that in the lower; small pieces of ice were thrown in, a few at a time, and driven home by sharp blows of a mallet on a wooden cylinder. By this means a solid cylinder of ice was constructed accurately fitting the hole. Weights were then suspended from the rope passing over the pulley until the cylinder of ice was sheared across. As by the melting of the ice during the experiment the diameter of the cylinder was slightly diminished, it was carefully measured with a pair of callipers.’

From the mean of two experiments, conducted in this manner, the shear of ice per square inch, or *unit of shear*, was determined to be 75 lbs.

By incorporating in the mathematical formula applicable to the imaginary glacier Professor Tyndall's measurements on the Mer de Glace, and assuming its inclination to be $4^{\circ} 52'$, Mr. Moseley has arrived at the conclusion that, for the Mer de Glace to descend by its own weight, at the rate at which Professor Tyndall observed it descending at the Tacul, the unit of shear could not have been greater than 1.3193 lbs., and that to produce the actual motion, with the real unit of shear, a force in aid of the weight and 34 times as great must be called into existence, and applied in the direction of motion. For such a force to be produced by the weight of the glacier alone, the density of ice would require to be increased more than 400 times.

Mr. Moseley has exhibited the incapacity of a glacier to descend in virtue of its weight in the following striking manner:—

‘Let a strip of ice one square inch in section and one mile in length, in the middle of the surface of the imaginary glacier,

be conceived to be separated from the rest throughout its whole length except for the space of one inch, so that throughout its whole length, except for that one inch its descent is not retarded either by shear or friction. Let, moreover, this inch be conceived at the very end of the glacier, so that there is no glacier beyond it. Now it may easily be calculated that this strip of ice, one inch square and one mile long, lying on a slope of $4^{\circ} 52'$, without any resistance to its descent, except at its end, must press against its end, by reason of its weight, with a force of 194.42 lbs. But the cubical inch of solid ice at its extremity opposes, by the *shear* of its three surfaces, whose attachment to the adjacent ice is unbroken, a resistance of 3×75 lbs., or 225 lbs. That resistance stops, therefore, the descent of this strip of ice one mile long, having no other resistance than this opposed to its descent, by reason of its detachment from the rest. It is clear, therefore, that it could not have descended by its weight only when it *adhered* to the rest, and when its descent was opposed by the shear of its whole length; and the same may be proved of any number of miles of strip in prolongation of this. Also, with obvious modifications, it may be shown in the same way to be true of any other similar strip of ice in the glacier, whether on the surface or not, and therefore of the whole glacier.'

It is far from my intention to impugn the accuracy of Mr. Moseley's calculations. Professor Huxley has quaintly remarked that the flour produced by the mathematical mill depends mainly upon the grain that is put into it, and it is the quality of the latter that I shall take the liberty of examining. Mr. Moseley assumes that the resistance to the sliding of a glacier along its bed is equal to the shearing force of ice, and that *every* point of a glacier in the same transverse section moves with a differential velocity. We know from Hopkins's experiment that the former assumption is contrary to the fact; we have no evidence of the truth of the latter. With these two conditions reversed the nature of the problem may be entirely changed.

Moreover, a glacier, considered in its totality, is composed not of ice only, but partly of *névé* and partly of snow. Of the shearing force of the latter forms of aqueous matter we have as yet no information; that it must be greatly less than the shearing force of ice cannot for a moment be questioned. After all, Canon Moseley only presents us with a dilemma. Either the shearing of a glacier is not caused by gravitation, or the gravitation of a glacier does not produce a shearing motion. He has asked us to impale ourselves upon the one horn, but

what if we should prefer the other? Has it never occurred to him to examine the possibility of the latter alternative?

In asking this question I am not unaware that many distinguished physicists have made use of language involving an implicit recognition of the shearing hypothesis. Professor Tyndall, for instance, thus describes the origin of glacier motion:—'Even after it' (snow) 'has attained a compactness which would entitle it to be called ice, it is still capable of yielding more or less, as the snow yields, to pressure. When, therefore, a sufficient depth of the substance collects upon the earth's surface, the lower portions are squeezed out by the pressure of the upper ones, and if the snow rests upon a slope, it will yield principally in the direction of the slope and move downwards.'* Again, in that magnificent series of experiments in which he demonstrated the principle of fracture and regelation, the ice was sheared by crushing under the force of the hydraulic press, and reunited by the same agency. Admirable as these experiments were in a physical sense, one cannot help venturing the criticism that their mechanical significance has not yet been rendered fully apparent. Between the shearing forces and the hydraulic pressure which overcame them a certain relation existed. What proportion does that relation bear to the mechanical conditions of a glacier?

It is precisely because Canon Moseley is investigating the problem from this point of view that he is likely to contribute to its solution materials of great scientific value. And here I must finally call attention to his paper on the 'mechanical properties of ice, in the current number of the *Philosophical Magazine.*' The first part of the paper is occupied by a description of Schumacher's experiments on dilatation, which I have already sufficiently explained. The author then proceeds to give the details of a series of experiments upon the tenacity, crushing, and shearing of ice.

To determine its tenacity he subjected rods of ice to strains in the direction of their length, and increased the load until the rods were torn asunder. In eight experiments the tenacity was found to range from 74 lbs. to 116 lbs. per square inch.

To determine its crushing pressure he loaded vertical cylinders of ice $1\frac{1}{2}$ inch in diameter, and ascertained that the pressure necessary to crush them was equivalent to 308.4 lbs. per square inch. Assuming ice to be of the same specific gravity as water, a strip one square inch in section and 710 feet high would have this weight. As no glacier is alleged to have

* 'Heat considered as a mode of Motion,' p. 183.

so great a depth, Mr. Moseley pertinently adds that this fact is an answer to the theory which attributes the descent of a glacier to the crushing of the ice at its base.

The experiments on shearing were made with an instrument somewhat similar to that described in his previous paper, but the results were remarkably different, the unit of shear, as determined by thirteen experiments, ranging from 98 to 119 lbs. per square inch. Mr. Moseley justly observes that *time* is an important element in the experiment, the shear which gave the smallest unit having required thirty-six minutes, the shear which gave the greatest unit having been effected in two. I am curious to know what weight would have sheared the ice if a *day* had been allowed for its operation, and what is the relation of time to crushing and tenacity.

It is characteristic of all these experiments that extraneous forces are brought to bear upon the substance submitted to our operations, and that conditions are thus introduced which may or may not obtain in the case of an actual glacier. It would throw great light upon our inquiry if we were to change this method of procedure, and simply to observe the deportment of masses of ice under the influence of no external forces but the gravitation of their own particles. As bearing upon this question, I venture to describe a simple experiment conducted during the last frost, in the prosecution of which I was indebted to the obliging assistance of my friend Mr. A. Follett Osler, F.R.S. A plank of ice 6 inches wide, and $2\frac{3}{8}$ inches in thickness, was sawn from the frozen surface of a pond, and supported at each end by bearers exactly 6 feet apart. The whole weight of the plank between the bearers could not have exceeded $37\frac{1}{2}$ lbs., and its cross section was nowhere less than 14 square inches. According to the views of Canon Moseley, shearing must surely have been impossible, yet what was the result? From the moment the plank was placed in position it began to sink, and continued to do so until it touched the surface over which it was supported. At the point of contact it appeared bent at a sharp angle, and was perfectly rigid in its altered form. The total deflection was 7 inches, which had been effected in about as many hours, under the influence of a thaw, during which the plank diminished very slightly in thickness. On observing the under-surface of the plank near the point of flexure, I noticed a number of very minute fissures extending a short distance into the ice, but they certainly were not sufficient to account for the flexure of the plank.

With this property of ice, viz. its power to change its form under strains produced by its own gravitation, combined with

the sliding movement demonstrated by Hopkins, we have, as it seems to me, adequate causes for glacier motion. What remains to be done is to connect the first of these causes with demonstrated principles of molecular physics, for which purpose many more experiments of the kind above mentioned will probably require to be undertaken.

Against the crawling theory, as an appreciable element in the problem, the verdict must, I think, be given, first, that it is highly improbable, secondly, that it is unnecessary. But whatever may be its fate, the services Canon Moseley has rendered to science by his contributions to the discussion, and by his investigation of the mechanical properties of ice, are beyond all question. To the recognition of those services I gladly unite the expression of my cordial thanks for the ready courtesy with which Canon Moseley has placed in the hands of an adverse critic all the materials for his essay.

THE LOFOTEN ISLANDS. By T. G. BONNEY, M.A., F.G.S.

A PAPER without a single mountain ascent may seem out of place in the 'Alpine Journal.' That mine has this defect is due not so much to want of will as to want of time and favourable weather. I spent a week in the islands, and four out of the seven days were too cloudy and rainy to allow of distant excursions; the remaining period only sufficed for carrying into effect the purpose which had more especially led to my visit. Still, though without any stories of climbs, this paper may, I hope, be useful to future climbers; for in writing it, I shall do my best to give a clear idea of the topography of the islands, and to mention a few things that I should have been glad to know before my journey. Though the voyage along the western coast of Norway, which has been pleasantly described by Mr. Tyrwhitt in the third volume of this Journal, is annually made by many travellers, all of whom are enthusiastic in their praises of the Lofoten scenery, none, so far as I know, have attempted to describe its features at all minutely; so that in planning a trip to them one is sorely at a loss to know where one ought to stop and what is best worth seeing, or to get any very clear idea as to the general physical geography of the country.* The weird beauty of the scenery seems to have so

* Mr. Campbell's paper (vol. iv. p. 1) is even more brief than is wont on this one topic. I cannot mention this paper without expressing

overpowered the beholders as to disqualify them for minute observation, and a Turnerian mystery is always present in their glowing pictures. Of this failing—if failing it be—I am conscious myself. I never found it more difficult to recall at the day's end the precise features of the country through which I had passed; all seems so strange and so overpowering, that though for the moment one feels as if a scene would be indelibly photographed on one's memory, it melts away like a dissolving view before the succeeding and no less entrancing impression. This difficulty, which the note-book to a certain extent overcomes, is heightened by the absence of good maps, the bewildering intricacy of the reefs and islets through which the steamer threads its way, and the difficulty of obtaining the names of the peaks. This paper, therefore, will, like its predecessors, leave much undone: all that I can hope is to make the task rather easier for any future explorer.

The Lofotens are an elongated cluster of islands, which, separated at one point from the mainland only by a narrow strait, trend gradually westwards until their most southerly outlier is some sixty miles away. Although doubtless forming part of the great chain which fringes the Norway coast southward from the Kvenanger Fjord, they are so far severed from it by the channel of the Vaags and And Fjords as to make one tolerably distinct group. The broadest part of this is at the upper end, where three large islands, Hindö, Andö, and Langö, whose irregular shores are fringed by hundreds of islets ranging in area from a few square yards to a few square leagues, form a dense cluster. Hindö is at once the largest, grandest, and nearest to the mainland, and lies on what we may call the principal axis of the group. South-west of this, severed only by a very narrow channel, the well-known Raftsund, is Ost Vaagö, followed in succession by Vest Vaagö, Flagstadö, and Moskenäsö, all preserving the same general direction, and parted from each other only by narrow straits. With the last the continuous chain of large islands ceases, but along the same line we find in succession two lonely groups, the principal islets in which are respectively denominated Værö and Röst.

The outline of the main islands is irregular beyond description; fjords run so deeply from opposite sides into Hindö and Ost Vaagö as to all but sever them. The whole group is really a partly submerged mountain chain, with the sea flowing up the

my admiration of its accuracy and general fulness. It is a *multum in parvo* of 'things not generally known' (by travellers) about Norway, and for purposes of reference is more valuable than most guide books.

principal valleys, and only the steep upper glens above water. Its crystalline axis corresponds roughly with that of the chain. By far the boldest scenery is in Hindö and Ost Vaagö, where the mountain outlines recall those of Chamouni or Dauphiné. Such parts as I have seen of Langö and the northern district of Hindö remind one more, in outline and colour, of the Cambrian and Cambro-Silurian regions of Wales, as do most parts of the islands south-west of Ost Vaagö. The crystalline rock is usually said to be granite, and possibly in some parts it may deserve that name; but I am convinced that in all the finest mountain scenery the rock, like the so-called Alpine granite, is only a highly metamorphic form of gneiss, which in hand specimens generally cannot be distinguished from granite—or perhaps I should say from syenite; for its constituents are commonly hornblende, feldspar, and quartz (the last not very abundant). I am informed that Andö, which I have not seen (except perhaps in the far distance), is in most parts uninteresting in scenery, but has recently become of considerable importance to Norway by the discovery of coal in a series of sedimentary deposits which occupy a trough in the crystalline rock.

It was a wild squally evening last June, when, after spending some rainy hours coaling in the harbour of Bodö, a village desolate even for Norway, we resumed our course northwards. The coast-line, generally so monotonous south of the Arctic circle, rapidly improves when that limit is passed, and north of Bodö rises more grandly than ever above the glacier-worn islets in the foreground. Fierce blasts from the north were driving along heavy storms of sleet and snow, and the rough sea which we traversed between the rocky breakwaters promised a stormy passage over the Vest Fjord. After a while the weather moderated a little, and some ghostly peaks, lit here and there by fitful gleams of sun, broke out through the rolling clouds in the western horizon. This was our first view of the Lofotens; these peaks (which we could not then identify) probably belonging to Moskenæsö, Værö, and Röst.

I would gladly have remained on deck during our passage towards them, but the cutting wind and rough sea drove me below. My companion, E. Walton, whose enthusiasm for his art renders him proof to most of the minor miseries of life, could not find it in his heart to leave such studies of storm-cloud, sea, and mountain, and even succeeded, by propping himself against the funnel, in making some useful pencil sketches, though from his account next morning it must have been no easy work. Sleep, however, was out of the question,

the restlessness which Alpine travellers have so often felt before a *grande course* was upon me; and as soon as the vessel ceased to roll I went on deck, to find a chilly grey morning with a drizzling rain. We were at Balstadt—the first station visited by the steamer—a little village on one of a group of islets at the southernmost corner of Vest Vaagö. Some bold conical hills rose abruptly from the sea, dull purple rock, with bright green streaks of verdure; but the morning was not favourable to the scenery, and at first I feared that here also, as in the more southern parts of Norway, I was doomed to be disappointed. It is very hard to be enthusiastic in a Scotch mist, on a cold morning at 3 A.M., so I turned into the saloon and had a doze. When, a couple of hours later, I came up again at Henningsvaer, my doubts vanished, and therefrom, notwithstanding a bitter wind and occasional driving storms of sleet and snow, that made winter clothing a necessity, and sketching a work of frozen fingers, the journey was one to be remembered with unceasing pleasure.

Passing Svolvaer, which I leave for the present, we came to the Raftsund. This has already been described by Mr. Tyrwhitt. Though he saw it in calm evening light and we in almost wintry storms, I can heartily endorse all his praise. Among so much fine scenery it is difficult to select, but I think that I was most impressed by the group of aiguilles on the western bank, which go by the name of Hanötinderne, and have been fairly depicted in Forbes' 'Norway,' page 63. There are a few huts on the same shore at which quarters might be found, but Digermulen, a little hamlet at no great distance on the opposite bank, seemed more promising. Several of the short steep glens which come down to the *sund* are barred by moraines close to the water's edge. In some cases, especially on the east (and less steep) side, there is a small alluvial flat behind the moraine; in one it forms a natural breakwater to a little harbour.

On issuing from the Raftsund, we pass the hamlet of Hanö on the left, situated either on a promontory of Ost Vaagö or on an islet close to the shore (I am not sure which). Here, as I was informed, very fair quarters might be found at the *landhandler's*, whose name is Ness. This would be an excellent station for exploring the Raftsund and the adjoining portions of Ost Vaagö and Hindö. The steamer now crosses a *sund* some miles broad to Hassel, or Ulvö, an island to the south of Langö, about ten miles long and four wide. Formerly its destination was Steilo, a hamlet on the south-eastern shore; now it makes for Stokmarknæs, a station on the eastern side of the northern shore. During this part of the voyage

the grandest parts of Hindö and Ost Vaagö are constantly in view, a crescent of peaks, extending for many miles and rising steeply above a landlocked fjord.

From Stokmarknæs the steamer returns through the Raft-sund, crosses the upper part of the Vest Fjord to Tranö, then returns to Kjöen on the coast of Hindö, from which it recrosses and goes up the Ofoten Fjord to Lidland, and then comes back to Lödingen, another station on Hindö, after which it runs along the coast of that island for several miles, through a *sund*, often very narrow, until after touching at Harstadhavn, well up on the east coast, it finally quits the Lofotens. During this zig-zag journey magnificent views are obtained, not only of the Lofotens, but also of the fine peaks of the mainland, one of which much resembles the Matterhorn as seen from Breuil, though of course on a smaller scale. As the squally day had gradually settled down into a tolerably fine evening, we greatly enjoyed this part; the whole being concluded with a lovely midnight sun at Sandtorv; and we were still more fortunate on our return from Hammerfest, when the view of the Lofoten peaks from the head of the Vest Fjord under an overcast sky about midnight, was one of the grandest effects of purples that I have ever beheld. The eastern coast of Hindö is fine, one peak (Haarbjerget?) seen from near Sandtorv being singularly beautiful in outline; but on the whole the mountains are hardly so grand as when seen from the neighbourhood of Stokmarknæs. Quarters of some kind or other might, I think, be obtained at all the above-named stations; Sandtorv and Harstadhavn would probably be the most convenient for explorers. Geologists will not fail to notice the fine raised beaches south of the former place.

A week after our former visit we were dropped by the steamer at Stokmarknæs. Pouring rain at 5 A.M., after sketching overnight into the small hours, is not enlivening, and we felt rather melancholy at leaving the 'Jupiter,' where we had found so many pleasant companions. The merchant's house, however, afforded us unexpectedly good quarters, and after some necessary delay we were shown into bedrooms spotlessly clean. The rain continued almost incessantly; Walton was quite ill, and I was very tired with the excitement and labour of the previous day, so that our first experience of land life in the Lofotens was not very cheerful. The next morning was less rainy, but heavy mists still hid the grand panorama of peaks, which had induced us to choose Stokmarknæs as our stopping-place. We got a little sketching of the lower islands, and rambled over the immediate neighbourhood. The village, a cluster of wooden

houses, half of them empty, stands on the edge of a low plateau which here intervenes between the sea and the fells, which are of a dull purple colour and very Welsh in outline. This plateau, a glacier-worn mass of crystalline rock, strewn with large boulders, is covered in most parts with bogs, which form in every depression. Walking, therefore, is tedious, devious, and uninteresting. Towards evening the weather improved, the mists broke, and by patiently watching the drifting clouds from our windows, we were able to accomplish our wishes and complete a sketch of the chain of Hindö.

The central part of this consists of three conspicuous masses; that on the left is a rugged ridge, which reminded me much of the Ailefroide in Dauphiné; the middle one is a flat snow-saddle, and on the right of it, separated by a mountain glen, is the third mass, also a bold ridge. A larger, longer valley, probably occupied by the Lanke Fjord, divides this last from another craggy 'grat;' and still farther away is seen a part of a third ridge which must be on the opposite side of the Ingels Fjord. The view is then closed by the hills at the north-eastern corner of Hassel, which protect the harbour on this side. The peak first named above rises over a high grassy headland, to the left of which a lower range is seen above Borö, which is a little island lying quite close to Stokmarknæs, and forming the other portal of its harbour.

From Stokmarknæs to Melbö, a farm on the southern coast of Hassel, is about a four hours' row, the views being magnificent the whole way. On arriving, we were most kindly received by the owner, Fru Coldevin, and her family, who did everything in their power to make us comfortable. Some of them understood a little both of English and of German—a great advantage, as my stock of Norse was even less than the peasant's proverbial hundred words. The information which we received from them determined us to change our plans and go across Ost Vaagö to Svolveaer, instead of returning through the Raftsund over old ground. As washing difficulties had obliged us to leave our luggage at Stokmarknæs, I returned thither next day to fetch it, leaving Walton to sketch. I was rewarded for doing this, as the morning was clear, and much was now plain that on the day before had been only very imperfectly seen through drifting mist.

The general plan of Ost Vaagö, so far as I have been able to make it out, is a central ridge with short, high spurs radiating from it, which break off abruptly on reaching the sea, being terminated, as is not unfrequent in the Alps, by peaks equal or superior in height to those on the main chain. Its coast-line

is much indented: in short, I believe that if that part of the *massif* of Mont Blanc which lies east of the monarch were depressed till the sea washed the Jardin (losing most of its snow in the process), it would have a general resemblance to Ost Vaagö.

It is hard to say whether the view of this island from Melbö or that of Hindö from Stokmarknæs is the finer. Perhaps for general effect the latter bears the palm, but the individual peaks in the former are certainly superior. First, going westward from the Raftsund, comes a jagged range of crags, the broken outline of which (though no one rises pre-eminently above the rest) is singularly fine. Beyond this is a fine snow-covered summit, which for want of a better name we designated Mont Pourri, as its form somewhat reminded us of our Tarentaise friend; and behind this, probably on the main ridge, lay a sharp rocky peak that for similar reasons we named Mont Emilius. High up on the spur connecting these two peaks, and partly enclosed by them, lies a glacier, or perhaps, more correctly speaking, a névé of considerable breadth but no great length, smooth in its upper part, but a little crevassed as it approaches some precipices, above which it terminates abruptly. These descend to the dark waters of the Hegraf Fjord, part of the central valley which divides Ost Vaagö into two distinct mountain groups. On the opposite side of this fjord lies a singular bell-shaped mountain, with beautifully smooth precipices. Another inlet, the Mor Fjord, flows under the western side of this, so that it occupies a kind of promontory. Between the Mor Fjord and the next in order, the Grundför Fjord, is a pyramidal mountain with a very precipitous face on the north; to the south-west of which, facing our Mont Emilius, is another bold bluff. The peaks beyond this are of a less interesting character.

Of these mountains, I imagine that the first and fourth could be ascended without much difficulty; and the glacier basin, from which probably the second could be attained, appeared easily accessible from the upper part of the Hegraf Fjord, but the precipices of the 'Bell' looked very unpromising from every point of view that I obtained. Melbö would of course have to be the head-quarters, though its distance by water (more than two hours at the least) would be a great inconvenience, and would on every excursion involve keeping the boatmen waiting for the whole day. Still, as I believe that none of the peaks, though they look almost any height, exceed three thousand feet, the time required for an ascent could not be very long, and happily in these latitudes night in summer is only a name.

There are indeed a few fishers' huts dotted about the shores of Ost Vaagö, but I should be sorry to take up my residence in any of them.

The island of Hassel appears to consist almost wholly of high bare fells, generally separated from the sea by a narrow and often boggy shelf of land, which evidently has been raised above the water at no very distant epoch. These fells are well stocked with *ryper*, and the shooting is owned by an English gentleman, whose party take up their quarters at Fru Coldevin's. As the shooting season had not yet begun, she was able to accommodate us; later in the year there might be no room. It is impossible to speak too highly of the kindness of this family; their house is a model of a large Norwegian farm, comfortably furnished, possessing even a sewing-machine and a piano, slight deficiencies in the latter being justly excused on the plea that the tuner came from Bodö!

As at Stokmarknæs, the very unsettled state of the weather prevented us from any extended rambles by abridging our sketching time; the distance also from the principal mountains was a hindrance to any expeditions among them; we therefore determined, as soon as we had got what we wanted, to make our way to Svolvær, where we should be on the shore of Ost Vaagö, and thus better able to make use of any fine intervals.

We bade adieu to our kind hosts on a misty drizzling morning, and were rowed by a couple of men across the Hassel Fjord. The clouds generally shrouded the peaks, but at times they lifted and produced some very grand effects. It took us rather more than an hour to cross the fjord, from which we had a good view of the fine precipice which the ocean surge has hewn out from the south-western corner of Hassel Island. We then, after threading the usual fringe of islets, rowed up the winding channel of the Hegraf Fjord. This is one of the most beautiful spots that I have ever seen, even, I think, more picturesque than the Raftsund. The peaks were unhappily too often shrouded by the mist, which at times descended in heavy rain; but now and then some fantastic aiguille would break out. Vast boulders and jointed crags of granitoid rock descend to the water's edge; every cranny and shelf is green with moss and herbage, or feathered with tufts of fern. Sometimes the tide ripples against the great walls of inaccessible precipices, at others long slopes of verdure intervene. The birch, with a few mountain ash, grows up these for several hundred feet, but the trees appear rarely to exceed twelve feet or so in height.

From Melbö to the head of the fjord is about a two hours'

row; as it is approached the valley slightly opens, and indications of a raised beach are visible about fifteen feet above the present water-mark, and four moraines may be traced in succession near the landing-place, which is some 200 yards below the point where the water shallows away into a marsh. At some former period this valley must have been a sea strait, just like the Raftsund; even now the pass is simply a bog, rather more than a mile from shore to shore, and some 500 yards or so across, with occasional mounds of moraine or fallen rock; and the highest point on the excellent carriage-road, which has lately been made across it, is hardly fifty feet above the water. Our boatmen obtained a couple of barrows at a neighbouring cottage, and wheeled our luggage across to the head of Oxnaes Fjord. Several cottages stand by the shore, from the nearest of which we hired another boat and two rowers. This fjord is wider, and, so far as the clouds allowed us to see, less grand in scenery than the other; its shores, however, are much more inhabited, cottages being dotted all along the shelf of land which, as usual, intervenes between the mountains and the water. As we descended, the rain, which had vented itself in a steady pour, gradually abated, and drizzled off at last into a tolerably fine afternoon. Towards the mouth of the fjord the mountains again become very grand, and on rounding the headland which separated us from the harbour of Svolvaer we came in for a heavy ground swell, over which our boat rode like a cork, and a grand sight it was to watch the long green rollers speeding landwards and breaking in surf on the rocks.

Svolvaer is a straggling hamlet, built partly on the ends of an irregular promontory from Ost Vaagö, partly on some low islets of rock. On one of them was our stopping-place, at the house of a *landhandler* named Berg. The accommodation was passable; but the situation of the house is very inconvenient, for the islet is a mere patch of rock, and as there is no regular ferry system, it is troublesome to get to and from the mainland. Here also clouds and rain deprived us of the greater part of another day; but on the second morning they broke up, and gave us a thoroughly good time for sketching, and there is no lack of subjects about Svolvaer. On the south-west the view is bounded by the magnificent cliffs and aiguilles of Vaagekallen. This mountain, which occupies the south-west corner of Ost Vaagö, rises very precipitously to a height of between three and four thousand feet above the sea. For grandeur and beauty of outline it will bear comparison with even the finest Alpine peaks, and unless its cliffs are very deceptive, or it is accessible from the north, anyone who tries to climb it will find

no easy work. To it succeeds a line of bold bare fells, patched with snow, terminating in a precipitous and quaintly jagged ridge which overhangs the harbour on the north; this bears collectively the name of Svolveer Fjeld. Many parts of it could doubtless be reached without any difficulty beyond that which bogs might offer. Over the end of this range rise the magnificent crags of Store Molla, a mountain island, no unworthy pendant to Vaagekallen. Farther east, Lille Molla, another precipitous ridge, towers up from the sea; yet farther away is Skraaven; and beyond it is the distant mainland, a line of blue mountains and primrose-tinted snowfields.

Next morning early the 'Hakon Jarl' picked us up, and we steamed once more under the magnificent precipices of Vaagekallen. Our enemies, the clouds, were again gathering on the mountains, but we saw enough to convince us that the general scenery of the coast from Henningsvaer to Balstadt is inferior to that of Ost Vaagö and Hindö; there is, however, near the latter station one fine craggy range, probably that marked Skottind on the map, which occupies a position similar to that of Vaagekallen. The clouds provokingly settled down upon the peaks as we steamed across the Vest Fjord, which was in an unusually placid mood. I was, however, able to make out the general topography of this part of the islands, and for the benefit of future travellers may as well note it down. As you cross from the mainland you have in front part of Ost Vaagö, Vaagekallen being the most conspicuous object; then, in a long line, Vest Vaagö, Moskenæsö, and Flagstadö, to the south-west of which lie three peaks marking the site of Værö, and yet more distant are the lonely hills of Röst.

I have spoken strongly of the wonderful grandeur and beauty of some parts of the Lofotens. At the same time I doubt whether they are suited for mountain excursions. The principal peaks, though diverse enough in form when seen from below, are about the same height; hence the views from their summits would be less varied than from their bases or from lower and more distant points. There are no rich woods on the slopes, as in the Alps, no large snowfields, no great glaciers; * the summits would command little save bare snow-patched rock and the wide plains of the sea. This, though striking in the narrower fjords, would, I think, be a poor exchange for the

* We saw, as we thought, a glacier on one of the highest peaks of Hindö, visible from the upper part of the Vest Fjord, and a snowfield or glacier much farther to the south, of which we did not again obtain a view.

green valleys and dark swells of the pine forests. The peaks, in a word, should be looked at from below, not from above. The country, then, seems to me one for the traveller rather than for the mountaineer; for the artist above all. The naturalist also might find plenty to do; the flora, though less striking than I had expected, would probably reward a more careful search; and I think the dredge would be likely to produce some interesting results: though, owing to the still waters within the reefs and the slight tides, little is thrown up on the shore, I could see that life was abundant enough as far down as the eye could distinguish objects. The bed of the sea, at a depth of perhaps from two to four fathoms, was often studded thick with nullipores and echini. Fish are of course abundant, and probably ryper would be found in all the islands. I am not aware that there is any larger game. To thoroughly explore the Lofotens with comfort would require a yacht; and anyone fortunate enough to own one will, I think, find a summer not ill spent in excursions among their numerous fjords and glens.

ERRATUM.

In the last number of the 'Alpine Journal,' p. 382, line 25,
for 'volcanic art' read 'volcanic ash.'

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