THE GEOGRAPHICAL JOURNAL

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL
EDITED BY THE SECRETARY

VOL. LXIV.—JULY TO DECEMBER 1924

LONDON
THE ROYAL GEOGRAPHICAL SOCIETY
KENSINGTON GORE S.W.7
EDWARD STANFORD, LTD. 12 LONG ACRE W.C.2
1924

PRINTED BY
WILLIAM CLOWES AND SONS, LIMITED,
LONDON AND BECCLES, ENGLAND

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and in according to Captain Brunt the gratitude of this audience I know well that I am also anticipating the gratitude of the much wider public who will read his paper; gratitude, that is to say, for making clear what has hitherto been a somewhat obscure subject.

THE MOUNT EVEREST EXPEDITION

THE third expedition to Mount Everest has been dogged by misfortune, and is now clouded by a tragedy of which we had, when this note was begun, only the bare news. A brief cablegram from Colonel Norton which reached London on June 20 told us only the distressing fact that Messrs. Mallory and Irvine had been killed in the last attempt upon the mountain, and that the rest of the party had returned safe to the base camp.

The details of this sad accident will arrive too late for inclusion in the present number of the *Journal*, but will probably be known before it is issued. Therefore we will not try to speculate on the course of events, but must express briefly the sorrow which this grievous loss has caused to all friends of the expedition throughout the world. Mr. Mallory was the veteran of the mountain: the only man who had been on all three expeditions. In 1921 with Mr. Bullock he made the first reconnaissance of the main Rongbuk glacier and found the frontal attack hopeless. He was, we believe, the only man who has ever looked over the snow col under the north-western peak into the forbidding western cwm. At a later stage in 1921 he was one of the small party which first stood upon the famous Chang La and found the route to the summit possible, though not then. In 1922 he led the first high-climbing party which gained near 27,000 feet without oxygen, and established the record which was just broken a few days afterwards with oxygen by Finch and Geoffrey Bruce. And he survived the avalanche which ended the season of 1922 so disastrously with the loss of seven porters.

Now two years later almost to a day the mountain has claimed him. Only four days before the news came, and some ten days after he died, the *Times* of June 16 contained, appended to Colonel Norton's report, Mallory's graphic account of this year's second misfortune on the mountain, when the party under Hazard which was making Camp IV. on the Chang La were driven down by a blizzard, and four porters whose nerve had failed them had to be rescued. It was a fine feat of courage and alpine skill, admirably told, but with ominous phrases. This kind of thing, he said, was bad for the spirit of the porters, and none too good for the sahibs. He spoke of time still left for one more effort after recuperation at the base, but the third journey up the East Rongbuk glacier would be their last: and so unhappily it has proved, for him and his comrade who lies with him somewhere on the mountain.

Mallory was the veteran, and A. C. Irvine the youngest recruit of this

year's party: an undergraduate of Merton who rowed twice in the Oxford boat, and last summer went sledging in Spitsbergen with the Merton College party whose exploits were so recently described to us at the meeting of June 2, and have not yet been published. He had shown himself this year a man of infinite resource and mechanical ingenuity when things went somewhat wrong with the oxygen outfit at the start, and his name had already been mentioned several times in the despatches from the expedition.

The Mount Everest Committee have received telegrams and letters of sympathy from His Majesty the King and from a great number of Geographical Societies and individuals throughout the world. These have been communicated to the relatives of the fallen members of the expedition. The Committee have telegraphed to Colonel Norton expressing their sympathy with the survivors in the loss of their gallant comrades.

Note added June 26.

Colonel Norton's despatches dated June 8 and June 11 reached London in record time and are published in the papers of June 26. If anything can relieve the tragedy of the great loss the party sustained, it is the heroic story of the first ten days of June. The expedition has failed to reach the summit, unless indeed—which is more than possible—the lost climbers achieved success but were unable to get back. Yet once again we have to record with pride two great achievements: a party climbing without oxygen reached 28,000 feet and returned safe; a second party, with oxygen, were seen climbing strongly at 28,000 feet, and how much nearer the summit they went no man can now tell.

The following brief diary of great events is constructed from Colonel Norton's despatches. His first (of June 8) was dictated by him while snow-blind at Camp III. to Geoffrey Bruce suffering badly from over-strained heart. A small discrepancy in dates has been adjusted from internal evidence.

May 30. Norton, Mallory, Somervell, Geoffrey Bruce, Noel, Irvine, and Odell arrived Camp III.

May 31. Hazard arrived Camp. III. Mallory, Bruce, Odell, Irvine, and nine porters arrived Camp IV. Chang La. (Date altered from June 1.)

June 1 (altered from June 2). Mallory, Bruce, and eight porters established Camp V. at 25,300 feet; five porters returned same day. Norton and Somervell arrived Camp IV.

June 2. Three porters remaining at Camp V. broke down. Mallory and Bruce returned with them to Camp IV., meeting on the way Norton and Somervell, who reached Camp V. that day with eight porters, and sent five back.

June 3. Norton and Somervell with three porters established Camp VI. at 26,700 feet and sent back the porters.

June 4. Norton and Somervell reached 28,000 feet without oxygen and returned to Camp IV. the same evening.

June 6. Norton escorted by Hazard and Hingston descended snow-blind to Camp III., Hazard returning to Camp IV. Mallory and Irvine with eight porters ascended to Camp V. with oxygen.

June 7. Mallory and Irvine reached Camp VI. Odell was either with them or followed closely after them.

June 8. Mallory and Irvine started from Camp VI. with oxygen towards the summit. Odell from Camp VI. saw them going strongly at about 28,000 feet. Odell returned to Camp IV.

June 9. Odell and two porters ascended to Camp V. in support.

June 10. Odell reached Camp VI. at 1.0 p.m., but found no trace of Mallory and Irvine. He returned to Camp IV. at 5.30 p.m. Camps V. and VI. had been under continuous observation from Camp IV. throughout. The camps were provided with magnesium flares, and it is certain that the two climbers did not return to them. They could not have survived two nights' exposure on the mountain away from camp, and their leader believes that they perished by some mountaineering accident on June 8.

So ends the glorious and tragic story of the climbing on Mount Everest in the third expedition. On receipt of Colonel Norton's despatches—quite remarkable for their clarity and precision, though penned in miserable conditions of blindness and anxiety—the Mount Everest Committee sent him immediately the following cablegram:

"The Committee warmly congratulate the whole party on their heroic achievements. They especially appreciate the consummate leadership displayed. All are deeply moved by the glorious death of the lost climbers near the summit. Best wishes for speedy restoration to health of all survivors."

AN INTERESTING COLLECTION OF EARLY MAPS

A SOMEWHAT remarkable, though extremely miscellaneous, collection of sixteenth and early seventeenth century maps and plans has been acquired by the Society through Mr. Francis Edwards. Unfortunately a good many of the maps, which were originally issued in a greater or less number of separate sheets, are incomplete, a fact all the more to be regretted as several of these many-sheet maps are great rarities, being known only from single copies preserved in Continental Libraries. All have been mounted and bound together in a large folio volume, but before this was done—possibly in the early nineteenth century—it is evident that some of the maps had suffered considerably from neglect, and those now remaining would appear to have been the salvage from a larger number, some of the individual sheets having perhaps been too much damaged to admit of repair. The eventual

they relate to so fruitful and important a period in the history of map-making, and to maps that in their complete form are with difficulty accessible to students. E. H.

INDIAN SCENES AND PROBLEMS: REVIEW

India: A Bird's-eye View.— The Earl of Ronaldshay, P.C., G.C.S.I., G.C.I.E. London: Constable & Co., Ltd. 1924. 8½ × 5½, pp. xiii., 332. *Illustrations and a Map.* 18*s. net.*

LORD RONALDSHAY lays it down that hard and extensive travelling is necessary to enable the meaning of statistics about India to be grasped—a statement which indicates how the material for this book was obtained, and throws light upon the manner of its treatment. The facts are rationalized: the author does not merely describe or record, he explains. The book is not a bird's-eye view in the sense of being a handbook or synopsis. It is a record of personal experiences and the reflections arising out of them. But the author's travels have been so selective and so purposeful, that the reader is provided with ample material for a true and consistent picture of India. There is not a dull page in the book. The order of treatment is such that each chapter seems the logical consequence of its predecessor. There are vivid descriptions of scenes and buildings. Statistics are effectively, even engagingly, presented, and the minor details selected for mention are just those that complete a picture or excite interest. The illustrations, which really illustrate, are reproductions of excellent photographs taken by the author.

The first two chapters answer the question "What is India?" and give first impressions, with the necessary warning against generalizations that can only hold good subject to large qualifications. Nevertheless India is and must be essentially an agricultural country, the population lives mainly in small country towns and villages, the consumption of two million miles of cotton cloth annually could only be true of a hot country, and, notwithstanding differences of race and language, the Indian peasant, as Mr. Moreland has pointed out, is a definite entity. But India also presents an amazing diversity, and to this is due much of its charm: extraordinary differences of rainfall, and in consequence tropical luxuriance in one part, sterile aridity in another; an ethnological pageant epitomising the gradual growth of civilization through centuries of time; the profoundest religious speculation and the crudest superstition; the refinements of art and modern science at one end of the scale, and the manners and customs of the Stone Age at the other.

Five chapters are devoted to the North-West Frontier, in which there s much admirable description of the country and the people, and the conditions under which the British officials work. The problems of the frontier, and the alternative policies which have been advocated in regard to it, have never been more lucidly stated.

The next six chapters deal mainly with the results of the commercial adventures of the sixteenth and following centuries, culminating in the acquisition of India by Great Britain. A picturesque account of the field of Plassey and the circumstances and immediate consequences of the battle, leads to an examination of the effects of the introduction of an administrative system of a Western type, and of the industrialism of Europe, into India, and of the impact thus brought about between two distinct civilizations. As regards the

benefit to the people arising from the introduction of an orderly system of government, and many of the conveniences of a more advanced civilization, familiarity has bred a loss of perspective. We take it all for granted, and the Indians of the present generation do not realize it, and what it means to them. It is necessary to leave the beaten tracts to grasp the completeness of our achievement, and the part played by personality in the actual working of the system. But in our anxiety to train the people to self-government we have made the mistake of imposing a type of local self-government unsuited to the genius of the Indian people. We should have done better had we begun by re-creating the village organizations that were congenial to the people. Lord Ronaldshay gives an interesting account of a successful movement in this direction in an Eastern Bengal village. The nature and extent of the inroad modern industrialism has made is exemplified by the astonishing development of Calcutta and Bombay as industrial centres. But it is significant of India that to an important section of the Indian intelligentsia this industrial development is anathema, and that the demand for labour in industrial undertakings is invariably in excess of the supply. Yet it is difficult to see how India can finance herself as a progressive country without developing her potential industrial wealth, which, both in man-power and raw materials, is undoubtedly great. The relations of Britain with India in the course of this inevitable development are a difficult and delicate matter. Protective duties are favoured by all parties of Indian politicians, who, on the other hand, are profoundly suspicious of any proposals for the preferential treatment of imports. We are reaping what we have sown by our manipulation of the cotton duties in the interests of Lancashire. What we have now to do is to prove practically that the interests of both countries will be served by the provision by Britain of the capital, the business acumen, and the science that India requires for the development of her resources.

The later chapters of the book deal with the religious aspects of Indian life, a subject obviously of profound interest to the author. As another writer has lately said, "religion has been the chief preoccupation of India from the earliest ages of its history, and has had a dominant influence in determining the special character of its civilization. The political situation in India is constantly discussed in England as though it had no connection with religion; but in India you may expel religion with a pitchfork, and it will always recur." Lord Ronaldshay remarks of the Indian people that laughter is singularly rare, and that their characteristic bearing is a submissive sadness. He analyses the causes of this pessimism. The religious cause is the doctrine of Karma. This doctrine, which has exercised a profound, a widespread, and an enduring influence upon Indian thought, is that what a man is, and all his life's experience, are the just recompense of acts in a previous life, and that this recompense involves him in further action which again must necessarily be expiated in another existence. Hence life is a thing to be endured rather than enjoyed, and happiness could only be found in the escape from the necessity of eternal re-birth. The physical cause of this prevailing pessimism is the lassitude due to climatic enervation reinforced by the prevalence of the forms of endemic disease due to the *Anopheles* mosquito and the hook-worm. Lord Ronaldshay tells us of the beginning of the campaign against these preventible causes of pessimism, and it is specially interesting to learn that a drainage project, designed for the protection and improvement of crops, not only brought about an immense increase in the agricultural value of the land affected, but a vast improvement in the health of the people.

It is impossible in a short review to do more than indicate the nature and variety of the subjects dealt with. The book is one that should be studied by all who realize the need at the present time of a greater and more sympathetic interest in India on the part of the people of Great Britain.

W. H. A. W.

REVIEWS

EUROPE

The Road-Books and Itineraries of Great Britain, 1570 to 1850. A catalogue, with an introduction and a bibliography.— **Sir Herbert George Fordham.** Cambridge: University Press. 1924. Pp. xv. + 72. *7s. 6d. net.*

IN this volume Sir George Fordham makes another contribution to an interesting branch of bibliography which he has made peculiarly his own. His knowledge of the intricacies of the history of English and French road-books is probably unrivalled. The present volume is not an entirely new work, but is in the main a new edition of 'Road-Books and Itineraries bibliographically considered,' which was published in 1916 as part of the *Transactions of the Bibliographical Society*. It is not, however, a mere reprint of the earlier work, for there are important differences. The entries which related to Irish roads have been removed from this later edition and now form a separate work, published recently by the Bibliographical Society of Ireland as 'The Road-Books and Itineraries of Ireland, 1647–1850.' In other directions the work has been, in the author's words, "revised and amplified," and it forms a most useful catalogue of British road-books, which will be invaluable to all who are interested in the literature of roads. It will also be of great service to librarians, for the bibliography of books of this kind is often complicated, and Sir George Fordham is a safe guide among the remoter ramifications of the subject.

The new material in this edition is composed chiefly of two classes of books: in the earlier period, certain almanacks and similar works, which include in their information tables of highways and other particulars relating to roads; in the eighteenth century, local itineraries of a new kind which were springing up in connection with the fashionable watering-places then coming into favour. Among the former may be mentioned such works as Richard Grafton's 'Litle Treatise' and Philip More's 'Almanack and Prognostication,' both of which appeared as early as 1571; in the latter class are guides to such towns as Bath, Buxton, Cheltenham, and Tunbridge Wells, of which many editions were issued between 1750 and 1800.

The catalogue is a very full one, though there seems to be no mention of the edition of Ogilby's 'Britannia' without text which appeared, also in 1675, with the title 'Itinerarium Angliæ.' The usefulness of the index would be increased if names of places were given in addition to those of authors and publishers. The guide to Hastings, for instance, appears in the index only under the heading "Inhabitant." We think, too, that it might add to the convenience of the work if the purely, or mainly, local itineraries were arranged in a separate section rather than in the general chronological order. The book, however, is a most useful one, and great credit is due to Sir George Fordham for his painstaking researches into a subject which has been too little studied in England.

F. P. S.

The Geographical Journal

Vol. LXIV No. 2 August 1924

PEKING TO LHASA

(From the diaries of the late Brig.-Gen. George Pereira)

Major-General Sir Cecil Pereira

Read at the Meeting of the Society, 16 *June* 1924

I WELCOME this opportunity of giving a brief outline of some of my brother, Brigadier-General George Pereira's work. During the course of over twenty years of travel in China he had made many official reports, but with the exception of a few letters to newspapers, the general public knows nothing of his work and travels. It was his intention to have returned to England at the beginning of this year and write a record of his travels, but he was not spared to do this; the diaries and letters of his last journeys are now being edited and will shortly be published and will give a more detailed account than I can give in the limited time available for a lecture. I propose to-night to point out the routes followed by General Pereira in his last journeys, referring to a few places of particular interest, but to confine myself principally to the most important part of the journeys, from Tangar to Lhasa.

General Pereira started the Peking to Lhasa journey in February 1921 and passed through an area stricken by a big famine that affected parts of the provinces of Chihli, Western Shansi, and Honan. It was caused by a failure of the crops, and hundreds of thousands perished. Far more devastating are the floods that affect this area when the Yellow River breaks its embankment and the number of deaths runs into millions.

The Hwa Shan in Shensi Province was reached in April 1921; it is one of the five sacred mountains of China and has the finest scenery and is the hardest to climb of the five. It is a mountain of pinnacles and precipices, the five main pinnacles, some of which look inaccessible, being crowned with temples, and they are approached by steps cut in the rock with chains to assist the pilgrims up and down the steep sides. The highest pinnacles are over 8000 feet.

Sian, the capital of the Province of Shensi, was reached a few days later. Like the rest of China this province was in a state of civil war, the northern part being under control of the military governor and opposed by a party in the south under a Han Kin scholar, who was supported by the leader of the local brigands.

Not only are there internal dissensions in provinces, but many provinces are at war with one another. Then there is the curse of brigandage, which is widespread. In many cases the origin of the brigand bands is that soldiers have been left for months without pay or food and they have deserted, taking their arms and ammunition, and live by looting the countryside and caravans. The local authorities usually insisted on sending an escort with General Pereira, and he describes these escorts as being very useless. His caravan was only once attacked and the brigands were driven off without difficulty. As escort and brigands all fired in the air there were no casualties.

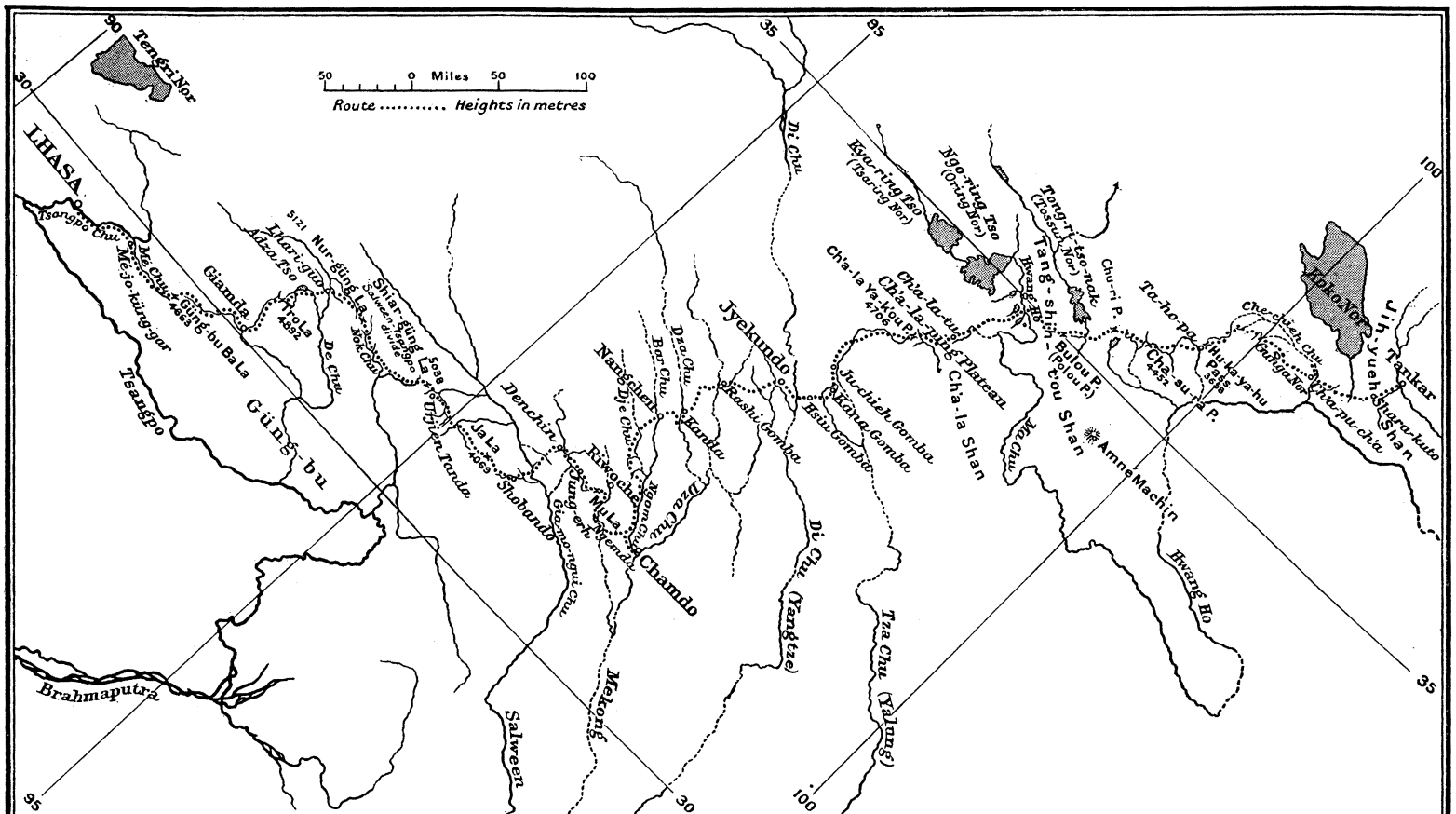
On July 19 General Pereira left Kiung-chow-sze for the Mu-p'ing district in Western Szechwan, a wild mountainous country covered with dense scrub and bamboo, except on the higher slopes, and uninhabited except for a few visiting wood-cutters and Chinese farmers. The shooting grounds were at altitudes between 7000 and 13,000 feet. The game comprises boar, bear, roe, leopard, giant pandar, pandar cat, serow wild dogs, and, on the highest ground, takin and blue sheep. The local hunters are useless; they are not keen, they know little of the habits of the game or where to find them, and this, combined with the thick jungle, made it purely a matter of luck if game was shot. General Pereira was particularly keen to get a giant pandar or pandar bear, as no European has ever shot one, but though he found traces of them he never actually saw one.

The physical exertion of climbing up very steep slopes and forcing a way through very dense bush was very great; climbs of 2000 feet or more being the general rule, and with the added discomfort of leeches, which are plentiful in places on the lower slopes. Having constantly to ford streams and negotiate slippery rocky surfaces, General Pereira discarded boots and wore native sandals, but they were not an entire success, as they do not protect the feet sufficiently, and a poisoned foot kept him in idleness at Teng-ch'e Kou for seven weeks.

As a reward for his labours General Pereira shot a serow and a pandar cat on his last trip. The cat is now in the British Natural History Museum at South Kensington. The weather conditions of cold and wet made a longer stay in the last hunting camp at an elevation of nearly 10,000 feet quite impossible. Heavy snow had fallen and there was every chance of the party being snowed up if they remained at that altitude.

As a result of having to walk 46 miles back to Teng-ch'e-Kou in deep snow, with the small protection afforded by sandals, General Pereira had four toes partially frostbitten on one foot, and from there he had to be carried in a chair to Chengtu, which he reached after seven days on November 14.

We now get to the important part of the journey. Tangar was reached on 10 April 1922, and it was here that the preparations for the journey to



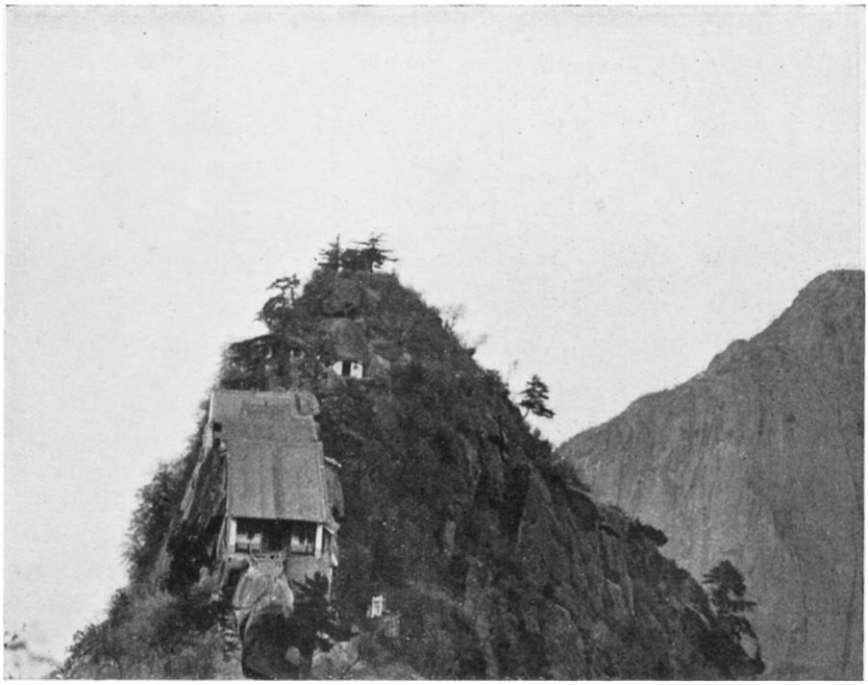
Sketch-map of General Pereira's route from Tankar to Lhasa.

Lhasa were made. Since Abbé Huc's journey seventy-six years previously, no European had reached Lhasa from the east. Many travellers had made the attempt—Mr. Sorenson and Madame Néel, a French lady, immediately previous to General Pereira's journey—they had all been turned back.

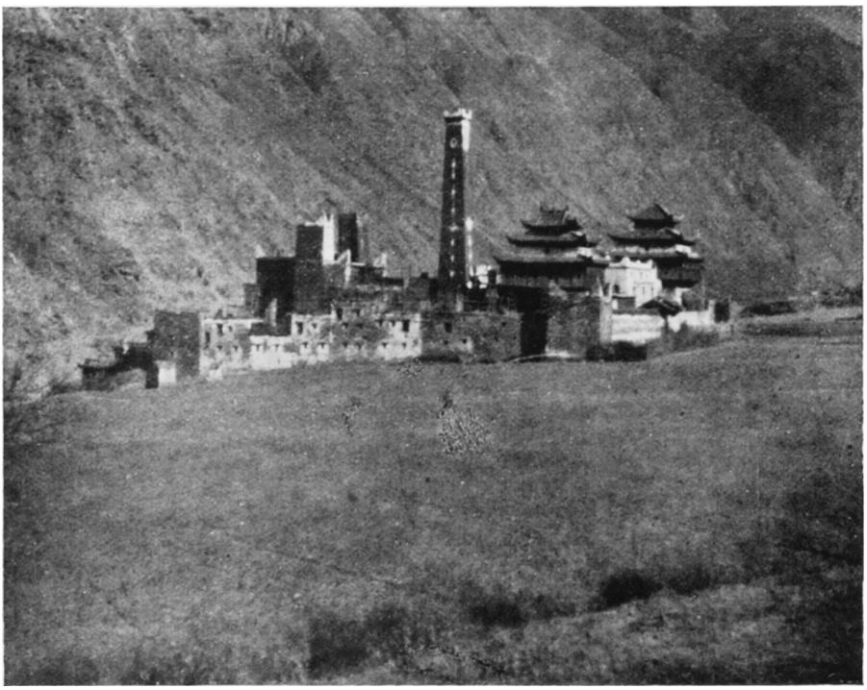
For many years it had been General Pereira's ambition to reach Lhasa from the east. A chance occurred when the Chinese conquered Tibet, as the Chinese Amban at Lhasa was a personal friend of his, but unfortunately he was not free at that time to make the attempt.

With the advent of the Chinese Republic in 1912, the Chinese garrison of Lhasa murdered the Amban; and, left without a leader, the Chinese troops were either massacred or driven beyond the Tang La Pass which is on the range which now constitutes the Chino-Tibetan frontier, or else driven south into Sikkim. The Chinese only retained their hold on the easterly Tibetan province, known as Koko Nor in Tibetan or Ch'inghai in Chinese, both names in English meaning "Blue Lake."

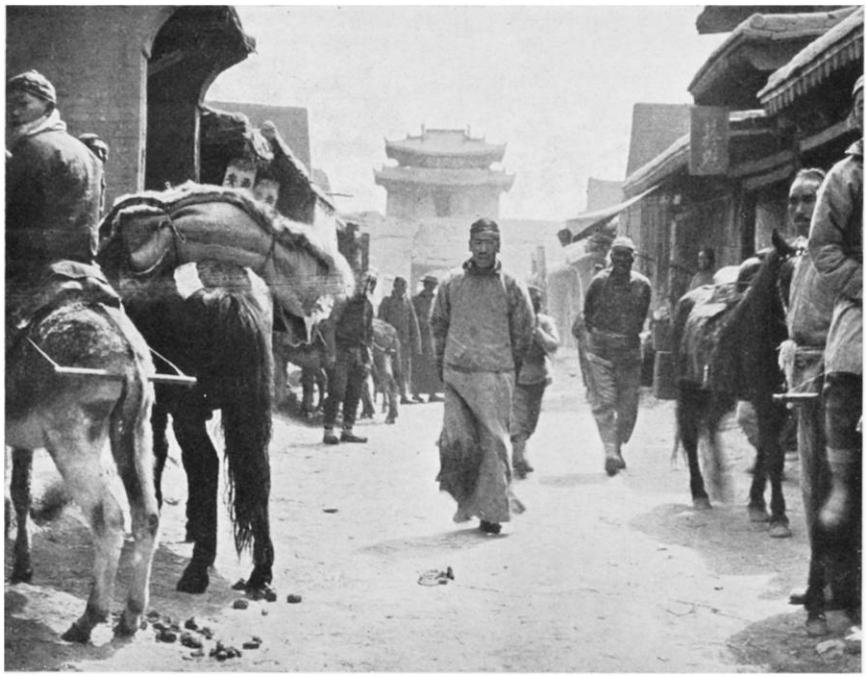
The roads leading from Tangar to Tibet had been closed for many years by Golok raids. The Goloks, a Tibetan tribe, were at one time very powerful, with their headquarters near Amné Machin. The Chinese had made several unsuccessful attempts to subdue them, but in 1921 a Chinese general, Ma Ch'i, tackled them and showed distinct genius. His successful attack on the Goloks is most like Gideon's successful attack on the Midianites, when he took three hundred Israelites and armed each man with a trumpet, a pitcher, and a torch which was concealed in the pitcher. They approached the Midianites after dark, and at a given signal they all sounded their trumpets, smashed their pitchers, and waved their torches, and in the confusion the Midianites slaughtered each other. The Chinese general knew that the Goloks always waited for the Chinese to attack them in some position selected in rocky precipitous mountains. As soon as they were attacked they descended upon their enemies and invariably inflicted a heavy defeat upon them. The Goloks were a fine fighting lot and his troops were not reliable. He therefore decided to rule out the fighting qualities of both sides, as they were so adverse to him, and substitute some tactics that would be wholly in his favour. He took some mountain guns with him and a fifth of his force was composed of buglers. When his force was drawn up under the Golok position the mounted guns opened with rapid fire and the buglers sounded their bugles and the Chinese troops charged. The din of the discharge of the guns echoing among the hills, the bursting of the shells among the rocks, and the terrific noise of many bugles struck the Goloks with panic; the Chinese were on them before they could recover, and hemmed in in their mountains a great part of their force was wiped out; the Chinese had practically no casualties. The general who can mystify, mislead and surprise his enemy and who destroys his



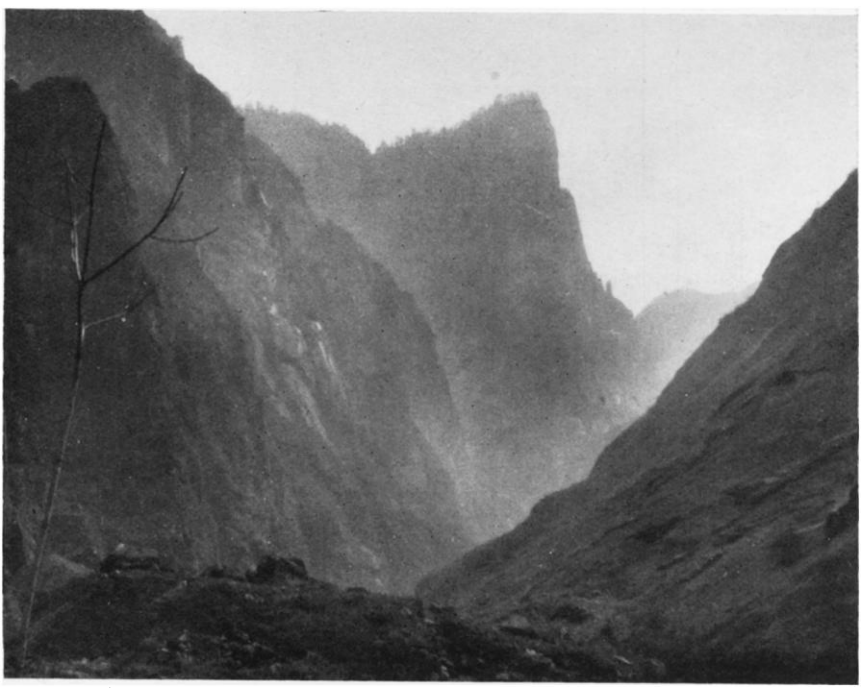
LOOKING ALONG RIDGE TO PEI-FENG



PALACE OF CHIEF OF OOJE; KWANCHAI



THE START FROM TANGAR



LOOKING SOUTH UP THE VALLEY TO HSI-FENG

fighting forces accomplishes everything necessary. The Chinese general had done all this, and had permanently opened the road to Lhasa.

But there were other difficulties, the chief one being how to get permission to enter Tibet. Without this permission there was no hope of accomplishing the journey. Travellers had always been turned back at the frontier. One of them, Mr. Sorenson, reached Tangar when General Pereira was there and gave him a lot of very useful information as to the routes he had traversed up to the Tibetan border, and made him an invaluable present, a boiling-point thermometer.

Father Schram, a Catholic missionary, accompanied General Pereira from his mission station at Sinning-fu to Tangar to help in arranging the caravan. He is a fluent Tibetan scholar and he wrote letters in Tibetan which were sent on ahead to important Tibetan officials asking for permission to cross the frontier. There was also a friend in headquarters who probably persuaded the Tibetan Government to give the permission, and the official sanction was received later on in the journey after further correspondence.

Then there were the actual difficulties of the road to be considered, high plateaus and lofty passes to be surmounted, accompanied possibly by great cold, strong winds, and deep snow. This entailed providing tents, one for himself and one for his followers, thick clothing and blankets. No food or forage was obtainable before reaching Jyekundo, this therefore had to be carried. The men's food consisted of Chinese vermicelli called kua-min, flour, butter, dates, and salt. Mr. Sorenson had crossed one long waterless stretch of country.

The next question was transport. General Pereira was badly advised, and he purchased his animals, eight riding horses and fifteen pack mules. We shall see later that this involved him in endless trouble and anxiety on the road during the first part of the journey. His troubles began with the buying. He describes how the wiles of the horse coper are just as prevalent at Tangar as they are in other parts of the world. As to the actual purchase, both in China and Tibet the buyer places his hand inside the loose sleeve of the seller and indicates his offer by the number of fingers he presses with, so that no one else knows the amount offered.

For the latter part of the journey he used the Tibetan "ula" system. Villages or districts in Tibet are bound to provide transport at fixed rates, the head man of the village being responsible for collecting the animals. Where there are no villages on the route there is a house for an official who requisitions the transport from the nomad caravans grazing in the district. To avoid delay in these cases, as animals may have to come from a considerable distance, word is sent on ahead of requirements.

Yaks are nearly always provided, but sometimes a few extremely small donkeys, and on one occasion General Pereira had a few natives to supplement the animals as a sufficient number were not available.

The diary constantly refers to the comfort and lack of anxiety when travelling with "ula" transport; the animals turn up punctually and there are no sick or tired animals. The lengths of the ula stages vary to meet local convenience, and they may be for half a day or for several days; they always stop short of a big river to save the difficulty of getting animals across. The yaks are pure bred, and very different from those found in the Tachienlu area, where the half-bred predominate. White is the predominant colour of the horses, but the most highly prized are dun horses with black tails.

"Ula" transport is very cheap. The cost of an average of twenty yaks from Jyekundo to Chamdo, a distance of 260 miles, was about £12. The cost from Chamdo to Lhasa worked out at £20 10*s*., about 8*d*. a mile for the whole caravan. The personnel of the caravan was picked up at Tangar; he had his boy and cook, and he engaged as interpreter a Chinese who spoke Tibetan, a head man, and four muleteers.

Before beginning an account of the journey I will refer to the difficulty of getting correct names for places. There is the double nomenclature over a great part of Tibet, where the Tibetans and Mongols roam over the same country; and in addition you have Chinese names for certain places. Where it is necessary to rely on the local pronunciation it is difficult to ensure accuracy; it was at times difficult to ascertain which were Tibetan and which were Mongol names as written down by previous travellers. Before leaving Chamdo, General Pereira got a complete list of the stages from Chamdo to Lhasa in Tibetan and in Chinese, and he constantly noted in his diary how, when compared with this list, the Abbé Huc was far more accurate than subsequent travellers or the Indian map.

By May 11 all was ready and the caravan started from Tangar, the first objective being Jyekundo. On May 12 they passed Sharakuto, the last Chinese town, and soon afterwards passed from Kansu into Ch'ing-hai Province. This was the old frontier between Tibet and China, the actual frontier now being the Tang La Range, south-west of Jyekundo.

The second camp was situated in typical Tibetan grassland scenery, hills and valleys, and large herds of yaks grazing in the distance, but not a house or tree to be seen.

The country presented no difficulties during the early stages of the journey, but the days' marches were arduous all the same. It was necessary to rouse the caravan at 4 a.m., and then wait about for two hours so that all was ready for the start at 6 a.m. For example, on May 13, they travelled 24 miles and reached camp, after travelling continuously, at 3 p.m., but some of the mules, including those with the tents, went astray and only reached camp at 5.20 p.m. Those who have had experience of caravan travel will remember that it takes a little while before the time spent between rousing the caravan and starting on the march gets speeded up to within reasonable limits, and it also takes several

days on the road before straggling and going astray is prevented. In fact, the first few days with a new caravan are always tiring and discouraging until everything becomes a matter of routine.

This stage on May 13 was across the large plain which is bounded on the north by the great Koko Nor Range. A little north of the route lay the small salt lake, Wayen Nor, which was formerly worked for salt. There are on this plain a few very small Chinese farming villages; the other inhabitants are the nomad Mongols and Tibetans with their flocks and herds.

Ch'a-pu-ch'a, a village of seventy-five Tibetan and nineteen Chinese families, was reached on May 15. No food—not even an egg—could be bought here.

On May 16, General Pereira was ahead of the bulk of his caravan, with his interpreter, and two mules with their drivers; as there were no signs of the rest of the caravan he sent his interpreter to find them. The interpreter found the caravan but lost him, and, consequently, General Pereira was left in the open foodless and resourceless. A good rest is always useful, and so, using the tent which was on one of the mules as a bed, and borrowing a rug and a coat from the muleteers, he put in eleven hours' sleep. They picked up the caravan the next morning, but he was practically foodless from breakfast one morning until 7.30 p.m. the next day.

Failure to realize that the track divided into two was the cause of this mishap: a longer route to the north with water all the way, which the interpreter knew, and a southern route, shorter, but with a long waterless stretch, which the rest of the caravan followed. Sorenson had been along the southern route when he tried to reach Lhasa.

With the exception of an occasional nomad camp with flocks and herds, a few gazelle, hares, and red-legged partridges, and duck on the lakes, there was very little life seen on these big plains. The grazing is good only in places, as there are large areas of poor soil bearing only scrub, and elsewhere there are sandy dunes.

On May 19 they crossed the Hu-k'a-ya-hu Pass, 12,000 feet, and entered the large Ta-ho-pa grass plain. The Ta Ho runs through a great canyon 600 feet deep, and above the river is a Chinese garrison of seventy Muhamadan soldiers, who lead a desolate life seeing only a few nomads and having an arduous descent and climb for every drop of water they require. No forage was available here, and the caravan was out of beans for the mules. There were a few trees in the Ta Ho Valley, the first trees seen since leaving the Sining Ho Valley.

The weather up till now had been warm during the day but cold at night; but on May 21, the day they left Ta-ho-pa, they were delayed by a snowstorm. However, by the evening all the snow had gone.

The mules had not thriven during the journey, and now with no forage for them they began to fail. The Tibetans in the camps near by

would not hire out their yaks, as there was no escort with the party. Owing to a scare of a raiding Golok party reported to be in the neighbourhood, the Tibetans were drawing close to Ta-ho-pa to be near the protection of the Chinese garrison. In the circumstances General Pereira decided to return to Ta-ho-pa to wait for an escort that General Ma-Ch'i had promised him, but which he had not waited for at Tangar. The escort arrived on May 25, and it consisted of thirty ununiformed men armed with rifles.

On May 25 they crossed the big Chasura Pass (14,600 feet, B.P.) through the Yalung Range, and crossing a plain with poor pasturage and soft going they camped at a height of 14,000 feet. The day had been dull and cloudy, and during the evening there was a strong west wind and sleet. In this area they saw herds of wild asses and occasionally wolves. The transport question was becoming very difficult, and it was necessary to reduce the loads on the mules, and to use some of the horses for transport. General Pereira found that steep climbs, or even long uphill gradients at these heights, were very trying.

On May 26 they crossed the Chu-ri or Chi-da Pass through the Chu-lung Range, 14,500 feet. The going was stony or boggy, the higher hills were snow-covered, and they descended through gloomy valleys to the sandy Luan-ch'uan Plain. It was on this day that he saw Amné Machin Peak, possibly 70 miles away to the south-east, when he was at an altitude of 13,000 feet. He estimated that the height must be at least 25,000 feet, and might be anything; it dwarfed all other mountains near it.

When General Pereira was lying ill at Calcutta at the end of his journey he was interviewed, and the optimistic reporter made him say that Amné Machin might be higher than Everest; but his studied opinion, based on what after all could only be the roughest of estimates made by a traveller who had seen many of the world's highest peaks, was as I have just stated.

On May 28 he crossed the Tung-ri Pass, 13,867 feet. All these passes so far were easy to cross, and there was no considerable climb to reach the summit. From the top he got a view of the beautiful blue Tung-ri-tso-nak, a Tibetan name meaning the Lake of 1000 hills, less poetically named by the Mongols the Butter Lake. At their camp this day they met the first people they had seen since leaving Ta-ho-pa. They found a large encampment of Tibetans of the Gaba tribe and a Muhamadan Tibetan merchant, by name Ma Hua, all bound for Jyekundo.

On May 29 they passed through a gap in the Ch'ang-shih-t'ou Shan Range, which appears to connect up with the range in which is Amné Machin. It was a gloomy day with strong winds and sleet during the afternoon, and the thermometer inside a tent was down to 38°. Several of General Pereira's mules were now absolutely done, and through the good offices of Ma Hua, the Tibetan merchant, he hired four yaks to

supplement his transport as far as Jyekundo. It was a great stroke of luck to have met the Tibetan caravan bound in the same direction, as there was no other possible means of getting the loads along.

The character of the country remained the same, large plains divided by mountain ranges with easy passes and usually very poor pasturage. On June 2 they crossed the West Malayi Pass, 14,500 feet, and later forded the Hwang Ho, or Yellow River, here only a small river 30 yards wide and 2 to 2½ feet deep.

There are not many Europeans who have forded it. The Tibetan name for it is Ma Chu; otherwise General Pereira said that, as far as he was aware, it is the only river in China that keeps its name throughout its course. He said that possibly the Han River kept one name, but he had not seen so much of it as of the Hwang Ho. The other big rivers have different names as they pass through different districts, and small rivers usually have a different name in each village that they pass. Ma Chu, the Tibetan name, means "Mother of Rivers."

The weather conditions were extremely remarkable, and General Pereira's diary often describes them as consisting of a collection of samples. The following describes the weather on one day. At noon, sunshine and summer, followed by a thunderstorm to the south and a hailstorm in camp; two hours later the wind veered round from north to south and there was a snowstorm; during the evening there was again a strong wind from the south and some sun.

The next stages continued across plains and through low passes, with nomad Tibetans, where there was good pasture; and on June 11, having passed over the Cha-la Shan Range, which is the divide between the Hwang Ho and the Yangtze, they camped on the Ch'a-la-ping Plateau at a height of over 15,000 feet. To the south-east lay a range of hills called Mu-mo-di-ya, shown on maps as Bayantukmu, which is possibly a Mongol name, as the Tibetans did not recognize it, neither did they recognize the name Oring Nor for the lake, another Mongol name. They pronounce Amné Machin, Anye Machin.

General Pereira stated that he was the only one in his caravan who appeared to be affected by the altitude, and that a climb of 200 or 300 feet made him gasp for breath, though he was not inconvenienced on the flat.

On June 13 they crossed the Ch'a-la Ya-kou, the highest point between Tangar and Jyekundo, and soon after forded the Ch'a Ho, a stream which eventually becomes the Yalung River.

There is a particular interest in this part of the journey from the fact that from not long before reaching Jyekundo to shortly after leaving Chamdo, the Hwang Ho, Yalung, Yangtze, Mekong, and Salween were all crossed, some of them insignificant streams at this stage, but the mighty Yangtze at Jyekundo is already a river of considerable dimensions.

Ju-chieh Gomba, or monastery, was reached on June 17. It is a

monastery of the Red Sect with one hundred lamas. These buildings and the barracks at Ta-ho-pa and Ch'a-pu-ch'a and the small villages near them were the only buildings seen since entering Tibet.

By this time the mules were at the end of their tether, and fortunately it was possible to make use of "ula" transport. Five yaks were engaged for the three stages to the Yangtze ferry near Jyekundo for 15 ch'ien for the lot = about 3*s*., which cannot be considered exorbitant as it works out at 1*s*. per 100 miles.

On June 19, near Hsiu Gomba, General Pereira notes that he came across scrub and small bushes 2 to 3 inches high, the first he had seen since leaving Ta-ho-pa, but no sign of a tree. He thought the absence of trees might be due to the severe winds that blow so constantly over this exposed area.

They were now down at 12,750 feet and a few miles from the Yangtze. He notes in his diary what a luxury it was to put up in a room in the monastery, and to be free of the gales and cold to which he was exposed in his tent, and he calls attention to a phrase in our military handbooks that "the best bivouac is not equal to the worst billet."

At Hsiu Gomba they halted a day for the hired yaks with the Tibetan caravan to catch them up. One of the loads contained 900 taels in silver and it was delivered perfectly intact.

The Hsiu Gomba, or monastery, is approached by a very narrow path winding up the hillside, and the monks' houses are built in tiers on uneven terraces, are made of mud, have flat roofs, and are painted grey with red and white borders. Below the monastery is a small village of twenty houses.

On June 22 they passed two more monasteries and a few Tibetan farms and crossed the Yangtze at the ferry. The river here is 80 yards wide, with some small rapids, it is muddy and has a strong current. Here the Chinese call it T'ung-t'ien Ho, or Prosperous Heavenly River. The ferry consisted of seven coracles paddled across by one or two men; the animals swam, most of them led by a rope from a coracle. The hired "ula," as is usual when a big river is reached, did not cross, and fresh "ula" was provided on the far side.

On June 23 they followed down the right bank of the Yangtze between hills rising 800 to 1500 feet above the river, passing a few small villages, and saw trees for the first time since leaving Ta-ho-pa—fir trees, willows and others. Jyekundo was reached during the afternoon.

The journey from Tangar had taken thirty-six stages, and the distance was 519 miles. The height of Jyekundo is 12,928 feet, it contains two hundred Tibetan families, and forty either Kansa Muhamadans or Chinese. It is a poor city of mud-built houses on a hillside above the Pa Chu, with a military camp and a Yamen in the outskirts.

The life of the town was best seen down by the river, where it breaks into several channels, forming green grassy islands, on which were pitched

some white tents belonging to Tibetan merchants. Hundreds of small naked boys were playing about in the warm sunshine, girls were playing with skipping ropes, there were groups by the roadside, chatting or turning prayer wheels, and women spinning cotton, altogether a gay and pleasing scene after several hundred miles of very sparsely inhabited country.

General Pereira met Mme. Néel, a French lady, at Jyekundo; she had then been five years in Tibet and China, and half the time was spent in studying in Kumbun Monastery. With her he visited the Jyeku Monastery, which has three hundred lamas of the Red Sect, whose abbot is appointed from a Sakya monastery south-west of Shigatse in Tibet, and is changed every two or three years.

The houses of all Sakya monasteries are painted grey, with red and white borders, except the house of the abbot and a few of the higher monks, which are painted red. It was the second day of the annual festival, and on arrival they found the lamas collected in the courtyard of the temple sitting in a circle round the abbot.

They were reciting prayers and ringing small bells, and General Pereira described them as a villainous-looking lot, than whom it would be difficult to find an uglier collection of men. From the courtyard the monks adjourned to the temple, and when they were all seated each received a large bowl of tsamba, a sort of barley soup with rancid butter floating on it. The principal monks were on raised stools, and received special condiments in addition to the pyramids of rice and rancid butter which were served with the tsamba. Two monks with thick ropes walked about and belaboured the shoulders of any monk caught talking, and for some time the noise of whacking predominated over all other sounds in the temple, one unlucky monk near General Pereira coming in for a special dose.

After the feast a crowd of Tibetans in the courtyard, chiefly beggars, were given the remains of the feast. The horrid smell of rancid butter, besides the dirt of the narrow streets on the hillside where the monastery is situated, made the whole place most unsavoury.

General Pereira left Jyekundo for Chamdo on July 10. He still had his four riding horses and one or two mules that had not been sold, but otherwise he relied entirely on "ula" transport. The country of plains had now been left behind for one of valleys and passes; but whereas the altitude soon after leaving Tangar until shortly before reaching Jyekundo had been over 13,000 feet the whole way, the altitude in the next section was getting lower until Chamdo, 10,500 feet, was reached.

On July 11 they crossed the Shung La, meaning "Middle Pass," the divide between the Yangtze and Mekong, the height of the pass being 15,724 feet, the highest point reached so far. It was a steep climb through bleak valleys and rugged mountains with some patches of snow, followed by an awful stony descent, eventually reaching the nice grass valley of the Jye Chu with good grazing and a wealth of wild flowers,

where there were several Tibetan camps. The length of the stage had been 21 miles, and very fatiguing. Camp was reached only at 7.15 p.m., and it meant a long interval between breakfast and the next meal. This, however, was not an exceptional stage, and once camp was reached there was the laborious work of plotting out the route and writing up the description of the day's route.

On July 12 the first tree region since Ta-ho-pa was met, and hills bordering the valleys were covered with fir trees, scrub, or grass. They passed Rashi Gomba, a monastery of a thousand monks, and later they crossed the Dze Chu, or Mekong, here 80 feet wide and with a very strong current. Only a single coracle was available to ferry them across.

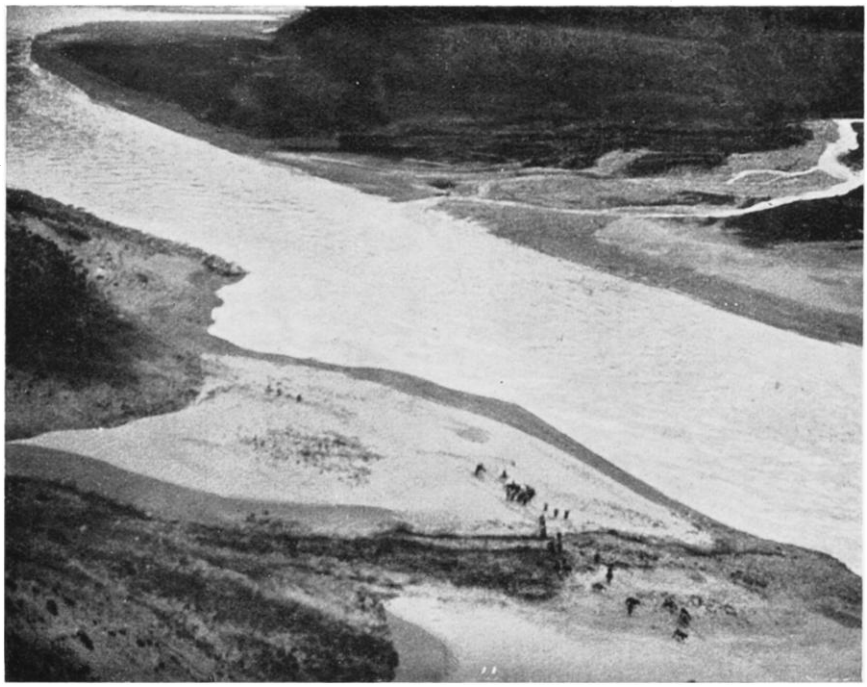
Göche Gomba, which has a small monastery, was reached on July 14. The various stages were very similar; the route lay through grass valleys, between hills rising from 500 to 1500 feet above the valley, sometimes fir-clad, sometimes grass. There were usually one or two passes through the mountain ranges to be crossed, the approaches and descents being generally through bleak valleys and over a boulder-strewn track, the ranges being rugged and rocky, and often of fantastic shapes. Many of the climbs or descents meant a rise or a drop of 2000 feet. Many of the lower valleys afforded good grazing and were covered with wild flowers. At the summits of the passes there were often extensive views over countless ranges, showing that the character of the country had entirely changed from that of the Tangar–Jyekundo section.

On July 16 the Mekong River was met again, and the route followed down its valley for 10 miles to the ferry. There were a few small villages with houses of mud and stone, and a few fields of barley still green but full-grown. The valley here runs between hills, rising to 600–700 feet above the river, and the width varies from a quarter to half a mile. There are many sandbanks with low bush. They crossed at the ferry, and again there was only one coracle to take them over. The river here was only 200 feet wide, but as after each journey the coracle had to be towed half a mile upstream, it took three hours for the caravan to cross. They encouraged the riding horses to swim across by stoning them.

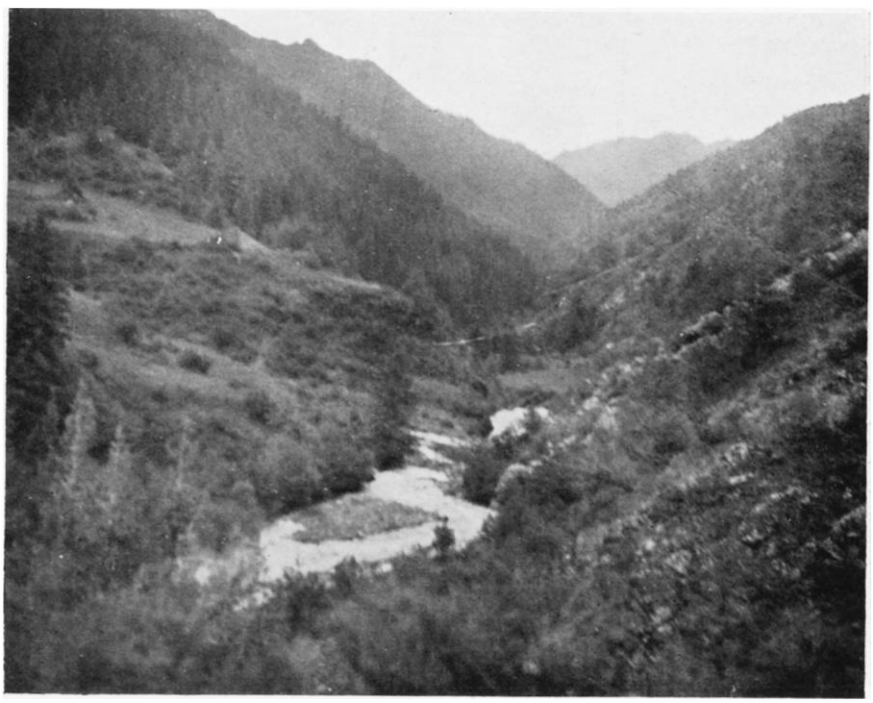
On July 22 Tang-Kwa was reached, and early in the day the Chinese–Tibetan frontier was crossed; to the north is the Tibetan kingdom of Nang-chen under the Chinese, and south of the frontier the country is administered from Chamdo.

General Pereira met near here some Tibetan men whom one would liken to kangaroos, as they were carrying babies in their bosoms with the small infants' heads just peeping out.

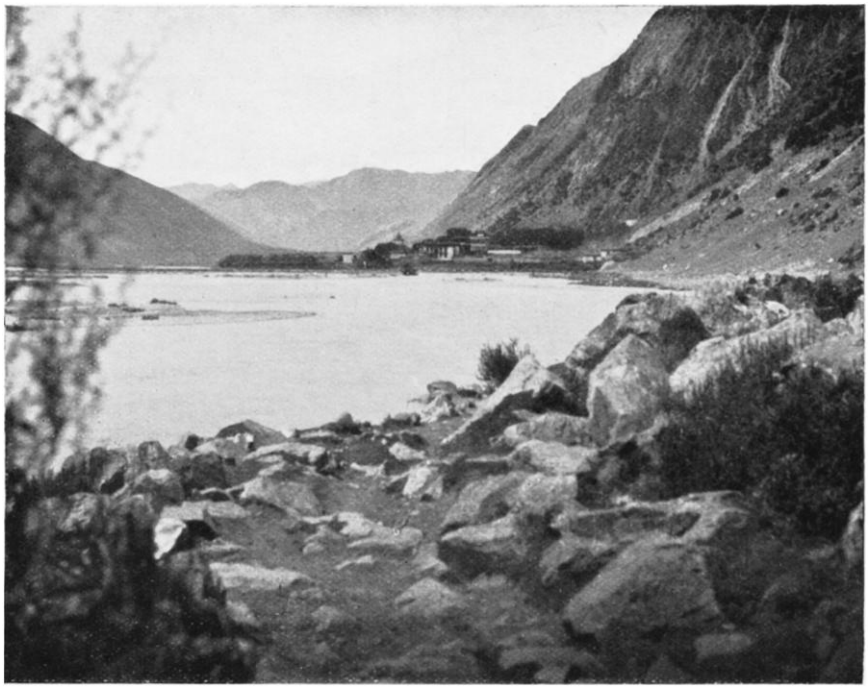
Jaraka, on the Ngom Chu, was reached on July 25, and a few miles before getting there they crossed the river by a bridge, consisting of four massive piers about 20 feet square, built of logs and stones; two of the piers are in the stream, with turret-like superstructures, and the roadway



THE CARAVAN BY THE YANGTZE



LOOKING DOWN TANG-KWA VALLEY



LOOKING N.N.W. TO PIENBAR

THE THREE-STORIED HOUSES IN WA-GE-WA

is of uneven planks. It is a wonder how they made the centre piers, as the river here is a raging torrent surging against them.

The Tibetan women in this area black their cheeks with grease, as mentioned by the Abbé Huc, and it does not add to their beauty. Wild cherries and peaches and gooseberries were not good to eat, but the wild strawberries found occasionally were excellent, and much larger than those found in China.

The villagers were all most friendly and extremely interested at seeing a European. As the caravan arrived they would troop out of the villages bowing and putting out their tongues, which has the reverse significance of what it has in Europe. They led the horses of General Pereira and his interpreter into the village, and the head man of the village bustled about to make things comfortable and to attend to the wants of the caravan.

The Tibetan houses are of mud and wattle, with uneven plank floors and log roofs which are not very waterproof. The windows occasionally have shutters, but have no paper to cover them as in China. Occasionally they are furnished with a low plank bed, stools, and rugs. When General Pereira availed himself of a room he always found it advisable to have the rugs removed. It was always a comfort to get a room instead of using a tent. There are no hens, and so eggs could not be got; milk was obtainable, but the cleanliness of the utensils in which it was kept was so doubtful that it was not sought after.

Chamdo was reached on July 28, and the whole town appeared to turn out to greet the caravan; at the stage before, General Pereira had been met by a Tibetan official to welcome him on behalf of the Siwala, the chief Tibetan official at Chamdo. Before reaching Chamdo the Ngom Chu was crossed by another fine bridge with five piers. Since entering Tibet the road had been well bridged.

It is about 260 miles from Jyekundo to Chamdo. On this journey they passed about six monasteries, all small except Rashi Gomba, and twenty-six villages of from one family to twenty-two families, but usually about six families. This is a main caravan route, and so it gives an idea of the small settled population. Of course the nomad population, with its need for good grazing, is more scattered, but the number of caravans met was quite small. A large English village would accommodate the total population met on this part of the journey, and if you scattered this population over the road between London and Newcastle, a similar distance, you would find the country a very lonely one, but as thickly populated as this part of Tibet.

Chamdo is on a little peninsula between two branches of the Mekong, in a valley surrounded by hills. When the Chinese ruled Tibet there were about three hundred families in the town and three thousand monks in the monastery, but during the fighting in 1912, when the Chinese were driven out, a great part of the town and most of the monastery were

destroyed. Now there are only one hundred and eighty families and very few Chinese and about four hundred monks in the monastery, part of which has been rebuilt.

Chamdo Province is governed by a lama with the title of Kalon Lama, and under him is a lesser official called the Siwala; a representative of the Dalai Lama, called the Drepon, commands the troops at Chamdo. Most of the troops had khaki jackets, and the words of command are in English, as they have a drill instructor who was trained at Darjeeling. More startling than hearing English words of command in this out-of-the-way place was to hear bagpipes; and at General Pereira's request one day the pipers played "Highland Laddie" very creditably.

General Pereira says that the tiny Tibetan children here are very jolly, dancing about and full of fun, but unluckily very dirty; the girls play shuttlecock, kicking it with their feet like the Chinese, and sometimes an expert will give a good exhibition, kicking it alternately with the front and back of the feet. Among the games played is stone-throwing to see who can throw the farthest.

The Tibetans are fond of flowers and have flowers in pots on their balconies; down by the river at Chamdo they have kitchen gardens with diminutive plots of cabbages, turnips, onions, and tobacco.

Whilst at Chamdo General Pereira's interpreter was taken ill and his face was covered with blotches; his Chinese boy said it must be smallpox, "t'ien-hua" or "heavenly flowers," as the Chinese call it, but it turned out to be a malady prevalent in this locality and not serious.

On September 3 a favourable reply was received from Lhasa to the letter sent from Tangar, and he started on the last section of the journey on September 6. The transport was eighteen "ula" yaks, or their equivalent, and a few riding horses.

For the first eight stages they followed the main Chamdo–Nagchuka road. Six weeks previously the Mekong had been exceptionally high, with rapid swollen waters, but now, though still a swift stream, the water had gone down a lot and the side streams were no longer fierce torrents. Two merchants, half-caste Chinese-Tibetans returning to Giamda, joined the caravan. The first day out from Chamdo they met a Tibetan woman carrying a letter from Lhasa from the Tsarong Shape, saying that General Pereira would be welcome at Lhasa and offering any assistance required, also stating that the telegraph at Lhasa was opened on August 3. An excellent English translation accompanied the letter. This friendly letter was indeed most welcome.

On September 7 some of the valleys were well wooded, chiefly spruce, and Namt'so La, 14,867 feet, was crossed after a very long and arduous climb. This range is not the Mekong–Salween divide. The natives all agree that the Dzer Chu joins the Mekong not far from Chamdo, though existing maps call it the Dzi Chu and generally show it as joining the Salween. Crossing the Namt'so La entailed a climb of 4000 feet, and

the long descent was by a track of large boulders or countless stones. The view from the top was over many ranges, some wooded, some bare. An 18-mile stage such as this at the high altitude called for considerable powers of endurance.

Ngemda was reached on September 8. Up to this General Pereira had at times followed for a short way or had crossed the routes of previous travellers—Major Bailey, Colonel Bower, Mr. Rockhill, Mr. Teichman, Colonel Kozloff and others. No European had been further west on this road since the journey of the Abbé Huc, although Mr. Coales of the English Consular Service had recently spent some time in Chamdo, and his excellent description of the town recently appeared in the Society's *Journal*.

The type of country was now entirely different from that of the earlier stages. Occasionally the valleys and hillsides were covered with spruce, maple, and acacia; sometimes they were grass-grown or covered with wild flowers, and the scenery was often very beautiful. At times the going was good, but often it was over very stony tracks. At Kama Sumdo there was a solitary house where the "ula" officials live, as there is no village for a long way and the "ula" has to be procured from the nomad tribes who are sometimes 20 or 30 miles away. Four young Tibetan girls making a pilgrimage to Lhasa joined the caravan here.

On September 10 there was a long stage of 24½ miles to Meru Tanda through uninhabited country among bare hills, over a very stony track with 8½ miles uphill to the top of the Mu La, 15,667 feet, the Salween-Mekong divide. Fresh "ula" which had come from 30 miles to the west was waiting here for the caravan. Only one house and a few tents were seen this day.

The stage on September 11 was 25 miles to Garmé. The Tibetans said it was an easy day, but it proved otherwise. The Tibetans are very good at geography, knowing the names of rivers and streams and where they flow; quite different from the Chinese, who are grossly ignorant and never know the name of a river. In Tibet the rivers do not change their names as they do in China; mountain ranges do, but the inhabitants know the names of the various sections.

The first 17 miles of the 25 was through almost uninhabited country. Five ridges were climbed, the highest and steepest being the Rab-che La, and they passed through high grass-covered hills, backed by rugged ranges. The last climb was over the Dung-re La, after going 15 miles; from it there was a beautiful view to the west down the Me-ru Valley, with three big monasteries high up on the hillside and many small villages down in the valley. Most of the hillsides and valleys were cultivated, and it looked more like China; it was the most fertile valley yet seen in Tibet. Forty miles W.N.W. there was a great snow-clad range called the Ture La running north and south, the only thoroughly snow-covered range yet seen with the exception of Amné Machin, and for a welcome change the hills

opened out to broader valleys. At Garmé, where they halted, there is a village of twenty-eight families and a garrison of two hundred and thirty soldiers, and it was strange at dusk to hear familiar English bugle-calls. The day's journey had been long and tiring.

Denchin was reached on September 13; a small village of twenty-three families, but an important place, as routes radiate from it north to Jyekundo, west to Nagchuka, and south to Shobando. It had been a fine warm day with hardly a cloud.

During his stay here General Pereira saw a specimen of Tibetan justice. Hearing the bugles sound the officers' call, he looked out of his window and saw a party of soldiers escorting an unfortunate lama to the outskirts of the village to undergo a sentence of having his right forefinger cut off. Later the soldiers returned headed by pipers playing "The Campbells are Coming," and behind them was the unhappy lama carried on a man's back. They sent round to General Pereira for medicine, and he provided boracic ointment and lint.

He had found the Tibetans a joyous race, always laughing but very servile. They always passed him anxiously, but if he nodded to them they beamed and put their tongues out. They have none of the tiresome Chinese etiquette, but they have an annoying habit of giving you presents and tipping your servants, all which generosity has to be returned.

General Pereira's stroll through the village of Denchin caused the greatest excitement, for all the inhabitants turned out and followed him, but not offensively like the Chinese. He described Denchin as being very prettily situated with lovely surroundings.

At Lachin, near the end of the next stage, he came upon many instances of stone posing, a favourite Buddhist devotion, presenting the most marvellous feats of equilibrium, sometimes with one stone, sometimes with three or four, and they seem to select the most impossible stones for this purpose. The same custom exists in China.

Forming piles of stones with prayer flags on the top is also a very prevalent custom. There is always a small one on the top of every pass, and it was these that General Pereira really appreciated, as they denoted the end of a generally arduous climb. Nearly every day there was some big pass to surmount with wonderful panoramic views from the top over bare, partially snow-covered hills in the distance, the lower hills generally covered with bush or fir trees.

Near the end of the stage on September 16, following a track along the hillside 800 feet above the valley, they got a wonderful view of the mighty Salween called in Tibet the Gia-mo-ngui Chu, coming in from the west, winding through a narrow valley between hills which rose 2000 feet above it. They had an extremely steep descent over stony and rocky ground to Zinda on the Salween, the height of which is 11,090 feet.

On September 17 they did 17 miles to Ru-a-tung, following the Salween all day, the path keeping mostly high up on the hillside, and at the end of the day's journey gradually descending to the river and across what for Tibet is a small plain with a monastery and about a dozen farms. They crossed the river by coracles, the horses swimming. The caravan had now crossed the Yangtze, Mekong, and Salween and various big tributaries and had forded the Yellow River and Yalung, and they were shortly approaching the basin of the Tsangpo or Brahmaputra. The Salween is full of fish, but the Tibetans, being Buddhists, do not catch them.

Shobando was reached on September 19; it is a comparatively large town of three hundred families, and there is a monastery of three hundred monks. The caravan, which up till now had been following a side route to Lhasa, joined the main route at Shobando, a dirty town with narrow winding streets, partly paved with big uneven cobbles. The houses are of mud and generally two-storied. The altitude of Shobando is 11,700 feet. There was a good variety of supplies here, turnips, lettuce, potatoes, eggs, butter, beef, and mutton.

From here on to Lhasa there are milestones called "melli"; the interval appears to be about 2000 paces.

Pien Ba was reached on September 23. It is the Pian Pa of Abbé Huc, who laughs at the Chinese for saying it is on the biggest plain in Inner Tibet, and says it is no plain at all; but General Pereira considered it the flattest piece of ground he had seen since leaving Jyekundo, though of course it does not compare with the great plains to the north.

On September 25 there was another hard stage of over 20 miles, over the Dor-ji La, 14,600 feet, as a preliminary to the Shiar-gung La. Following a snow-covered path they eventually came to a very steep ascent to the summit of the second pass. There were 2 or 3 inches of snow on the top and all the surrounding mountains were covered with snow, but as it had snowed two nights previously, it was impossible to tell if snow was normal up here or if all had fallen recently. There was a jumble of mountains all round, one towering peak to the south-west in shape like the Matterhorn, which must have been well over 18,000 feet

The Shiar-gung La is the Salween–Tsangpo divide and is reckoned the worst pass on the road. Abbé Huc, who calls it M. Tanda, crossed it at the worst season, and gives a very graphic account of the difficulties that he encountered. The height of the pass is 16,528 feet. The descent was steeper than the climb, and they soon got out of snow, but the route in many places lay over huge boulders and stones and it was a relief when they reached a beautiful gorge all covered with scrub, where they camped at 5.30 p.m. Fortunately it had been a bright sunny day.

Judging from Abbé Huc's account of the stage to A-la-ja-gung on September 27 General Pereira expected to find the path high up on

narrow ledges with yawning precipices below, but he found nothing alarming, and said that unless you were bent on committing suicide you could hardly fall off the path except in a few places; but the road was shocking, and General Pereira says it was the worst he had ever met in 40,000 or 50,000 miles of travel in the Far East. There were compensations in the magnificent scenery of the Nok Chu defile with hills rising 2000 feet up on either side covered with fir trees. Often the path lay through delightful woods and there were some waterfalls descending from a great height. During the next stage to A-la-dor-ta the deep abysses which Abbé Huc said abounded were not met with. They had a chilly camp at the end of the stage at a height of 15,200 feet.

September 29, 18 miles to Sa-chu-ka. General Pereira said in his diary that this was the very worst stage he had ever done, owing to the appalling going. They at first followed the well-wooded Nok Chu valley for several miles and then travelled between barren, stony hills over the boulders and rocks that had fallen and rolled down into the valley. It was a regular sea of boulders; they eventually crossed the Nur-gung La. Unfortunately spirits of wine ran out and so no more boiling-point altitudes could be taken, but the altitude of this pass by aneroid was 16,800 feet, the highest point yet reached. Abbé Huc called this pass the Chorku La.

On reaching more level ground the route passed the beautiful blue Serpentine Lake, the Tso-dung-wu-ngi, a mile long and 300 yards at its widest point. The camp that evening was at 14,800 feet near the hot springs mentioned by Abbé Huc; it had been warm and sunny during the day, but very cold in a tent at night.

On September 30 they had an easy stage to Lhari-guo through narrow, barren valleys and easy going, and only one hill to cross.

This place is marked Lharung Giachug on the Indian map, and is called Lhari by Abbé Huc. It is a poor village of fifty families and a monastery of sixty monks, but is important, as several routes radiate from it. After ten very strenuous days a rest was taken here, and General Pereira enjoyed the comfort of a nice clean room. The Chief Official called on General Pereira in his robe of state, bringing a supply of eggs and vegetables. Judging from what the official said, Abbé Huc did not exaggerate the terrors of the passes in winter when the Shiar-gung La is the worst and most difficult pass on the road, and he correctly describes how forty unladen yaks are driven ahead of a caravan to make a path through the deep snow. Merchants cannot afford this luxury, and it is usually only officials on the most pressing business who attempt the journey in winter.

On October 2 they crossed the Banda La, the Archa Pass of the Indian map, and Mount Lhari of Huc, whose height is 16,000 feet. It is the third highest pass on the road, with a final climb of fourteen zigzags to the top, which was extremely trying; though snow-covered, the path

was clear. In descending they soon got a view of the Adza Lake of a beautiful light blue in a valley surrounded by snow-covered mountains, the end of the valley being blocked by a range of 17,000 or 18,000 feet. Here they camped at 13,000 feet.

The following day their route lay below this range, and only a few nomads were seen. They camped at Guo-Le, where there were three stone hovels, and had an extremely cold night at a height of 14,450 feet. General Pereira was feeling weak from the great exertions of the steep climb, and walking was a great effort. On the other hand it was extremely cold riding, and it was always a choice of one of two evils whether to suffer from fatigue or cold. Abbé Huc related that there were unicorns here.

On October 4 the Tro La was crossed, 16,050 feet. This, the last of the four big passes, crosses the very high ground broken by deep valleys extending to east of the Shiar-gung La. There were some very steep zigzags and a final easy rise to the top of the pass, the last 500 or 600 feet rise being through snow. It had been cold at the start of the march, but in the camp at Giamda it was sunny and quite pleasant with a fur coat at 5 p.m.

Lara, 12,400 feet, was reached the next day, a village of twenty families. They saw from the road several square towers about 40 feet high. They were the defensive towers put up at the time when the Jungar Mongols, also known as the Eleuths, were powerful in the Koko Nor region. They invaded Tibet several times, and were finally crushed by the Chinese Emperor Chien Lung, who banished part of them to Chinese Turkestan, where a tract of country is still known as Jungaria, and General Pereira had met remains of this broken race whilst shooting in the Tien Shan.

Giamda was reached on October 6. It was a relief to be camped again at a lower altitude of 11,750; it had been a glorious sunny day and the scenery had been very beautiful, the evergreens mingled with the yellow and brown autumnal tints. A clear stream often ran parallel to their path, sometimes passing over rapids, and occasionally forming islands covered with trees, prominent among which were dwarf cedars, and a blue flower very common in Tibet.

Inner Tibet, with high mountains everywhere and its deep valleys, is a beautiful country in September and October. General Pereira had never seen country to surpass it for grandeur. At this time of year, except at great heights, it is as mild as an English autumn, with sun most days, and there had not been a drop of rain since leaving Chamdo. There was generally a frost at night.

Abbé Huc mentioned that there were two colossal temples at Giamda, but there is no sign of them now. He also mentions a colony of natives from Bhutan; General Pereira found two in the village.

Jinda was reached on October 8, and from here the road now ran due

west to Lhasa with only one big climb ahead. Leaving Jinda they followed down the Siap Chu Valley, the river, 20 yards wide, flowing over a bed of boulders through a valley 300 to 500 yards wide. The hills were mostly covered with trees and bush, now very beautiful with their autumn colouring. The journey was now more enjoyable, chilly starting in the morning and then gloriously warm and through beautiful scenery, between hills rising 1500 to 2000 feet or more above the valley, at times passing through pleasant woods.

The last pass on the road was crossed on October 11, the Gung-bu-ba La, 15,300 feet, by far the easiest pass of the lot. Whilst going over the pass there was a bitter head wind and ice on the streams, but there was only a little snow on one or two of the hills. Abbé Huc described the crossing of the pass in winter as very difficult, "five days winding in a labyrinth of ravines and torrents." It is probable that the winter crossing made the configuration of the ground seem worse to Abbé Huc than it really is. The caravan halted at Ren-jin Ling, 14,800 feet. It was cold there, but General Pereira secured a room in one of the four hovels that comprise the village.

It was a great satisfaction to have no more passes to negotiate, and from here to Lhasa it was all downhill. Me-jo-kung-gar was reached on October 14. There was a great change in the country, and the route lay down a broad flat valley $\frac{3}{4}$ mile wide at the start and opening out to 2 miles, the flattest and most open bit of country seen since they were north of Jyekundo. The bordering hills were lower, rising 500 to 800 feet above the valley, grass and scrub covered, with practically no trees except a few round the villages, of dwarf cedar, and small evergreens along the banks of the river. Eight small villages were passed this day and some big, square, two-storied, flat-roofed houses of better class. The last of the barley crop was being gathered. The route followed the Shung Chu, which changes its name to M'e Chu, and later to Song-hu Chu; this change of name of the river seems different from General Pereira's experience in Eastern Tibet.

Three more stages following down the Song-pu Chu Valley and Lhasa was reached. The journey had been done in 37 stages from Chamdo, 670 miles, and the distance from Peking was 6360 miles, of which General Pereira had walked over 3500. He had successfully accomplished the big journey on which his heart had been set for many years, and his cablegram home, "LHASA, ENGLISHMAN FIRST," showed his pleasure that the credit of this journey should come to England.

General Pereira had a charming residence at Delinka, outside Lhasa, put at his disposal by the Tsarong Shape, the Commander-in-Chief of the Tibetan Forces, and he had an extremely interesting audience with the Dalai Lama. He met all the big Tibetan officials and four Rugby boys, Tibetans who had been educated in England, one of them a lama.

LOOKING EAST FROM THE DOR-JILA

LOOKING WEST DOWN ME CHU VALLEY

LOOKING WEST TO NGUI-CHOR-KE

LOOKING DOWN ON TSO-DÜNG-WU-NGI FROM THE NUR-GÜNG LA

After a short stay at Lhasa, General Pereira travelled to Calcutta, a part of the journey now so familiar that I will not refer to it. He reached Calcutta on November 23, and was carried off to a nursing hospital suffering from thrombosis, or clots of blood in the left leg brought on by the severe exertion of his journey. As soon as he was well he started off on 2 January 1923 on further arduous journeys.

In concluding my lecture I wish to explain that I was emboldened to undertake the task by the number of letters I received from friends of my brother who were anxious that an account of his travels should be published. These letters showed what great friendships he had formed. I have had them from all parts of China, from officials, missionaries, and civilians; and his friendships were not confined to Europeans, for his diaries constantly show the mutual trust and interest there was between him and many Chinese of high rank.

Also I wish to emphasize this point: the difficulties of carrying through such a journey as this are obvious, but General Pereira was over fifty-eight years old when he started on it. He was lamed in a hunting accident soon after joining the Grenadier Guards, the lasting effects of which would have deterred most people from undertaking arduous journeys on foot, and he suffered from the effects of frostbite incurred during his shooting expedition in the Mu'ping district. A will of iron and an unshakable determination to overcome all difficulties were the cause of his success.

Before the paper the PRESIDENT (the EARL OF RONALDSHAY) said: A certain melancholy attaches to our proceedings this evening, for the traveller of whose journey we are to have an account to-night is no longer alive to tell the tale himself. We are greatly indebted to Major-General Sir Cecil Pereira, the brother of the late Brig.-Gen. George Pereira, for compiling from his letters and diaries an account of his last great journey from Peking to Lhasa. It may be that the general public have up to the present time known little of the many journeys of the late General, but those who have had the advantage of reading his reports officially can testify to their great value, particularly from a geographical point of view. I am told that although the late traveller spent the greater part of the last two and a half years of his life in out-of-the-way places, his brother never once during the whole of that time failed to receive a regular mail from him. Sir Cecil Pereira is well qualified, therefore, to give us an account this evening of that great journey from China to the heart of Tibet which in its entirety has not been performed by a European since the days of the Lazarist missionaries, Gabet and Huc. I now have much pleasure in calling upon General Sir Cecil Pereira to give us his account of the journey.

Major-General Sir Cecil Pereira then read the paper printed above, and a discussion followed.

The PRESIDENT: We are fortunate in having with us this evening General Anderson, who has travelled with General Pereira in former days. I will ask him to add a few words.

Brig.-General ABBOT ANDERSON: It was my great privilege in 1911, on leaving the Legation Guard at Peking, to accompany Brig.-General Pereira

on a trip for shooting and exploring in the Altai and Tien Shan. We were together for nine months on this journey. Starting from Peking, we went to Omsk by the Siberian Railway, and from there *viâ* Semipalatinsk, travelling up the River Irtish for fourteen days in shallow-draft steamers to the Russian outpost of Zaissan. I need not weary you with details, but in nine months one gets to know a man pretty well. I had previously seen a great deal of Brig.-General Pereira when he was our Military Attaché in Peking, and I can only say that from what I knew of him I am not the least surprised that he succeeded in this great effort of travel from Peking to Lhasa, for a man with more grit (he was lame, as Major-General Pereira has told us) I have never met. He had travelled all over China, and had been in every province there; but the amount of work he had done and the reports he had sent in are known to very few. I only wish, judging from a letter I had from him last year, that he had been able personally to tell us of his journeys and to have given us the interesting lecture which we have listened to to-night.

The PRESIDENT: The account of the journey which we have heard to-night recalls another great journey which was made from Peking to India many years ago by an ex-President of this Society, Sir Francis Younghusband. I will ask him to address the meeting.

Colonel SIR FRANCIS YOUNGHUSBAND: As one who has travelled both in China and Tibet, I should like to take this opportunity of expressing my high opinion of that fine achievement the record of which we have listened to. We are impressed by the grit and determination which General Pereira showed, and it is all the more remarkable that at the time he made that journey, travelling 3500 miles on foot, he was a lame man and had been lame for many years. That, as General Anderson has said, emphasizes his grit and determination. But to me it seems that the most valuable result of his journey is the good impression which he left behind. He had to find his way through China at a time of civil warfare when one province was at war with another, and when the whole country was overrun with brigands; and it stands to reason that no man travelling by himself, as General Pereira did, could have got through if he had not possessed in a high degree the capacity of getting on with the peoples, both high and low, whom he met. That evidently was the case with General Pereira. With high Chinese officials, with high Tibetan officials, and, I should gather also, with high British officials he was able to find his way. The result was not only a feat of great physical endurance, but the gathering of much valuable geographical information as well, with maps and photographs. Probably the most striking geographical feature which he met with on his journey was that high mountain which the exuberance of some journalist in Calcutta put higher than Mount Everest. When we read of that in the papers we made allowances for the optimism of journalists. Knowing General Pereira we knew that he would not have committed himself to such a statement unless he had very good foundation for it. It is not likely that a mountain over 29,000 feet would stand up by itself without some other very high mountains as satellites by it. Mount Everest itself does stand head and shoulders over the other mountains round; all the same there are peaks of 26,000 feet and 27,000 feet close by, and so it was not likely that anything higher than Mount Everest would stand out without being accompanied by satellites something like it in height, and we do not hear of any considerable cluster of peaks. But from the good impression which General Pereira left behind, we hope it may be possible for some future expedition to go out there and measure the exact height of that mountain, and probably it will be in the order of 25,000 feet, as General Pereira has surmised.

It was very fortunate for General Pereira that he had the good-will of the Tsarong Shape, the Commander-in-Chief of the Tibetan Forces. Evidently the attitude of the Tibetan Commander-in-Chief has changed since I was in Tibet twenty years ago. The commander at that time said that as a rule he did not eat meat, but he would be exceedingly glad to eat the flesh of us Englishmen. That was his attitude in this very month twenty years ago, when he was with 8000 men engaged in besieging us in a small farmhouse, whilst we had only 500. So that there is a considerable change for the better now—though perhaps not entirely for the better, for we have heard of the advent of bagpipes into Tibet, and about "The Campbells are Coming." The Campbells did come when I was at Lhasa. The colonel of one of the regiments of the escort was Colonel Campbell, who lived in the same house with me at Lhasa, and he had bagpipes playing all day long and most of the night as well.

I am glad to have heard the many references in the lecture to the French travellers Gabet and Huc. Theirs was really a very remarkable journey. I asked the Regent with whom I was negotiating whether any Europeans had been there before us. He said he could quite well recall when he was a small boy having pointed out to him two Europeans walking through the streets of Lhasa. From the dates which he gave it was evident that they were Huc and Gabet. All that General Pereira has said confirms the good work which those pioneer missionaries did in Tibet.

Major-General H. R. DAVIES: I will not detain you long at this late hour, though I am very glad to respond to the call of the President, because of the great admiration that I have felt for General George Pereira, both as a man and a traveller, during many years' friendship. I know there are a few people who realize the important work that he did even before his great journey to Lhasa, but so modest was he and so averse to putting himself forward in any way as a great traveller, that I think there were many to whom his name may hardly have been known when the news came through that an Englishman had arrived in Lhasa from the East. It was a great feat. Many had tried before, but no previous traveller had succeeded since the 'forties of the last century. I think also the great work that he did previously should not be lost sight of. He had, I believe, travelled between 40,000 and 50,000 miles in the Chinese Empire. He had visited every province and every part of every province, and he had not only travelled in China proper but in Mongolia, Manchuria, Chinese Turkestan, and Tibet.

I may say without any fear of exaggeration that no European who ever lived has made such extensive journeys in the Chinese Empire, and I may also add that I do not believe that any Chinese has ever had such a great geographical knowledge of his own country as General Pereira had of China. The President has alluded to General Pereira's great thoroughness. I have had the opportunity of seeing many of his reports, and know how true that remark is. No more thorough observer ever travelled in China.

Those who did not know him might imagine that he was a very robust man who felt no fatigue and could stand any climate. But this was by no means the case. He was not a very strong man. It was not bodily strength that carried him through; it was the great spirit within. His great heart carried him through all obstacles and all physical disabilities. I do not think there is any better example of this than what happened when he arrived in Calcutta. He was suffering, as the lecturer has told us, from clots of blood in the leg, was fifty-eight years of age, and had just done a journey that no European had done for eighty years. A less resolute traveller might well have

been content to say that this was sufficient, and go home ; but this was not his way. He had determined that he would do other travels in China, and knowing full well the risk of his leg breaking down, he started off again into one of the most mountainous provinces.

One more qualification I have for speaking of General Pereira here to-night, and that is that during the war he was at one time commanding a battalion in the brigade that I then had. I need hardly say to any one who knew him that the more dangerous the position he found himself in the better he was pleased. He was a great example of courage and enterprise to all those who served under him. I feel we have lost not only a very great traveller but a very gallant soldier.

The PRESIDENT : At this hour of the night I do not propose to add anything to the discussion which has taken place on the paper. I merely desire, on your behalf, to express to our lecturer our sense of admiration, both for the character and for the achievements of his late lamented brother, and to the lecturer himself the sense of our gratitude for the manner in which he has compiled from the traveller's letters and diaries so admirable and accurate an account of his brother's great journey. Finally, we assure him that after listening to his description of that journey we shall all look forward with the greatest interest to the more detailed account in the publication which he has foreshadowed.

THE PROPOSED ADOPTION OF A STANDARD FIGURE OF THE EARTH

G. T. McCaw, M.A.

Read at the Afternoon Meeting of the Society 12 *May* 1924

THE question here propounded for discussion has first to be stated in terms of scientific precision. On the Earth there are many obstacles militating against precise definition: mathematical uniformity is not to be expected in the phenomena of Nature. In considering the dimensions of the Earth it is essential to fix on some kind of regular surface; what is the surface to be adopted?

At the outset we are faced with (1) the *actual* surface of the Earth with all its irregularities; obviously it would be impossible to speak in precise general terms of the dimensions of the actual surface. There is (2) the surface of M.S.L., such as would be apparent to the eye were it possible for the ocean to interpenetrate the land through frictionless canals of great capacity. This surface is known as the *geoid*. There is (3) a surface described as the *ideal*, being the external form of an earth in a state of permanent hydrostatic equilibrium. Finally, there is (4) the *geodetic* surface with which we are chiefly concerned at the moment.

The geoid may be popularly described as the surface to which the plumb-line is everywhere perpendicular. It is found to be of irregular curvature within the continents, and it is fairly certain that the curvature of the oceans themselves is not quite regular. The surveyor is directly interested in the geoid—an equipotential surface on which he works

joins the mighty Kogin Sanga, and thence onward the combined waters are known as the Mada. When I first encountered the Kogin Sanga I could find neither boat nor canoe, and had to swim across the river when the discharge was about 5000 cubic feet per second. Subsequently the best that could be obtained was a fragile bamboo raft lashed upon four large calabashes for floats, upon which we transported all our instruments and valuables. The native of that part would swim across readily enough, taking a load on his head, with the support of a large hollow calabash under his "middle." The Kogin Mada continues southerly through the Mada country and the more level plain of Keffi and Lafia, and flows finally into the River Benue—under a different name.

We found several wild citrous fruits; also mahogany, rubber, and the ubiquitous fan-palm and oil-palm. Some of us found spoor of bush-cow and leopards; while monkeys, rock-rabbits, porcupines, ant-bears, and baboons abounded. Birds, even the greater and lesser bustard, Marabout stork, crown cranes, partridges, and guinea-fowl in abundance, besides parrots, parakeets, green pigeons, blue starlings, jays, and canary birds of bright and beautiful plumage. For the lower forms of life—such as flying and creeping insects—I should say the Kloof was a very happy hunting-ground. We saw at least ten different kinds of praying Mantis, and nearly every variety of Stick insect. I regret to say that the presence of the tsetse fly in and around Jemaa and along the Sanga and Mada rivers made itself felt, but am glad to report its total absence from Fadan Zagoro to Fadan Delli and from all the highlands of the Bauchi plateau.

THE MOUNT EVEREST DISPATCHES

WE print below the dispatches which cover the heroic and tragic events of the Mount Everest Expedition from its arrival in the Rongbuk Valley until its withdrawal after considerable success and heavy loss. The story will be re-told in lecture and book: yet never, we think, more effectively than in the dispatches which have compelled admiration as they were published from week to week, but must be read consecutively for full appreciation. It is Colonel Norton's singular good fortune that his style rises with his altitude, and with the height of his subject. His eighth dispatch, dictated when blind, and his last with its noble tribute to the lost companions, will surely become historic in the literature of mountaineering. Characteristically he gave it to his colleagues to narrate the three great exploits: the rescue of the four porters who had lost their nerve, told by George Mallory in the last effort of his gifted pen; the record climb in which Somervell was beaten at 28,000 feet, and was left to describe how his chief struggled a little higher; and

lastly the strange and wonderful story by Odell, in support on the last high climb, to whom, as he made a lonely geological survey between Camps V. and VI., was suddenly revealed for a brief time the last sight of Mallory and Irvine as they gained the crest below the final pyramid, and disappeared for ever into the cloud about the summit.

The dispatches are cabled in slightly abbreviated form, with little punctuation. By the courtesy of the Editor of *The Times*, to whom they came for distribution, we have been allowed to compare the first published versions with the original cablegrams, and have corrected a few evident mistakes in transmission, adding an occasional note in explanation of such change. Otherwise they stand as they were first printed.

COLONEL NORTON'S DISPATCHES

NO. 6. BASE CAMP, RONGBUK. MAY 13
[PUBLISHED MAY 31]

When I last wrote hence on April 29 things had gone so smoothly that we were wondering when the crash was coming. We had reached the Base Camp exactly according to plan and, amply provided as we were with local labour, the way seemed clear before us to a possible assault on the mountain somewhere about May 17. Portraits of the gods guarding Everest are painted on the walls of the Rongbuk Monastery. We studied them with interest and smiled.

The first task, after Camp II. had been established and stocked by local labour with all stores for the higher camps, was to transport the necessary proportion to Camp III. with our own specially enlisted porters. On May 3 Mallory, Noel, Odell, Hazard, and Irvine started for Camp III., accompanied by twenty of these porters. On the following day Havildar Umar, 6th Gurkhas, followed with twenty more porters. These two parties were to complete the establishment of Camp III., close under the glittering wall of the North Col with all stores required for itself and the higher camps, and then to proceed with stocking Camp IV. on the North Col itself, as soon as the snow and ice staircase to that point had been reconnoitred and constructed by Odell and Hazard. A reserve of twelve porters, including some of the toughest veterans of two years ago, was maintained for the moment at the base, under Geoffrey Bruce. Somervell, Beetham and I left the Base Camp on May 6. It was a very clear, cold morning, after a night when the temperature at the Base Camp fell to *minus* 10° Fahrenheit. We arrived without incident at Camp II. on the morrow, finding Noel there. The same evening it began to be clear that all was far from well. A party of porters based on Camp II. had made two trips towards III., but encountered such low temperatures, combined with head winds, that Mallory decided to establish a dump for stores at a point on the glacier about a mile short of the camp.

But who are these weary, crippled men coming staggering and straggling through the seracs of the glacier into Camp II., between 4 and 6 p.m., from the direction of III., looking for all the world like the stragglers of the British Army I once saw blocking the roads south of Le Cateau on August 27, 1914? It appears that they are porters of the first party from Camp III. They have made one "carry" to that camp two days ago, and are now clean driven out by exposure and exhaustion after spending forty-eight hours practically confined to the tents, with only bare necessities in the shape of food and clothing—

in other words, a blanket apiece and the local barley meal to eat. The ample and varied supplies of food and spare blankets and most of the fuel are still dumped on the glacier a mile short of their camp. As at St. Quentin, Chauny, and Noyon in 1914, there is now no time to count the cost nor look far ahead. The stores dumped at II. for all the higher camps must be ruthlessly broken up and expended. The high altitude tents are pitched, the priceless stores of Meta solidified spirit are broached, high altitude sleeping-bags are issued. The capacity of Camp II. is doubled for the night and some degree of comfort is extended to the sufferers.

On the morrow Mallory arrived at breakfast from Camp III., and we held a council of war. Mallory's story was short and sweet. Temperatures as much as *minus* 22° Fahrenheit, 10° lower than anything met in 1922, coupled with terrible wind and the failure of the majority of stores from II: to reach Camp III:, explain the rout of the first party. Mallory himself ordered the retreat, and had practically to man-handle many men out of the tents on to their feet, so completely had the hardships taken the heart out of them. Such weather conditions surely must be exceptional, and it was decided to rest and recuperate the first party at Camp II., and next day to send the second party from Camp II: without loads to the Glacier dump, thence to carry all essentials up to Camp III., where they were to remain, changing places with the first party. The situation was explained to the men, and the second party went off on their third trip in four days in good heart, under Somervell's escort.

Geoffrey Bruce now arrived at Camp II. with the old guard, affording neither the first nor the last instance in history when the commander blessed his reserve. This day Odell and Hazard attempted to reconnoitre the route to North Col, but the conditions were such as precluded their reaching more than halfway, making a dump of rope pickets. The next day Mallory, Geoffrey Bruce, and I left for III. with a convoy, very much more cheerful than the first party, and a reserve carrying stores partly to the dump and partly through to Camp III. Hazard, who was sent to the base to relieve Shebbeare, met us *en route.* I have a sharp silhouette of him in mind as I write, making famous going down the glassy surface of the glacier in the teeth of the gale, with his beard and moustache iced, so that he looked like Father Christmas. Shebbeare's special qualifications as transport officer now called for his presence at Camp II., where it was hoped under more favourable conditions to dispense with an officer.

Now began a blizzard lasting continuously for forty-eight hours. Strictly speaking, it only snowed for perhaps twenty-four hours, but the conditions subsequently were identical, or worse. The wind increased after the snow ceased to fall, driving the fresh-fallen powdery snow before it in incessant gusts, producing much the same results as if snow were falling, combined with a lower temperature. All woke at Camp III. on the morning of the 10th to find the tents filled with inches of powdery snow. It was now apparent that it was inadvisable to maintain more sahibs than were necessary under such conditions at Camp III. The carriage of provisions and consideration of the condition of those climbers destined for an early attempt outweighed the acclimatization question and decided Mallory and Irvine to return to Camp II:, which they did after breakfast. Somervell and I escorted a party from Camp III: back to the dump, and returned well laden in the teeth of driving snow, while Geoffrey Bruce stimulated the reluctant camp into activity, and did what could be done under impossible conditions to evolve order out of chaos and comfort out of misery.

The night of the 10th–11th served the purpose, perhaps, of testing the

wind resistance of our apparently flimsy high altitude tents; for all other purposes it is best forgotten. The wind appeared to be shot high in the air over the North Col, Rapiu La, and Lhakpa La, the three passes surrounding us, and, from some point high in the zenith, descended on the camp like a terrier on a rat-pit, and shook our little tents like rats. The minimum temperature was *minus* 7°, and the tents were again filled with drifted snow. At 9 a.m. on the 11th the temperature was still *minus* 1°, a gale was raging, and everything was deep in snow. The North Col route would in no circumstances be safe for some days. The much-enduring second party of porters were now reduced nearly to the condition which the first party had reached three days before.

There was nothing for it but retreat—retreat to the Base Camp for a few days' recuperation before making a fresh start. Messengers were dispatched to Camp II. with instructions to evacuate it in hopes that they would reach there in time to stop any upward convoy. Then Geoffrey Bruce did a fine bit of work, though it was very much in the ordinary day's work for him. Taking up a commanding position in the centre of the camp in the teeth of the gale, he proceeded to order the striking and packing of the camp, for it was impossible to risk standing or even collapsed tents in such weather. How he got the men to work, the tents struck and packed in bags and boxes, bedding, stores, and fuel all neatly dumped, only he can tell. Perhaps his stinging words cut more than the wind, but it is on record that he found time and opportunity to give exactly the right amount of sympathy to the really sick and to those who thought they were more sick than they were. Such loads as were to accompany our downward course were fairly and justly apportioned, and to his credit, be it said, a comparatively cheerful party thankfully turned their backs on what had an hour ago been Camp III., and which was now something resembling a neat pile of stones.

Halfway down that weird corridor, with blue ice pinnacles, resembling nothing so much as a transformation scene at Drury Lane, which forms the lower road from Camp II. to Camp III., we met the convoy for Camp III., our note having arrived too late to stop it. Never mind, they can go right through to the base next day. Our convoy goes through to Camp I., with Mallory, Noel, Irvine, and Beetham in charge, and Somervell and Odell as far as Camp II. Geoffrey Bruce and I spend the night at Camp II. to look after and escort on the morrow a man who had broken a small bone in his leg on the glacier. So by 2 p.m. on the 12th the whole expedition was again at the base. And what a different base from that which we thought so bleak a fortnight ago! Bleak it still is, with no sign of the stir of the Tibetan spring in scanty vegetation and grey moraine heaps, but a garden of roses after III.

The end of Round One finds us discomfited, but very far from defeated. A hitch, but by no means the crash we feared, has come. We have one man with seriously frost-bitten feet, one with a broken leg, and two severe cases of bronchitis, and, worst of all, Lancenaik Shamsherpun, of the 6th Gurkhas, suffering apparently from hæmorrhage of the brain and in a serious condition. We lose inevitably five or six days of the original programme. On the other hand, when we reoccupy Camp III. in three or four days, we shall have no need to look over our shoulders. Everything will be up and the proportion of stores to go up higher will be a fleabite compared with what has been done. Porters and sahibs are acclimatized and tested up to 21,000 feet. We know our good carriers. Already, twenty-four hours after arrival at the Base Camp, the porters have got over most of their minor ailments and fatigues, and are showing

normal cheerful faces. We hope to get them and the expedition as a whole blessed two days hence by the Head Lama at Rongbuk Monastery, who was too sick to do this when we passed through Rongbuk.

The British members of the expedition are in perfect health, despite their roughish experience. Give us but the weather encountered in 1922 and nothing will prevent the smooth continuance of the plan, with ample time to carry it out. The brightest spot on our arrival at the base was to find that Hingston had rejoined, after leaving General Bruce at Darjeeling, in the nick of time to relieve Somervell of some of the arduous duties of medical officer.

Since writing the above I have to record with the greatest regret the death of Shamsherpun, painlessly, and without recovering consciousness. The death of this splendid young man in the prime of youth is much felt by all the members of the expedition, who, in tendering their sympathies with his relatives and the regiment, feel that they have lost a friend and a most loyal assistant.

NO. 7. CAMP I. EAST RONGBUK GLACIER. MAY 26 [PUBLISHED JUNE 16]

"No game was ever worth a rap for a rational man to play into which no accident, no mishap, could possibly find a way." This sentiment must be our consolation as I start the seventh dispatch from the Everest Expedition, for since I last wrote we have done little but provide Everest with games worth raps enduring [? message mutilated]. The task of describing our doings in detail I am leaving to the ready pen of Mallory, confining myself to a brief epitome of the events which led to our finding ourselves once more temporarily defeated and strung out in echelon between the Base Camp and Camp II. for two or three days' recuperation from the rigours of Camps III. and IV.

We advanced for the second time to the attack on May 17, the day originally planned for the first assault on the summit. As luck would have it, this was, perhaps, the most perfect day I have ever seen on the mountain, certainly the only day of the sort seen this year. We arrived on May 19 at Camp III., and on the 20th a party consisting of Mallory, Odell, and myself established a route to the site of Camp IV. and on to the North Col itself.

On the 21st twelve porters, escorted by Somervell, Hazard, and Irvine, established a camp on the old site. Incidentally, no sign could be found of the old camp established there in 1922. All was buried deep under the snows of two winters and two monsoons. Somervell and Irvine returned to Camp III., leaving Hazard in charge of the twelve porters, pitching camp in a snowstorm at 5 p.m.

On the 22nd a similar party under Odell and Geoffrey Bruce were to have repeated the trip, but as snow had started falling at 1 p.m. on the previous day and continued unintermittingly for twenty-six hours, the attempt was impossible. The night of May 22–23 produced the lowest temperature recorded by the Everest Expedition—56 degrees of frost. Many of the party at Camp III., which now included five climbers, did not sleep. The eiderdown sleeping-bag is a wonderful invention, but it has its limitations. Enboldened by the low temperature, the brilliant morning, and other reassuring indications, and urged on by the consideration that priceless days were slipping past, a party of sixteen porters, under Bruce and Odell, left on the morrow for Camp IV. Halfway up the steep snow and ice slopes the party encountered such dangerous conditions underfoot, aggravated by the fact that it began to snow hard again, that the attempt had to be abandoned, and the party returned to Camp III., dumping their loads at the highest point reached by the porters.

From there they saw Hazard descending through the snowstorm above them, escorting what it was hoped would be his whole party. At about 5 p.m. the party arrived, Hazard having rightly judged that there was nothing for it but evacuation. He had shepherded the party safely down the unpleasant descent, but most unfortunately, while he was in the post of danger ahead, going first to test the treacherous new snow, the last four men lost their nerve and turned back to Camp IV., where they remained marooned, their food supply, it turned out, confined to a sack of barley meal, as, two days before, a complete load of mixed luxuries had been accidentally dropped over an ice cliff by the porter who had been carrying it.

Here was a pleasant situation. The snow continued to fall until midnight, increasing in volume, and, what was worse, in softness. In fact, the indications were multiplying that some form of monsoon current was undoubtedly upon us. Yet the four unfortunate marooned men had to be extricated, and that without another day's delay. One man had already been reported frost-bitten, and it was impossible to say if he would be fit to descend even on the next day. The whole party in Camp III. were in none too fit condition. Five days of alternate heavy climbing and lying snowbound in 16-lb. tents and five nights with temperatures averaging 50° of frost had played havoc with the health of all, British and Himalayan, and to some extent also with the *moral* of the latter, many of whom were shaken.

The route to the North Col would obviously be unsafe for some days to come. Meanwhile our stores of food and fuel—the former replaceable from below, the latter irreplaceable—were being consumed at an alarming rate. There was nothing for it but once again to withdraw to the lower camps, where sleep and some degree of comfort could be obtained and where the usual yak dung could be burnt instead of artificial fuel. Accordingly a twofold operation was carried out on the 24th—the evacuation of Camp III. and the rescue of the marooned men from Camp IV. Of this Mallory will tell the story. That he was himself suffering from the prevalent high-altitude cough—which prevents sleep at nights and handicaps the climber—and yet was the mainspring of two fine climbs, he will probably not tell, but few would, or could, have done what he did.

Hence, to-day finds us echeloned up the East Rongbuk Glacier, ready to repeat our attempts on the mountain with but a day's delay when the weather permits. Once more the *via dolorosa*, threading the moraines of the glacier, has witnessed a melancholy little procession of sick, frostbitten, and snowblind men painfully wending their way to the comparative comfort of the Base Camp, where there are adequate medical arrangements. At Camp I. we are occupied in recasting our plans. If the monsoon is really on us—and who ever anticipated the beginning of the monsoon as early as May 19?—our only hope is largely to modify our plan and snatch fleeting chance in some fine interval. If it is only the preliminary current, to be followed even now by a real spell of the fine weather we have looked for in vain, we must be prepared to take advantage of it. But we have our warning. Prudence must recognize the third alternative, which, however, I prefer not to discuss. Here I let Mallory take up the story.

MR. MALLORY'S STORY

" This pause in our protracted struggle does not seem the moment for telling a story; Norton probably thinks so, as he hands over this part of his task to me. Action is only suspended before the more intense action of the climax. The issue will shortly be decided. The third time we walk up East Rongbuk

Glacier will be the last, for better or worse. We have counted our wounded and know, roughly, how much to strike off the strength of our little army as we plan the next act of battle.

" In making plans, however, though we turn from the story of the past to the brighter future, we have been brought to consider certain events of the past few days. The events all belong to one stage—between Camp III., 21,000 feet up, and Camp IV., 23,000 feet up, and still 6000 feet short of the summit. In 1922 the way here consisted of a brief hour's easy going up the stones of the glacier, followed by a steeper ascent of about 1400 feet on snow and ice slopes, and up and down these slopes the men went freely, without thought of the difficulties, until the party of seventeen was swept off them by an avalanche and seven porters were killed. That was on June 7, after the first big snowfall of the monsoon on June 3–5. Naturally now in 1924 we do not mean to be caught in the same way again, not if we can help it.

" It is when we think and think how we can make safe the way to Camp IV. up on the snowy shelf among the great ice-cliff of Chang La that we begin to appreciate the immense difficulties Everest holds in store. It must be remembered, in the first place, that our great ally, the Sherpa porter, is not a practised mountaineer. Give him good hard snow where nails can grip, slopes where he can just walk comfortably on good steps carved by the sahib's iceaxe clean and clear, unencumbered by fresh powdery snow ; give him a rope for a handrail here and there at danger points ; give him, above all, to believe that at the journey's end he will find good food and a warm bed, and he will go up and down steep tracks without a qualm, happy, confident, and safe.

" But the mountain does not always acquiesce in this cheerful view. The first weapon of defence is simply the cold. It seems cold beyond a certain point somewhere about – 10° Fahrenheit at night. The cold at these altitudes and under these conditions, whether in camp or on the mountain, tends to cause the expansive Sherpa's nature to contract. It is not surprising, when the hard conditions of their life are considered, that the porters, with few exceptions, lose their vitality most quickly in great cold. Nor can it be said that the British sahib is unaffected.

" The second weapon is the snow. The fewest inches of snow enormously increase the labour of carrying a load from Camp III. to Camp IV. All that was firm and sure becomes slippery and uncertain. The porter no longer distinguishes clearly the hole where his foot may be placed in the new snow, and is inclined to slide on the hard old snow or on the ice beneath as the powdery stuff blows up into his face. Instead of stepping in glad confidence, body erect, he begins hesitatingly to crawl, with his body hugging the slope. All sense of security is gone ; the splendid fellow who bore his load so proudly has become a veritable child, a child for whom the British officer is at every turn responsible.

" The fortune of this expedition in 1924 is sharply differentiated from our experiences in 1922 by the greater cold this year, and the greater snowfall to date. It is, of course, the snowfall which has chiefly affected the mountaineering difficulties between Camps III. and IV. The particular slope of the corridor where the avalanche occurred in 1922 is not dangerous every day, and was in perfectly good condition when Norton, Odell, and myself set forth to reach Chang La on the 20th. Nevertheless, warnings of bad weather already received convinced us that we must establish at the outset a way independent of this slope in case of heavy snow.

" The rules of this game, so to speak, are that you may directly ascend a slope in comparative safety, but must never cross a slope, where the snow is

likely to slip just by crossing it, and so breaking the surface, you are likely to start an avalanche. The corridor in 1922 was unsafe after the monsoon snow had fallen because the floor was on a slant, so that, though one might feel that one was going directly up a slope, one was really crossing one all the time. Now, as one looks up at the intermingled masses of white broken snow and bluish broken ice below the long snow saddle called Chang La, or North Col, it is almost unimaginable, if one does not take the corridor leading directly to the strategical point, that it will be possible to regain this line and reach this point without crossing one or other of the snow slopes, all of which are dangerous to cross after sufficient snowfall.

"Away to the right, separated from the corridor by a series of icecliffs, we saw the long slopes used for the ascent by the first 1921 expedition. The place has changed a good deal since, but the lower slopes remain substantially as they were, while higher an immense crevasse curves across the face and stretches to the upper end of the corridor. Would it be possible to use this crevasse if we came up to the right to take us back to the head of the corridor? Clearly on the lower lip, if we could work along, we should be protected from an avalanche from above. Any party making fresh tracks up to Chang La from Camp III. will find they have a full day's work, though on the 20th we had favourable conditions and went slowly enough.

"At length the steep slope brought us to the crevasse and the one real difficulty of the route. On the lower lip, which we wanted to follow, impinged hereabouts a line of ice-cliffs. It was necessary to climb up the steep wall to the foot of the little chimney which here represented our crevasse. The snow in the bed of this chimney gave no foothold; steps could not be cut in its sides, so inconveniently narrow it was. Before we emerged and found ourselves on the big crevasse proper, with the lip fortunately accessible, we had climbed 200 feet as steep and difficult as one could wish to find on any big mountain.

"The rest of the way gave no trouble, though taking the straight way in order to avoid traversing the final slope up to the old site of Camp IV. involved more step-cutting. We congratulated ourselves on having shared the labours of the day, so each could feel satisfied at his part and also at having eliminated the principal dangers on the way up. But it remained to be seen how the porters would manage the loads up that steep 200 feet.

"On the following day, the 21st, Somervell, Irvine, and Hazard set forth to escort the first lot of loads to Camp IV. It was snowing slightly when they started, and the day grew worse. Somervell found our tracks covered or could not find them at all. The ice chimney no doubt they rightly decided was too narrow for the majority of the loads. Somervell and Irvine established themselves at the top while Hazard directed operations from below, and all twelve loads were hauled up. Tremendous efforts must have been required of those two who hauled and the two or three porters who helped. Two hours and a half were thus spent. Having seen Hazard up to the foot of the final slope Somervell and Irvine returned. According to plan the porters were to rest next day at Camp IV. before going on with Bruce and Odell to establish Camp V. This operation has to be conducted with oxygen. Irvine was now wanted in camp to prepare the apparatus for the next day. In such thick weather Somervell judged that Irvine must have a companion on the descent.

"A further illustration of the mountaineering difficulties in reaching Camp IV. is the story of the party conducted by Bruce and Odell on the 23rd, a day later than they were due to go up. Fresh snow had greatly altered the easy walk up the stones of the glacier. Instead of a brief hour up to the foot

of the slopes nearly three hours were required. On the slopes themselves snow was found to be in the most disagreeable state. Hazard's party were coming down the ice chimney as Bruce and Odell, having left the porters lower down, were approaching the crevasse. They did not reach the crevasse, deeming the snow dangerous. Hazard was apparently deaf to their shoutings, and for an hour or so the two parties were never in touch.

" The two stories we heard in Camp III. that evening, with the news that not all Hazard's party had descended, mingled as we lay in our tents with the sound of ever-increasing snowfall, produced the nearest thing to gloom I remember during the expedition. As night came on the snow had a moister and stickier quality. Was this really the monsoon then ? Four men caught on Chang La for the first snow of the monsoon. One of them reported frost-bitten. It was this circumstance that compelled rescue the next day and no later. I woke in the early part of the night for a coughing fit. The tent was brighter, and Norton murmured : ' The moon.' Sure enough, looking behind me, I made out through the canvas a bright unclouded moon. The snow had stopped. It was not the monsoon this time.

" Was there ever such a party as set out straggling up the snow-covered stones next morning ? Norton, Somervell, and myself, the three who have climbed together on Everest before, must have appeared like a party of thrashed curs. I suppose we were half sick with the cold and the altitude. Never can three men have looked less like accomplishing a hard task ; never, I confess, has a task appeared to my mind so utterly far away and unlikely to be accomplished. We drove ourselves somehow or other over the fresh snow of the glacier basin and up, up, slowly and wearily, puffing and coughing. ' If only it were not for that blessed cough,' I thought, ' even in snow up to my knees I could have gone on well enough.'

" We started at 8 a.m. ; at 1.30 p.m. we were at the foot of the steep place below the ice chimney. Every ledge and step were filled with snow. But there remained the thin descending line of rope, fixed by Somervell's party to help the porters. That blessed rope ! How pleased we were to grasp it with both hands and pull ourselves up the steep places ! On two dangerous sections above the crevasse Norton and Somervell in turn went ahead on the long rope, while the remaining two secured them.

" While Somervell was leading up and across the final slope the four porters above were held in conversation. As there was no time to lose, we wanted to know whether all were ready to move. The question appeared to puzzle them. Eventually one asked, ' Up or down ? ' Norton's reply seemed to surprise no less than delight them, so little had they realized the situation or appreciated the threat of more bad weather. It was 4.30 p.m., and we were already in cold shadow when Somervell reached the shelf, or, rather, reached within a few feet of it, for the rope on which we held him was just too short for the purpose. The quickest way, we had decided, was to make a handrail and send down the men one at a time to where Norton and I were posted ; but now the proposed handrail did not reach far enough, and the men had to move two or three steps before they could reach it.

" Watching with some anxiety Norton and I suddenly saw two of the four men sliding down the steep snowslope. By some miracle they stopped some 15 feet below. Somervell was entirely equal to the occasion. We heard him shout : ' What's Khaskura for : Stay still ? ' Norton gave the right expression, and the two, clinging in their precarious situation, with fingers dug into the snow—neither had an ice-axe—were duly instructed not to stir for their lives.

The others were passed along the rope. Somervell stuck his ice-axe into the snow and passed a rope round it, and in a few minutes we saw him apparently gather to his bosom the errant porters in a paternal manner worthy of Abraham. The two were passed along the rope.

"It had been our great good fortune to find that the frostbitten member of the party of porters had suffered not in his feet but in his hands. We had not to use our one man-carrier brought up by Norton. He could go down on his own feet. He was a very sick man nevertheless. The ice chimney was no place for one hardly able to bear holding the fixed rope, and in our race with the oncoming darkness he necessarily suffered. But it was well for him, as for us, that the race was ours.

"As I headed the party trudging a little grimly across the glacier basin in the last light of day I dimly made out a party approaching. It was Noel and Odell, with two or three porters bearing hot soup in thermos flasks. *Sic itur ad astra.* They will deserve their thrones in Heaven. But not every party descending from Chang La will find good tracks and an untroubled evening, still less will they meet hot soup. We know now what we have to do to make safe the way. We expect no mercy from Everest. Yet perhaps it will be as well he should not deign to take much notice of the little group of busy ones on the great north side, or, at all events, that he should not observe among the scattered remnants he has half put to flight the still existent will, perhaps power, to sting his very nose-tip."

NO. 8. CAMP III. EAST RONGBUK GLACIER. JUNE 8 [PUBLISHED JUNE 26]

I dictate the eighth dispatch from Camp III. I say dictate, as I am unable to write, as I am just recovering from an acute attack of snow-blindness, whereof more anon. Geoffrey Bruce, jack-of-all-trades, is my secretary. Both of us having had a go at high altitudes feel that this particular kind of work for the moment is what exactly suits us.

Above towers Everest, somewhat powdered with fresh snow, still and windless, and half shrouded in that type of damp, sticky cloud which surely this time presages the advent of the monsoon proper. Every eye in camp is turned on the final pyramid. Expectation is at its keenest, for somewhere there the final attempt, as it must inevitably be, is at this moment deciding the success or failure of the 1924 Expedition.

When last I wrote I explained that the original plan would require modification, partly owing to uncertainty, more definitely owing to the exhaustion, physical and moral, of the porters. I propose shortly to describe the psychology of these interesting men in more detail. At present it must suffice to say that Geoffrey Bruce and Shebbeare, who know them best, agreed that twelve to fifteen at the time of the return to the assault was the maximum to be depended upon to go beyond the normal 23,000 feet. It behoved us to cut our coat according to our cloth.

At a conference of climbers at Camp I. on May 27 it was decided that for the present the use of oxygen must be discarded; that a series of at least two attempts without oxygen, sleeping two nights on the mountain, above 23,000 feet, with the absolute minimum of organization should be made; afterwards as the fates might decide. Another precious day of fine weather was sacrificed on the 28th to the recuperation of the climbers; no doubt the results repaid the risk. The day, further, was utilized by those ingenious and infallible

mechanics, Odell and Irvine, in constructing a rope-ladder from Alpine rope and tent-pegs, to enable the loaded porters to negotiate safely the ice chimney leading to Camp IV., of which you have already heard. Like all the work of the well-known firm of " Odell and Irvine," this proved a most complete success.

The weather now was apparently almost perfect for our purpose. The mountain day after day was standing clear cut in azure ; day after day even the streamer cloud, the hall-mark of the master peak, was lacking from the master of all. The preliminary monsoon symptoms had entirely disappeared, yet we well knew that the monsoon might at any moment be on us in full force. The parties selected for the first two assaults were Mallory and Bruce, and Somervell and myself, with Odell and Irvine supporting on the North Col.

The party reached Camp III. on the 30th, accompanied by Noel and his kinema outfit. Hazard, destined to support from Camp III., arrived a day later. Beetham, unluckily suffering from an attack of acute sciatica, determined not to be out of the hunt, had broken off from the doctor's supervision at the Base Camp, and struggled manfully to Camp III. with his usual determination, prepared to cook, climb, or carry, indeed, to support the climbers in any way possible. It was my painful duty to return him to the Base Camp with an order to release Hingston, so that a doctor should be available to ascend to here and look after possible casualties. It must not be forgotten that the 1924 expedition is two under strength.

With the above climbing parties at Camp III. were assembled that picked gang of porters who were considered still reliable to go high. They were fifteen in number, and distinguished by the name of " Tigers." At the stage set for the final attempts on the mountain the weather continued perfect. On June 1 Mallory and Bruce, accompanied by nine of the " Tigers," camped at the North Col [Chang La] establishing *en route* a rope ladder. Odell and Irvine were to remain in support at Camp IV.

On June 2, still apparently under perfect weather conditions, the two climbers and eight porters started up the great north ridge to establish Camp V. But the weather on Everest is not always what it seems. Once past the jumble of crevasses and seracs separating Camp IV. from the true col, a bitter north-west wind, one of the most formidable foes we have to face on Everest, smote the little party on the flank. This wind must be felt to be appreciated. Every member of the party was equipped with every device of windproof clothing experience could invent. Yet such is the keenness of the wind that it appeared to have the double quality of penetrating through and yet nearly blowing the laden porters out of their steps.

Progress up the north ridge of Everest does not lend itself to description. It is a fight against wind and altitude, generally on rock, sometimes on snow, at an average angle of 45°. It will appeal to those who have ever tried mountain climbing above 23,000 feet. Camp V. was to be situated on the east or sheltered side of the ridge at about 25,300 feet. At about 25,000 feet the endurance of the porters began to flag, and of eight only four made Camp V. under their own steam. The remainder deposited their loads, unable to go on. While Mallory set to work to organize the camp, Bruce and one Lobsang, meriting the distinction of being one of the leaders of the " Tigers," made two trips back from the level of the camp and brought up the missing loads on their own backs. Whites cannot carry loads at these altitudes with impunity, and it is scarcely to be wondered at that Bruce's heart was strained, happily only temporarily, in this fine performance.

Camp V. was now established—two fragile 10-lb. tentlets perched on an

almost precipitous slope. The tents occupied by the non-oxygen party in 1922, collapsed and held in position by big stones, were clearly seen 200 feet below. According to plan, five porters now returned to Camp IV., three picked ones being retained to sleep the night and carry a tinier camp some 2000 feet higher on the morrow. Obviously everything depended upon the physical condition and *moral* of these three men. The most persuasive powers of Bruce could elicit little enthusiasm from them as to their next day's task. Apparently the wind had taken the heart out of them. With no rosy anticipations the party went to bed, with the sun still gilding the tops of the surrounding mountains, after the truly miserable but inevitable routine in high altitudes of cooking the dinner.

It was intended to make an early start next morning. This has been done, therefore is not impossible, but when Tibetan porters are concerned it certainly approaches the limits of the possible. Making a long story short, a series of visits to the men's tent while the climbers' breakfast was being prepared produced in the end nothing but the most unwelcome information that only one was fit to proceed. The other two professed to be sick and totally unable to carry a load. Bruce talks their language fluently and has great influence over them, and there is not the slightest doubt that if anybody could have stimulated them to go on it was he. It was fairly evident that the three porters had shot their bolt, and that nothing more was to be got out of them. After a brief consultation it was decided to return to Camp IV. Halfway down the party under Somervell and myself, timed to follow the footsteps of the first party one day behind, was met. The doings of the second party will be separately chronicled by Somervell.

Mallory and Bruce, on arrival at the North Col, were met by Odell and Irvine, who were fulfilling, for the first time in the history of Everest climbing, the official *rôle* of supporters. Since 1922 we have recognized the necessity of this *rôle*, picturing the comfort to a returning party of weary climbers such support might afford. The most optimistic imaginations fell short of the reality, as produced by that "well-known firm." For over a week those two have lived on the North Col (23,000 feet), and have cooked every meal—and only those who have done it can appreciate the recurring hatefulness of this operation. They have gone out day and night to escort and succour returning parties of porters and climbers over the intricate approaches to the camp, carrying lamps, drinks, and even oxygen to restore the exhausted. They have run the camp and tended the sick, and Odell, for one, has been down to Camp III. and returned to Camp IV., escorting parties or fetching provisions on three consecutive days. Whether we reach the top or not, no members of the climbing party can pull more weight in the team than these two by their unostentatious, unselfish, gruelling work.

The following is Somervell's story of our climb to 28,000 feet:

MR. SOMERVELL'S STORY

"The weather was looking more and more settled every day. On May 30, as Norton and I toiled up the glacier the third time this year to Camp III., we felt at last we were really going to be allowed a shot at the peak itself, and not merely baffled and foiled by a blizzard or hurricane at some comparatively low level. On June 1 we went up the steep ice-wall of the North Col with a few porters, and on arrival at the camp at the top of the pass heard that the other party had got off early, and were probably even then settling in at 25,000 feet.

"We slept well that night—beds of snow are much more comfortable than

those of the stores at the camp below. Early on the morrow we set out for the upper camp, six porters carrying extra food and bedding to replace what Mallory and Bruce would have taken up with them to a still higher bivouac. As we crossed over the snowy shoulder of the col to the windy western side the blast was most chilling. We drew our fur caps over our ears, tightened our belts, and went as fast as the altitude permitted, in order to keep warm. For though the sky was cloudless and the weather settled, Everest can provide on the finest day a wind chilling to the marrow. We had not been going long when Mallory and Bruce and their porters appeared above, coming down fast, an unexpected and unwelcome sight. They told us how they made a camp with two little tents, how the stoutest porter was sick, and the others unable or unwilling to go on. So there was nothing for it but to come back and hope for success of our attempt in the second of the series.

"Rather apprehensive as to the attitude of our own porters on the morrow, Norton and I plugged along up the easy scree on the shoulder leading for over 4000 feet from the North Col up towards the north-eastern summit ridge of Everest. We found Mallory and Bruce's tents pitched on the steep but sheltered south-eastern side of the shoulder. Keeping four of our porters in the camp, where they spent a very fair night in a space 6 feet by 5 feet, we then proceeded to settle down in the other tent of similar size. The floor had been well levelled by our predecessors, and, after making a good meal of pemmican and bully beef, coffee and biscuits, we spent a very fair night, during at least half of which we slept, finding no discomfort from the altitude or difficulty in breathing.

"Another glorious sunny day followed, and we were delighted to find three of the porters willing to proceed and carry loads, tent, bedding, and food to the next stage. One porter especially deserved credit, as he had cut his knee rather deeply on a stone the previous evening. The easy scree of yesterday became looser as we got higher, and energy as well as temper suffered in the weary plod from 25,000 feet to 26,700 feet, where the scree gives place to sloping slabs covered with small stones, which render footing rather precarious.

"We all found the views most attractive, not only for their magnificence, but as excuses for frequent halts. Indeed, halts were necessary as we went along, as they enabled us to keep breathing sufficiently for our bodily needs. Finally, at the height of 26,700 feet, in a rocky little basin on the ridge we had to stop and pitch our tent. The situation was far from ideal, but it seemed the best available in the vicinity, and on Everest you have got to take what you can get and be thankful. A lot of levelling had to be done, but the wind was kind, and, although by no means what we could have desired, the tent was at least habitable. The three faithful porters returned to Camp IV. quite fit, and armed with a note setting forth their prowess, and suggesting its reward with food at the lower camps, where no doubt they had the meal of their lives. In our tiny tent we cooked a good brew of coffee and a little soup, but the altitude was attacking our appetite and we could not fancy more than a morsel of solid food. Filling the thermos with coffee for the morrow, in order to avoid having to cook before an early start, we settled down for the night. Both of us were surprised that we got some sleep, at any rate, though not very much, but when morning arrived we were well rested and untroubled by breathing and other effects of great altitude.

"We got up full of hope as the dawn was breaking, but there was an early disappointment. Alas! the thermos had shed its cork during the night, and we had to waste nearly an hour melting snow in order to make more liquid. For both of us remembered how, in 1922, at a somewhat similar altitude, thirst,

above everything, destroyed stamina and going-power, and we were determined to start our final climb with plenty of fluid inside us. At last we got going about 6.45 a.m., and trudged slowly up a broad rocky shoulder slanting across towards our right in the direction of the summit, for there the going seemed easiest; moreover, in that direction was a patch of sunlight. Our side of the ridge was in shadow and very cold, and we thought climbing in the sunshine correspondingly attractive. At length, panting, puffing, and sometimes slipping back on the scree and compelled to stop for a minute to regain our breath, we attained the sunlight, and soon began to get warm. We crossed the snowy patch, with Norton gallantly chipping steps in front, and reached the broad yellow bank of rock which is such a conspicuous feature in distant views of the mountain. This rock has weathered into horizontal ledges some 10 or more feet wide, and provides a safe and easy route towards the summit ridge; so up these ledges we went, pulling ourselves, with heavy breathing, from one to another, and walking along them occasionally for respite, but always keeping upwards and to the right, hoping by these means to avoid some of the loose-looking rock on the north-eastern ridge above.

"But the altitude was beginning to tell severely on us. About 27,500 feet there was almost sudden change. A little lower down we could walk comfortably, taking three or four breaths for each step, but now seven, eight, or ten complete respirations were necessary for every single step forward. Even at this slow rate of progress we had to indulge in a rest for a minute or two every 20 or 30 yards. In fact, we were getting to the limit of endurance. At a level of somewhere about 28,000 feet, I told Norton I could only hinder him and his chances of reaching the summit if I tried to go any further, as an intensely sore throat added greatly to the misery of the fight. I suggested that he should climb the mountain, if he could, by himself, and settled down on a sunny ledge to watch him do it. But Norton himself was not far from the end of his tether. From my seat I watched him slowly rise, but how slowly, and after an hour I doubt whether he had risen 8 feet above my level. He realized that a successful issue to the fight was impossible, and after a little returned. We agreed reluctantly that the game was up. On the way to the summit was a patch of loose rock where it was desirable that two fit men should be roped together, but two men more or less "done to the world" were unable to hope to reach the top within a good many hours, and it was now 2.30 in the afternoon.

"So with heavy hearts, beating over 180 to the minute, we returned and retraced our steps; but slowly, for even downhill movement at this level is rather hard and breathless work, and both of us required frequent rests for regaining our breath and resummoning our energy. The view from the topmost point that we reached, and indeed all the way up, was quite beyond words for its extent and magnificence. Gyachang Kang and Chouyo, among the highest mountains of the world, were over 1000 feet beneath. Around them we saw a perfect sea of fine peaks, all giants among mountains, all as dwarfs below us. The splendid dome of Pumori, the finest of Everest's satellites, was but an incident in the vast array of peak upon peak. Over the plain of Tibet a distant range gleamed, 200 miles away. The view, indeed, was indescribable, and one simply seemed to be above everything in the world and to have a glimpse almost of a god's view of things.

"But we were far from being gods ourselves, tired and breathless as we were, the very epitome of human limitations. We revisited our high camp, and there packed our rucksacks and set off again downhill. We found the scree-covered slabs slow and annoying, and when we finally reached the snowy

shoulder at 25,000 feet, where going becomes easier, the sun had set, and we still had 2000 feet to negotiate in darkness. How well we remembered the same place in 1922, when we two, with Mallory, were exerting every effort to get down the invalid Morshead to the North Col alive, but this time I was the invalid, and my congested throat only allowed me to breathe at a certain and all too moderate a rate! I fear that my extremely slow progress must have annoyed Norton fearfully, though of course he said nothing about it. Flashes from our electric torch aroused the North Col to activity, and Mallory and Odell came up to meet us with lanterns while Irvine brewed tea and soup in camp against our return. How we welcomed their presence as supporters in camp and contrasted our experience in 1922, when four of us returned to an empty camp and went to bed with empty stomachs! This time we reached camp at 9.30 p.m. Within an hour we were fed, warmed, and fast asleep. Norton is still recovering from severe snow blindness, unfortunately contracted on the climb. I can almost speak aloud again. We are both rather done in, too, in general condition, but are satisfied that we had the weather and a good opportunity for the fight with our adversary. There is nothing to complain of. We established camps, the porters played up well, we obtained sleep even at the highest, nearly 27,000 feet, we had a gorgeous day for the climb, almost windless and brilliantly fine, yet were unable to get to the summit. So we have no excuse—we have been beaten in fair fight; beaten by the height of the mountain, and by our own shortness of breath. But the fight was worth it, worth it every time, and we shall cherish the privilege of defeat by the world's greatest mountain.

"We now await news of Mallory and Irvine, who to-day are making another attempt, hoping that they may reinforce the feeble summit air by artificially provided oxygen, and by its means be enabled to conquer the chief difficulty of reaching the summit. May the Genie of the Steel Bottle aid them! All of us are hoping that he may, for nobody deserves the summit more than Mallory, the only one of our number who has been at it for three years."

This ends Somervell's story.

The two attempts without oxygen failed to reach the summit. I hope to discuss later in your columns the vexed question whether success on these lines was possible or not. In any case, I was delighted to find on my arrival at Camp IV. on the night of June 4 that Mallory had rightly determined in my absence that there must be one more attempt, and that immediately and, if possible, with oxygen. Bruce, the condition of whose heart definitely prevented him from taking part in another attempt, had already gone down to Camp III. to see if it were possible to supply sufficient porters to put on oxygen so as to make the attempt with an absolutely minimum load. The men were forthcoming. Mallory had already decided that the climbers to make this final assault should be himself and Irvine. Unremitting and indefatigable work which had been put in by the latter on the most defective of the oxygen apparatus fully justified his inclusion in the party. On the morning of June 6 these two, with eight porters, started for Camp V., intending to sleep the following night at Camp VI. and to make the assault on the summit to-day.

Their movements are shrouded in mist and mystery, but one brief note reached us yesterday from their perch near the top of the North Ridge by the hand of a returning porter. It is to the effect that Noel, with the cinema, should be on the look-out for them about the base of the final pyramid that starts 650 feet from the top at 8 o'clock this morning. The returning porters

report that this pair were going exceedingly strongly with oxygen yesterday; from every point of view the situation is dramatic. One more small incident is worth noting.

During the night of June 4–5 on the North Col I was smitten with acute snow-blindness, and for sixty hours was completely and absolutely blind. At 10 a.m. on June 6 Hingston and two porters arrived from Camp III. to relieve and, if possible, escort me down. I was anxious to descend, as my presence at Camp IV. could only be an embarrassment to Odell and Hazard, who had now taken the place of Irvine in the *rôle* of supporters. Hingston, being unable to perform the miracle of restoring my sight at the moment, performed, with the help of Hazard and the two porters, another miracle.

The route to North Col is admittedly an Alpine climb. They shepherded me down some 1500 feet of sheer ice and snow, placing my every footstep, leading me by the hand, and supporting me with ropes, fixed and unfixed, with complete security. Hazard turned back after roping me from the top of the chimney to the bottom, and Hingston saw me the rest of the way into Camp III.

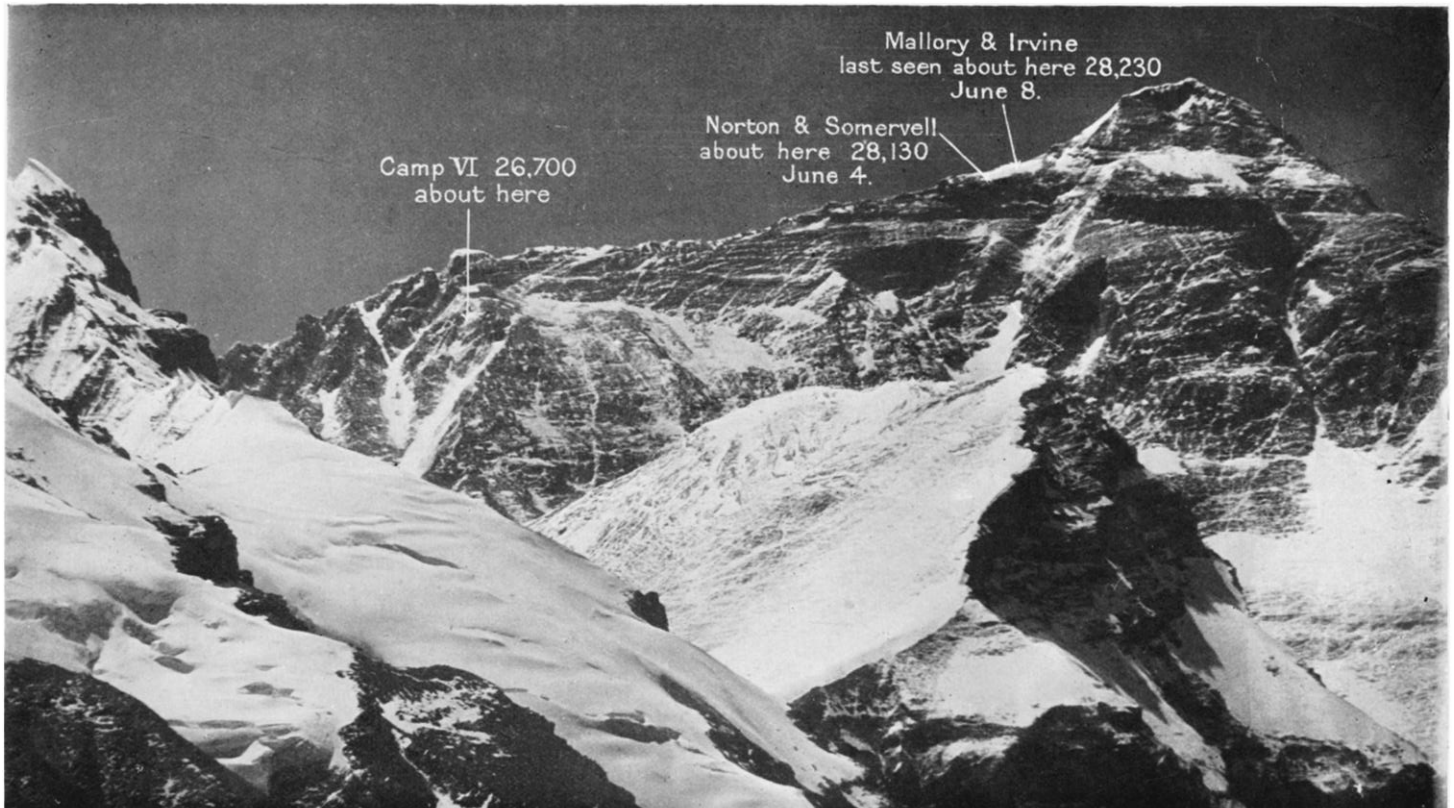
Hingston is a famous goer on a hillside and has a limited experience of snow and ice conditions in the Pamirs, but he has never done any Alpine climbing, so I think it must be admitted that his performance was remarkable, and it was certainly one that I shall not forget in a hurry.

BASE CAMP, JUNE 11

With the deepest regret I add these few lines continuing the above dispatch. Mallory and Irvine perished on the mountain beyond all doubt. They were last seen by Odell from Camp VI. going strong for the top. I have not yet seen Odell, but estimate that this was about 11 in the morning of the 8th, and that the point reached at that time by the climbers was about 28,000 feet. Nothing has been seen or heard of them since. Odell returned to Camp IV. that night, and until about noon on the 9th the absence of news occasioned only anxiety, as the climbers might well have passed the night in Camps V. or VI.

At noon on the 9th Odell and two porters started from Camp IV. and spent the night at Camp V. About 1 p.m. on the 10th Odell reached Camp VI., whence he signalled that there was no sign of the missing men. Camps V. and VI. were under continuous observation by Hazard from Camp IV. throughout. These were provided with magnesium flares for distress signals, and there is no doubt that the climbers did not return to them. This puts any possibility of their survival out of the question, for no one could spend two nights on the mountain under existing conditions except in one or other of the two high camps and live.

The only likely explanation of the tragedy is that there was a mountaineering accident, unconnected with questions of weather or the use of oxygen. This is borne out by my own observations four days previously of the nature of the ground they were crossing when last seen. I remained at Camp III., directing operations by messenger, watching for a signal through the telescope, until 5.30 in the afternoon of the 10th, by which time I saw Odell reach Camp IV. safely. My condition and that of Captain Bruce, the only climber with me, precluded our reaching Camp IV. in time to be of any help, and, beyond a letter of instructions and the use of a system of signals, I had to give the supporting party in Camp IV. a free hand. They appear to have done all that was humanly possible.



TELEPHOTOGRAPH OF THE SUMMIT OF MOUNT EVEREST TAKEN FROM THE BASE CAMP IN 1922

The points marked rest on an interpretation of Colonel Norton's dispatch No. 9. The point about 28,130 feet is believed to be that reached by Norton and Somervell together. Norton went on along some distance towards the summit, but gaining little in height: the relation of his highest point to the point at which Mallory and Irvine were last seen is not yet clear. The heights given by theodolite as 28,128 and 28,227 have been rounded off to the nearest 10 feet provisionally. They are referred to the summit as 29,002 feet.

Irvine Mallory Norton Odell Macdonald
Shebbeare Geoffrey Bruce Somervell Beetham
(Not in the group General Bruce, Hingston, Hazard, Noel.)

THE MOUNT EVEREST EXPEDITION OF 1924

I should add that I myself forbade any reconnaissance beyond Camp VI., as the weather was extremely threatening and conditions on the mountain appeared to be as bad as they could be, and I had to consider the lives of the two British and three Himalayan members of the Expedition who were still at or above Camp IV. I shall, of course, give you all details in my next dispatch.

NO. 9. RONGBUK BASE CAMP. JUNE 14
[PUBLISHED JULY 5]

The expedition leaves the Base Camp to-morrow, bound for a short period of recuperation in the Rongshar Valley, under Gaurisankar, before starting on its homeward march. The fickle weather, which has played so many dirty tricks this year, continues to be brilliantly fine, and there are indications that the monsoon has ceased for the moment. But there is no question of a resumption of hostilities on the mountain. Every one of the surviving climbers has shot his bolt. I have before me a medical report showing that each of us has a more or less dilated heart, besides various minor disabilities. The trouble will right itself at the lower altitudes to which we are bound, but would probably be permanent if further high climbing were attempted. This the medical officer [Major Hingston] definitely forbids.

There is yet another casualty to report. Man Bahadur, a Nepalese, the assistant bootmaker, who was very badly frost-bitten in the feet, as reported in my message of May 13, died of pneumonia at the base camp under Hingston on May 25. Perhaps it was merciful, as he would have lost both feet had he lived.

We leave here with heavy hearts, We failed to establish success, for who will ever know whether the lost climbers reached the summit before the accident which it may be assumed caused their death? The last point at which they were seen was determined by the theodolite as 28,227 feet—less than 800 feet from the top. Together with the height reached by Dr. Somervell and myself, which, measured by the theodolite, was 28,128 feet, these constitute a world's "record" for climbing with and without oxygen respectively.

But the price is out of all proportion to the results. Much will be written by those at home of both Mallory and Irvine in regard to the various departments in which they distinguished themselves. I shall only say a few words on how we knew them here. Mallory was for three years the living soul of the offensive on Everest. I believe the thing was a personal matter with him, and was ultimately somewhat different from what it was to the rest of us. The story of his determined, and ultimately successful, reconnaissance in 1921 is now well known. In 1922 he formed one of the party which reached 27,000 feet without oxygen and established what was then a world's height "record." This year he was earmarked for the first attempt with oxygen, but this was prevented by the weather. Then he took part in the first attempt without oxygen, but had to turn back at 25,000 feet. Only three days later he started on the last fatal attempt with oxygen, and this time who will say whether victory was at last his or not before he died?

We always regarded him as an ideal mountaineer, light, limber, and active, gifted with tremendous pace up and down hill, and possessing all the balance and technical proficiency on rock, snow, and ice which only years of experience give. But the fire within made him really great, for it caused his spirit constantly to dominate his body to such an extent that, much as I have climbed with him, I can hardly picture his ever succumbing to exhaustion. As a man

he was a very real friend to us all, a cultured, gentle spirit curiously contrasting with the restless, fiery energy he displayed in action. His loss is irreparable no less to his friends of the successive Everest expeditions than to the very much larger circle of those who loved him in England.

Irvine was described in an earlier dispatch by General Bruce as our "experiment," for he was a mountaineer of limited experience and twelve years younger than the average age of the expedition. But the experimental stage was short indeed, for it was a matter of hours rather than of days. The qualities which made him such a success when sledging in Spitsbergen brought him to the front; his first winter's ski-ing in Switzerland placed him, and the Oxford boat made all realize immediately that we had here no untried boy, but one of the most valuable members of the new expedition, and, what is more, one who could take his place modestly, but with absolute equality, with men of so much senior age. Then in no time his cheery *camaraderie*, unfailing good nature, and untiring mechanical ingenuity and resource made him not only valuable, but invaluable.

I do not know how we are going to get on without him. Physically he was the strongest of us. He did surprising feats in carrying and hauling loads; his times up some stages of the East Rongbuk Glacier were unequalled.

In my last dispatch I spoke of his work on the North Col in the *rôle* of supporter—a true test of a man's mettle, but nothing new to him, for ever since Khamba Dzong he had been working unremittingly and unostentatiously every day and all day for the good of the expedition and of its individual menbers. We mourn in him the loss of a true friend to every one of us, and a most gallant gentleman.

I have asked Odell to amplify his previous brief account of the final attempt and tell the story, as he took part in it from the position in support at Camp IV. His performance in climbing once to 25,000 feet and twice to 27,000 feet in seven days constitutes, I consider, a remarkable feat to be accomplished on Everest or on any other of the great Himalayan peaks. Perhaps more remarkable still is the fact that he suffered less than most other climbers in doing so.

It remains for me to say a few words about the evacuation of the glacier camps. Throughout you have heard little of Shebbeare, yet he played a most important part in them. After the first evacuation of Camp III. on May 11 it was decided that Shebbeare's knowledge of the language and of the psychology of the porters called for his presence on the lines of communication rather than at the Base Camp. Accordingly, he was established as king of Camp II. From that moment we at the higher camps never had to look over our shoulders or give a moment's anxious thought to our line of supply. Food for the sahibs and porters, fuel and stores of all sorts, arrived smoothly as required, and, more important still, we knew that the comfort and health of the porters on the lines of communication were well cared for.

When the time came on June 11 to evacuate all the camps from Camp III. downwards—the higher camps we decided to abandon all standing—Shebbeare took the matter in hand, and in three days, by good organization and the use of every porter who could carry a load, he had cleared to the Base Camp every single article the value of which justified transport home across Tibet. So smoothly was the operation performed under his skilful leadership that there is nothing to write of it.

Our one free day here before we finally leave this old Base Camp of conflicting memories, so bleak and inhospitable after the sunny plains of Tibet, so homelike and cosy after the far bleaker glacier camps, is fully occupied.

Every man that can be spared is at work arranging the loads for to-morrow's march, or employed on erecting a monument on one of the great conical moraine heaps which overlook the Base Camp to commemorate the names of those who lost their lives in the three Mount Everest expeditions.

Odell's story of the final attempt on Everest—and victory ?—is as follows :

MR. ODELL'S STORY

" Colonel Norton has requested me to relate the events connected with the last great climb of Mallory and Irvine, a climb a good many aspects of which I had the advantage of witnessing during a protracted period of eleven days, while acting in support at the North Col (23,000 feet). The duty of being in support, from meaning readiness to support at need any exhausted member of the party on the mountain, largely transformed itself into cooking and preparing meals for whatever climbers made the North Col Camp a place of call. This function kept us fully occupied, particularly as all the water had to be obtained by melting snow, snow that at this altitude was of an exceedingly dry and powdered variety.

" On June 6, following an early breakfast of fried sardines, joyfully acclaimed and moderately partaken of, Mallory and Irvine left the North Col Camp for Camp V. (25,000 feet), accompanied by five porters, with provisions and reserve oxygen cylinders. Yesterday, using oxygen, they had already ascended from Camp III., 2,000 feet below, in two and a half hours. They were highly pleased with their performance, which seemed to augur well for the final attempt on the mountain. The next day they ascended to Camp VI. (27,000 feet), which had been established by Norton and Somervell in a ' record ' climb three days previously. The same day I ascended to the supporting Camp V. Hazard at this time arrived at the North Col to replace me. Porters returning from Mallory that night were the bearers of a hopeful message in a note which said that they had only used the minimum oxygen up to 27,000 feet, and that the weather was perfect for the job. The latter I could well appreciate, for, looking out that evening from the little rock ledge on which the tent was pitched at Camp V., I saw that the weather indeed seemed most promising for the morrow.

" The situation of the camp was unique and the outlook a commanding one. Westward there was a savage, wild jumble of peaks, culminating in Cho Uyo (26,750 feet), bathed in pinks and yellows of most exquisite tints. Right opposite were the gaunt cliffs of Everest north peak, intercepting a portion of the wide northern horizon, of a brilliant opalescence which threw into prominence the outline of a mighty peak far away in Central Tibet : was it General Pereira's supposed rival to Everest ? Eastward, floating in the thin air, the snowy top of Kangchenjunga appeared, and lastly, the beautifully varied outlying Gyangkar range. Sunset and after at that altitude were a transcendent experience never to be forgotten.

" At early morning of June 8 it was clear and not unduly cold at such an altitude. The two porters I had brought with me to Camp V. complained of sickness and headache, and altogether I was not unthankful for an excuse to send them down to Camp IV. at the North Col, for I especially wished to be free during an ascent I was to make for as wide a geological survey of the mountain face between Camps V. and VI. as possible. Soon after I had started on my task banks of cloud began to form, which periodically immersed one in gloom, but the wind remained quite light for such an exposed ridge. Now and then there would be an accompaniment of sleet and light snow. I could see above me frequently during these squalls that there was a glow of light,

indicating clearness at a higher altitude, and hoped that Mallory and Irvine were above the mist.

"At 12.50, just after I had emerged in a state of jubilation at finding the first definite fossils on Everest, there was a sudden clearing of the atmosphere, and the entire summit ridge and final peak of Everest were unveiled. My eyes became fixed on one tiny black spot silhouetted on a small snowcrest beneath a rock-step in the ridge, and the black spot moved. Another black spot became apparent and moved up the snow to join the other on the crest. The first then approached the great rock-step and shortly emerged at the top; the second did likewise. Then the whole fascinating vision vanished, enveloped in cloud once more.

"There was but one explanation. It was Mallory and his companion moving, as I could see even at that great distance, with considerable alacrity, realizing doubtless that they had none too many hours of daylight to reach the summit from their present position and return to Camp VI. at nightfall. The place on the ridge mentioned is a prominent rock-step at a very short distance from the base of the final pyramid, and it was remarkable that they were so late in reaching this place. According to Mallory's schedule, they should have reached it several hours earlier if they had started from the high camp as anticipated. That they had encountered bad conditions and snow-covered rocks and other obstacles was likely. However, in my opinion, from the position in which they were last seen, they should have reached the summit at 4 p.m. at latest, unless some unforeseen and particularly difficult obstacle presented itself on the final pyramid. This seemed to be very unlikely, for we had scrutinized the last slopes with telescopes and binoculars and had seen that technically the climbing was easy. Perhaps the two most likely explanations of their failure to return were a fall or inability to reach camp before darkness set in. I rather incline to the latter view, and consider it very probable that they sheltered in some rock recess and fell asleep, and a painless death followed, due to the excessive cold at those altitudes.

"After the brief glimpse of the party above described I continued up to Camp VI., which was reached just as a rather severe blizzard started. The camp consisted of one small mountain tent perched on a ledge, backed by a step of rocks by no means conspicuous or easy to find. I brought up with me provisions for the camp, and, after placing them in the tent and sheltering for a while, I decided to go out in the direction of the peak along the mountain-side, in case bad weather should compel the party to turn back. I whistled and yodelled through the driving sleet to give the returning party the right direction, but soon realized that in point of time it was a worthless task, for they would still be beyond hearing even if they were returning. Perhaps they were right above the blizzard in sunshine. Within two hours the storm had blown over and the whole north face was bathed in sunshine. I searched the upper crag for another glimpse of the party, but nothing could be seen.

"In accordance with earlier arrangements suggested by Mallory himself, I returned to the North Col, and with Hazard kept watch till late for signs of the returning party. As they had not returned on the morrow, it was assumed that perhaps they were still sleeping at Camp VI., having reached it at a late hour the night before, but we were unable with field-glasses to detect any movement around the distant tent. At noon I decided to ascend to Camp V., stay the night, and proceed to Camp VI. the next day to ascertain if they had returned and whether help was needed in consequence of some mishap. I arranged a code of signals with Hazard, by means of sleeping-bags placed con-

spicuously on the snow in case assistance, medical or otherwise, should be required. Two porters again came with me to Camp V., but again they had to return to Camp IV. because of indisposition.

" After a very cold night I pushed on to Camp VI., this time carrying with me an oxygen apparatus, and also provisions for the missing party. I reached the tent of Camp VI. in the afternoon, only to find everything as I had left it two days previously, and as Mallory and Irvine had left it on the morning of their climb. Leaving the tent, I climbed some distance, and worked out along the face in the direction of their route, searching for some clue. But what hope was there on such a vast mountain-face ? Weeks of diligent search by a party fully equipped for such difficult and particularly trying work at that altitude might not produce any result or unravel the mystery.

" At length, as the day was drawing to a close, I reluctantly gave up the search and signalled down to Hazard at the North Col, over 2000 feet below, that no trace could be found. Closing up the tent, and leaving it with the last relics of our lost companions, I made my way down the north ridge, having now and then to take shelter behind rocks from the violent and bitterly cold west wind and to restore warmth and prevent frostbite, and at dusk reached the North Col Camp, with its profound comforts and hot soup. The next day we evacuated the camp and the others in succession down to the East Rongbuk Glacier.

" Has Everest been climbed ? Colonel Norton has referred to this question. It will ever be a mystery. Considering all the circumstances and the position they had reached on the mountain, I personally am of opinion that Mallory and Irvine must have reached the summit. At least they have established a mountain altitude ' record.' "

THE SURVEYS OF SIR AUREL STEIN : REVIEW

Memoir on Maps of Chinese Turkistan and Kansu, from the surveys made during Sir Aurel Stein's explorations, 1900–1, 1906–8, 1913–15.— **Aurel Stein, K.C.I.E.** With appendices by **Major K. Mason, M.C.,** and **J. de Graaff Hunter, Sc.D.** (Records of the Survey of India, vol. **17.**) Dehra Dun : Trignometrical Survey Office. 1923. $13\frac{1}{2} \times 8\frac{1}{2}$, pp. xvi. + 208. *Illustrations, and volume of maps and charts.*

THE Survey of India has recently completed the publication of Sir Aurel Stein's maps, compiled from the surveys of his three journeys in Central Asia, in 1900–1, 1906–8, and 1913–15. They are issued in a portfolio, which contains altogether :

(*a*) An index chart of the area surveyed.

(*b*) 47 maps on a scale of 1 : 500,000, each covering two degrees of latitude and longitude.

(*c*) 11 charts, showing on the same scale the various systems of triangulation upon which the topography is based. And (*d*) a sectional drawing of ground levelled from the lake-bed north of Kum-Kuduk to that east of Besh-toghrak.

Accompanying these sixty maps and charts, and as one of its series of Record Volumes, the Survey of India has published a memoir by the same traveller. In this account Sir Aurel states briefly the geographical work of each expedition, explaining the methods he and his surveyors employed, and some of the difficulties encountered. A second chapter divides the whole

area into sections, and describes the physical features of each. Chapter iii. contains some general observations on the map compilation and on the symbols used; and the last chapter gives detailed notes on each of the forty-seven maps, with lists of the observed latitudes of each.

Two appendices, by members of the Survey of India, follow. The first investigates the accuracy of the triangulation, and has a comprehensive list of all the triangulated stations and points in each sheet. The second discusses the auxiliary height observations. Forty-three pages are then taken up with a systematic index of local names; there is a general index; and lastly some thirty plates, giving nearly eighty illustrations of typical landscapes, reproduced at the Calcutta offices of the Survey of India, add to the interest of the volume.*

The memoir thus presents a summary of Sir Aurel's geographical results, shorn of all the archæological detail that attracted him and brought him back again and again to the scene of his triumphs. A student who wishes to discover at once the particular journey during which any area was visited, will find the index chart invaluable. The geographer or traveller will find a mass of detail on the maps, for by the judicious selection of a variety of symbols, Sir Aurel has managed to depict, not only the topographical features, but also the nature of the surface crust, and of the various types of vegetation, living and dead.

A glance at the index map shows the vast extent of ground covered by these journeys. From the Pamirs on the west to the northern headwaters of the Huang-ho of China is nearly 28° of longitude, or roughly 1500 miles as the crow flies. But a better idea of the magnitude of the surveys may be formed by noting that during the actual progress of the second expedition, there were no less than 488 shifts of camp with a marching distance of 8300 miles; while on the third, Sir Aurel himself, in spite of the loss of toes he sustained in 1908, and his riding accident in 1913, covered 7000 miles, and his surveyor, Lal Singh, probably more.

This short notice therefore cannot pretend to do justice to the work in the field. The traveller has himself described each expedition to members of the Society, and it will be sufficient to give a brief *résumé* of this published summary. In chapter i. the author describes in some detail the geographical work of each member. In his first expedition he was puzzled by the discrepancies of Johnson's map south of Khotan. He states how in his second journey he at last succeeded in unravelling the mystery, and corrected the topography of the Yurung-kash valley, which he traced to its ice-bound source.

The last two journeys were the most fruitful of Sir Aurel's expeditions. Here we see how each call was answered, how each section was made to fit the best—often the only—season when work was possible. The reader may wonder at first why the traveller returned so often to the same area. The reason was not always purely archæological. Frequently it was to extend some previous survey, which had been abandoned through lack of time or the necessities of life. But when the expedition returned, in almost every case a new route line was surveyed, so that the fitting of the various sections has gradually produced large areas of completed map.

Little by little the uncharted recesses were traversed. The sandy wastes of the Takla-makan were crossed and recrossed. The Lop Sea bed and

* The 'Memoir' is also published without a complete folio of maps. In this case the Index Map, triangulation charts, sectional level drawing, and a specimen map are included in a pocket at the end.

Turfan depression were surveyed and levelled. The Emperor Wu-ti's ancient wall, with its watch-towers and fortified posts of the second century B.C., was traced for seven degrees of longitude. The Hindu-tash pass was crossed, and the Pusha and other hidden valleys of the K'un-lun revealed. The four parallel ranges of the Central Nan-shan, previously visited by Potanin, Obruchev, and Kozlov, were explored in detail. The headwaters of the Huang-ho were reached, and the Etsin-gol and Su-lo-ho traversed and mapped. In the north, the southern ranges of the T'ien-shan, the arid Kuruk-tagh and even the moist upland grazing-grounds of Dzungaria were surveyed, while on his last journey Sir Aurel broke entirely new ground by visiting the frontier Dard republics of Tangir and Darel, the full story of which has not yet been published.

In his second chapter, the author reduces this chaos to order. He separates the desert from the mountain, the arid from the moist, the heat from the cold, the living from the dead, the past from the present. He explains the principal features of the Tarim basin, comprising the Takla-makan wilderness of sand, the prehistoric dried-up Lop Sea bed, the dead settlements and terminal oases by the dying rivers. He passes to the gravel glacis, to the arid spurs, and to the snow-bound summits of the basin's rim. He describes each part in brief detail, and though the memoir is not intended to be a systematic treatment of geography, he has given an extremely clear description of each main feature.

Chapters iii. and iv. require little comment. The writer of this note was responsible for Appendix A. In the same way and with the same gentle persuasion that Sir Aurel employs with all associated with him, I was asked to investigate the triangulation. I can only say that the preparation of this appendix, dull as it must appear in print beside the traveller's own chapters, afforded to me the utmost interest. As a result and with Sir Aurel's consent, I have included in the lists all triangulated points in the area of his travels, whether fixed by his or previous expeditions. They are now given with their dates, observers, and relative order of accuracy.

There is one point in this connection, to which attention must be drawn. In certain sheets the triangulated coordinates of some points do not agree with those on the map sheets. The discrepancy is due in the first place to an error of identification during the field-work of R. S. Lal Singh, and in the second to the assumption in the Dehra Dun office that the error at the Korla end of the triangulation was due to a systematic accumulation of error, instead of one mistake. This led the office to distribute the error somewhat arbitrarily. It is one more pity that must be laid to the fault of the Great War, for had it been possible to consult Sir Aurel Stein, it is probable the significance of the mistake would have been made clear. As it happened, it was not till my re-investigation of the triangulation that an error of identification during the field-work was discovered. On pp. 35, 36 the author describes the great difficulties and hardships of Lal Singh in the Altmish-bulak area. The surveyor waited for nearly a fortnight under most disagreeable conditions of extreme cold and exposure, with an inadequate supply of water, in the hopes of getting a connection over a distance of 130 miles of haze to a single fixed peak of the K'un-lun. When at last he saw a small section of the range he had a glimpse of a peak which answered his mind's picture recorded 15 months before, when seen from an entirely different angle.

This identification was almost certainly wrong, and the link here has been rejected, but its consequences—the distribution of an assumed systematic

error—have shown themselves on some of the maps. In the lists now given and in the charts, the two sections of Lal Singh's work are published without correction. In the south the triangulation is continuous to Pk. 1/75 E, while the northern section between Korla and Astin-bulak is based solely on Clementi's value of the former place. The matter is discussed in Appendix A, while in the lists the incorrect map-values have been given in italics below the revised co-ordinates of each point.

In Appendix B, Dr. de Graaff Hunter compares the height results obtained by mercury and aneroid barometers and hypsometers. The first were good, the second surprisingly so, while the hypsometric heights proved valueless. Dr. Hunter discusses the reason for this failure and describes shortly the process of reduction.

Sir Aurel Stein's systematic record of local names should prove of great value. Whatever system of transliteration is eventually used internationally for this area, a complete list of all names on one system is an immense step forward. The maps of Central Asia, particularly those published by Russia, at present appear to follow no method in this respect, and though perhaps the use of many accents is disliked by some, they undoubtedly assist in the correct pronunciation of names.

The interest of the volume, especially that of the first two chapters, is much enhanced by the careful selection and excellent reproduction of the author's own photographs. These are collected together at the end of the volume and give a vivid idea of the various types of country surveyed.

Throughout his journeys, Sir Aurel Stein has been accompanied by surveyors lent by succeeding Surveyor-Generals. These have maintained throughout a very high standard of excellence in their topographical work. It is a great pleasure to read the leader's glowing tributes which he pays to all who worked with him in those inhospitable deserts and mountains. Sir Aurel brings many admirable qualities to his assistance in his capacity as a geographer. Not least of all these may be counted his fixity of purpose, his gentle persuasion and boundless tact in achieving a desired result, and his unstinted gratitude to all associated with his work, whether British, Indian, Chinese or the wild men of the Afghan borderland.

K. M.

THE MAKING OF A MOUNTAINEER: REVIEW

The Making of a Mountaineer.— **G. I. Finch.** London: Arrowsmith. 1924. 10 × 6½, pp. 340. *Illustrations and Diagrams.* 30*s. net.*

THIS substantial volume is the record of the *tours de force* of one of the most competent representatives of the advanced school of modern mountaineering; the climbers to whom the chief attraction of a climb is in its difficulties and in the test they afford of their own powers in coping with them. Captain Finch has been at pains to describe the struggle between man and mountain with an amount of personal and technical detail which will doubtless prove interesting to his fellow-experts in the craft. Two hundred and forty out of his three hundred and forty pages are devoted to the incidents involved in some of the most formidable expeditions in the Alps; such as, for instance, the ascents of the Dru and the Chamonix Aiguilles, of Mont Blanc from the South, of the eastern face of Monte Rosa, the northern face of the Dent d'Hérens and the traverse of the Matterhorn. The story of the last, excellently

told by Mrs. Finch, gives a very vivid picture of the impression made on a fresh mind by the tremendous crags and cliffs of the grim Zermatt mountain.

For some years a student in Zurich, Captain Finch soon became one of the leading spirits of the Academic Alpine Club of that city, a body who pride themselves not only on performing feats of endurance and agility, but also on dispensing with the aid of guides. We do not impute any blame to them in this respect, for a youth who, living close to the mountains, has been able to practise on them from boyhood is naturally inclined to trust to his own experiences; in fact, he is mainly differentiated from a guide by climbing for sport and not for his livelihood. But Captain Finch might have remembered in his retrospect that the case was very different with the first generation of our countrymen who set out to climb by themselves or—a far more questionable proceeding—to teach, unaided, mountain-craft to English schoolboys. On a kindred point, the absence, during the latter half of the last century, of more than a handful of first-rate professional guides, we—with some experience—agree with Captain Finch. The risks run in company with incompetent guides and the accidents due to them have been, we think, as a rule underestimated. We agree also with Captain Finch in his opinion that the greatest guides have had (in the Alps, at any rate) no equals among amateurs in the combination of daring and judgment which is as essential a quality as gymnastic force in the forming of the perfect mountaineer.

Captain Finch is an expert not only in climbing in the ordinary sense, but also in winter sports, and he here describes at length several of his adventures on ski in the heart of the Bernese Oberland. He differs from many of his contemporaries in recognizing that rock-climbing is not the only form of mountaineering, but is surpassed in the qualities called forth by the snow and ice-craft in which the great guides of the last century conspicuously excelled. We commend the following sentences to those whom they may concern. "In fine, as a training-ground for snow and ice-craft, our homeland hills are useless . . . ; there are some British rock-climbers who contend that snow and ice-craft is no more difficult than rock-climbing. In reality there is not one of the big snow and ice expeditions of the Alps that does not represent a far more serious undertaking, physically and mentally, than the Grépon, Requin, or any other of the better known 'crack' rock climbs. . . . Rock-climbing is too liable to strangle any innate aptitude for mountaineering proper, and to restrict achievement in the wider craft to a level of dull mediocrity" (pp. 265–7). What is true of the Alps is *à fortiori* true of the Caucasus or the Himalaya with their far more complicated climatic conditions.

An account, written by a brother of the author, of a winter ascent of the Tödi, the monarch of the mountain group nearest Zurich, the heroes of which were benighted on the glacier and severely frostbitten, proves that the Swiss students gained their experience, at times, at the cost of their extremities; while the attack on the steepest ridge of the neighbouring Bifertenstock may strike even climbers as touching, if not transcending, the limit of sane adventure. From the pages in which one perilous situation after another is described and then brought before one's eyes in the thrilling photographs with which the volume is liberally supplied the general reader may turn for variety to the description of an Easter holiday spent among the mountains of Corsica, the granite crags that look down on the forests of Evisa and the blue bays of the Mediterranean. In the final chapter he will find an account of the leading part taken by Captain Finch in the 1922 assault on Mount Everest. The story of that gallant adventure, the author's and Captain Bruce's climb

to 27,300 feet, is once more vividly told. We are led to realize how skilfully the crisis caused by the partial breakdown of the oxygen apparatus was met; how, weather-beaten and half-starved, the two climbers fought their way literally to the last gasp.

Two questions are raised by Captain Finch, the discussion of which must now of sad necessity be postponed. It is well known that he and Mr. Leigh Mallory took opposite views as to the expediency of using oxygen. On this point the experiences of the 1922 climbers were not conclusive. It was shown that a height of 27,000 feet can be reached without the help of oxygen, while the weight of the apparatus proved obviously a serious handicap, and its liability to get out of order a possible danger. On the other hand, the relief that oxygen gives from the exhaustion caused by altitude was forcibly demonstrated. There until the full story of this year's tragedy has been told the matter may be left. Now that 28,000 feet has been reached without oxygen the cases in which it need be resorted to are few indeed.

Again, Mr. Leigh Mallory (see 'The Reconnaissance,' p. 232) stated his conviction that the North East Ridge of Mount Everest is inaccessible, or at any rate useless as an access to the summit. Captain Finch here puts forward an opposite opinion, citing Mr. Raeburn as an authority for his view; but Mr. Raeburn's nearest approach to the mountain was apparently the 20,000-feet camp at the head of the Kharta valley, and he does not seem to have visited the Rapiu La, the nearest point to the ridge in question.

Captain Finch's pages call our attention to the growing habit among modern mountaineers of reducing the number of the climbing party to two. This has only been rendered possible by the preference for rock-climbs shown of late years. In glacier expeditions it is, of course, suicidal. So long as all goes well two practised rock-climbers need not necessarily require a third, and may even move more rapidly without one. But let any illness, or crippling accident, occur, the position of two men becomes at once critical. The sufferer must be left alone until his comrade can procure aid. There seems no ground whatever for modifying the opinion expressed over and over again by very competent critics in the Badminton volume on 'Mountaineering' that a party of less than three is exposed to additional and very serious risks. A long personal experience urges the present writer to endorse a verdict that has of late been insufficiently respected.

It is the author's fault if in laying down his volume we feel bound to class it rather with the literature of sport than with that of travel. The personal incidents of mountain climbs, repeated one after another, if more dramatic than those of rounds of golf, have except for enthusiasts a like inevitable sameness. Captain Finch has an eye for scenery, and a feeling for the heights, and he knows how to convey his impressions to his readers. He could, we are confident, give us an agreeable volume of mountain experiences, but—and this perhaps indicates the weak point of the gymnastic climber—he has, in writing the present volume, been so absorbed in the constantly recurring struggle against gravity that the effect of the natural environment has been subordinated to the figures in the foreground.

The volume lacks an index.

D. W. F.

It was they who packed the figs, wove the carpets, tanned the leather, and dug the minerals which formed the staple articles of Anatolia's export trade. Turkey has committed industrial suicide.

Whatever may be said about the Turk's treatment of his expelled Christian population, whom he regarded as enemies and traitors, nothing can excuse his neglect of the incoming Moslem *muhajirs*. He had ample time and opportunity to provide for them. Last September the British Army handed over to the Turkish Red Crescent Society at Kilia on the Gallipoli Peninsula a well-laid-out hut cantonment, with electric light and water laid on, capable of accommodating an infantry brigade. This would have formed an ideal concentration camp and clearing centre where the refugees could have been housed in cleanliness and comfort until suitable accommodation had been found for them. Far from availing himself of such an obvious and providential advantage, the Turk started to tear down the huts immediately after our evacuation, and in such a way that the timber and corrugated iron sheeting was rendered entirely unfit for reconstruction.

However, the Turk has assumed the task of running his own country in his own way, and few will dispute his right to do so. If he fails he will, in the long run, be himself the chief sufferer. And it must be granted that in many ways he is running his country better than it was ever run before, and that in spite of the enormous difficulties engendered by a succession of wars, a diminished population, and an almost chronic political and constitutional ferment. To take one example: internal order and security are now absolutely assured throughout the country, whereas six months ago it was still being ravaged by bands of deserters and brigands. Religious and racial fanaticism is dead in Turkey, and throughout our journey of 1200 miles across Anatolia we met with unfailing courtesy, candour, and kindness. During our absence of six weeks from Constantinople we never suffered a day's real discomfort, and all were full of interest and pleasure; to any one in search of a new and fascinating experience I can confidently recommend a journey in Anatolia.

THE SNOW MOUNTAINS OF YUNNAN

F. Kingdon Ward

Map follows page 272.

IT seems at first sight rather curious that the earlier travellers in western China should have had so little to say about the snow mountains of Yunnan. The reasons however are simple. Travellers as a rule have chosen the summer months for their journeys through so mountainous a country, when the snow peaks are usually veiled. Since at this season on any given route they may be visible only for a

day or two at a time, unless one is favoured by fortune, it is easy to pass close to a great range without even suspecting its existence. Thus Gill, crossing the Paima La, south of Atuntze, on 9 September 1877, makes no mention of the snowy range on his right only a few miles distant, though on a fine day the peaks and glaciers are very conspicuous. "As for the rain and fog," he writes, "except for five minutes . . . rain fell and fog enveloped us incessantly the whole day" ('The River of Golden Sand,' vol. 2).

There is another reason. Many of the trade routes in the north-west corner of the province, where the snow ranges are situated, are confined for long distances to the deep river gorges. The high ranges for the most part rise abruptly above the rivers, and only an occasional glimpse of the snow peaks is obtained from below. Unless one is spending some time in the country, therefore, the chance of seeing them is remote; at best one is likely to pass on with only a vague idea of their position, height, and extent. So Cooper, in 1868, when travelling from Atuntze to the Mekong, failed to see Kakarpo, which, during the latter half of the descent, fills the mouth of the Atuntze valley, and again becomes visible for a few minutes only further down the Mekong. Similarly, M. Bacot, who visited Gongkaling (Congkaling on his map) in 1909, departed ignorant of the fine snowy range which must almost overlook the monastery. He remarks that on the day he was there the sky was overcast and rain fell—an event so rare at that season as to cause comment. He was particularly unlucky. Not so long ago, as geological time is reckoned, it must have been quite impossible to traverse Yunnan without seeing snow peaks on every hand. One can picture the remarkable spectacle in the north-west, where glaciers crawled down every range to at least as low as 10,000 feet, and in many cases must have entered the Mekong itself. At that time too the rivers must have flowed at a higher level, and it is possible that glaciers reached the Salween, and the Yangtze also. But the ice has steadily retreated till now the snowy ranges are well defined, the snow peaks isolated.

Even so, and despite the attention paid to Yunnan by recent explorers, little is known of the snow mountains of Yunnan. The heights of the great peaks are mere matters of estimation. No one has ever climbed a snow peak in Yunnan—or in Szechwan either. Their positions on the map, when recognized at all, are often wrong, their extent vague.

The standard map of Yunnan is that by General H. R. Davies. On this map however no snow peaks are marked, though several are referred to in Davies' book, 'Yunnan; the Link between India and China.' The relationships of Yunnan and Szechwan to adjacent regions are well shown on the map of Tibet published by the Survey of India; but the 1919 edition does not credit Yunnan with a single snow peak, its compilers evidently being quite blinded by the glitter of the Himalaya. In vindication, therefore, I am tempted to write these notes—a summary

of observations made during journeys undertaken in 1911, 1913–14, and 1921–22—put together in the hope that they may be of use to future explorers and climbers, since western China will certainly attract scientific travellers in larger numbers in the future.

The snow ranges of Yunnan are a prolongation southwards of uplifts which have their origin in Tibet.* They have in the past been regarded as spurs of the Tibetan plateau; a view which, whatever meaning may be attached to the word "spur," is certainly wrong. Some of them at any rate are independent uplifts. These parallel ranges grow lower in the south, and more dissected; so that in Yunnan, the groups of snow peaks are at the ends of well-defined ranges, and are neither so lofty nor so numerous as they are in Tibet itself.

The present snow peaks can hardly be considered apart from the glaciated ranges of which they are the culminating points; and I shall have frequent occasion in the course of this survey to refer to past glaciation. I will begin with the Likiang range, because that is the first snow range likely to be encountered by travellers from the Burma side. Probably it is the most southerly group of snow peaks in Yunnan, though the Tali range, 70 miles to the south, must have been recently glaciated.

The Likiang Range.—The French traveller Gervais-Courtellemont seems to have been the first to notice the Likiang snow peaks, though several travellers must have been in a position to see them, had the conditions been favourable, long before 1898. Following the main road northwards from Tali to Weisi or Likiang, a good view of them is obtained from the head of the Kienchwan valley. An even better view is obtained from the neighbourhood of Yungpeh, in the east, when the whole extent of the southern range is revealed, from the southernmost peak which rises from the head of the Likiang valley, to the gap in the north where the Yangtze cuts its way through.

After the discovery of the great Yangtze loop round Likiang, it was assumed that the snowy range (though not then recognized as such) was responsible for this. The river, so it was asserted, had been turned aside by this obstacle, and forced to flow round its end. Unfortunately for this comfortable theory, the axis of the Likiang range lies north and south, while the Yangtze here flows north-north-east, thus cutting clean across it; the range is in fact continued beyond the Yangtze, which flows through it at the bottom of a profound gorge.

The Likiang range, on Handel-Mazzetti's map published in Vienna in 1919, for the first time receives a definite name—Yülung Shan. He gives the altitude of the main summit (marked "Satseto") as 5900 metres, subsequently reduced to 5815 metres; and in a letter he informs

* I am not here referring to their geological origin. Their underlying axes *may* run east and west; but the traveller sees them as a series of independent ranges trending north and south.

me that this height was obtained by "photogrammetric construction over Lidjiang (Likiang) 3340 metres." It is unlikely that the highest summit is under 19,000 feet, or that it attains 20,000 feet.*

The Likiang range is crossed at its southern end (at Kan-hai-tzu, "dry lake") by the main road to Chungtien, which after crossing the Yangtze follows its western foot. The main road to Yungning, on the other hand, passes through the centre of the Yangtze loop, following the eastern foot of the range and gradually diverging from it. On the first two days the glacier torrents Pai-shui Ho and He-shui Ho are crossed. From Minying, reached on the fourth day, a road crosses the mountains to Taku, on the Yangtze, whence Chungtien may be reached by a road along the eastern foot of the snows.

The big glacier which feeds the Paishui on the east flank of the range has retreated some miles, and is evidently still in retreat; and the same is true of the other glaciers. The lake at Kan-hai-tzu has virtually disappeared, and so has a lake on the east flank, immediately south of the Paishui. A lake at the head of the Likiang valley has shrunk till it is now little more than a marsh; while the valley or plain of Likiang itself is obviously the bed of a former lake. The level strata of gravel and sand on the floor, containing lacustrine shells, prove that. The Likiang range was marked correctly as a snowy range on the map of Tibet and Adjacent Regions published by the Survey of India in 1914. For some curious reason it was removed from the 1919 edition, yet it is some 40 miles in length. Unlike most of the snow peaks of Yunnan, the Likiang range is composed mainly of limestone.

Kakarpo.—Neither Cooper nor Gill mentions these peaks. M. Roux, whom Prince Henry, when at Tzeku, had sent up to Atuntze, sighted "the three snow peaks of Dokar La, with its fine glaciers, on the right bank of the Mekong, and estimated their height at about 17,875 feet" ('From Tonkin to India,' Prince Henry of Orleans). Davies and Ryder saw two of the peaks from the Dong Gorge just north of Atuntze, and calculated them at 20,000 feet by clinometer observation. Handel-Mazzetti on his map marks them "about 6000 metres." Prof. J. W. Gregory, on the other hand, who saw them only from a considerable distance, estimated the highest peak at 24,000 feet. Considering that the rainfall on Kakarpo is probably much heavier than on Paima Shan, it is quite unlikely that the highest peak exceeds 22,000 feet.

The Kakarpo range extends for about 30 miles from north to south between lats. 28° 45′ and 28° 15′, forming part of the Mekong–Salween

* Writing at a distance from libraries, the author seems to be slightly in error in regard to the earliest accounts of the Likiang snows. In describing his journey of 1895 Bonin already spoke of two peaks covered with perpetual snow and probably exceeding 5000 metres, and was aware that the Yangtze passed between them. Gervais-Courtellemont was not there till 1903, and had been preceded in the same year by Litton, who also spoke of the great snowy range.—ED. *G.J.*

divide. The range is crossed at its southern end by the Dokar La, and at its northern end by the Chu La, each pass being overshadowed by a snow peak. From above Atuntze six snow peaks are revealed, one of which—the southernmost and highest—is itself a triple peak. This type of peak, a central pyramid flanked by two smaller teeth, is common in Yunnan. The central peaks of the range are almost due west of Atuntze, and are well seen from the high peak west of that village. An even better view is obtained from Paima Shan. Again, some of the peaks are visible from the valley of the Yü Chu, and one at least from Trana, just below Menkung, in the Salween valley. Kakarpo, in fact, is a sacred mountain, and one or other of its half-dozen peaks is in view from almost any point on the circuit followed by the pilgrims.

When crossing the Dokar La I glimpsed the big glacier which discharges a torrent into the Salween at Lakorah. But there appears to be no record of the appearance of these glaciers on the western flank, or of the peaks: doubtless owing to the inaccessible nature of the Salween–Irrawaddy divide.

From the Dokar La it is a simple matter to reach the foot of the southernmost glacier and approach the highest peak. Similarly the most northern peak could be climbed from the Chu La.

M. Bacot, when crossing the Dokar La in 1910, caught sight of the glaciers of Kakarpo. He does not, however, call the mountain by that name, but speaks of a saint named Koa Kerbo, who some centuries ago lived (so it is alleged) amidst the desolate snows; hence the name of the mountain, henceforth sacred ('Dans les Marches Tibetaines,' J. Bacot). But Karpo ("dkar po," དཀར་པོ) means "white" and "Ka" ('k'a ཀ) means "snow," a description attached to many otherwise nameless snow peaks in eastern Tibet; for instance, Kangri Karpo. This therefore seems to be the more simple explanation of the name. Like the Likiang peak, Kakarpo has had its plumes cropped on the new edition of the Indian Survey map, and no longer figures as a snow peak. The range appears to be composed chiefly of granite.

Paima Shan is a snowy range, part of the Mekong–Yangtze divide between lat. 28° 10′ and lat. 28° 25′. It does not exceed 15 miles in length, with four or five snow summits. On the west flank there appear to be no glaciers. From those on the east flank rises the Kari river. They all show signs of long-continued retreat, which is still in progress. A good view of the whole range is obtained from the high plateau between the Mienchu La and the Paima La, on the route between Tungkhuling and Atuntze. The view from Kakarpo is more distant and less convincing. Indeed, from this direction they would hardly pass for snow peaks but for the fact that one of the glaciers of Tsaya, the highest peak, is just visible.

There is a difficult pass across the range immediately north of Tsaya,

THE ICEFALL OF A KAKARPO GLACIER

THE DOUBLE FOOT OF THE DAMYON GLACIER

A GLACIER ON KAKARPO

TSAYA, PAIMA SHAN:
Glacier source of stream on right: Amoeboid glacier of north face on left: Pass on extreme right

the trail crossing the foot of a glacier. On the right-hand side, *i.e.* north, is a small " dead " glacier (or corrie glacier) facing the valley of Atuntze ; there is no snow peak here, however. There are three distinct glaciers on Tsaya, and two more on Omagu, the next peak to the south. Beyond Omagu are two smaller peaks, each with one glacier. All these discharge into a deep valley which runs from north to south at the western foot of the range ; and this stream appears to be the source of the Kari river, the evidence for which is as follows : The Kari river is formed by the confluence of two streams which unite just below the village of Kari. From this point to the Kari pass, whence one of the streams is derived, is just 7 miles ; and to the head of the Paima Shan valley, due north 23 miles. From this confluence, however, to the source of the main stream, as shown on Davies' map, is only 14 miles. But this main stream, from the north, is enormously greater than the stream from the Kari pass, and it is inconceivable that, with an identical rainfall, the source of the main stream is only twice as far distant as that of the small tributary descending from the Kari Pass, unless indeed it rises amongst very lofty snow peaks. For the Kari river at this point is still a formidable stream, and it has moreover all the appearance of a glacier torrent.* I may add that Dr. Handel-Mazzetti is quite of the same opinion as to the source of this stream.

The only reasonable alternative is to suppose a group of high snow peaks immediately south and west of Tungkhuling, from which the Kari river rises ; and for this there is no evidence. The glacier stream from Paima Shan rises from the glacier on the north face of Tsaya, crossed on the way to the pass over the range. It flows at first northwards, then east round the shoulder of the pyramid, leaving a glacier lake at the angle where it turns ; though most of the water does not flow through the lake now. While flowing east it receives the drainage of the big " amœboid " glacier on the north-east face. Finally it turns south. Streams from the limestone range east of Paima Shan flow west or south-west to join the main stream. Photographs of this mountain were published in the *Geographical Journal* (48, 56, July 1916, and 56, 188, September 1920). Gill writes that the Chinese name Paima Shan, or Paina Shan, is probably an attempted translation or transliteration of an old Tibetan name—a conclusion not supported by modern Tibetan nomenclature, at any rate. He adds that the present Tibetan name is N'geu-La-ka (surely it ought to be N'geu ka La ?), or the mountain of Atuntze (' River of Golden Sand,' vol. 2, p. 239).

The entire Mekong–Yangtze divide is intensely glaciated, but these appear to be the only surviving snow peaks between Yakalo in the north and Weisiting in the south, though there are several " dead " glaciers north-east of Atuntze.

* ' From Kari we followed the stream . . . to its junction with Chin-chŭ [Kari river], a beautiful clear river 16 to 20 yards wide, coming from the west, and flowing rapidly through a pretty valley " (' The River of Golden Sand,' vol. 2, p. 253)

Paima Shan has never been recognized or marked as a snow peak on any map with which I am acquainted. The range seems to be composed entirely of porphyry.

Damyon is a hump of porphyry, composed indeed of the same rock as Tsaya, situated on the same range as Kakarpo, but separated from the northern Kakarpo peak by 40 miles of mountains amongst which no snow peaks are visible. There are, however, in this gap numerous "dead" glaciers, one of which is shown. A photograph of the peak was published in the *Geographical Journal* (62, 7, July 1923).

The Damyon group is well seen from any of the passes above Yakalo, which lead from the Mekong to the Chiang Ka river, namely, from north to south, Lhong La, Bi La, and Kia La. I crossed the Lhong La in 1911, and caught sight of Damyon, then known to me under the name Ta-miu ('Land of the Blue Poppy'). Bailey, crossing the Kia La in the same year, did not see them, as they were then buried in cloud; but when I crossed the Kia La and subsequently the Bi La in September 1922, I had a perfect view. There are only two snow peaks, connected by a saddle, the southern one being the higher. Damyon has two glaciers on its south-east face, uniting below and discharging into one valley. This stream, after receiving a contribution from the Pitu La, enters the Mekong below Legong.

The glaciers of Damyon were formerly far more extensive. The existing glacier extended many miles down the main valley, which it now scarcely reaches; and from every side valley a glacier entered the main ice stream. The Pitu La also was glaciated, and so too was the Kia La on the opposite side of the Mekong, on neither of which does so much as a "dead" glacier remain to tell the story.

The Damyon peak is most easily approached from Legong by following the torrent northwards up the valley. Mules can be taken almost to the foot of the glacier, but not beyond the head of the valley. The trail leads nowhere, save by a difficult path back to the Mekong. It was formerly a pilgrim route round Damyon—though as a matter of fact it impinged on, but did not make the circuit of, that mountain.

The Pitu La crosses the Damyon range at its southern end. Northwards there seems to be no way across until the Ghotu La is reached; the explorer A—K crossed the Ghotu La from Sambaduka, and his information is all there is from this part. The name Damyon is neither Tibetan nor Chinese. Probably it is of Moso origin. On some maps the range is marked Kha kar po; but this is incorrect. The height of Damyon is probably about the same as that of Paima Shan—in the neighbourhood of 20,000 feet.

Gangkaling.—Strictly speaking, the Gangkaling range is in Szechwan, not in Yunnan, though close to the provincial boundary. However, it is convenient to consider it here. The Gangkaling range comprises three needle peaks, each between 19,000 and 20,000 feet high.

Their position I was able to fix with fair accuracy from two peaks on the Yungning plain, observations to which had already been taken from a measured base on the plain. The peaks may also be seen from the pass at the southern end of the Yungning lake, on the road to Yungpeh, and from the cliffs above Muli. A distant view of them is also obtained from the plateau above the Litang river, to the east. The range rises west of the Sholo river, one branch of which appears to rise from the snowy peaks.

Davies glimpsed the Gangkaling peaks when marching from Kulu to Muli, but says nothing more about them. Bacot visited Gangka Ling monastery in 1909—apparently the first and last European to do so. He does not mention any snow peaks, though he must have been very close to them; but he writes: "Il pleut, malgré la saison qui devrait être sèche. La pluie en Octobre est dans ce pays aussi singulière que le serait la neige au mois de juin en France" ('Le Tibet Revolté,' by J. Bacot).

The range is called Gangkaling (སྒངས་ཀ་གླིང་, "the snowy place"), after the monastery of that name at its foot. The names of the three peaks are said to be Gangka, Nyapo, and Soni.

The 1919 edition of the Indian Survey's map of Tibet, which is as prolific in snow peaks for Szechwan as it is niggardly towards Yunnan, marks a big range some 50 miles long here, height 19,000 feet. The altitude is about right, but the range is not so extensive as shown.

Gompa La.—Of all the snow peaks in Yunnan this is the least known. It has been seen by few travellers and crossed by still fewer. No one has ever explored or climbed it. However, it is shown on Handel-Mazzetti's map of his travels in Yunnan, which is excellent as far as it goes.

The Gompa La (དགོན་པ་ལ་, "monastery mountain") is on the Salween–Irrawaddy divide just above the village of Tramutang (Chamutong) on the Salween, in about lat. 28° 2′. Its name is derived from the monastery of Tramutang. It is visible from several passes over the Mekong–Salween divide, notably the Londre La (a pass immediately south of the Dokar La), the Nyiserrigo, above Bahang, and from a low internal pass above Kieunaton. Indeed, it is visible from the Salween valley itself at Tramutang—a striking tribute to the difference between the Mekong and Salween valleys.

Gompa La appears to have escaped even the eagle eyes of the Indian surveyors, working from the Irrawaddy side, though from that direction the mountain is probably far less imposing to look at. Undoubtedly the Salween–Irrawaddy divide is invisible the greater part of the year. If a glimpse of it is obtained between January and June, it is almost impossible to discern which are snow peaks and which are not. I have, however, on three occasions seen it in October and November from

three different places, and am thus able to give a definite description of it, as seen from the east. There is, to begin with, only one snow peak, which sends down three glaciers towards the Salween. Two of these join up below, and discharge into the main valley over a cliff. The third follows an independent course, but discharges into the same valley lower down. There appears to be a fourth glacier flowing north; but it is in any case much smaller than the other three. On the south-west face is a single small hanging glacier, high up in a couloir.

Dr. Handel-Mazzetti, who crossed the Gompa La in the summer of 1916, writes to me that he saw no glacier on the Gompa La, and only a very small one on a peak he calls Schatsakon, a few miles to the south. But this statement is not borne out by his own map, which shows a large glacier on the Gompa La, and the veriest remnant of one on Schatsakon. The existence of this latter is doubtful, as the whole range was visible day after day in October, and I saw no trace of it.

The height of the Gompa La can only be assumed from the height of the pass. The peak rises in an almost sheer cliff above the pass to a height of perhaps 3000 feet, giving a total height for the mountain of about 17,000 feet. The glaciers once extended much further down the valley. The Gompa La, like Tsaya and Damyon, is built up chiefly of porphyry, which rests on limestone.

Other Snow Peaks.—There is a snow peak on the Mekong–Salween divide south of the Si La, in about lats. 27° 30′–27° 45′. Looking south from the mountain above Atuntze, it is quite a conspicuous object, owing to a big snowfield on the east flank.

I know of no other snow peaks on this range; but Dr. Handel-Mazzetti informs me there are several "dead" glaciers south of the Dokar La. The same authority denies the existence of my snow peak in lat. 27° 40′, so that I can only leave the disagreement to the next traveller to unravel.

Between the Chu La and the Pitu La I counted five "dead" glaciers, but saw no snow peaks between the northernmost Kakarpo peak and Damyon.

Going much further east, from above Muli I observed a snow peak in the east, probably within the loop of the Yalung river, just as the Likiang range is situated in the loop of the Yangtse, and Namcha Barwa in the loop of the Tsangpo.

The range of snow peaks seen from the Pitu La, on the west bank of the Yü chu, is of course in Tibet proper, and forms part of the watershed between the Salween and Yü rivers. I counted eight glaciers on the eastern face of the range, all discharging into the Yü river.

It is possible that Orpor, a twin snow peak visible from the Chu La, is on this same range, further south; but Orpor is certainly not visible from the Pitu La.

Here, however, we are overstepping the boundaries of Yunnan. I

wish merely to emphasize the fact that, up to a point, the further one travels north-westwards the more snow peaks one meets with, and the more obviously they are gathered into great ranges. This is due in part to their greater altitude, and in part to increasing precipitation. After a certain distance, however, the drier regions behind the rain screen of the Himalaya are reached, and snow peaks probably become scarcer again. The greatest concentration would seem to lie in the almost unexplored region lying in lat. 28°–30° and long. 96°–98°.

There are, however, many fine snow peaks in the almost equally unknown Tibetan Marches, and I may fitly close this brief survey with a note on what I believe to be the highest peak in these parts. This was a snow pyramid seen from Paima Shan in a north-easterly direction, some distance away, across the Yangtze, in Szechwan. Judging by its apparent height at that distance, it must have been even more lofty than Kakarpo.

NOTES ON THE VEGETATION OF BURMA

L. Dudley Stamp, B.A., D.Sc., Professor of Geography in the University of Rangoon, Burma

Map following page 272.

THE following brief notes are published to enable geographers to correct the extraordinarily erroneous ideas which are contained in "vegetation maps" of Burma published in atlases and elsewhere. Some of the latter seem to be founded on suppositions (*e.g.* that tropical forest fringes the coasts and runs up the main valleys—which it does not); others on the idea that all forests are gazetted Government reserves, and that the remainder of the country is covered with grassland or scrub. Further, the vegetation has an extremely important significance in the economic development of the one of the least developed provinces of the Indian Empire. In value timber has long held third place amongst Burma's products, yet hitherto one timber alone—teak—out of the multitude of valuable species has been seriously exploited.

These notes are based mainly on the author's own observations during the greater part of three years' travels in all parts of Burma. The details of the investigations are published or are in course of publication elsewhere.*

The Factors governing the Distribution of Vegetation.

Taking Burma as a whole, two factors are of paramount importance in determining variation in vegetation. These two factors are climate

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Map to illustrate the paper
by
F. KINGDON WARD
on

THE SNOW MOUNTAINS OF YUNNAN

Published by the Royal Geographical Society

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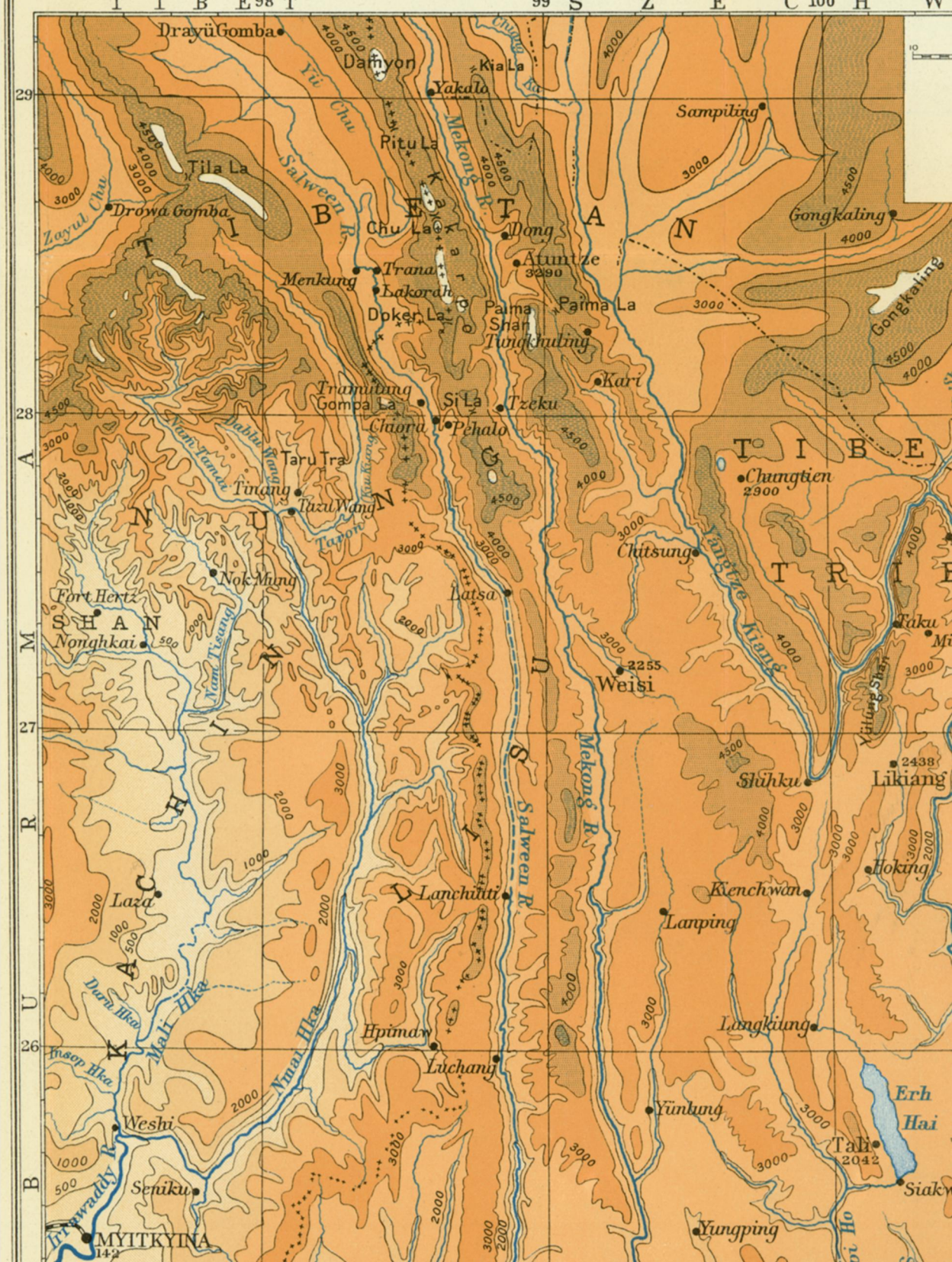

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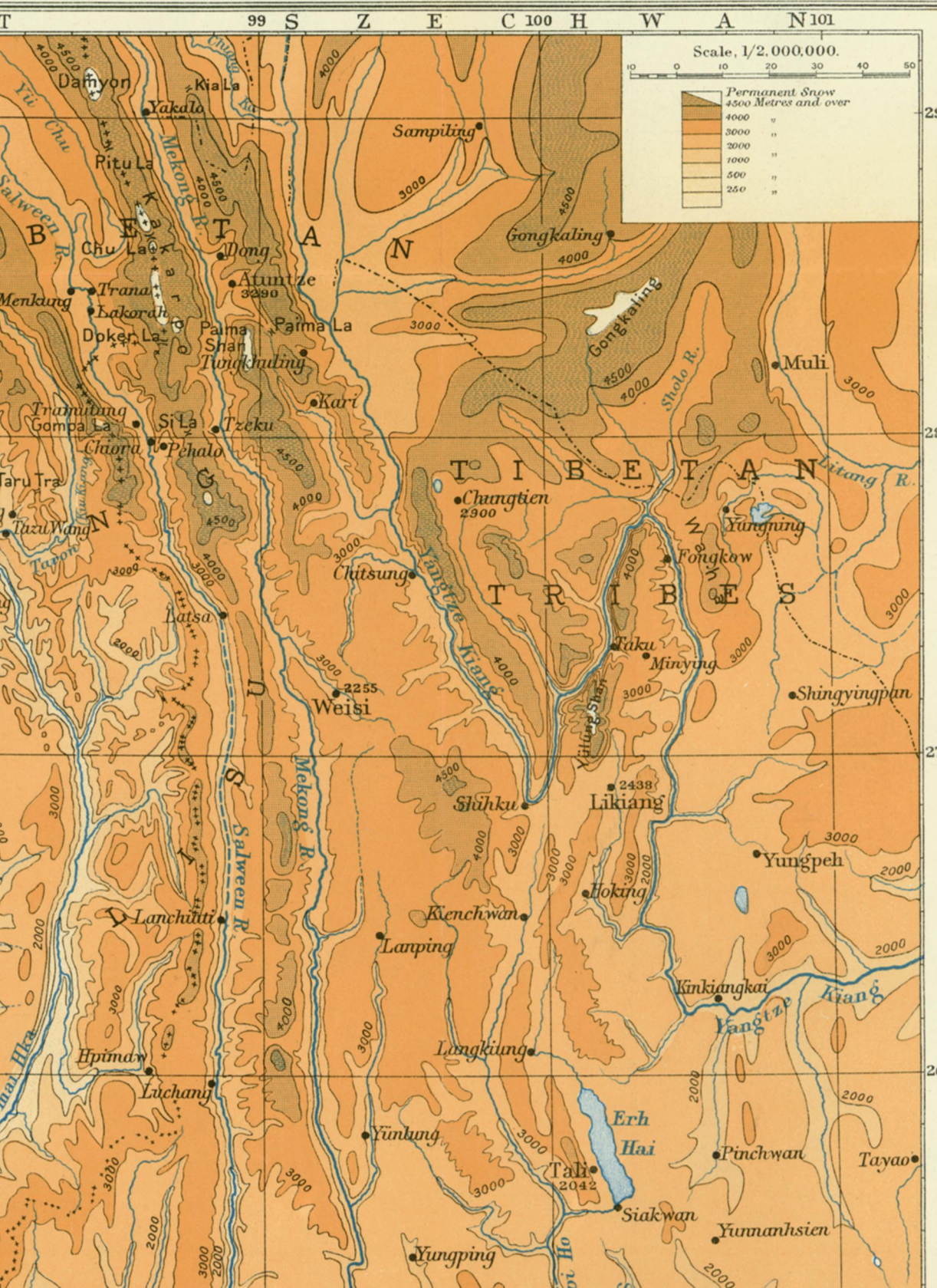

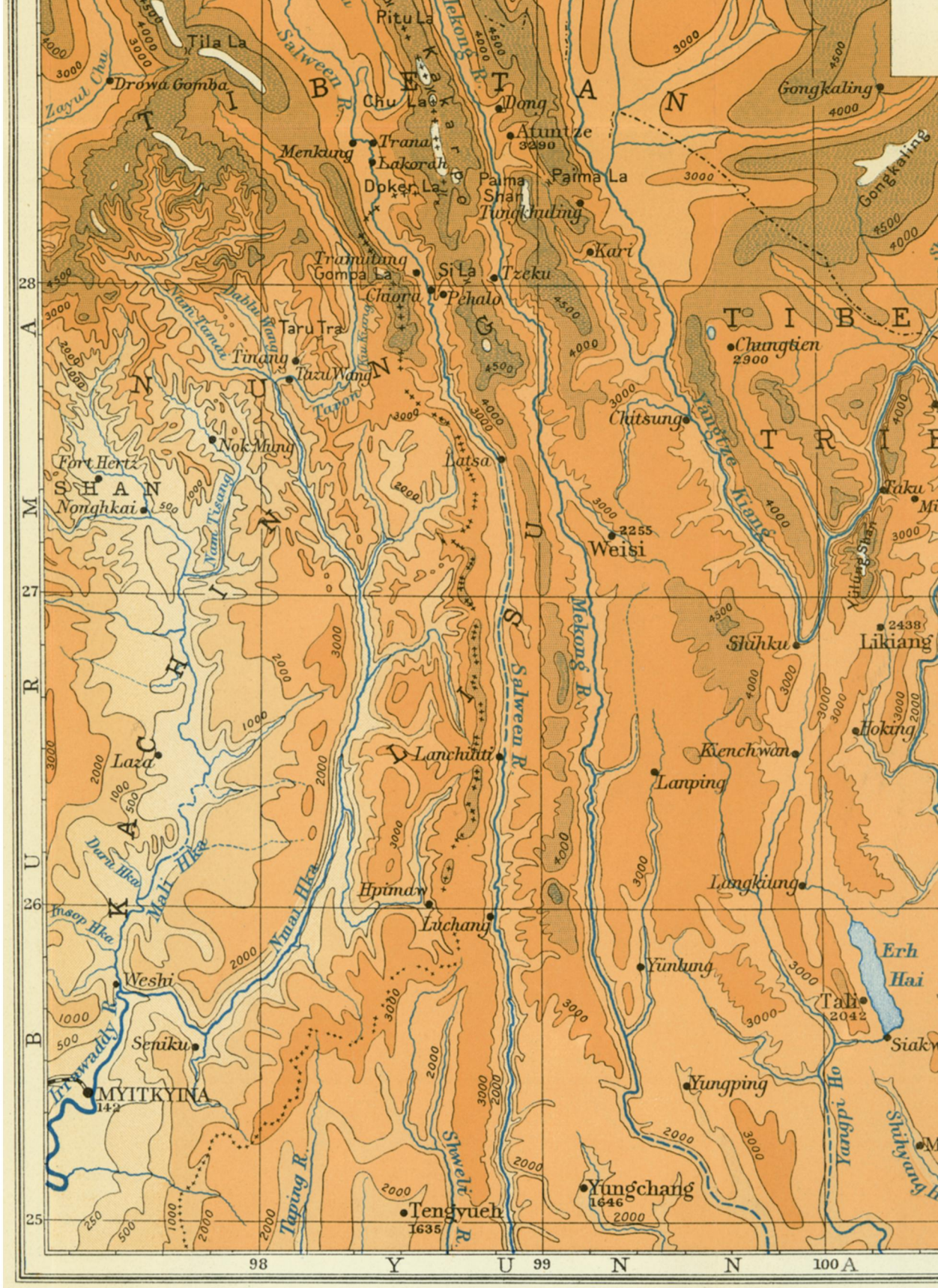
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Zayul Chu
Salween R.
Mekong R.
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Atuntze
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Palma Shan
Palma La
Tungchuling
Kari
Gongkaling
Tramutung
Gompa La
Si La
Tzeku
Chiora
Pehalo
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Nam Tamai
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(especially rainfall) and elevation. They determine regional or major changes. If one takes an area of a few dozen or few hundred square miles, however, it is often found that the relationship between the geology and soil and the superincumbent vegetation is remarkably close. As a result of edaphic control, typical Monsoon Forests may be found side by side with dry Thorn Forest or Thorn Scrub.

Elevation affords a basis for a rough classification of the vegetation of Burma into three broad divisions:—

(i) Land above 3000 feet.
(ii) Land below 3000 feet.
(iii) Tidal areas.

The 3000-feet contour line is an arbitrary limit, but convenient in practice. Actually the dividing line between the lowland and mountain forests is to be found at a steadily decreasing altitude as one goes northwards. In Tenasserim there is little change below 4000 feet, but in Central Burma, between latitude 18° and 20°, the great change takes place at about 3000 feet. It is believed that this dividing line corresponds to the "frost-line" below which frosts are unknown; and so in "frost-holes"—local depressions in plateaux such as the Shan Plateaux—it may descend considerably lower. The seedlings of broad-leaved monsoon species are particularly susceptible to frost. For example, however abundant it may be just below, teak is practically never found above this line of 3000 feet.

The vegetation of land above 3000 feet may be called mountain vegetation—it comprises especially oak-chestnut forests, pine forests, and grassland, with rhododendron forests at higher levels. Mountain grassland would seem to be the only true grassland in Burma.

Much of the land below 500 feet, or even below 1000 feet, is cultivated, but most of the remaining land below 3000 feet is to be described as forest-covered. Rainfall determines the gradation from evergreen tropical forest at one extreme to thorn scrub or semi-desert at the other. It is important to notice that all the drier types are impoverished woodland and not impoverished grassland. Practically all the forests at present exploited are below 3000 feet.

It is convenient to deal separately with the tidal and deltaic forests, since they are, in nature, well demarcated. Two groups may be separated: (*a*) the tidal forests—"mangrove swamps," and (*b*) the delta forests just above the reach of normal high tides.

Burma is essentially a monsoon country. The rainy season lasts approximately from June to September or October. Except in the south (Tenasserim), the remainder of the year is almost rainless. November, December, and January may be said to form the cool season; in February the temperature as a whole begins to increase, reaching a maximum in April or May. Although a considerable area of Burma lies to the north of the Tropic of Cancer, the whole of the province

in its vegetation belongs to the tropical zone. The so-called "warm temperate" forests of the north are due to elevation; monsoon or evergreen tropical forests stretch as far north as does the suitable low ground.

The monsoon rains provide a deep-seated water-supply suited to the growth of trees rather than grass. In the drier regions the rain falls during a few heavy downpours in the wet season, and the surface soil is rarely damp for long. The climate is, then, a woodland and not a grassland climate, though often sufficiently favourable to the growth of grass to make the latter a serious enemy of the forests.

In the course of this investigation it has been found that there are two isohyetal lines of marked importance—40 inches and 80 inches. Speaking of the area below 3000 feet, these two lines divide Burma climatologically into three parts:

(i) The Dry Belt with a rainfall of less than 40 inches, resulting from its situation on the lee of the Arakan Yomas. The lowest rainfall recorded is about 20 inches. A rainfall of less than 40 inches is insufficient for the proper growth of forests, and the cultivated crops—sessamum, millet, ground-nuts, etc.—in this region are quite different from those in other regions.

(ii) The regions with a rainfall of from 40 to 80 inches: the home of the Monsoon Forests—forests which are leafless during the hot season and of which the teak forests are typical examples. In some cases teak may flourish with a rainfall of 90 inches or more, but it is not typical, and becomes practically absent where the rainfall reaches 100 inches. Most of the Shan Plateau—a great area over 3000 feet—seems to enjoy a rainfall of 40 to 80 inches, but is of course covered with the appropriate mountain vegetation.

(iii) The regions with a rainfall of over 80 inches: the home of the evergreen tropical forests—increasing in height and luxuriance southwards as they approach the belt of rain at all seasons. These forests cover enormous areas in Burma, but as yet have been little exploited. The timber is mostly hard, and species varied, and here is a vast store of magnificent cabinet woods.

Except in regions of very high rainfall, geology is nearly always the controlling factor in local distribution, its control being shared only by that of aspect. To some extent geology and climate counteract one another, the same plant formations occurring both on physically dry sands with a low rainfall and on physiologically dry soils (especially gypsiferous clays) with a much higher rainfall. The uplands are formed of old hard rocks, the lowland regions mainly of Tertiary strata. Edaphic control over selected areas has been dealt with in detail elsewhere.

The Main Types of Vegetation.

The principal types of mountain vegetation—growing above the supposed "frost-line"—are oak-chestnut forests, pine forests, rhododendron

forests, grassland, bracken, and bamboo brake. The oak forests are very widespread, and vary from close damp forests to open forests with much grass. In the extreme north the trees are said to have boles unbranched to a height of 40 feet. There are many species of *Quercus*, together with *Castonopsis*, *Ilex*, etc. These forests are evergreen. Normally the pine forests occur at a somewhat greater elevation, and are more restricted in their distribution, flourishing on lighter soils. *Pinus Khasya* is the common species. In Tenasserim *Pinus Merkusii* occurs locally and sometimes at much lower altitudes. The rhododendron forests occur at considerably greater altitudes. Up to a certain height the trees increase in size, reaching a maximum in the north of Burma at an altitude of 7000 to 9000 feet; thence they rapidly decrease in size, the ground at 12,000 feet and upwards being clothed with a carpet of dwarf alpine species. Grassland, apparently as a climax community, covers large areas of the Shan Plateau where extensive regions of short springy turf are strongly reminiscent of English downland. The tops of ridges elsewhere are often clothed with rank grass, 2 to 4 feet high. The grassland of the Shan Plateau frequently seems to occur on fissured limestone, to which its presence may be due. The wild flowers of these areas are remarkably European in their general aspect. The bracken brake and bamboo brake which clothe many hillsides result largely, if not entirely, from the "taungya" system of cultivation, practised throughout Burma. The forest is cut down and burnt off, and the ground cultivated for one or two seasons and then allowed to return to jungle. Deserted taungyas are, however, invaded by bamboo and bracken which successfully prevent natural re-afforestation. This terribly wasteful system of cultivation cannot be too strongly condemned.

Evergreen tropical forests may be taken to embrace all evergreen forests occurring on land up to 3000 feet, but excluding the tidal and semi-tidal forests. The minimum rainfall is 80 inches. This type of forest clothes the greater part of Tenasserim, and much of Arakan, as well as occurring in the southern part of the Pegu Yomas and over considerable areas in the north. It is perhaps only in the extreme south that the forest attains one's preconceived ideas of an evergreen tropical forest. These words are being written within sight of the luxuriant untouched forests of the Mergui Archipelago—forests of tall varied trees whose dense canopy, cutting off nearly all light from the ground, is made still more intense by the wealth of woody climbers which have struggled upwards to reach the light. The number of species present is very great, and the forests are still little known. In the better-known regions *Dipterocarpus spp.* are very typical, but the distinction between these evergreen Dipterocarp forests and the dry Dipterocarp forests should be carefully noted.

Under Monsoon forests may be included the leaf-shedding forests found on the lower elevations (up to 3000 feet), with a rainfall of about

40 to 80 inches or slightly more. A number of types, determined mainly by rainfall, may be separated. They are: Pyinkado or semi-evergreen, moist teak, dry teak, Indaing and Pyinma or plains forest. All the most important, as far as the present time is concerned, of the exploited forests belong to this group. The period of leaf-fall varies with the rainfall, being earlier in the drier parts, from January (with some species much earlier) to the end of March; the new leaves appear with the rains in June.

The semi-evergreen forests are characterized by the pyinkado or Burma ironwood (*Xylia dolabriformis*), but include some of the *Dipterocarps* of the evergreen forests. Teak forests flourish best on the well-drained moderately light soil such as is furnished by the Tertiary Sandstones (*e.g.* of the Pegu Yomas). Teak rarely furnishes more than 10 per cent. of the total trees; in the damper types Pyinkado is often numerically superior, whilst in the drier types the species of the Indaing are abundant. Clumps of bamboo occur in nearly all teak forests, but different species characterize the moist and dry teak forests respectively. Pyinkado is a very heavy wood and will not float; bundles of bamboo are used as floats for the timber rafts. The Indaing is an interesting type of forest which flourishes on very light sandy soil—even pure sands—under conditions of less rainfall than the normal teak forest. The two dominant species are *Dipterocarpus tuberculatus* (in) and *Pentacme suavis* (ingyin), and the Indaing may be called the dry Dipterocarp forests. These forests are more open, and there is an abundant undergrowth of grass with scattered Cycads, but bamboo is absent. The Pyinma or *Lagerstroemia* forests occur under the rainfall conditions of the moist teak forests, but on poorly drained—especially alluvial—soils.

The vegetation of the Dry Belt ranges from open grassy forests, which may be called savannah forests, through thorn forests to thorn scrubs and semi-desert. The writer and Mr. Lord have separated a number of types which are well marked in the drier regions of Burma, and whose distribution is controlled mainly by edaphic factors. The richer woodlands in the dry belt yield posts for local building and large quantities of firewood, but very little exportable timber. The savannah forests are often very open, and their chief undergrowth is grass. Bamboo is absent except for occasional clumps of *Dendrocalamus strictus* (myin). The thorn forests are characterized by spiny species of *Acacia*, and often have many wood climbers. *Acacia catechu*, replaced sometimes by *A. leucophloca*, as a shrub, is the characteristic plant of the thorn scrub. These species of *Acacia* are also found in the extreme type of vegetation in the driest regions in association with fleshy species of *Euphorbia*.

The true tidal forests are usually called "mangrove swamps," but the species included under the name "mangrove" are numerous and varied. They agree generally in the leathery nature of the leaves; in some places

one species is dominant, in other places another. Common forms include *Rhizophora Heritiera*, *Ceriops*, *Bruguiera*, *Sonneratia*, and others. Mangrove swamps fringe very many of the islands of Tenasserim, the coasts of Arakan, and the Delta.

The most important of the delta forests, occurring above normal high-water mark and covering very large areas of the Irrawaddy delta and Mergui, are the Pinle-Kanazo (*Heritiera minor* and *H. littoralis*) forests. They furnish the fuel supply of Rangoon, and valuable timber is available besides.

It is convenient to use the term "seral" to embrace those plant formations which have not yet reached the normal climatic climax of the region. One of the most striking examples is the Kaing, or Elephant-grass jungle which clothes the sandbanks of the river Irrawaddy. As the sandbank becomes permanent and rarely subjected to floods trees develop, and doubtless the land would gradually pass into forest. Actually most of such land is cultivated.

Semi-natural vegetation covers unexpectedly large areas of Burma. The wasteful system of taungya cultivation has been extensively practised, not only amongst the hill forests, but amongst many of the fine monsoon and evergreen forests. It is probable that most, if not all, of the bamboo brake has been caused in this way. "Grass blanks" occur in many teak forests, and there are large stretches of savannah-like country—scattered trees and coarse grass. Everywhere clearance of the forest has given bamboo and grasses an opportunity to establish themselves. In drier regions the thorny scrub, *Zizyphus jujuba*, springs up with amazing persistence on deserted rice-lands, together with such plants as *Capparis horrida*.

On the map the distribution of the main types of vegetation has been indicated, but it has not been possible to separate the patches of semi-natural vegetation and the areas covered by the several communities.

The Timbers and Timber Trade of Burma.

Forests of valuable timber cover at least 130,000 square miles in Burma—over half the total area of country. The Government Forest Reserves cover only about 30,000 square miles of this total. Teak, and a much less extent Pyinkado, are the only timbers which have been seriously exploited, and teak is the only one known outside India. Once the many other valuable timbers of Burma become known, there can be no doubt that they will be in great demand in European markets. Exhibits of the more important timbers are to be seen at the British Empire Exhibition.

In exploitation, most of the trees are killed by girdling—cutting away the sapwood the whole way round at a short distance from the ground. The tree is allowed to die and dry for three years before felling. After felling it is dragged by elephants or buffalo to the nearest watercourse.

The logs are floated down during the rains into the main streams. The watercourses in the forests themselves are but mountain streams, and the successful removal of the timber may depend on two or three "rises." It may be two or three seasons before all the timber actually felled can be removed in this way. The timber from the Pegu Yoma forests is brought down either by the Hlaing river (to the west of the range) or Sittang river (east) to the saw mills at Rangoon. From other parts of Burma the Irrawaddy is the great highway, and the timber is built into rafts before being floated down the main river. The Salween in its lower course is also used.

It would be hard to find another part of the British Empire where the timber resources are so extensive, so varied, and so accessible, and yet so little appreciated.

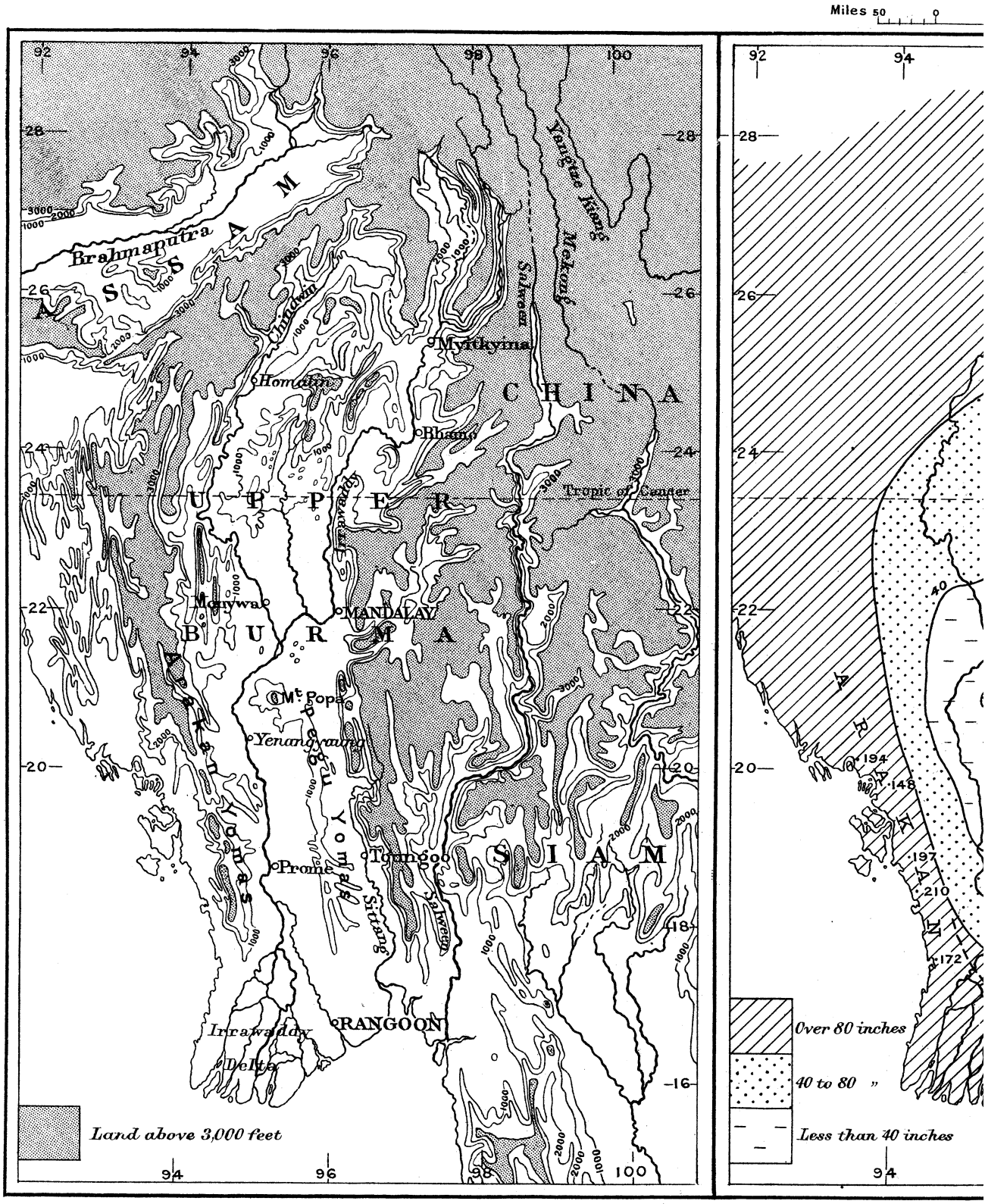
THE WILTON CODEX OF PTOLEMY MAPS

THE sale at Sotheby's on July 28 of a fine set of MS. Ptolemy maps from the second half of the fifteenth century brings into prominence once more the question of the Ptolemy MSS. and their relationships, both among themselves and with the early printed versions of the Geography. These maps, which were formerly in the library of Wilton House, Salisbury, having been purchased by the eighth Earl of Pembroke (1656–1733), had come into the market in 1914, when they were bought by a Continental collector for £1800. At the recent sale they fell to Messrs. Maggs at the greatly enhanced price of £2975, and though the name of the actual purchaser has not yet been disclosed, there is little doubt that they have once more left this country, and will be out of reach of British students without a special visit to their present home. It is to be hoped that their new owner's name will be made known in due course, so that the volume may not pass out of the ken of those seriously engaged in Ptolemaic researches.

There can be no doubt that the MS. deserves careful study from competent scholars, and we may hope that the foremost modern student of Ptolemy, Prof. Josef Fischer. S.J., may have had the opportunity of inspecting it during its stay abroad. Even such cursory examination as was possible at the sale room, on the two recent occasions on which it changed hands, sufficed to show its interest, and the short account printed in the sale catalogue suggests various points for further study. The writer of the note draws somewhat positive conclusions as to the history of the MS., and as he is evidently well versed in the history of Ptolemy documents, they no doubt merit careful consideration even if we think them in some ways open to question, as will be shown presently.

The maps contained in the document are the traditional twenty-seven found in one of the two main types of Ptolemy MSS., and (with one exception) are drawn by hand on vellum and finely coloured—water in deep violet, mountains in yellow, names in purple, the whole liberally embellished with gold, etc. They are painted on the inner sides of twenty-seven vellum leaves, and the twenty-six MS. maps have a descriptive text on the outside, with fine ornamental borders. The first map, which, like the first leaf of the second,

SKETCH
to illustrate the pa

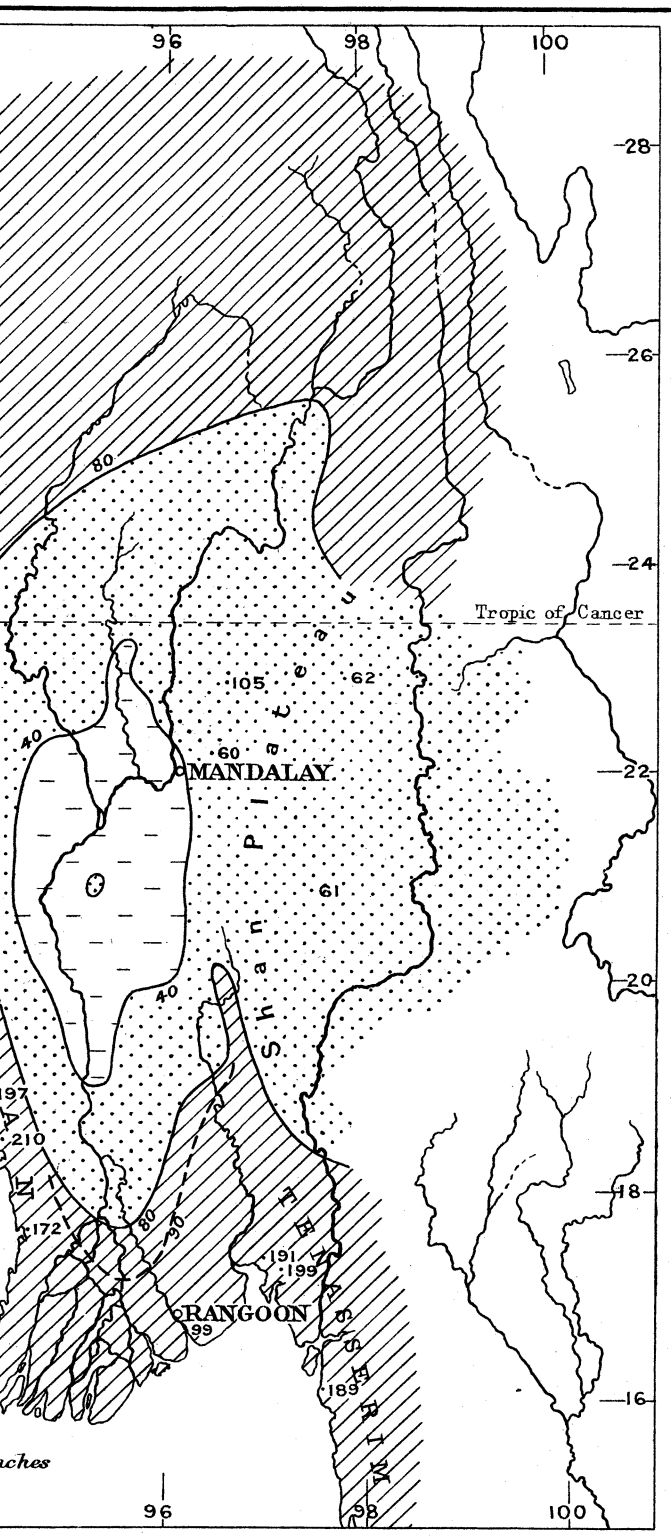


I – Relief

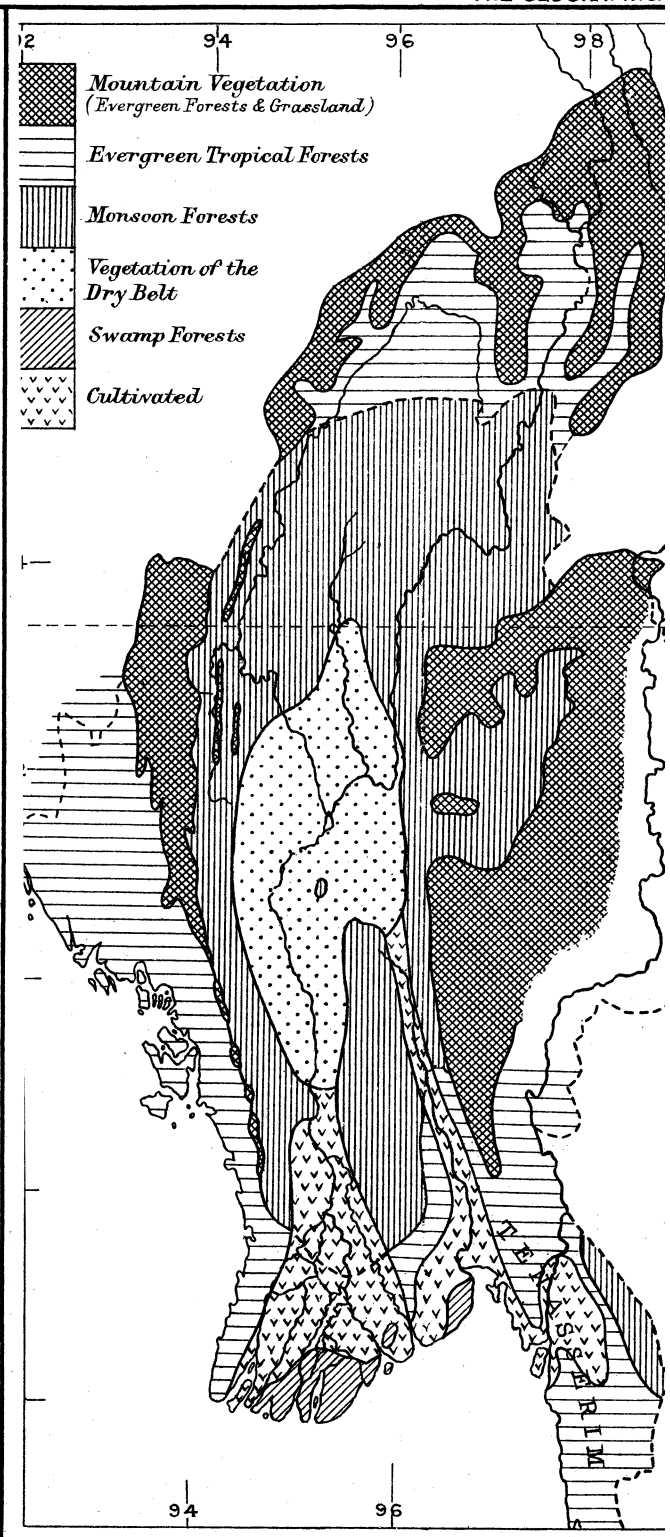
Published by

TCH MAPS OF BURMA

he paper by L. DUDLEY STAMP, B.A., D.Sc.,

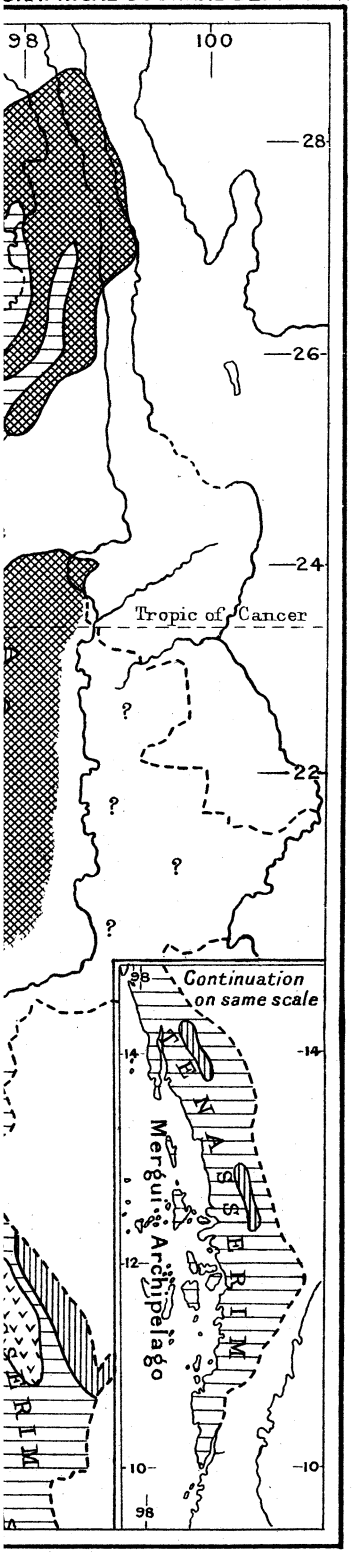


II – Rainfall



III – Vegetation

ished by the Royal Geographical Society



BURMA
Dudley Stamp.

the history of Siberia's discovery and settlement, and an appendix on time, calendar, money, weights and measures, have been copied verbatim (errors included), *without a word of acknowledgment*, from this book. Thus the author falsely gives himself credit for the only scholarly chapter in an unsatisfactory book. R. N. R. B.

Tales from Turkistan.— Stor Løb. Edinburgh and London: William Blackwood & Sons. 1924. 7½ × 5, pp. x. + 307. *Two Illustrations.* 6*s. net.*

The author writes under a *nom de plume*, but it is not difficult to recognize in him Major L. V. S. Blacker, whose paper read before the Society in 1921 (*Journal*, Vol. 58, pp. 178 *et seq.*) covered in part the same ground. Few officers can have served in so many war areas so widely separated from one another as Major Blacker and his gallant contingent of the "Guides," and after a perusal of this work the armchair critic, who cursed the "side-show," would perhaps be ready to allow that the tiny force employed was able to carry out important military work that was out of all proportion to its size and cost.

To take the thrilling pursuit of the fifteen Afghans across unmapped mountains, where the cold was great and where rations were very short, until they were finally run to ground and seized in a caravanserai at Yarkand, not only are the finest qualities of British leadership displayed, but important results were secured with a tiny expenditure of force. Again, on the north-east frontier of Persia, what splendid work was done by the same gallant band, and how much loss of life and property was escaped by the Persians through the British operations! Moreover, every opportunity was taken to add to the geographical knowledge of the countries that were visited. Major Blacker has studied Persian history, but in his account of a visit to the forbidden fortress of Kalat-i-Nadiri, he makes a slip in stating that Nadir Shah, whose fastness and treasure-house it was, came of a Kurdish line. Actually he was of Afshar, and therefore of Turkish, descent, and so cannot be claimed as belonging to the Aryans, about whom the author waxes eloquent throughout his book. This does not a whit detract from a most graphic account of a natural fortress, which is probably unmatched in the world, and which struck the reviewer with awe when he visited it. Altogether we have a collection of thrilling stories of peril and adventure by land and sea, and it is to be hoped that they will be advertised as especially suitable for boys and girls, for such deeds must never be forgotten, as they enrich the annals of our race and also the records of our Nordic brethren in the Panjab.

One has often wondered how our descendants will compare the great deeds of the World War with those done by the heroes of the Elizabethan era. The leaders in those days were as brave as lions, permeated with pride of race, and did great things, but the men they led were, in some cases, cowardly, owing to the superstitions of the period and also lack of spirit. Will not the verdict be that the British officer of the World War was enabled to do deeds that can never be surpassed, partly owing to his own spirit, but also owing to the splendid quality of the men he led? In any case a great tribute for valour is surely due to those unconquerable Indian troops who fought with success in every war area, and who covered themselves and the "Guides" with undying fame in the expeditions here narrated. P. M. S.

AFRICA

Reise durch Kusch und Habesch.— Eduard, Freiherr von Callot. Bearbeitet von F. Bieber. (Sonderabdruck aus L. Frobenius "Afrikanisches

At last the real start has been made. Before me all is unknown, full of the mystery and the fascination that lie in those parts of the Earth's surface yet untraversed by men from the outside world.

(*To be continued.*)

THROUGH BHUTAN AND SOUTHERN TIBET

Major F. M. Bailey, I.A., Political Official in Sikkim

Map follows page 352.

THE presentation of the insignia of the G.C.I.E. to His Highness the Maharaja of Bhutan gave an opportunity for the journey described herein, through portions of Bhutan and Tibet hitherto quite unexplored, or only visited by the secret explorers of the Survey of India in the 'eighties of last century. We had the great advantage, denied to our predecessors, of being accompanied by a survey party under Captain Meade, who worked with the co-operation of the inhabitants, and were able thus to use plane-tables, theodolites, and other instruments openly. All Tibetan and Bhutanese names for the map were transliterated by the recognized system from names written on the spot, so, though the English spelling of some names has been changed, it is hoped that further changes will not be necessary.

In October 1921 a meeting had been arranged in Paro between the Maharaja and our President, when he was Governor of Bengal, at which the insignia were to be presented ; but an outbreak of influenza in Bhutan prevented His Highness from coming to meet Lord Ronaldshay.

Parts of the route from the Chumbi Valley to Bumtang had previously been followed by several travellers from Bogle in 1774 onwards, but the only people who had actually travelled the whole distance were Mr. Claude White and his party in 1905. He described the country in a paper published in the *Geographical Journal* for January 1910.

Travelling leisurely, our journey from Chumbi, or Yatung as it is now called, to Bumtang occupied us from 20 June to 19 July 1922. Since the main range of the Himalayas forms the northern frontier of Bhutan, dividing it from Tibet, a journey from west to east through Bhutan necessitates crossing a series of subsidiary ranges which run south from the main range. In each of the main valleys between these ranges is one of the large dzongs or castles from which the country is governed. Our first pass was the Kyu La (14,150 feet) leading from the Chumbi Valley to the valley of the Ha Chu, with Ha Dzong (9100 feet). We then crossed the Chilai La (12,400 feet) leading to the Paro Chu Valley, in which is Paro Dzong (7750 feet). Our next pass was the Bela La (11,600 feet) leading to the valley of the Timbu Chu, in which is Tashichö Dzong (7800 feet). The waters of these three valleys, Ha,

Paro, and Timbu, unite in Bhutan and reach India as the Ridak. Then followed the Dokyong La (10,400 feet) leading to a valley which contains the upper waters of the Sankos, and in which are Punaka (5150 feet) and Wangdü-potrang. The pass east of this is the Pele La (10,950 feet), leading to Trongsa (7100 feet), and between this and Bumtang (9725 feet) was the Yuto La (11,210 feet). All of these valleys drain into the Manas. A glance at the above figures will show the switchback nature of the road.

We spent several pleasant days at each of the big dzongs we passed. At Ha an afternoon was spent in archery with the Bhutanese officers, whom we found to be very expert, though the bows required great strength to pull. The distance was 130 yards. A hit on the target counts two, and an arrow in the ground one arrow's length from the target one point.

Nothing could have exceeded the kindness of the Bhutanese to us on the road. The roads themselves had been repaired and beautiful camps arranged at every halt, in which in some places huts had been built for us : in others we pitched our tents, while our followers lived in sheds which had been put up for them. Our camps were surrounded with fences of silver fir and pine trees to keep out the curious public.

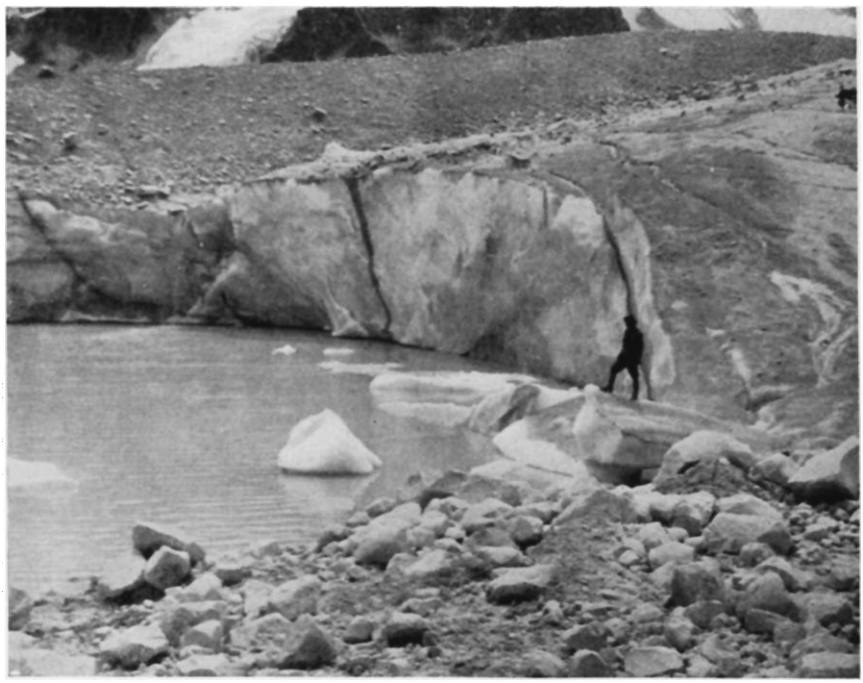
The vegetation was wonderful : in places dense forest of pines and firs, while higher up were slopes covered with the most beautiful Alpine flowers, blue and yellow poppies, primulas, ground orchids, etc. The most striking flower was a magnificent lily (*Lilium nepalense burmanicum*), which we found in great quantities during two days' march at a height of about 9900 feet. We sent men later to bring in bulbs, of which many have been planted in our garden at Gangtok, while a few are being grown at Darjeeling and Edinburgh.

At Paro we were met by a bodyguard of men in picturesque blue uniform with steel helmets and armed with thoroughly efficient Bhutanese swords. With them were two dancers, who with small drums danced before us wherever we went during our stay at Paro. Here we saw a very fine dance of lamas in the most gorgeous costumes. We also saw some beautiful religious pictures, not painted as is usually the case in Tibet, but wonderfully embroidered. Near one of our camps lived the incarnation of a former ruler of Bhutan, a very holy man ; but, as mice had damaged the image of his first incarnation, he was obliged to undertake silent meditation for three months, and we could not see him.

We reached Bumtang on July 19. Here we were met by H.H. the Maharaja, and conducted over strips of scarlet kinkob to a beautiful camp in which painted huts had been constructed, shrubs and flowers planted, and turf laid down. Our table-cloth was of white silk with gold patterns. Here we spent twelve days as guests of the Maharaja. He is a fine old man whose young days were spent in fighting his various enemies. I had met him when, as the Bhutanese representative, he accom-

PARO VALLEY, BHUTAN

BHUTANESE ESCORT AT PARO



END OF GLACIER NORTH OF KULAKANGRI GROUP

CROSSING GLACIER ON THE MONLAKARCHUNG PASS

panied Sir Francis Younghusband to Tibet in 1904, on which occasion he was very useful as a go-between with the Tibetans. He is the first hereditary Maharaja of the country. We also saw a lot of his family, and some of them had their meals with us during our stay.

There is a school at Bumtang in which English is taught, and a number of boys are being educated in India. His Highness hopes that these boys will later be trained as doctors, veterinary surgeons, foresters, teachers, engineers, etc., and inaugurate efficient branches of administration in these and other lines.

At Bumtang, and at other places at which we stopped, we played the people at cricket (with a tennis ball) and at football, which furthered friendly intercourse. These games were very popular, and recently Bhutanese hockey and football teams have come to play against Sikkim in Gangtok. The absence of caste and the freedom of women makes it as easy to form real friendships with these people as with Tibetans. His Highness' daughters were frequent visitors to our camp, and we were shown round a weaving factory in their house.

Near Bumtang is a very holy temple called Kuje, meaning, in the honorific language of the country, "body print." Here about twelve hundred years ago the Indian saint Padma Sambhava, called Lopon Rimboche in Tibet and Bhutan, spent some time when he was converting the country to Buddhism. He lived in a cave, and for long periods would come out and sit up against the rock meditating: the result was a deep imprint of his body against the rock. Against this holy rock a temple has been built, and the cave and the imprint are behind the altar. Above the temple is a large juniper tree which tradition says grew from the saint's staff which he stuck in the ground. This temple was at first chosen for the ceremony of the presentation of the G.C.I.E., but later it was thought that, owing to its age, it might not be safe for a large number of people to congregate in its upper storey, where the cave was, so a newer temple alongside was chosen.

Hither, when the lamas had chosen a lucky day, we rode out and witnessed an interesting ceremony. After the presentation of the insignia all the officials of the State came in order, touched their heads three times on the ground, and each with a great flourish presented a scarf, while a servant banged on the ground great rolls of cloth and silk, the skins of tigers, leopards, and other animals, money and other offerings to His Highness. We were struck here by the extreme youth of the highest officials of the state. After the ceremony we witnessed a dance by masked lamas and were entertained at lunch. Meanwhile the whole population of the valley were fed.

We left Bumtang on August 31, genuinely sorry to say good-bye to our new friends. The Maharaja met us in a tent about 6 miles down from the road, and we had lunch together before parting. We exchanged scarves, which we waved as we called to each other in the Bhutanese

way until out of sight and hearing. Other members of his family travelled two or three days with us.

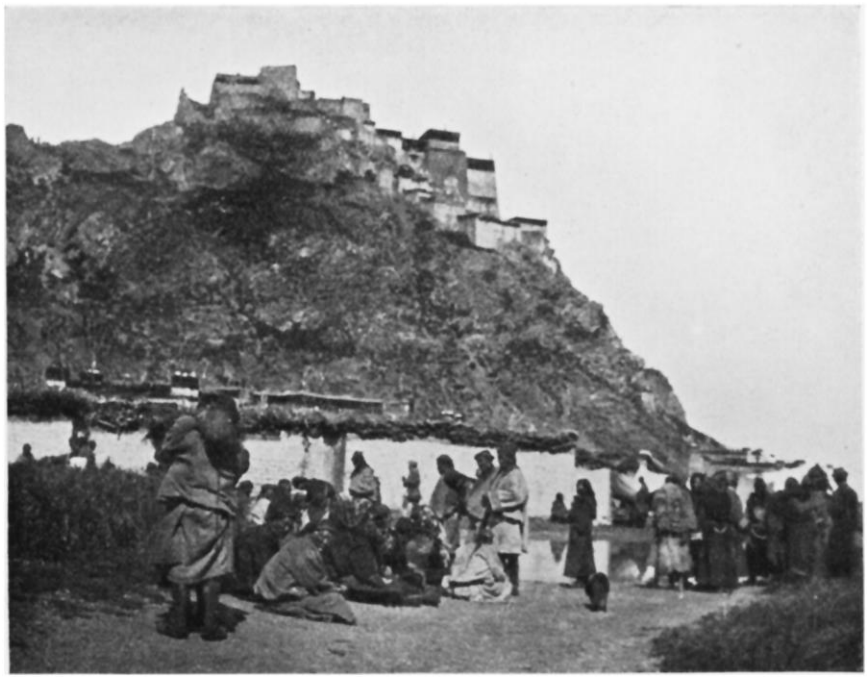
From Bumtang onwards we were on comparatively unexplored ground. One of the secret-service explorers—later a leading landlord of Sikkim, whose death occurred this year—travelled this road in the 'eighties. When he reached Tibet he was suspected and imprisoned, but escaped and travelled about 50 miles across country to get away from his pursuers. His prismatic compass traverse proved relatively remarkably accurate when compared with Captain Meade's work. Both the Tibetans and Bhutanese appear to have quite got over their objection to surveying, provided they are given copies of the maps.

We considered the Bhutanese to be very great artists, especially in metalwork. They make delightful boxes of worked silver for their pan and betel nut, which the whole population chew incessantly. We also noticed beautiful metalwork in their temples. They make very gay saddle cloths of bright colours in *appliqué* work. Their silk-weaving is also extremely effective. The cattle of Bhutan are of enormous size and have a very distinct strain of the huge wild *mithan* of the plains of India. The most remarkable animal is the Bhutanese mule. These animals are imported from China, and they evidently get the pick of the market there—huge, absolutely sure-footed animals. It is the custom for a man to lead the mule and to talk to him all the time. He says such things as " be careful," " slowly," and " look out," etc.

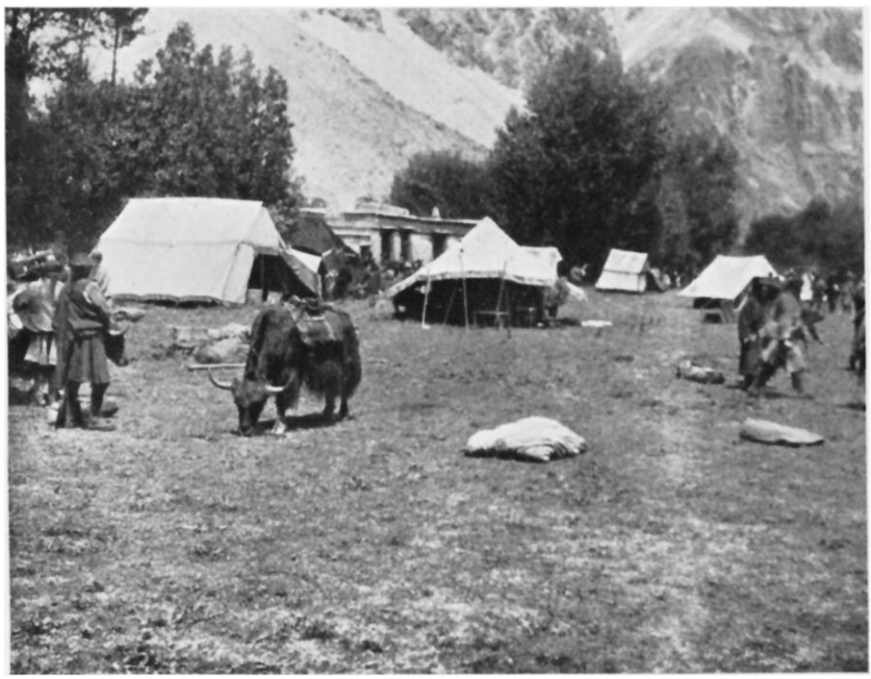
We were disappointed in the game seen in Bhutan. Our bag included bear, bharal, gooral, barking deer, pheasants of various kinds, and quail. Takin are found in one valley, and His Highness presented us with two, of which one died in England and one is at present in the Zoo. Captain Meade once saw sambhar. We also caught a young bear, which we took with us to Tibet and sent to Lhasa as a present to the Dalai Lama.

From Bumtang our road led up a very steep valley, the river being for its size of extraordinary rapidity. After three days' marching we passed the level of fuel, and two days more brought us to the foot of the Mönlakarchung pass, where we camped by a lake at a height of 15,500 feet. From here on August 7 we had a long march, riding on yaks over the pass. We had to cross a large stretch of glacier ice on each side of the pass, while on the summit (17,400 feet above sea-level) the ice was covered in snow in which were deep crevasses which had swallowed up four yaks the day before we crossed. We were lucky to have a fine day for the pass. Bad weather would have made it dangerous. On the pass we parted with Kumar Tobgye Dorji, who had made all arrangements for our journey—no small matter for such a large party—and who was always cheerful under the most worrying difficulties.

Our object was to travel from the Mönlakarchung to the south-east corner of the Yamdrok Tso and thence along the lake, the southern shore of which had never been surveyed. After leaving the pass we were

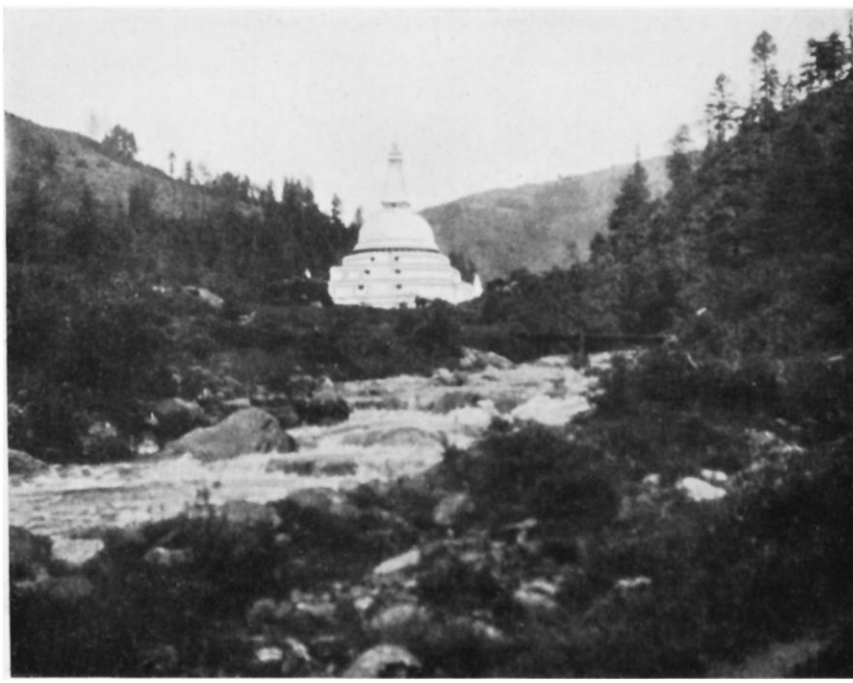


TALUNG DZONG



CAMP AT TOWA LHOBRAK VALLEY, TIBET

WANGDÖ POTRANG, BHUTAN



CHORTEN IN BHUTAN

met by the local Tibetan official, the Dzongpen of Towa, who accompanied us for several days while we were in his district. We travelled for two days down the Konang Chu Valley, with precipitous sides above which were grass slopes running up to permanent snows.

Our second march brought us to a holy temple called Tsegutok —"Tse of nine storeys." There is a tower nine storeys high built by a holy man, Mila Repa, many years ago. He was greatly interfered with by demons, but in the end was successful. It is an act of great merit to walk round the narrow platform at the top of the tower, on which chains are tied for safety; but it required a better head for heights than we possessed. Of one holy image in the monastery the fingers were tied loosely to the hands by strings bearing a seal, and we were told that in the time of the fifth Dalai Lama (about 1700) this image had spoken, but the effort had been so great that the fingers fell off one hand.

From Tsegutok we made our way to another high pass, the Drum La (16,660 feet), which was luckily clear of snow. On the south side of the pass a series of three lakes flowed one into the other from a small pond below a glacier on Kulakangri, a snow peak 24,784 feet in height. We had some fine views of this group through mist and clouds. On August 11 we reached Towa Dzong in the district of Lhobrak, and were very glad of two days' rest at the comparatively low altitude of 12,500 feet, in a delightful camp, pitched on turf under willow trees with Alpine flowers, including ground orchids, underfoot. At this camp a small herd of bharal came down to the river-bank within 200 yards of our tents, and we spent an interesting hour watching them. The valley was of the typical dry Tibetan type, with irrigated cultivation and poplar and willow trees, and was a great contrast to the thick forests of conifer at similar elevations in Bhutan and Sikkim.

Here in this secluded place the Tibetans keep prisoners whom they wish out of the way. They showed us one dungeon 50 feet deep in which prisoners are kept after being let down with a rope. The actual dungeon was within a few feet of the road, and for years, through the solid rock, the poor creatures in the dark must have heard every passer-by. In a garden the Tibetans had a prisoner, a Chinese General Peng, whom they had captured some years before. He had bombastically told the Tibetans he was advancing on Lhasa, and that they could either fight or clear out: and he had ended in being captured. We wished to see if we could do anything for him, but he refused to see people we sent to him.

The stream at Towa joins that which we had left at Tse a few days before, and the combined streams flow into Bhutan as the Kuru Chu, and eventually reach India in the waters of the Manas. The gorges are so terrible that it is easier to cross the 16,000-feet Drum La than to take the more level way followed by the waters.

We left Towa on August 14 and, crossing a 16,000-feet pass, the

Uyu La, we left the basin of the streams which break through the Himalayas and flow direct to India. We were now in a country between 14,000 and 15,000 feet in elevation in which the water drains into several large lakes. The people are nomads and are quite different from those whom we had left in the Lhobrak Valley. The men braid their hair into many strings, which they gather together in a bunch and allow to hang as a kind of tassel on the right side of the head. In this country we saw numbers of gazelle, kyang (wild donkeys), and hares, and geese on the shores of lakes. All the game was very tame, and we only took sufficient for our own food. On August 17 we reached the shore of the Yamdrok Tso, and enjoyed some lovely lake scenery with its fjords dotted with islands and surrounded by bare hills, the tops of which were dusted with fresh snow. We travelled for three days along the southern shore of the lake; but were obliged to leave it several times owing to high hills; and once we actually returned to the Padzo Tso, a lake at which we had camped some days previously, but Captain Meade succeeded in mapping the whole of the southern shore of the Yamdrok Tso.

We spent August 20 and 21 at Talung, at the south-west corner of the lake. Here a famous fair is held once a year, for which we were in time. Traders of several nationalities were there—Nepalese and Ladakis from Lhasa, and people from various parts of Tibet. The usual rubbish was for sale in the bazaar, but the fair is mostly famous for the sale of live stock, and in this we were disappointed. Perhaps we were ignorant of the points of a yak; but the other animals were inferior in quality and superior in price. One trader brought us a quantity of Russian paper money which he wished us to help him to change.

The new telegraph line had just been made to Lhasa, and we were able to send a man from here to Nangartse to telephone to Gyangtse about arrangements for our journey, and to Lhasa to say how we were getting on; and our messenger returned with the replies in the evening. No doubt from here our easiest way would have been to have gone to Nagartse, and to have returned by the main Lhasa–Gyangtse road, which had been used by Sir Francis Younghusband's mission in 1904. But our object was to get as much new country surveyed as possible, and so we travelled by an unknown route south of the high snows round the Karo La.

Two days' march from Talung, after crossing the Tug La, a pass 16,750 feet high, in rain and sleet, we reached the valley of a large lake, the Pomo Tso, which is no less than 16,000 feet above sea-level. South of the lake we could see the snow range which forms the Tibet–Bhutan frontier. Mr. White in 1906 had travelled between these snows and the southern shore of the lake. Leaving this lake we climbed to the Dap La, over 17,000 feet high, and here we left the region of the lakes and entered that of streams which, flowing *viâ* Gyangtse and Shigatse, reach the

Tsangpo and thence India. On this pass Gyaltsen Kazi, who had accompanied the Mount Everest Expedition in 1921, collected some fossils which Sir Henry Hayden identified as Jurassic ammonites. The next night we woke to find our tents covered with snow (at 15,150 feet, on August 24). In spite of this we had no frost, and on our coldest nights at the highest altitudes at which we camped, we registered temperatures of about 35° taken in the open.

We now soon entered the Nelung Valley, which had been surveyed by Colonel Ryder in 1904, and our journey to Gyangtse, which we reached on August 27, calls for no notice. From Gyangtse we travelled to Gangtok. On our journey of over 600 miles Captain Meade surveyed about 6000 miles of new country, and revised a much larger area which had only been done very roughly.

Except for some mountain sickness on the Mönlakarchung, the health of the party, which included Lady Cozens-Hardy and my wife, was excellent. Dr. Dyer, who accompanied us, was of the greatest value in making friends with the people, who have the highest opinion of Western medicine, and there is no doubt that in places where one is unknown a doctor adds greatly to the popularity of the party with the inhabitants.

Appendix.

NOTE ON BHUTAN AND SOUTH TIBET SURVEYS, 1922

Captain H. R. C. Meade, I.A., Survey of India

A Survey of India detachment consisting of one British officer, one Indian officer, with Serpa and Gurkha khalasis, accompanied the Political Officer in Sikkim.

An area of 9493 square miles (6589 original survey and 2904 revision) was mapped on the ½-inch scale, the work being based generally on triangulation carried out during the journey.

Triangulation.—A 6-inch micrometer theodolite was used, reading to 1 second. The rate of march (averaging over 8 miles a day) and the monsoon prevented both ordinary triangulation and an astronomical latitude and azimuth traverse independent of previous triangulation.

The theodolite work consists of 14 hill-station fixings, 12 astronomical azimuths, 6 latitudes, and 32 intersected points.

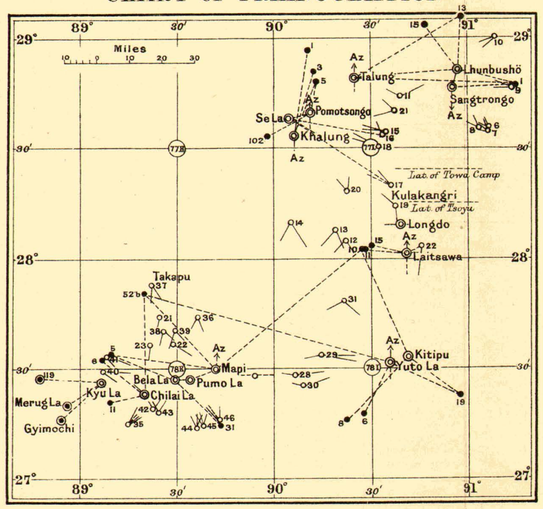
Mapping.—Like the triangulation, the mapping was affected by the conditions. The whole of the Mo Chu basin in north Bhutan is still unsurveyed, though the prominent snow peaks (two over 23,000 feet) were fixed, and the map between Bumtang, where touch was lost with the Assam Triangulation Series, and Lhunbushö (on the Yamdrok Tso), where the 1904–5 Tibet series could be used, is more or less in the air, and adjusted by astronomical work.

The mapping around the main route through Bhutan is however accurate plane-tabling, and the lake district of Southern Tibet was mapped by photo-survey.

The northern and southern Kulakangri (both nearly 25,000 feet high) and adjacent groups were also fixed.

Of the total output, 5345 square miles consist of accurate plane-tabling and photo-survey, and 4148 square miles of reconnaissance.

CHART OF TRIANGULATION



Reference

- Triangulated Stations
- Intersected Points
- Astronomical Azimuths
- ,, Latitudes
- Previously triangulated stations
- ,, intersected points

PRINCIPAL STATIONS

Sheet No.	Name	Latitude ° ′ ″	Longitude ° ′ ″	Heights in metres
77L	LAITSAWA	28 01 15	90 40 46	4930
	LONGDO	28 08 52	Plane-table ray	
	TSOYU	28 15 14		
	TOWA CAMP	28 23 24		
	SANGTRONGO	28 46 09	90 55 28	4618
	LHUNBUSHÖ	28 51 05	90 57 15	5087
	TALUNG	28 48 56	90 25 07	4750
	POMOTSONGO	28 39 38	90 11 09	5340
	KHALUNG	28 32 52	90 06 12	5595
	SE LA	28 37 48	90 04 50	5280
78E	KYU LA	27 26 19	89 07 11	4501
	CHILAI LA	27 22 59	89 20 16	4107
	BELA LA	27 26 57	89 29 17	3640
	PUMO LA	27 27 04	89 34 12	3983
	MAPI	27 29 48	89 42 01	3913
	WANGDUPOTRANG CAMP ...	27 27 59	Plane-table ray	
78I	YUTO LA	27 31 37	90 35 27	3680
	KITIPU	27 33 13	90 40 56	4131

INTERSECTED POINTS

Sheet No.	Point No.	Description	Latitude ° ′ ″	Longitude ° ′ ″	Heights in metres
77L	11	Pointed peak	28 43 56	90 38 58	5269
	12	N.W. of Kangri	04 39	22 11	6595
	13	N.W. of Kangri	07 33	19 04	6639
	14	... ...	09 28	05 01	7212
	15	Corrugated peak	34 12	34 22	5607
	16	Snow peak	33 19	33 33	5766
	17	Peak between Sharkangri and Kangri ...	19 41	36 13	6215
	18	Not highest point	30 06	32 11	6040
	19	Kulakangri	14 02	37 09	7554
	20	Snow peak	37 47	24 20	—
	21	Snowy point	40 02	36 59	—
	22	Peak E. of Mönlakarchung Pass	02 56	45 46	6306
77P	6	——	28 35 24	91 06 24	5854
	7	——	34 37	06 26	5904
	8	——	36 05	03 34	5728
	9	On Padzo Tso divide	45 58	13 41	5114
	10	Snow peak N.E. of Lhunbushö	59 49	08 01	5385
78E	21	Snow peak	27 43 41	89 24 40	5696
	22	——	27 36 34	29 02	5161
	23	Peak above Paro	36 09	21 48	5551
	35	Tegola Peak with Cairn	15 11	15 25	4958
	36	Snowpeak N. of Mapi	43 43	36 11	5447
	37	Takapu, Snowpeak	52 25	22 21	6531
	38	Southernmost of 3 peaks	39 55	25 38	5623
	39	High conical peak	40 06	29 35	5387
	40	Pointed peak at head of Ha Chu	29 00	07 24	4817
	41	Middle peak of Masangkyaungdü	33 07	08 30	5493
	42	Peak South of Paro	18 49	22 48	4012
	43	Round hill South of Paro	18 06	24 47	3995
	44	Sth. end of range between Wong Chu & Mo Chu	13 52	36 17	4258
	45	High point	18 44	38 03	4477
	46	Round peak	16 07	43 02	4711
78I	28	Peak	28 08	90 06 17	4161
	29	Dhungkajamso	33 38	14 21	4167
	30	Highest point in Dong Chu basin	25 18	08 52	—
	31	Peak on Dong Chu-Mati Chu divide	48 09	21 24	—

Parts of
BHUTAN AND SOUTHERN TIBET
from surveys by
MAJ. F. M. BAILEY, C.I.E., I.A. and CAPT. H. R. MEADE, I.A.
1922

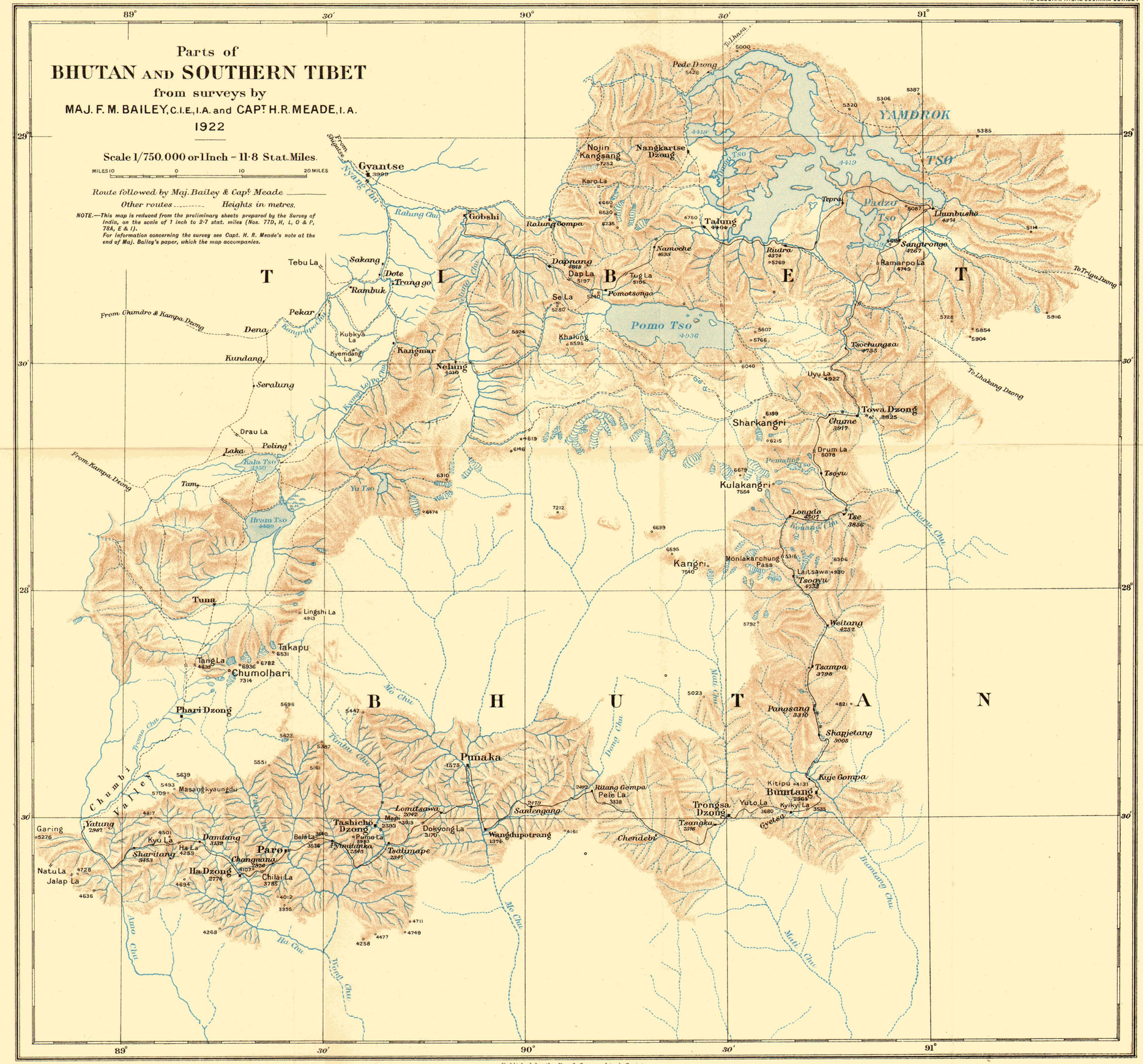
Scale 1/750,000 or 1 Inch = 11·8 Stat. Miles.

MILES 10 0 10 20 MILES

Route followed by Maj. Bailey & Capt. Meade ———

Other routes ..... *Heights in metres.*

NOTE.—*This map is reduced from the preliminary sheets prepared by the Survey of India, on the scale of 1 inch to 2·7 stat. miles (Nos. 77D, H, L, O & P, 78A, E & I).*
For information concerning the survey see Capt. H. R. Meade's note at the end of Maj. Bailey's paper, which the map accompanies.



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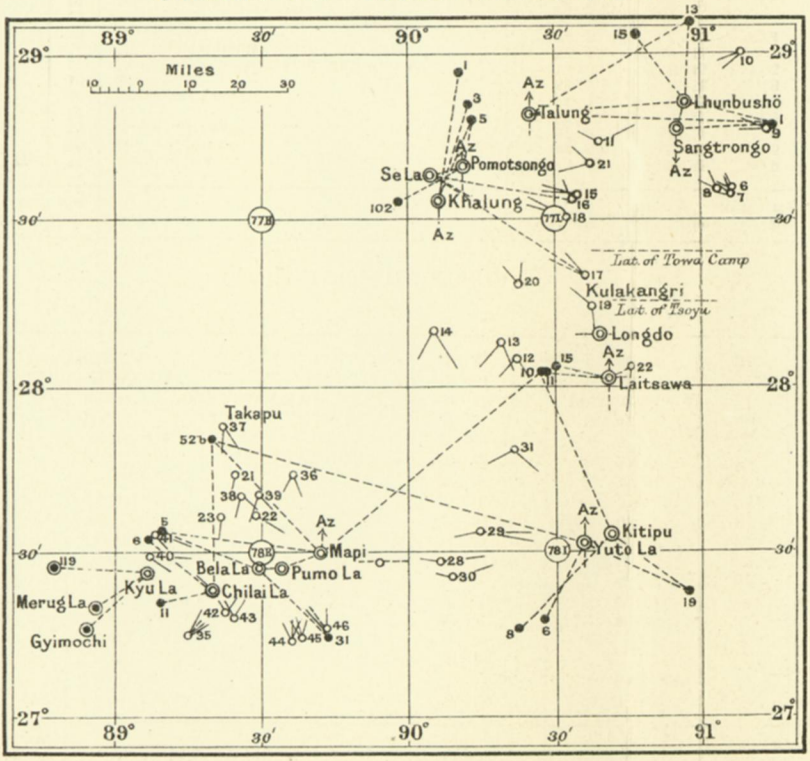
BHUTAN AND SOUTHERN TIBET
Bailey and Meade

CHART OF TRIANGULATION



Reference

- Triangulated Stations
- Intersected Points
- Az Astronomical Azimuths
- ,, Latitudes
- Previously triangulated stations
- ,, intersected points

PRINCIPAL STATIONS

Sheet No.	Name	Latitude ° ′ ″	Longitude ° ′ ″	Heights in metres
77L	LAITSAWA	28 01 15	90 40 46	4930
	LONGDO	28 08 52	Plane-table ray	
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Sheet	Point	Description	Latitude	Longitude	Heights


89°
30′
Parts of
BHUTAN AND SOUTHERN TIBET
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29°
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MILES 10 0 10 20 MILES
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From Shigatse
Gyantse
3999
Nyang Chu
Rahung Chu
Tebu La
Sakang
Dote
Trang go
Rambuk
T
From Chimdro & Kampa Dzong
Pekar
Dena
Kangrupa Chu
Kubkya La
Kyemdang La
Kangmar
30′
Kundang
Seralung
Kyang Lo
Po Chu
Drau La
Peling
Laka
Kala Tso
3460
From Kampa Dzong
Tam
Yu Tso
6310
6474
Hram Tso
4480
28°
Tuna
Lingshi La
4913
Takapu
6531
Tang La
4639
6936
6782
Chumolhari
7314
Mo Chu
B
Phari Dzong
5696
5447
5623


30′
90°
30′
TIBET
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To Lhasa
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Pede Dzong
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Nojin Kangsang
7252
Nangkartse Dzong
Nyang Tso
Karo La
6660
6530
6235
4750
Talung
4404
Gyantse
3999
Nyang Chu
Rahung Chu
Gobshi
Rahung Compa
Namoche
4633
Riutra
4374
5269
Sakang
Dote
Trang go
Rambuk
Dapnang
4618
Dap La
5197
Tug La
5105
Pomotsongo
5240
Se La
5280
Nelung Chu
Pomo Tso
4936
5924
Khalung
5595
5607
5766
Kubkya La
Kyemdang La
Kangmar
Nelung
4510
6040
Kyang Lo Po Chu
6199
Sharkangri
6215
4619
6146
6310
Yu Tso
6679
Kulakangri
7554
Pemaling Tso
6474
7212
6699
6595
Kangri
7540
Monlakarchung Pass
5316
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Mo Chu
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Pangsang
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30'
91°
29°
30'
28°
To Lhasa
Pede Dzong
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5000
5387
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YAMDROK
TSO
4419
5385
Tso
4419
Padzo
Tso
Tepra
5087
Lhumbusho
4974
4750
Talung
4404
5114
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4686
Sangtrongo
4267
Riutra
4374
5269
Ramarpo La
4749
To Trigu Dzong
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5728
5916
5854
5904
Tso
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5607
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Tsochungsa
4755
6040
Uyu La
4922
To Lhakang Dzong
Towa Dzong
3825
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Sharkangri
Chume
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Drum La
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Pemaling Tso
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Tsoyu
Kulakangri
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Longdo
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Tse
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Kuru Chu
Konangi Chu
6595
Kangri
7540
Monlakarchung
Pass
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Laitsawa 4930
Tsoayu
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Tsampa
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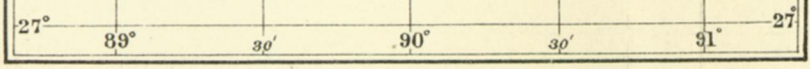
Shapjetang
3005



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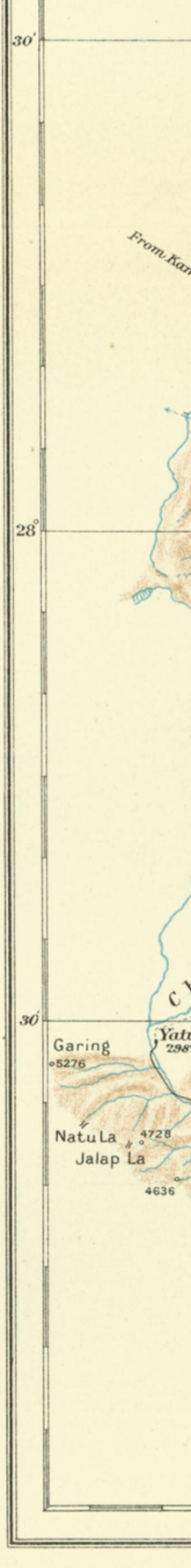

Kundang
Seralung
Drau La
Laka
Peling
From Kampa Dzong
Kala Tso
4450
Tam
Hram Tso
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Kyemdang La
Kangmar
Nelu
4510
Kyang La
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Phari Dzong
Tromo Chu
Chumbi Valley
5696
5447
B
Mo Chu
Tiinbu Chu
5623
5387
5551
5161
5639
5493
5709
Masangkyaungdu
Paro Chu
4817
Yatung
2987
Garing
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4501
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Damtang
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Ha La
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Sharitang
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Natu La
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Jalap La
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Ha Dzong
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Changmana
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Paro
Chilai La
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Bele La
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Mepi
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3313
Pumo La
3983
Pyumitanka
2545
Lomatsawa
2042
Tsalimape
2347
Dokyong
3170
4711
4749
4477
4258
4268
Amo Chu
Ha Chu
Wong Chu
89°
30′
28°
30′

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BHUTAN AND SN TIBET
Bailey and Meade

1670 to 1700, of which a specimen is to be seen in the illustration No. 164 in the May number. That in the T.C.D. manuscript can be exactly matched from a book printed in London in 1688. The lion of Holland in an oval band (*ibid.*, No. 166) is also a common mark of the same period (my earliest specimen is from 1669), but the only other example I have yet found with the monogram CAW (?) beneath dates from the very year 1686 to which the T.C.D. manuscript is ascribed. The initials of the makers or mill-owners not only confirm this date, but tell us where the paper was made. The details of the Angoulême paper industry given by Briquet ('Les Filigranes,' vol. 4, pp. 704–6), show that in the C D G of the MS. we have the initials of Claud de George, an Angoulême maker who died a little before 1686. The use of his initials (which had come to be regarded as a guarantee of quality) by another maker gave rise to a lawsuit in this very year 1686, the plaintiff being Jacques Salmon, proprietor of the mill which De George had worked, and the defendant Abraham Janssen, whose initials are probably to be traced in the A I under one example of the lion. (Curiously enough, they also occur in the same book, published in 1686, in which the CAW is to be found.) In the countermark D I we have the initials of Dericq Janssen, who is known to have held several mills at Augoulême between 1656 and 1673 (and probably later). The P B with the Amsterdam arms may perhaps stand for Pierre Bernard, another of the Angoulême makers of the time.

Salmon's plea in bringing his suit stated that complaints of unequal quality in paper marked C D G had been made by the *Dutch Merchant* to whom the paper was supplied, and we thus have the required link between the makers and users of the paper of the T.C.D. manuscript.

NOTES ON THE MARCH OF ALEXANDER THE GREAT FROM ECBATANA TO HYRCANIA

A. F. v. Stahl

THE Greek historians and geographers who described in their works the march of Alexander through Persia, Media, and Parthia, generally omitted the native names of towns and places which he passed, substituting Greek names for the most part. If we note only the number of "newly founded" towns called Alexandria, and consider that Alexander, pressing forward, could hardly have had time for the foundation of new towns on his road, we must come to the conclusion that he gave his name to towns already existing, the native names of which remain unknown.

The descriptions of the roads and countries which he traversed are also very deficient and sometimes confusing. In consequence it is more than difficult to reconstruct this march geographically with the desirable accuracy, and up to the present moment many questions in regard to it are still unsolved. This fact induces me, since I have explored a considerable part of Northern and Central Persia, to discuss in the following pages, from a geographical point of view, the famous march of Alexander the Great from Ecbatana to Hyrcania.

In the first place, there is some doubt as to the site of this Ecbatana. It is now generally identified with the modern Hamadan. Sir Henry Rawlinson, however, in a paper published in the *Journal R.G.S.*, vol. 10, 1840, endeavoured to prove that the Ecbatana to which Darius fled, and to which Alexander followed him, occupied the site now known as Takht-i-Suleiman. A brief consideration of the position of Hamadan and Takht-i-Suleiman, and of some of the classical references, will, I think, show that the Ecbatana of Alexander's march is to be identified with Hamadan.

Takht-i-Suleiman.—The ruins of the fort known as Takht-i-Suleiman are situated in the province of Azerbaijan, in the district of Afshar. On the north, west, and east sides the Afshar district is surrounded by high mountain ranges, and only towards the south is the country more open and hilly. The ruins of the fort are in a narrow valley, surrounded on three sides by commanding hills. The circular wall stands on a mound, 15 to 20 feet high. Built of limestone tufa, the walls have a circumference of about 1500 yards.

Inside the wall is a round, very deep lake, of strongly calcareous water. This lake is surrounded by the ruins of a palace of no great age, and a mosque, whereas the western half of the interior is covered by ruins and heaps of broken kiln-burnt bricks, which represent the more ancient quarter. In the centre Sir Henry Rawlinson observed the remains of a fire-temple, and at the western side of the fort, outside the wall, he found traces of an old town. The space between the mound with the ruins and the surrounding steep hills does not exceed 100 to 150 yards. Over the southern space winds a mound 10 feet high, along the line of an old watercourse used for driving a mill.

To the west of the ruins, on somewhat more elevated ground, there rises the high conical basin of an ancient, now waterless, fountain named Zindani-Suleiman, and to the south-west of this basin, on the same elevated ground, a line of mineral springs stretches. To the north is the broad, slightly hilly slope of the high mountain range, whence several streams flow south to the north-west arm of the Saruk river, which runs past the Zindani-Suleiman. On this mountain slope are situated the villages Gangabad (village of treasures), Chiragh Tepe (hill of fire), and Zarshuran (goldwashers). In the stream which passes the last-named village the sand contains gold-dust, grains of cinnabar, and magnetic iron sand, and on the top of the mountains is a mine of a mineral containing arsenic (auri-pigment and realgar). To the west of Zarshuran are the three villages of Akdereh, at the gorge of a valley through which a road leads to a mountain pass of the same name. On the adjoining hills there is a lead-mine.

The south-east arm of the Saruk river, which is somewhat larger than the north-west, has its sources in the mountains of Takht-i-Belkis, where there are ruins of an ancient castle of the same name, and skirting

the Tavileh hill, joins the north-west arm of the Saruk and the small stream of Tikan Tepe; then taking a westerly direction, it joins the Jeghetu river at the foot of the lofty Seferkhaneh mountain.

The Tavileh hill which separates the two arms of the Saruk river has an altitude of about 2230 metres, and consists on the top of horizontal beds of the same limestone-tufa of which the wall of the fort is constructed. Underneath these limestones there are friable sediments of the Miocene gypsum formation, which cause the sides of the hill to be precipitous. I note this because the Persian gypsum formation sometimes contains petroleum and inflammable gases, which might perhaps have some connection with the "hill of fire"—Chiragh-Tepe.

As to the roads of Takht-i-Suleiman, they are, except that to Hamadan, more or less mountainous and difficult. From the villages of Akdereh a road runs over the pass due north through the hilly country of Hashterud to Ujan and Tikmedasht, on the high-road from Tabriz to Tehran, and another road is said to go from the pass direct to Basmindj and Tabriz, as well as one to Mianeh; but all these roads are little frequented. To the east a road goes over the mountainous country of Anguran to Zenjan, whereas another road is said to have been in use in ancient times over the plain of Sojas (Sohriverd?) to Sultanieh. The road to Sainkaleh goes as far as the village of Hasanabad along the bank of the north-west Saruk river, then over the hills and the pass of Mahinbulak (Magin-Bulak?), to the village of Sanjut, and along the valley of the Kaureh river to Sainkaleh or to the bridge of Kiz-Kopri and Souj-Bulak. To the south of the Mahinbulak pass, at the foot of a long flat hill, lie the caves of Kereftu.

Hamadan.—This lies about $1\frac{1}{2}$ miles east of the Elvend mountains, on a plain inclined slightly to the north-east, at an elevation of about 1611 metres. On the eastern edge of the town rises the high isolated hill of Musallah on which there formerly stood a citadel, part of the walls of which can still be seen. Its flat summit is strewn with broken kiln-burnt bricks. To the south and east the Hamadan plain is surrounded by low hills; in the west the two peaks of the Elvend mountains rise suddenly to a very considerable elevation, and the main range behind them stretches in a long line from north-west to south-east. In the north the Hamadan plain extends for about 25 miles as far as a range of lower mountains, which separate the plain of Hamadan from that of Mehreban and Sarderud. The plain is abundantly watered by the Kara-su river and its many tributaries; numerous villages cover the valleys and the wide plain, in the north of which there are very fine pasture grounds.

Hamadan is a centre of many important caravan roads; here passes the ancient military highway to Babylon and Rhages (Rei); another road goes through Sehneh, Shehrizur and Kirkuk to Mosul (Nineveh), a third to Bijar, Maragha, and Tabriz, others to Zenjan, Kazvin, Qum, Isfahan, and Burujird, of which the last was in ancient times the highway

to Susa and at present leads to Disful. All these roads bear witness to the great importance Hamadan had in historic times.

We know very little about the foundation of Ecbatana. Ctesias relates that the city of Ecbatana had existed from the most remote antiquity, and to have been beautified and enlarged by Semiramis during one of her Asiatic journeys. It is interesting to note what Diodorus * relates of this legendary queen: that when she had finished the sculpture and the cuneiform inscriptions on the Baghistan rocks at Bisitun (which in reality were the work of Darius Hystaspis), she advanced to the town of Chauon (?) and there built a palace; she then proceeded as far as the Zarcaic (Zagros) † chain of mountains, where, to avoid the roundabout way, she had a road constructed which would lead straight over the mountain range to Ecbatana. Such a road still runs from the neighbourhood of the village of Assadabad, over a high pass of the Zagros range, and descends along the 'Abbasabad valley between the two Elvend peaks (Orontes) to Hamadan; whereas the easier carriage road rounds the mountains from the north side.

Diodorus further describes how, as the town of Ecbatana had only an insufficient supply of water, Semiramis arranged to improve it; he writes: ‡

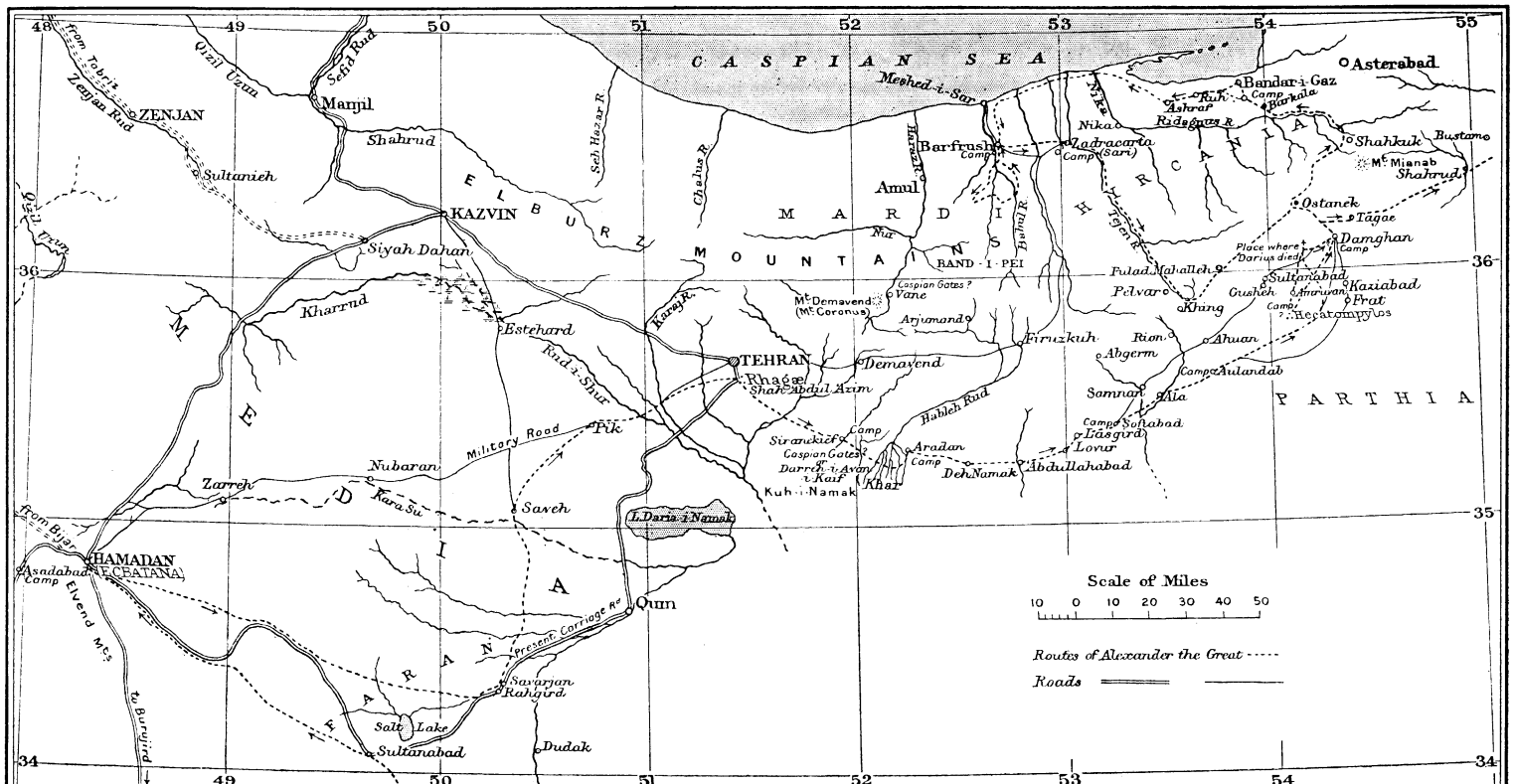
". . . twelve stadia (2·22 kms.) from Ecbatana is a mountain called Orontes, which is distinguished by its roughness and its great height, rising abruptly for 25 stadia to its summit. As there was on the other side of the mountain a large lake, which issued in a river, Semiramis gave orders to construct a canal at the foot of the mountain 15 feet broad and 40 feet deep; through this canal she led the stream from the lake and supplied the town with water in abundance."

The cuneiform inscriptions of Darius and Xerxes, about 8 kms. to the south-west of Hamadan, in the 'Abbasabad valley, are engraved on a solitary granite rock. This rises out of a heap of sand and loose stones at the foot of a branch of the main range, just to the west of the northern Elvend peak, and on the right bank of a rapid stream, which flows in cascades from a neighbouring rocky valley and falls into the small 'Abbasabad stream. On my visit I had the impression that the rock with the cuneiform inscription was a monolith, and that the valley on the bank of which it stands was once blocked up by a stone avalanche. Such as is the cause, for instance, of the formation of the two alpine lakes to the east of Demavend. This would account for the possibility of an accumulation of water in the higher part of the valley, to make a lake, which had perhaps formerly an outflow into the stream of a neighbouring valley to the north of the place described and the Elvend

* Diodorus, ii. 13.

† Generally this mountain range is named Zagros; only Diodorus writes Zarcoeum. The root of this word might be either Zag= alum, or Zar = gold. Some gold has been found near Hamadan in these mountains.

‡ Diodorus, ii. 13.



The march of Alexander through Media and Hyrcania.

peak. A canal cut through the wall of the avalanche, would certainly have drained the supposed lake and increased considerably the quantity of water in the 'Abbasabad stream, which flows towards Hamadan. The construction of such a canal would also account for the position in such a desolate place, of the cuneiform inscriptions in which both kings glorify Ormuzd and themselves. Semiramis is also said to have built the splendid palace at Ecbatana, though Herodotus* says that Ecbatana was founded a good deal later than Semiramis, namely by Deiokas (708–655 B.C.).

Arrian writes†:

"When the news arrived [that Darius was still at Ecbatana], Alexander marched towards Media. . . . On the twelfth day he arrived [from Persepolis] in Media."

Here he was still at least three days' journey from Ecbatana. That would make at least fifteen days' march from Persepolis to Ecbatana. The distance from the ruins of Persepolis to Hamadan is about 775 kms., and fifteen days' would just be the time necessary for the journey; whereas from Hamadan to Takht-i-Suleiman is another 250 kms., or about five days' journey more. This, again, goes to prove that Ecbatana is to be identified with Hamadan.

One objection to the identification of Ecbatana with Hamadan is that Arrian mentions it took Alexander eleven days' heavy marching from Ecbatana to Rhagæ (Rei, 8 kms. south-east of Tehran), whereas, assuming Ecbatana to be the modern Hamadan, there would only be eight stages along the ordinary caravan or so-called Parthian military road (Babylon, Ecbatana, Rhagæ, Aria). But we must note that Curtius writes:‡

". . . with this army he (Darius) deviated somewhat from the military road, after he had given orders to the baggage train and its escort to advance."

We find here, that Darius did not march along the ordinary road, which, being mountainous, was not suitable to carts or carriages. It is more than probable that he took a south-easterly direction along the broad plain at the southern limit of which the town of Sultanabad stands at present. The route leads first south-east, passing on the north the salt lake of Sultanabad (District of Farahan), and continues to the pass of Rahgird and Savarjan; then turns north and joins the present caravan road from Isfahan to Saveh and Kazvin. From Saveh it takes a north-easterly direction, and near the present village of Pik joins the military road from Ecbatana to Rhagæ.

The military road between the last-named towns measures about 310 kms., which make, for eight caravan stages, 35 kms. a day; whereas by the roundabout way which has been described the distance would be

* Herodotus, i. 98.

† Arrian, 'Anabasis,' iii. 19. ‡ Curtius Rufus, v. 24.

about 440 kms., *i.e.* for the eleven days of Alexander's march, 40 kms. a day. There can hardly be any doubt that Alexander followed Darius by the roundabout way.

Considering the high temperature in those low-lying desert plains at the end of May or the beginning of June, when Alexander's march took place, and the scarcity of drinkable water on the saline steppes, it is not at all astonishing that soldiers and animals suffered exceedingly, and that many of the former collapsed on the road or fell out, unable to continue the march. Perhaps also they were attacked by fever, which is not mentioned in the historical works, but exists at the present moment in such places all over Persia. On account of the heat, Alexander afterwards marched from Rhagæ only at night.

A further point in favour of Hamadan can be made from Arrian's remark on Darius' action after his defeat at Gaugamela: "Darius drove straight from the battlefield under the Armenian mountains to Media." * In my opinion, this means that Darius went up the valley of the present Lesser Zab river, and before reaching the Kurdistan mountains turned through Sehneh to Ecbatana (Hamadan). If Ecbatana is to be located at Takht-i-Suleiman, he would have been obliged to cross the mountains.

Rhagæ.—Having reached Rhagæ, Alexander remained five days and gave his men a rest. The position of Rhagæ is well known; the town was about 8 kms. to the south-east or the present Tehran, on the spot where we now find Shah 'Abdul 'Azim. According to Strabo it was 500 stadia distant from the Caspian Gates. The ruins are all of clay bricks and best preserved at the foot of the hills, on the summit of which some stone-built fortifications can still be traced. The ruins now bear the name of Rei, which might also have been the ancient native name. Once the largest town of Media, it has several times been destroyed by earthquakes and Mongol invasions. In the year 1404 Ruy Clavijo found the town in ruins; but it was rebuilt once more, and in 1427 became the residence of Shah Rukh, the son of Tamerlane. After his death the town fell finally into decay.

The present capital of Persia, Tehran, did not exist in Alexander's time, and the Tehran of which the Arabian geographer Jakut (*c.* 1180) wrote that its inhabitants are troglodytes and in constant feud with the inhabitants of Rei, was, so far as I could ascertain, a district to the east of the Demavend volcano. A village of that name still exists in the valley of a stream which comes down from the mountains of the district of Band-i-pei in the Elburz range.

The Caspian Gates.—Arrian continues: † "He himself (Alexander) went further on in the direction of Parthia. The first day he camped at the Caspian Gates. . . ." The Caspian Gates (Caspiæ portæ) have served for an important ancient geographical landmark and the principal meridian from which the Greek geographers like Eratosthenes

* Arrian, 'Anabasis,' iii. 16. † *Ibid.*, iii. 20.

and Strabo calculated the distance of a number of towns. But the descriptions of their position which the Greek authors give are vague.

The Greeks gave the name of "gates" to certain mountain defiles and passes; so Diodorus writes in his historical work: *

". . . Persia, Susiana, and the so-called Caspian lands, into which lead only narrow passes, which therefore are named 'Caspian Gates.'"

Arrian writes †:—

"This place (Rhagæ) is for a traveller of Alexander's speed one day's march from the Caspian Gates."

The Caspian Gates in question are doubtless the defiles of Sialek and Sardar, which are about 70 kms. south-east of the ruins of Rei or Rhagæ (about 52° east of Greenwich) and cut across the Kuh-i-Namak or Salt mountains—a low range of hills, which branches off from the Elburz mountains. The Sialek defile is the northern one, and is at present blocked by landslips; it is narrow and runs between steep walls. The Sardar defile (885 metres altitude) is somewhat more to the south. The entrances at both ends are about 20 to 25 yards wide, with steep mountain walls on both sides and an exceedingly salt stream running through; in the centre it widens to a small circular valley, where are the ruins of an ancient stone tower. At the north-western entrance there are also traces of some ancient brick buildings. The length of the defile is about 10 kms.

The importance of these defiles consists in the geological character of the range; it is of easily disintegrated Miocene rocks, which by erosion have been cut into innumerable ravines and make such a mass of tumbled hills that to pass the range in any other place than the defiles would be a very difficult task. Moreover the range, which on the south is bounded by salt swamps and deserts, is an effective barrier between the western and eastern parts of the road and was once the boundary between Media and Parthia.

On the other hand, Strabo writes: ‡

". . . and Rhagæ itself, a foundation of Nicator, which he named Europus, but the Parthians, Arsacia. It is about 500 stadia to the south of the Caspian Gates, as Apollodorus of Artemita reported."

In another places he writes: §

"Media is for the most part high and cold, and so too are the mountains situated over Ecbatana and those which are about Rhagæ and the Caspian Gates; . . . but the part [of Media] below the Caspian Gates, which consists of low-lying valleys, is very rich, producing all sorts of crops except the olive."

Here the defiles of the Kuh-i-Namak cannot be intended, and the Caspian Gates of Strabo can be only the defile of the Heras-pei river,

* Diodorus, ii. 2.
† 'Anabasis,' iii. 20.
‡ Strabo, xi. 13, 6.
§ *Ibid.*, xi. 13, 7.

north-east of Rhagæ, at the foot of the Demavend volcano (the ancient Coronus Mons). It is possible that Apollodorus knew this defile and pass also as the Caspian Gates, and as it leads to the Caspian Sea it has perhaps more right to the name than the defiles of the Kuh-i-Namak, but the Caspian Gates through which Alexander marched are the Sialek and Sardar defiles.

Death of Darius.

The site of the first camp of Alexander, after his departure from Rhagæ, must have been the present Aivan-i-Kif, as it is the only place thereabout where fresh water could be procured.

We continue to quote from Arrian's account:

"... on the second day he (Alexander) advanced through them (the Caspian Gates) as far as human habitations extended." *

That means that after passing the defiles he crossed the district of Khar, the ancient Choarene, and advanced probably as far as the present village of 'Aradan, which even now has the aspect of an ancient fort with high clay walls. It might have been formerly a small town, since close to it is a place called Atishgah, or "Fire-place," that is, a former fire temple of the Zoroastrians.

Arrian: "... taking with him only his companions, the light cavalry scouts, and a selection of the strongest and lightest-armed men of the infantry, without waiting for the return of the detachment of Coenus from its foraging expedition. ... Over the army left behind he set Craterus with orders to follow by moderate daily marches. His own following had with them arms and provisions for two days only. Thus he advanced throughout the night and until the following midday. ..." †

This account implies about fifteen hours of continual march. The road to the east of 'Aradan goes over hilly waterless country, flanked on the north by high rocky mountains, and on the south by salt swamps and desert plains. About 25 kms. east of 'Aradan is now a small village, Deh Namak, which has only brackish water, and about 35 kms. further is the village 'Abdullahabad, with some better water. About 25 kms. still further in the same direction is a stream of fresh water, on the bank of which now stands the caravanserai Lovur. Both the last-named places can be taken into consideration for Alexander's camp; but I am of opinion that 'Abdullahabad was the place where the camp was, as the men on foot could hardly do more on such cut-up ground during the fifteen hours' march.

Arrian: "he then let his army rest for a little while, and resumed the march throughout the night and arrived at daybreak at the camping-place from which Bagistanes had started his retreat. ..."

During this march he could hardly have covered more than 60 kms., though the country, except for a small pass over a range of hills between

* Arrian, 'Anabasis,' iii. 20. † *Ibid.*

Lovur and the village of Lasgird, which stands on an artificial elevation, is a plain. He probably camped at some place to the south-west of Samnan.

Arrian: " . . . Artabasus, his sons, and the Greek mercenaries excepted. These had remained true to Darius, but had not the power to stop the progress of things; they therefore had turned off the highway and by themselves sought the mountains." *

The Greek troops doubtless went in the direction of the present Firuz-kuh, where are ruins of an ancient castle or fort.

Arrian: ". . . he continued his march, covered a considerable distance during the night and up to the following mid-day, and arrived then at a village, where those who were conducting Darius had camped the day before; . . . he asked the inhabitants if they knew some short cut by which to follow the fugitives." †

This village could have been only in the valley of the Rion river or in the Vardimek mountains, which separate the plain of Samnan from that of Damghan and protrude from the main range of the Elburz mountains to the south-east.

Arrian: ". . . . On their declaring that they knew such a road, but on account of the absence of water it was a desert, he ordered them to lead him this way. Knowing that the infantry would not be able to follow his forced march, he dismounted 500 of his cavalry, chose the ablest leaders and soldiers of the infantry, and bade them mount the horses armed as they were. . . . [Two captains] received the command to follow along the road which Bessus had taken. . . . He himself took the road again about evening and advanced at a swift trot. He covered thus about 400 stadia [74 kms.] during the night, when about dawn he came up with the enemy, who were advancing without order or arms. . . ." ‡

To explain the situation, we must presume that Alexander passed to the south of Samnan, on the road from the present villages in the mountains of Vardimek or the valley of the Rion river.

From these places there are three roads leading in the direction of Damghan. The northern, the so-called Parthian military road, crosses the mountains to the caravanserai of Ahuan, and thence goes on to the village Gusheh (Sultanabad) and the district of the present Qumish—the old Comisene. On this road only the interval between Ahuan and Gusheh is waterless and level steppe. A second road runs more to the south. After passing the mountains it goes between a group of isolated hills on the north and the Kuh-i-Sultan Shah Rukh on the south, through a waterless desert, where only on the eastern slope of the Vardimek mountains are two small springs. From this point for about 70 kms. as far as Damghan no fresh water is to be had; and it is about 60 kms. from the springs to the village of Kaziabad, on the road from Damghan to Frat. The third road rounds the Kuh-i-Sultan Shah Rukh and the

* Arrian, 'Anabasis,' iii. 21. † *Ibid.*

‡ *Ibid.*

Benober mountains from the south, and, with several springs on the way, leads direct to Frat.

Bessus marched by the military road over Ahuan and Gusheh, whereas Alexander took the second, the desert road. He came upon the enemy somewhere near the large group of villages of the district of Qumish.

That the army of Bessus marched without arms is not astonishing; I have frequently met marching Persian regiments who walked without order and had donkeys to carry their arms. It seems to be a very old custom.

Arrian: ". . . Bessus and his companions of conspiracy dragged Darius with them for a while in a travelling waggon; but as soon as Alexander came up, Nazabanes and Basaentes who had wounded Darius abandoned him there. They themselves with 600 horsemen fled, but Darius died of his wounds soon after, before Alexander had seen him. . . ." *

Curtius † gives a somewhat different account of the facts; he writes:

"But Bessus and the others who were implicated in his crime, caught up the car of Darius and began urging him to mount a horse and get clear of his enemy by flight; but he called on the Avenging Gods to take note, and invoking the protection of Alexander declared that he would not accompany the parricides. On this, in a burst of anger they hurled darts at the king, and left him prostrated by many wounds. They also foundered the draught mules, so that they should not be able to advance, and killed two slaves who were accompanying the king. Having accomplished this deed, Nazarbanes made for Hyrcania and Bessus for Bactra, each with a few horsemen so as to leave few traces of their flight. . . . None of [Alexander's] prisoners could show the car of Darius: every vehicle as it fell into their hands was separately searched, and still no trace of the king was found.

"Meantime the animals which were drawing Darius, feeling no rein, had left the military road and wandered about 4 stadia till, exhausted from the heat as well as their wounds, they stopped in a valley. Not far away was a spring, to which tortured by thirst came a Macedonian, by name Polystratus, who had been directed by some one who knew the country, and as he drank the water, which he had drawn in his helmet, he noticed spears sticking in the bodies of the dying draught cattle. Astonished that it should have been preferred to founder these animals rather than drive them off. . . ."

Here the manuscript of Curtius breaks off; but the remainder of the tale has been supplemented from the writings of Justinus, Diodorus, and Plutarch.‡

From Curtius we learn that Darius was murdered not far from the military road—doubtless to the south-west of Damghan. The valley to which the car with Darius was dragged must have been on the south-east side of the present Sefid-Kuh mountains, from which water is drawn to irrigate the fields of the villages of Qumish, and somewhere to the north of the present villages of Taziabad and Ahzabad.

* Arrian, 'Anabasis,' iii. 21. † Curtius, v. 37, 38

‡ Darius died about July 330 B.C.

Arrian's account states: ". . . Alexander now drew together those parts of his army that had remained behind and then advanced towards Hyrcania. . . . ".*

Hecatompylos.—According to Diodorus, Plutarch, Curtius, and others, Alexander and his army, after their great exertions in the last forced marches,† took a rest in Hecatompylos and its environs. Polybius, Appian, and other authors mention that Hecatompylos, later on the residence of the Arsacids, was at a point of divergence of several roads. From this fact comes the Greek name which was given to it by Seleucus I. instead of the native name unknown to us.

The real position of this ancient town is still a puzzle to us; some authors think it was at Damghan; others put it on the site of Bustam; and others again even as far away as Jajarm; but only Damghan corresponds to the facts mentioned below, and even Damghan leaves a certain doubt. The Greek geographers counted 1260 stadia or 233 kms., distance from the Caspian Gates to Hecatompylos. Now Damghan is reckoned to be about 262 kms. distance from the defiles of the Kuh-i-Namak or the Caspian Gates which Alexander passed; whereas Bustam and Jajarm are much too far east.

Curtius writes:‡ "On the third day [after leaving Hecatompylos] of his march through Parthia, he [Alexander] arrived at the boundary of Hyrcania [Varkana], having left Craterus with the troops under his command and the detachment which Amyntas led, and also 600 horsemen and as many archers in order that Parthia might be fortified against an invasion of the Nomads. To Erigyius he gave orders to forward the baggage under a small escort along the plain road; he himself with the phalanx and the cavalry advanced for another 150 stadia (28 kms.), and then fortified a camp in a valley which gave access to Hyrcania. There rises a dark forest of very high and dense trees; the soil of the valley is rich and irrigated by springs which flow from the rocks which rise above it. At the base of the mountain-chain rises the river Ziobetis, which flows for about 3 stadia undivided: then, rebounding from a rock which interrupts the river-bed, it parts its waters into two halves, of which each flows a separate way. From this point becoming a rapid stream of all the greater violence for the rough rocks between which it flows, it plunges underground and flows invisible for 300 stadia (56·4 kms.). After that it breaks out again at another spring and forms a new river-bed, more spacious than that of its upper course, for it flows with a breadth of 13 stadia (2·5 kms.); thereafter it is once more squeezed between narrow banks and reduces its course, till at the end it discharges into another river called Ridagnus."

This boundary between Parthia and Hyrcania, as well as the rivers mentioned, Ziobetis and Ridagnus, are important landmarks, which we must trace and fix before we discuss the position of Hecatompylos.

To the north-west of Damghan rises the Sefid-kuh range, and to the north the Soldar mountains, which are divided by the defile Damghan–

* 'Anabasis,' iii. 23.

† He had passed eleven ordinary daily stages in something like six days.

‡ Curtius Rufus, vi. 10.

Astaneh. Behind these mountains stretches the long and broad valley of Fuladmahalleh–Chashmeh-i-'Ali–Chehardeh. This valley is flanked on the north-west by a range of mountains, which represents the boundary between the province of Damghan—the ancient Parthia—and the district of Hazar-Jerib, or Tabaristan, the former Hyrcania, or at least part of it. The south-eastern slope of the boundary range, as well as all the country to the south of it, is destitute of any vegetation except that produced by artificial irrigation; whereas the north-western slope of the mountains, as well as the whole country down to the Caspian Sea, is well wooded and has altogether a luxuriant vegetation.

Near the meridian of Damghan, this S.W.–N.E. boundary range takes a W.–E. direction, and at the mountain-knot of Mian-ab, where the rivers Dorudbar, Shahkuh, Mujin, Tazireh, Chehardeh, etc., have their sources, divides into two ranges, of which the northern consists of the mountains Shahkuh, Shahvar, and Belamberan, striking S.W.–N.E. and ending at the valley of Abri. The second range consists of the Tapal mountains, which strike W.–E. and are cut by the defile Shahrud-Bustam.

Where the boundary range turns to the east, and the road from Damghan to the village of Shahkuh crosses it, is a river called Dorudbar (Turudbar; = two river-beds); on the right bank of it at this place, extending as far as the rivulet Bar-kuh, is an open valley, still covered by a forest of high old juniper trees. In fact it is the first forest that we meet coming from the south. As to the Dorudbar river, the first part corresponds to the description which Curtius gives of the upper course of the Ziobetis river: on its lower course it runs along a narrow cleft of rocks, named Shamshir-Cur (= cut by the sword). This cleft might not have existed at the time of Alexander, and could have been produced later on by earthquakes, which in this district are very frequent,* therefore it is possible that in Alexander's time the river flowed partly underground,† and that this is the Ziobetis river, as no other exists in this part of the country or east of it, which would answer so well to the description. The valley with the juniper forest was perhaps the place where Alexander camped before entering Hyrcania; it would be difficult to find in these rough mountains a place more adapted for a large camp.

The Dorudbar at some distance from its source joins the Shahkuh river, then flows through the broad valley of Asp-u-nizeh and the plain of Rudkan (about 25 kms. broad), where at the foot of the mountains are the ruins of an ancient tower with a conical cupola. Then the river bed is again squeezed in between rocks and opens near the present

* The village of Tash to the east of this place is an earthquake centre, and about every five years suffers from earthquakes. In 1890 it was totally destroyed, but again rebuilt.

† Crossing in 1906 from Firuzkuh over the mountains to Barfrush, I passed in one place a cleft of the rocks in some places only about 1–2 yards broad, 1000 feet high, and 2 kms. long, on the base of which a rivulet flowed through a tunnel of about 10 yards in breadth and height.

caravanserai Barkala, where it joins the river coming from Iunezar. The valley then broadens again considerably, and the river, which here bears the name Nikah, after flowing westerly from Barkala for about 70 kms., issues into the Caspian coast plain; here it is sometimes called Gauher-Baran river. Probably the Nikah river with the Iunezar, was called in ancient times by the Greeks "Ridagnus"; whereas the Dorudbar Asp-u-nizek river was the Ziobetis.

If we consider that Alexander took three days to reach the boundary of Hyrcania from Hecatompylos, and 28 kms. more to the camp in the forest, it is evident that Damghan could hardly be the ancient Hecatompylos, as from it to Chashmeh-i-'Ali or Chehardeh would be only one day's march. These places must be considered to be near the boundary of Hyrcania, hardly two days' journey; whereas from Chehardeh to the presumed camp at the Dorudbar would be about the 28 kms. mentioned. Moreover Damghan is no greater road junction than Samnan, Firuzkuh, or Bustam, and the few roads that cross there could have hardly given the town the name of a hundred gates.

Ruins which might indicate the position of an ancient town are unknown in the environs of Damghan. All these considerations have led me to the following supposition:

Once when I was following the old military road from Samnan to Damghan, I noticed to the south of Gusheh a group of isolated hills of peculiar form, and noted them on my map.* These isolated hills, of which there are quite a number, encircle a plain of elliptical form; the plain inside I estimated to be 10–15 kms. long and 3–4 kms. broad. It afterwards struck me that these hills might possibly enclose the ruins of the ancient Hecatompylos, and that the many apertures between the hills had given the impression of gates, from which the name "Town of a Hundred Gates" had been derived. The place is now desolate and without water supply; but through the Tueh-Dervar valley to the north of Gusheh flows a very abundant stream, so that the valley, over 10 kms. long, is so well irrigated that it resembles one long park. This stream might possibly in former times have been led into the plain inside the said hills.

So far as I know, no European has ever explored this spot, and therefore I should recommend some future traveller to take the trouble to visit it from Gusheh, so as to ascertain if there are any ruins on the plain between the isolated hills, and if my supposition is right.

This possible position of Hecatompylos would not only explain the three days' journey to the boundary of Hyrcania, but it would also agree with the distance of 1260 stadia from the Caspian Gates, as calculated by the Greek geographers.

Curtius continues†: "Already having given four days' rest to his soldiers

* *Petermanns Mitteilungen*, Gotha. Ergänzungshaft No. 118.

† Curtius Rufus, vi. 11, 12.

on the same spot . . . he marched, with his troops ordered in squares : . . . the warlike population, as well as the difficult and inaccessible natural character of the country, kept the king uneasy. For it is one long uninterrupted valley down to the Caspian Sea, into which, as it were, two arms of it project, enclosing between them a bay of moderate curve that greatly resembles the moon when its disc is not yet full and its horns project."

This description fits admirably the valleys of Asp-u-nizeh and Nikah and the bay of Asterabad.

After leaving the camp on the Ziobetis river, Alexander probably passed through the defile of the Shahkuh valley into the broad valley of Asp-u-nizeh and camped during the four days specified on the plain of Rudkan, near the short defile of Barkala.

Curtius : * "From here the King advanced 20 stadia (3·7 kms.) on a nearly impassable path, with a forest hanging over it and torrents and gutters impeding his march ; but as no enemy opposed him he got through, and at last arrived in cultivated land. . . . There grew many trees, which had the appearance of oaks ; but from their leaves honey dropped abundantly. If the inhabitants do not collect this juice before sunrise it dries up even though the temperature be moderate."

It is clear that, from his camp at Rudkan, Alexander advanced to the present village of Barkala, and from thence went over the forest-covered ridge which separates the valleys of the Asp-u-nizeh and Nikah from the low lands of Asterabad bay. This he observed from the top of the ridge, whence it looks exactly as Curtius describes it. This path, though much frequented at present by caravans from Shahrud and Bustam to Bandar-i-Gaz, is still in just as bad a condition as it was at the time of Alexander.

On the northern side of the ridge Alexander entered the plain of Bandar-i-Gaz (= Shore of Gaz), a small town and port on the Caspian Sea. "Gaz," or "Giaz," is the Persian term for a sort of manna ; a sweet juice which, as a result of perforation by insects, flows out of the leaves of a certain sort of oak, and when dried is like sugar. This "gaz" is largely collected in Kurdistan, and at Isfahan is used for the manufacture of a sort of sweet also called "gaz."

Curtius † : ". . . 30 stadia (5·5 kms.) he advanced from here . . . and arrived at the city of Arvæ."

Though the distance indicated is exactly that from the foot of the ridge to the town of Gaz, it is impossible to ascertain whether Gaz is the same as Arvæ, or whether there was another small town of that name between Gaz and Ashraf. I remember that a place on the bank of a dry river-bed, somewhere about the village of Ruh, was named to me : "Kohne-shehr," *i.e.* old town.

Further, Curtius describes the progress of Alexander in a western direction against the Mardi, whom he defeated, and writes : ‡

* Curtius Rufus, vi. 13. † *Ibid.*

‡ *Ibid*

". . . From this point he returned on the fifth day to his camp. . . . They had already arrived at the city of Hyrcania, where the palace of Darius stood."

It is impossible to say what town is meant. If it is Ashraf, the palace is that which is still standing (restored by Nasir-ed-Din Shah) to the west of the town on a high projecting rock overlooking the Bay of Asterabad, and which is said to have been at times the residence of the kings of the Safi or Safavi dynasty. Or it might be Barfrush, where a palace had stood on an artificial island surrounded by a broad ditch. On the south side of this town is a large site square in shape and artificially raised, where once perhaps a camp has been. If this was the camping-place of Alexander, five days would not be too much for him in which to defeat the Mardi and to return to the camp. On the other hand Strabo * mentions a king's residence called "Tape," which stood only a little above the surface of the sea and was 1400 stadia (259 kms., distant from the Caspian Gates. The Turks call a hill "Tepe." In this part of the country is an artificial hill called "Qara-tepe" (black hill), 7 kms. to the north-west of Ashraf and about the distance required from the Caspian Gates *viâ* Firuzkuh and Sari.

Arrian writes: † ". . . he himself with the archers marched through the defiles and then camped in the valley beside a river of no great size."

It is difficult to say whether this camp was the one at Rudkan or one on the northern side of the ridge and passes near Gaz. The last may be more probable.

". . . For four days Alexander remained in camp. . . . Thence he started to advance into Hyrcania against the town of Zadracarta. . . ."

Here Alexander was joined by Craterus, who had passed the land of the Tapurs, probably by the route Astaneh, Fuladmahalleh, Pelvar and along the Tejan river, by Erigyius with the baggage animals and carriages, who could only have come from Fuladmahalleh over the Alpine pastures of Khing and Aseran and the valley of the Talar; and also by Artabazus with his sons, coming from Firuzkuh, where the Greek soldiers of Darius, after leaving him near Samnan, had remained.

Arrian: "He himself moved against the Mardi. . . ."

After the defeat of the latter, he returned to the camp from which he had advanced against the Mardi. He then arranged everything necessary for the administration of the conquered country, and—

Arrian: ‡ "After all this had been arranged, he led his army to Zadracarta, the largest town of Hyrcania, where was the palace of the Hyrcanian kings. Here he remained fifteen days . . . and thence advanced towards Parthia. Thereafter he passed into the district of Aria and reached Susia (Tus?), a town of the Arians. . . ."

* Strabo, 508. † 'Anabasis,' iii. 23. ‡ *Ibid.*, iii. 24.

We have followed the march of Alexander more or less satisfactorily as far as the coast of the Asterabad bay at Bandar-i-Gaz; from here he advanced in a westerly direction towards Zadracarta against the Mardi. From this point the description of his movements, given by the Greek historians, leaves much to be desired.

The so-called Amardi or Mardi are said to have inhabited the higher mountains of the Elburz from about the Qizil Uzun and Sefid Rud rivers in the west as far east as the boundary river between Media and Hyrcania, named Charinda. Some authors suppose that Charinda is identical with the present Haraz river, which has its source in the Demavend mountain, flows through the town of Amul, and falls into the Caspian Sea; but this can hardly be the case, since the easiest and, even during the winter, the most frequented road from Media to the Caspian lowlands runs through the Caspian Gates (Kuh-i-Namak defiles) and Choarene (Khar) up the present Hableh Rud to Firuzkuh, hence over the easy Gaduk pass and down the valley of the Talar river to the Caspian plains (Mazanderan). As the name Charinda (Kharinda) indicates, there must be some connection between it and the district of Choarene (Khar), and Charinda was probably the ancient name of the Talar river. The name "Talar" must have been derived later on from the place which Strabo calls Talarbroca, and describes as a large open town with a castle situated on the northern part of the mountains. Probably the inhabitants of the present districts, Chelab, Shirgah, Band-i-pei, and Savad Kuk, were named Mardi; whereas the inhabitants of the east of the Talar river were the Tapurs of Hyrcania.

Moving from the district of Bandar-i-Gaz, Alexander passed Ashraf and Qara Tepe; then, going along the shore of the sea to avoid the thick woods and low moorlands between the mountains and the sea, and leaving Zadracarta to the south of his road, he advanced near to the present Meshhed-i-Sar (Mandagarsis?); then he turned to Barfrush (Samariana or Saramanna?),* where he pitched his camp and where he undertook his expedition against the Mardi probably up the valleys of the Babul and Surkh Rud rivers. The five days which this expedition lasted could not have taken Alexander very far into the mountains. From this camp he advanced to Zadracarta, where he stopped fifteen days.

The capital of Hyrcania is called Zadracarta by Arrian, Karta by Strabo, and Syrinx by Polybius. It was not far from the source of a small river. There are many facts which support Sari's claim to be Zadracarta (Zerd-karta, Sari-Karta).† It is about half a kilometre to the west of the Tejan (Maxera) river, at its exit from the mountains and near the sources of a smaller river which passes it on the west. The town stands higher than Barfrush, and even now it is a considerable

* Or Orocana?

† Sare-Karta or Sari-Karta = Head-town.

place with a palace of the Shah where the governor of Mazanderan lives.

From Zadracarta Alexander advanced probably by the road up the Tejan river over Pelvar, Fuladmahalleh, and Astaneh; and issuing from the defile of Astaneh-Damghan, he passed the present Taq or Tagh and continued his march along the military road to Aria.*

It is strange that, if Damghan were identical with Hecatompylos and situated on the military road, it should not have been mentioned, when Alexander passed it so near on his return from Hyrcania.

THE BAHR-EL-ARAB

M. J. Wheatley, Governor of the Bahr-el-Ghazal Province

IN vol. 61, No. 5, of the *Geographical Journal,* May 1923, there is an account of a lecture by Dr. Cuthbert Christy on "The Bahr-el-Ghazal and its Waterways," and on pp. 328–32 is a discussion of what little was then known of the Bahr-el-Arab and the importance of determining its navigability. I have recently, with Lieut. J. M. Stubbs, 3rd Hussars, followed the course of this river from approximately meridian 27° to meridian 25°, that is to the junction of the rivers Adda and Umbelacha, which together form the Bahr-el-Arab. Thence we followed the Umbelacha to Hofrat-el-Nahas. The following description of the river is going upstream.

The Bahr-el-Arab at the point where we struck it at Safaha, roughly in long. 27° E., was in April about 40 yards wide and 10 feet deep. Going westward the water gradually shallowed for about 18 miles until the bed was quite dry. The channel was then about 12 yards wide and 10 feet deep, and extremely circuitous, so much so that navigation would be quite impossible. After about another 18 miles the channel begins to open out again and to become shallower. It continues to broaden until it reaches a width of as much as 120 yards and is some 6 to 8 feet deep. The sides and bed are sand. There were numerous pools of water, many of them very deep and full of fish. At the many bends in the course there are large accumulations of sand, and at the convex bank of these bends the channel is quite shallow. In our opinion even this section of the river would be difficult to navigate, and it could be accomplished only during high flood. The reason for the above change in the size of the river is undoubtedly the fact that for about 30 miles the water spills out over the country and annually floods a large area. This

* Alexander marched to "Susia," supposed to be the former town of "Jus," the ruins of which are situated about 20 kms. to the north of Meshed and from here to Kuchan (Alexandria), from where he advanced to the place called "Dare," probably the defile and pass which now leads to 'Ashqabad, and then turned towards Kelat and Herat (Artacoana), the capital of Aria.

Devon the thick soils of an unglaciated region lead to the use of cob for building, and a long low type of farmhouse is evolved.

Several foreign influences affected the architecture at various times, but the styles were always, to some extent, modified by local feeling and workmanship. The bulk of the trade of the Exeter district was with Holland, and Dutch engineers were employed to render the river navigable. Many of the houses of Exeter and Topsham are typically Dutch, and in some cases rubbed bricks were specially imported. The successive fashions in domestic architecture found their way from London to Land's End, and two interesting points are brought out: the various styles, such as the stucco of Nash and his period, are traced along the great west road and the modifications brought about by local tradition are noticed. Such fashions naturally affected the "country seats" of noblemen and the houses whose owners were familiar with London more than those of the humbler folk, who regarded the greater part of England as a foreign country. St. Ives is a typical village of granite cottages, many of which are later in date than such brick houses as the "Retreat," aptly compared by the authors to a red-coated Hanoverian soldier among the fishermen.

The photographs and sketches, over two hundred in number, are all placed appropriately in the text, an advantage somewhat discounted by the consequent use throughout of a heavily loaded paper, making the book difficult to handle. The latter part of the book betrays evidence of hasty writing in the style and grammar and a few slips; geologists will be amazed to find the Totternhoe stone, rightly compared with that of Beer, described as the "old red sandstone of Bedfordshire," and Cookworthy's discovery of china-clay should be dated 1753, not 1733. There is a useful index of illustrations as well as a general index. In the Introduction the authors suggest that five architectural regions should be recognized in England; we hope that they and Messrs. Benn will give us similar volumes on the remaining four.

C. N. B.

ASIA

Sport and Service in Assam and Elsewhere.— Lieut.-Col. Alban Wilson, D.S.O. London: Hutchinson & Co. 1924. $9\frac{1}{2} \times 6$, pp. xv. + 320. *Illustrations.* 18*s. net.*

Colonel Alban Wilson served for twenty-seven years in the 1st Battalion of the 8th Gurkha Rifles, mostly on the Assam frontier. During that time he obviously made the most of his opportunities for sport, and every page of this genial, discursive, and easily written book shows him to be the true hunter, and above all the true fisherman. His most unpleasant adventure was an encounter with a rogue elephant which charged him, and he describes how "the thick, heavy grass, which was at least 8 feet high, pushed aside by his body as he passed, forced me backwards," and declares that he has "never been in such a funk either before or since." He gives an interesting account (which might well have been elaborated) of the Abor expedition of 1894, and has much of interest to say of the Nagas and other frontier tribes, while his book is most eloquent testimony to the splendid spirit of his Gurkhas. "There is not one," he writes, "no matter how queer a character he may have been, of whom I do not retain some pleasant recollection." The book is admirably produced and the photographs are excellent.

O. R.

The Geographical Journal

Vol. LXIV No. 6 December 1924

THE MOUNT EVEREST EXPEDITION OF 1924

Joint Meeting with the Alpine Club at the Royal Albert Hall, 17 October 1924.

I. INTRODUCTION

The Earl of Ronaldshay, President R.G.S.

MANY of you who are present to-night were able to attend the beautiful Memorial Service held at St. Paul's this morning to the memory of Mallory and Irvine. Those who were prevented from doing so will wish to join in the tribute of admiration, affection, and respect which was then paid to the memory of these two men whose dauntless spirits refused to be bound by the fetters of their earthly bodies, and in that refusal found a glorious release. "We expect no mercy from Everest," declared Mallory after the climbers had been driven from Camp III. for the second time by abnormal weather. They received no mercy, and they died. But not, surely, in vain; for in dying they showed that the upward aspiring spirit of man, which will sacrifice all in its pursuit of an ideal, is a living and compelling force in determining the conduct of the individual, and equally therefore in shaping the destiny of the human race. I shall move no formal resolution of condolence, but will ask you to pay your tribute of respect in silence by rising in your places.

The story of the Mount Everest Expedition of 1924 will be told to you by those who actually took part in it—by General Bruce, who has the sympathy of all of us in his ill fortune in being compelled to relinquish the command by a temporary break-down in health; by Colonel Norton, who shouldered the responsibility of leadership with such conspicuous success; by Captain Geoffrey Bruce, who played so large a part in establishing those high-altitude camps upon which the success of any attempt to scale Mount Everest must necessarily depend; and by Mr. Odell, who was in support during the last great climb which ended in the loss of Mallory and Irvine. In these circumstances I need do no more than make bare mention of the outstanding achievements of the Expedition. The highest camp at which a night was spent during the attempt in 1922 was 25,000 feet; this year a

camp was established and nights were passed at 26,700 feet. In 1922 all previous records were beaten when Mallory, Norton, and Somervell without oxygen, and Finch and Geoffrey Bruce with oxygen, climbed to close on 27,000 feet and 27,250 feet respectively. This year these records have in their turn been beaten by Norton and Somervell when they climbed to 28,130 feet without oxygen, and by Mallory and Irvine when they reached 28,230 feet for certain and probably a greater altitude with oxygen. When it is remembered that these feats were achieved after the physical vigour of the climbers and the *morale* of the porters had been affected by two retreats to the base camp imposed by violent climatic disturbances—blizzards of snow accompanied by as much as fifty-six degrees of frost—the real magnitude of what has been accomplished becomes apparent.

Is the fight finished? Is the possibility of climbing Mount Everest to be left in doubt? Neither the members of the Expedition nor of the Mount Everest Committee are content to let the matter rest where it now stands, and it is our intention to apply immediately through the Government of India for permission from the Tibetan Government to make another attempt, possibly in 1926.

I will now ask General Bruce to begin the story.

II. THE ORGANIZATION AND START OF THE EXPEDITION

Brigadier-General the Hon. C. G. Bruce, C.B.

I find that I am down to follow the President of the Royal Geographical Society both in my capacity as President of the Alpine Club and as the original leader of this year's Expedition.

As President of the Alpine Club I consider myself free to offer my warmest congratulations and to express my admiration to Colonel Norton and to the members of the Expedition, for his (Colonel Norton's) wonderful leadership, and to all for the heroic efforts which they all made. I must also express on the part of the Alpine Club the deep sorrow felt for the loss of two gallant members of our expedition who made their sacrifice in the most terrific effort of all mountaineering history. They were two magnificent personalities, and have the finest cenotaph in the world, and are worthy of that splendid monument.

Speaking now as the original leader of the Expedition, I must pass on to its organization. Colonel Norton, Captain Bruce, Mr. Shebbeare, and myself found ourselves in Darjeeling in the last days of February. There we found a large collection of porters, both true Tibetans and Sherpas, for us to choose from. We also found local supplies which had been ordered by our excellent agent Mr. Weathered, all ready for forwarding to Tibet. Our old interpreter and our old headman of porters were also ready to re-engage.

Owing to the experience gained on previous expeditions, and our exact knowledge of the geography of the district, and of where the high camps would be placed, it was found possible to earmark our stores for the different camps, so as to save time at our Base Camp. These arrangements were made by Norton and Bruce, and Shebbeare was despatched to Kalimgpong to take delivery of the stores and forward them on by our contractors into Tibet. All went swimmingly, and as soon as our whole party was collected, which was at the beginning of the last week in March, we were able to set out.

We marched in two parties in order not to overcrowd the rest-houses on our route, and collected in the beginning of April in Yatung. Certain arrangements had to be made there, but the party and its entire stores were gathered in Phari by April 5. We were a day earlier than in 1922, but experienced the whole way up an infinitely milder climate. Phari, to our intense relief, and somewhat to our surprise, was almost balmy. There we had rather more than our expected troubles with the local authorities, who are of a peculiarly grasping nature, and had taken the opportunity of putting up the prices of everything 25 per cent. over 1922 rates. We had a two days' battle, and a dramatic *finale*, when a telegram to the Prime Minister of Tibet reporting their conduct was torn up in their presence as soon as a suitable agreement had been arrived at. We had previously discovered that orders had come from Lhasa directing every assistance to be given us, but the final collapse of the Phari authorities was both dramatic and amusing.

From Phari began the second stage of the march across Tibet to the Base. We left Phari on April 7, the main party, owing to the curious district restrictions on transport in Tibet, marching *viâ* the Dongkar-La to Kampa Dzong, and Major Hingston, Mr. Macdonald our postal expert, and myself going with a light outfit by the Tuna, Dochen, and Tatsu Tatsung route. However, I was obliged through illness to relinquish the command of the Expedition at Tuna, and hand it over to Colonel Norton.

Disappointing as this step was, it was partially made up to me by the personality of my successor, for no finer or more inspiring leader could have been found, and this is borne out by the manner in which he dealt with the immense difficulties and hardships occasioned by the terrible conditions met with this year.

One word about the weather. All through May there was a wave of cold and wet weather over the whole of the Western and Central Himalaya, brought by strong winds from the west, and giving in the Panjab and North-West Provinces almost the lowest temperatures ever experienced for that time of year. These storms and winds had nothing to do with the monsoon, which itself was favourable, in that it was about a week later in arriving in the Eastern Himalaya than is usual. This condition was a thorough bit of bad luck, and very unusual. I think it

will be seen that at the time of the final effort on Everest the weather was extremely favourable, which was probably due to the slight delay in the monsoon.

With regard to the porters, they had an extraordinarily rough time, but to get so large a percentage as six men who were able to carry loads to the terrific height of 27,000 feet is in itself remarkable, considering the way the men had to be chosen; for, after all, with the exception of certain old hands, they were picked from a crowd of men who had come for daily labour to Darjeeling.

I will leave it to other members of the Expedition to give an account of the personal prowess of its members, but I must draw attention to the results of the Expedition.

It is perfectly clear that the summit of Everest can be reached—certainly with oxygen, and in all probability without it—for there is no doubt that the very severe conditions experienced before the weather cleared up left the members of the Expedition less fit than they otherwise would have been.

We have quite clearly increased the standard of expectation. Who would have thought four years ago that men could climb without oxygen to over 28,000 feet? Who would have thought that three ascents between 25,000 feet and 27,000 feet would have been accomplished inside the same week by the same climber? And who, again, could possibly have forecast that men were to be found who could possibly carry loads to a height of 27,000 feet?

A slight addition has also been made to the geography of the mountain. The West Rongbuk Glacier and its neighbourhood have been surveyed, and other additions to the map have been made at the head of the Dzakar Chu. Another great Himalayan gorge also has been further explored, the Ringshahr.

Later on, no doubt, Major Hingston will give an account of his physiological observations on members of the Expedition, and he has brought back also an immense collection of insect and plant life.

I will now hand the story on to Colonel Norton, who will tell you about the *personnel* of the Expedition.

III. THE PERSONNEL OF THE EXPEDITION

Lieut.-Col. E. F. Norton, D.S.O.

I feel that an account of an expedition which omits some description of the members is a sadly colourless business. I should like to be able to make these men real flesh and blood to you instead of mere lay figures. Unfortunately the time available is too short for me to hope to do this, even had I the talent, and I must content myself with a very brief introduction.

I have an uncomfortable feeling that, as I go on, you will conceal a smile at what you may term a mutual admiration society. I would be the last to suggest that we were a party of little tin saints, but it is a matter of common knowledge that expeditions involving some hardship have a way of bringing out the best that is in every man and of obscuring his faults. In this lies the greatest virtue of such enterprises. It is not my business to-night to talk of the faults.

When *General Bruce* went sick we sustained a loss which—irreparable as the loss of such a leader must be to any expedition—was doubly so in an exceptional year. For it was just in the conditions which we met this year that General Bruce's well-known influence over our Himalayan *personnel* might have made so great a difference.

Yet it must not be forgotten that we owe him much of what was achieved this year. To him must be given the credit of having collected the very strong party we were, for with him rested the last word in the selection of the British members, and it was he who actually chose the porters and other Himalayan establishment.

The very name of Bruce is a charm to conjure with all along the Himalaya, but more particularly in and around Nepal. He it was who, by his treatment of the people of the country great and small, consolidated the permanent way across Tibet which a Mount Everest expedition now follows so comfortably.

I would add that—much as I appreciated the chance of leading this year's party—no one recognizes more than I do what we lost when we lost our leader, and it was with nothing but regret that I got my opportunity under such circumstances.

I think every one will agree with me when I say that the first task of an Everest expedition is to get to Mount Everest. So I speak next of the man who virtually took us across Tibet to the mountain, and well up its slopes to the higher glacier camps.

Without *Geoffrey Bruce's* previous experience and sound advice we should often have been sadly at a loss on our journey to the Base Camp; and, arrived there, it was organization which established Camps I., II., and III. in record time. But first and foremost it was Geoffrey Bruce who ran our porters: he it was who disciplined them, who attended to their wants and comforts, and who put heart into them when they were down on their luck. For he is gifted with the power of leadership, inherent in the first instance, and practised in eight consecutive years of war.

I think that if our porters were asked to sum him up their verdict would be: "The Captain Sahib is a hard man—but a just. Skrimshanking and malingering are useless with him, and he has an unaccountable lack of sympathy with the common failings of mankind;

perhaps he is a teetotaler. But he knows us and understands us and our language ; when we are really in trouble he is the man to go to. Further, he will never demand of us anything he is not prepared to do himself."

Bruce is emphatic that he is no mountaineer : then he is a very good imitation of one. Two years ago he established with Captain Finch the world's record by reaching a height of 27,200 feet odd. This year, when we re-cast our plans halfway through the campaign, he was selected to go with Mallory on the first attempt as being undoubtedly the fittest and strongest of us. Unfortunately, he temporarily strained his heart carrying into camp (at 25,500 feet) the loads of porters whose strength failed them short of camp. And so he could take no further part in the high climbing.

To my mind *Somervell* shares with Mallory the distinction of having been one of the mountain's two most formidable antagonists.

His physical toughness is remarkable : in 1922 he reached a height of nearly 27,000 feet, and was the only one of those who went high to be absolutely unaffected. His holidays in the Alps have always taken the form of climbing one first-class peak per fine day for weeks on end. This year his going power high up was seriously affected by a very bad cough and sore throat—the " high altitude throat " which attacked so many.

But Somervell has—as had Mallory—a moral reserve on which he draws to make good any physical disabilities, so that it hardly matters whether he is fit or not—he is always fit to go high on Everest ; and it was this reserve of determination which carried him this year to the North Col under circumstances of which you will hear again, and later to a height of 28,000 odd feet without oxygen.

Gifted with an exceptionally quick and versatile brain he is a surgeon by profession, an artist and musician in his spare time. One of the most familiar sights on the expedition was his figure perched on a rock sketching, or, surrounded by itinerant Tibetan musicians, jotting down their music on the back of an envelope. Not the least interesting thing in an interesting personality is that he has deliberately chosen to apply these many talents to the duties of surgeon in a Mission hospital in remote Travancore in preference to a sure success in Harley Street.

Odell shared one characteristic with Somervell: he acclimatized slowly. We did not in time this year draw what may well be the logical inference—that in this, as in other matters, slow is sure. Certain it is that these two slow acclimatizers have achieved more with less physical deterioration than any one else in our brief record of really high climbing. I feel that Odell was never given the opportunity he should have had this year, and that our chances of success were prejudiced thereby.

Odell's reputation as a mountaineer and an explorer is known to

most of you. Being also a scientist and a mechanic, he shared with Irvine the labours and responsibilities of the oxygen apparatus besides organizing the important department of high-altitude cooking with Primus or Meta stoves.

As a geologist not the least of his achievements was the discovery of the long-hoped-for fossils at a height of over 25,000 feet.

It was the famous firm of Odell & Irvine which gave so fine a display of the most unselfish team work in a year when team work was a salient feature. I refer to the way in which they created the *rôle* of supporter on the North Col.

Having experienced to the full the meaning of such support, I speak with feeling. On its way up the mountain each party was welcomed by the Old Firm, its tents were allotted, it was fed, waited on, and served in every way. I leave you to guess how these attentions were redoubled when the same climbers returned somewhat the worse for wear after going high, and the supporters met them with lights and drinks well on the Everest side of the North Col and took complete charge of the weary party.

Odell alone has carried out the last and hardest task of a supporter—the forlorn-hope search for a party fatally overdue.

If the performance of these duties denied him his chance of the top it gave him another opportunity: it gave him the opportunity of beating all records for continuous climbing at really high altitudes. For in addition to three previous trips from No. III. Camp to the North Col—one successful and two abortive—he in ten days did this same climb three times, and went from Camp IV. once to 25,500 and twice to 27,000 feet. The astonishing thing about this performance is that he finished up very little the worse for his exertions.

The stars in their courses fought against *Beetham*, and so deprived us of the services high up of a mountaineer of exceptional speed and endurance.

Passing through Sikkim on the outward march he contracted a severe go of dysentery. By sheer determination and force of character he recovered by the time we reached the Base Camp from an illness that would have sent many of us back to the Swedish Mission in Sikkim. Just as he was getting fit again at the Base Camp he was attacked by sciatica and badly crippled.

Heartbroken at being out of all that was going on, he got out of bed and, defying doctor's orders, he struggled "dot and carry one" up to No. III. Camp—determined to cook, to carry, to do anything to help the rest of the party. But here it was so evident—despite his sedulous efforts to conceal the fact—that he was a cripple that his brutal leader had to return him to the Base.

He contributed the majority of the still photographs this year, and

the public will have the chance of judging the very great success of his efforts in this direction.

But his whole heart was above the North Col.

I can only say that if an indomitable spirit coupled with every physical qualification of a first-class climber is what we want on Everest, you should hear of Bentley Beetham again. No mountain in the world can stand against the concentrated rage that he will bring to bear on his next attempt.

Hazard, like Odell, acclimatized slowly, and that his part in the high climbs was not a greater one may be largely attributed to this. He went to 25,500 feet, and, on Irvine's departure on the last climb, took his place as supporter on the North Col, to which he had already twice escorted convoys of porters.

When, heartily sick of the squalor and discomfort of high-altitude tents and feeding, we left the Base Camp for our little holiday among the trees and flowers of the Rongshahr valley, Hazard volunteered to lead a survey party back to the ice and snow of the West Rongbuk glacier, of which the reconnaissance was regarded as a task of some importance. Undeterred by the breaking of the monsoon the day after he started, he successfully carried out this operation, and we owe the results achieved to his hardihood, for—with the exception of Beetham, whose photographic skill was needed in the Rongshahr—no one else would have volunteered for a prolonging of conditions of which we had had more than enough.

Hingston was our doctor and naturalist.

The qualities required for a doctor on an expedition of this sort are peculiar. Medical skill is one of them, and Hingston was well qualified in this respect.

Far more important are the human qualities of common sense, sympathy, and energy; the power to detect unerringly the really sick from the fancied sick, the power to enlist the confidence of the simple hill-folk with whom we had to deal. It was the possession of these qualities that made our doctor the right man in the right place.

As a naturalist he probably enjoyed the whole expedition even more than any of us; and when I tell you that his collections include some ten thousand specimens it will give you some idea of his industry and keenness. Every stone in Tibet was to him a potential gold-mine, for under it might lurk something really fascinating—such as a tick.

Hingston professed himself no mountaineer, and I believe he was right in that he has only a limited experience of ordinary snow slopes in the Pamirs, and has done no climbing in the Alpine sense. But it was characteristic of his all-round efficiency that he once escorted a blind man down the 2000 feet of formidable ice cliffs, snow slopes, and glacier

between the North Col and No. III. Camp, placing his every footstep and holding him up in complete security in a style that would have done credit to an Alpine guide.

Shebbeare is in the Indian Forest Department: his work has taken him much into the foothills of the Himalayas in Bengal; consequently he talks Nepalese and knows and understands the hill-men. These qualifications helped to make him the valuable transport officer he was.

But it was his temperament that made him so great an asset to the party. Not for nothing has he the reputation of being the most popular man in the Darjeeling district, for he is peculiarly gifted with those qualities of good nature, equanimity, and sympathy which made him as popular with our porters as with the British members of the party.

Hence it was that once he was established as king of Camp II. i/c of lines of communication, we never had to give a thought to this department, no less important on an expedition of this nature than in war, while the porters were content in the knowledge that they had a " father and a mother " in the old " she bear."

The name of *Noel* is as familiar to most of you as his work.

This year he specialized on the cinema, leaving most of the still photography to Beetham. The results of his most assiduous labours and of his organizing ability will speak for themselves. It is more of his part as a member of the expedition that I would speak now. For though he ran his own separate organization he was out to help the main expedition in every way, and his arrangements were so detailed and perfect that he was often able to supply us with equipment or man power when these were most welcome. Even now I cannot think of his little tins of potted meat without emotion.

From the loan of a magnesium flare as a distress signal to an offer to act as supporter up to any height there was nothing he was not ready to do for the furtherance of our schemes. As he is entirely unaffected by cold and hardship, and has a happy gift of hitting it off with the hill-men, he was a most valuable member of the party, apart from his technical skill in his own department.

In two years *Mallory* and I have spent many weeks together in a small tent; we were friends, and if you share a tent with a friend you get to know him very intimately.

Mallory had an ideal figure for a mountaineer, but it would have made little difference had he been of an inferior build—so entirely did his spirit dominate the flesh: of him might have been written the lines

> " If you can force your heart and nerve and sinew
> To serve your turn long after they are gone,
> And so hold on when there is nothing in you
> Except the Will that says to them, ' Hold on.' "

A fire burnt in him, and it made him one of the two most formidable antagonists Everest has ever had. He was absolutely determined to conquer the mountain, and no one knows better than I do how for several months this year he devoted his whole mind and will to this object.

At the same time those who suggest that he may have taken chances to achieve success in his last climb misrepresent him. For equally strong as his will to conquer was his sense of responsibility as leader of a party, and I know that he was prepared—nay, determined—to turn back however near the summit if it could not be reached in time to return in safety.

To his organizing power, his remarkable gift of concentration, his genius for detail, and his true appreciation of the task before us we owed this year much of our plans and much of our organization on the mountain.

In the Mess he afforded a marked contrast to what he was when actively employed: his temperament was singularly æsthetic and cultured for such a man of action. Impatient by nature, time had taught him a great patience, and this was one of the things that made it so pleasant to work and plan with him.

Such was Mallory. His death leaves us the poorer by a loyal friend, a great mountaineer, and a gallant gentleman.

Irvine was once referred to by General Bruce as "our experiment," for he was young—twelve years younger than the average age of the party—his mountaineering experience was limited, and he departed from what we considered the true Everest type in being big and strong rather than light and limber.

It did not take him long to justify the experiment. If he was young he was a man full grown mentally and physically, and at once took his place with all modesty on equal terms with the rest; if he was an inexperienced climber he proved one of the fastest of us, and I believe, though I never actually climbed with him, as sure and safe as any. If he was on the heavy side he was strong and active to a degree.

Mechanically he was a genius: from a broken camp chair to the more complicated valves of the oxygen apparatus, nothing came amiss to him. His tent daily assumed the aspect of a fitter's shop; here until late at night he would be found hard at work on the oxygen apparatus or doing some job for a friend who had long been tucked into his warm blankets.

He was always the willing horse.

Selected to take part in the first attempt with oxygen, he was, in our revised plans, relegated to a later attempt, giving place to others who were to try first without oxygen; as a result he, with Odell, became a supporter on the North Col. He never even hinted at disappointment, but tackled with unselfish energy and his usual enthusiasm the part of cook or scullion or nurse to a cripple.

That Irvine was loved by all of us for his cheery unselfishness, his

camaraderie, and his manly qualities goes without saying. It is perhaps more significant that he was loved by the porters, not a word of whose language could he speak.

Together these two went up the mountain for the last time: higher than ever man has been before they were last seen—one giving a hand to the other, and then—they were seen no more.

Could either have wished for a better friend to hold his hand at the crossing into the unknown land beyond?

IV. THE JOURNEY THROUGH TIBET AND THE ESTABLISHMENT OF THE HIGH CAMPS

Captain Geoffrey Bruce, 6th Gurkhas

The route taken this year across Tibet was almost identical with that of 1922. The uplands between Phari and Khampa Dzong, particularly the Dongkar-La, were as usual bleak and cold, but with the experience of 1922 behind us we were able to travel in far greater comfort than before. The baggage train consisted again of over 350 animals—yaks, donkeys, and bullocks—changed at each Dzong (capital of a district) aloug our route. This year we had very little difficulty over transport arrangements. Several of the Dzongpens we already knew. One and all seemed pleased to see us, and to do what they could to help us on our way.

From Khampa Dzong onwards there were no hardships or difficulties to speak of. Evenings, on arrival in camp, were generally spent in oxygen drills, conferences about plans of climbing the mountain, and so on. Beetham was very unlucky in suffering from an attack of dysentery in the early part of the march, but he refused to give in, and by the time we reached the base camp he had almost got over it.

On April 23 the Expedition arrived at Shekar Dzong. Our old friend, the Dzongpen, rode out to meet us, and it was at once obvious that he was ready to give us every assistance. Everest itself lies in his district, and it was a very great comfort to know that we had this capable and straightforward man to deal with. Our two days' stay there was busily spent in arranging with the Dzongpen for grain, meat, and fuel to be regularly supplied to the Base Camp during the next two months. He also gave us much personal help in collecting coolies to be used on the glacier in addition to our own specially enlisted porters. These coolies will be mentioned again. Four days later (April 28) we camped at the Rongbuk Monastery, only 5 miles from the site of our Base Camp. Unfortunately, the Lama was ill and unable to see us, or bless the porters as he did on our way through in 1922. We sent the interpreter to him with messages and presents—among the latter a yak-load of cement which he had specially asked for in 1922 for repair work to his monastery.

The following day we came to the end of the four and a half weeks' trek from Darjeeling, having experienced no really unpleasant weather the whole time. But conditions at the Base Camp were quite different. We arrived with snow falling and a bitterly cold wind. We were soon into all the warm clothing we possessed, and then buckled to the task of establishing the camp and sorting out stores and equipment ready to push up the glacier on the morrow. It had been decided to reoccupy the old sites of Nos. I., II., and III. Camps, and to have them established for the first attempt on the summit to take place on May 17. The position and heights of the camps were roughly:

Base Camp, 16,500 feet.

No. I. Camp at the junction of the Main Rongbuk and East Rongbuk Glaciers, 17,800 feet.

No. II. Camp, halfway up the East Rongbuk Glacier, 19,800 feet.

No. III. Camp, on the snowfield at the head of the East Rongbuk Glacier close under the North Peak, 21,000 feet.

Following this, Odell and Hazard were to reconnoitre and construct the route up the North Col. Odell and I were to establish Camp V. and return; then two simultaneous attempts should start for the summit, made by Norton and Somervell (without oxygen) and by Mallory and Irvine (using oxygen). To this end the tentage, rations, and equipment intended for each camp were selected and put into separate dumps on arrival at the Base, and the four Gurkha N.C.O.'s were entrusted with the important task of establishing Camps I. and II., and, in addition, putting into Camp II. all the loads required for Camps III. and IV., and the high camps on the mountain itself. In order to meet this big demand on porterage and to save our own men we had, through the good offices of the Shekar Dzongpen, started to collect local coolies at Shekar, and continued recruiting them between there and the Rongbuk Monastery. We now had at the Base Camp over 150 of them ready to begin work at once. Their terms were: pay at the rate of four tankas (about one shilling) a day and some rations. They were not to be employed on snow or ice, and requested to be quickly released when the work was done as they had the sowing of their fields to attend to. They undertook to look after themselves as regards tentage and extra blankets, but, as a matter of fact, they scorned the use of either.

On April 30, under better weather conditions, a convoy of 151 Tibetans under three Gurkha N.C.O.'s left the Base Camp for Camp I. Half the Tibetans were to remain in Camp I. and carry up to Camp II. on the next day, while the remainder were to leave their loads in Camp I. and return to the Base Camp for the night. On the following morning we were greeted with the news that of the 75 local coolies at the Base Camp 52 had deserted in the night. This was a very serious matter, and we feared that the Gurkha N.C.O.'s at Camp I. might be experiencing similar trouble. A transport strike at this juncture would effectively

cripple our detailed programme, so Norton, Shebbeare, and I went up at once to Camp I. to see how they were faring. We were greatly relieved to find that there was no sign of discontent among the Tibetans, and that the N.C.O.'s had everything well in hand and running smoothly. While we were there the first convoy from Camp I. to Camp II. was just returning. It consisted of men and women. We sat them down in lines and gave them extra rations and a promise of a rise in pay if they completed the establishment of Camp II. by the following evening. They were delighted and showed no inclination to be off home. One of these coolies—quite an elderly woman with grey hair—actually danced a *pas seul*, although she had just carried a 40-lbs. load to Camp II. over rough and difficult ground. Another woman—a mother—had insisted on carrying her lusty baby all the way on the top of her already full load, and now came into camp fresh and smiling. What was more, she and all the others were prepared to sleep again in Camp I., with no tent accommodation or extra blankets, and repeat the performance next day.

No more desertions occurred, and by the evening of May 2 we received a message from the Gurkha N.C.O.'s at Camp II. saying that Camps I. and II. were fully stocked as ordered. In these three days over 180 loads were put into Camp II. That evening all the local coolies were given a large feed and paid off, after which they went off towards Rongbuk in high spirits.

In the mean time our own Porters Corps was organized for work higher up into two parties of twenty each and a reserve of twelve. Briefly, they were to be utilized as follows: No. 1 Party were to go through with some of the climbers to Camp III., establish it, and remain based there for getting the next camp on to the North Col. A day later No. 2 Party were to move into Camp II. for the purpose of working between II and III. The reserve were to remain for the time being at the Base Camp. The Gurkha N.C.O.'s were to be in charge of the three camps to see to the feeding and welfare of every one in them, and to supervise the arrivals and departures of convoys.

The weather had now improved a little, but it was mainly cold and stormy, and the conditions on the mountain looked forbidding. Nevertheless we were able to go forward with the plan. On May 3 Mallory, Odell, Hazard, and Irvine left the Base Camp with No. 1 Party. No. 2 Party started on the 4th under one of the N.C.O.'s; and Norton, Somervell, and Beetham on the 6th. I followed with the reserve party on the 7th, while Shebbeare remained in charge at the base

Our good luck was not destined to last long. To begin with, poor Beetham, having recovered from his dysentery, now succumbed to a crippling attack of sciatica, which finally prevented him getting on to the mountain at all. I reached Camp II. on May 8. There things were far from happy. Most of the No. 1 Party of porters had been

unable to remain in Camp III., chiefly owing to the failure of No. 2 Party to carry their loads the whole distance from Camp II. to Camp III. Instead they had made a dump on the glacier below Camp III., and the men in Camp III. did not receive their extra blankets or rations, and suffered terribly.

Mallory came down from Camp III. to see Norton, and explained that there had been a temperature of $-22°$ F. the first night there, and very low temperature the next night. The men were all complaining of hardships and looked crestfallen and weary. The situation was a difficult one, and it was fully realized that the *morale* of the porters must at all costs be raised. The first step was to send for Shebbeare to come up to Camp II. and take charge. It was essential that there should be an officer at this camp who could speak the language, and ensure the safe arrival of convoys into Camp III.

It is worthy of note that from the moment Shebbeare came up and established himself as king of No. II. nothing ever again went wrong on the lines of communication.

In the mean time Somervell with a few men of the No. 2 Party got off to relieve the food situation at Camp III. The rest of the day was spent by Norton and Mallory in revising the plan, while I endeavoured to put some heart into the men. On the whole the results were good, for on the following morning Norton, Mallory, and I with a convoy of twenty-six porters left for Camp III.

The route over the glacier was somewhat changed from 1922, for instead of crossing the trough we followed along it for quite a distance. Here the scenery was wonderful, but one was in no mood to enjoy it. This part of the glacier is within the " gates of altitude," and in addition produces a special brand of lassitude which saps one's energy and enthusiasm for anything. Fantastic blue pinnacles surrounded us like a forest—some of them gigantic when we entered the trough, getting smaller as we emerged on to the glacier itself. The glacier surface consisted of absolutely smooth ice, varied by depressions and cracks full of powdery snow. Snow began to fall shortly after we left Camp II. It continued to fall all day, getting heavier and heavier and finally assuming proportions of a real blizzard, which was to last for forty-eight hours. The porters at Camp III. were wretched; the cold was getting at them badly. Many became so apathetic that they would not even attempt to cook food for themselves, although I pushed Primus stoves and oil inside their tents for them.

Wind and snow continued that night with unabating violence; the snow drifted into our tents to a depth of an inch or two, making everything miserably uncomfortable. Morning came and the snow stopped falling, but fallen snow was being hurled along the surface of the glacier by the wind, producing the same effect as a blizzard. Kami, our cook, rose manfully to the occasion, and produced for breakfast at about 10 a.m.

an unrecognizable mess in a Primus stove, followed an hour later by extremely unpalatable tea, which had been brewed in the same greasy pot. Still, it was hot and comforting, and we shall always be grateful to the faithful Kami.

We then reviewed the situation, and it was decided that Mallory and Irvine should move down to II. as a temporary measure and prepare for the possibility of evacuating altogether should the same weather continue. A message was also sent to stop Noel coming up with his cinema outfit, with which he subsequently obtained remarkable results. During the day Norton and Somervell did an excellent piece of work in braving the blizzard and getting down to the dump with seventeen porters and bringing up nineteen loads. As evening came on the wind blew still harder in tremendous gusts from every direction; the tents were again filled with snow, and the temperature fell to 39° below freezing-point.

Now there was no other course left but the evacuation of the whole line. The porters were in a bad way, the climbers were by no means improving, and in any case the North Col route would have been impracticable for several days. But to evacuate Camp III. was no easy matter, for the porters were all huddled up in their tents, having lost the will to move or even cook for themselves. After compelling them to cook and eat, we turned them out and struck camp, leaving tents, stores, and fuel piled in some kind of order.

Then we took to what Norton has described as the "Via Dolorosa," first the wind-swept glacier down to Camp II., then the rough miles of the tumbled moraine; withdrawing every man to the Base Camp with a melancholy procession of snow-blind, sick, and frostbitten men being shepherded down by their comrades. But we knew that everything was ready for us to return up the glacier, and only a small amount of high-altitude stores remained to complete Camp III. for the first attempt.

How had we all stood Round 1? The British members were in good health, and full of optimism. They had all acclimatized themselves up to 21,000 feet. Further, a strong reinforcement had arrived in the shape of Hingston. He had left General Bruce in Gangtok and hastened across Tibet to rejoin us. He was in the nick of time to relieve Somervell of the heavy duties of medical officer. In the Himalayan ranks we were not so fortunate. One man was severely frostbitten in both feet and subsequently died. One man had broken his leg; several had bad attacks of bronchitis, and, worst of all, the Gurkha N.C.O. Shamsher was in a very serious condition with hæmorrhage on the brain. After twenty-four hours' unconsciousness he died while being carried on a stretcher into the Base Camp. He was a very great loss to the Expedition, and to his regiment, where he undoubtedly had before him a brilliant career.

The weather had by now improved, and after even one day's rest at the Base Camp the men were beginning to look their normal cheery selves

again. They were all very keen to pay a visit to the Rongbuk Monastery, 5 miles down the glacier, and receive the blessing of the Holy Lama, who had now recovered. This was duly arranged to take place on May 15, and was an unqualified success. The Lama conducted an impressive service, and sent them away happy and full of courage for further efforts. That evening in the Base Camp the interpreter Karma Paul—a rather vain youth and apt to be a little carried away by his own self-importance—announced that the porters were very pleased that the interpreter and the Colonel Sahib (note the order) had arranged such a good show for them. A feature of the Base Camp about this time was a herd of Burhel (wild sheep) which came grazing the scanty tufts of grass right down to our tents.

The Lama's blessings had apparently worked wonders with the weather and the men, so after sundry pieces of reorganization the advance was resumed, and by May 19 Camp III. was re-occupied. Round 2 had now begun, and was remarkable for the spirit of team work displayed by everybody, and the excellent comradeship which existed through all ranks of the Expedition.

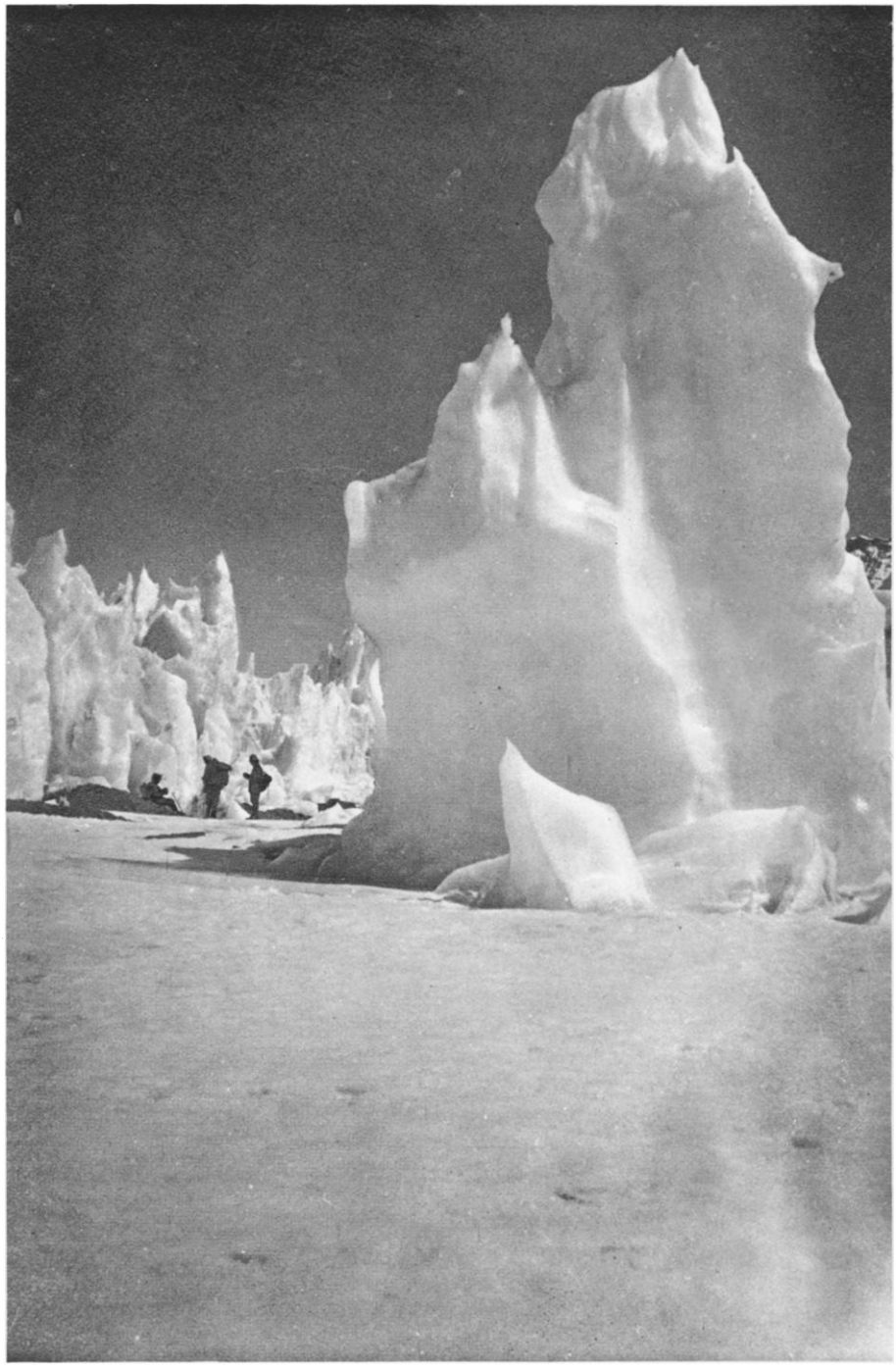
On May 20 Norton, Mallory, Somervell, and Odell left Camp III. to reconnoitre the route up to the North Col—that dangerous wall of ice, like a trap set at the foot of the mountain. Just below the slopes it became evident that Somervell was far from fit, and he had reluctantly to return to camp. He told me afterwards that he had taken his temperature the night before and found it to be 104°. It was little short of marvellous how he managed to start at all in the morning. Mallory, too, was suffering from a bad cough, and only his great heart carried him on. However, they succeeded in working out a new route right up to the No. IV. Camp site, designed to be safe from avalanches, and satisfactory except for an ice chimney 150 feet high. The old route looked very unsafe and certain to avalanche. They did a fine day's work, and returned to Camp III. that evening.

On May 21, morning broke warm with a lot of cloud about. Light dry snow kept falling at intervals. This day the North Col Camp was to be established. Somervell, Hazard, and Irvine got off at 8.30 a.m., with twelve porters, their plan being that Somervell and Irvine should return to Camp III. while Hazard remained in IV. till the next day, when Odell and I would arrive there, stay the night, and then proceed to establish Camp V. At 1 p.m. it began to snow in earnest—very soft, wet snow—and nothing could be seen of the North Col from Camp III. At 6.30 p.m. Somervell and Irvine returned, having left Hazard and his twelve men within easy reach of Camp IV. They told us that they had found the ice chimney too narrow for the majority of loads. Somervell and Irvine had established themselves at the top while Hazard directed operations from below, and all twelve loads were hauled up by rope. It was a tremendous effort, and over two hours were thus spent.

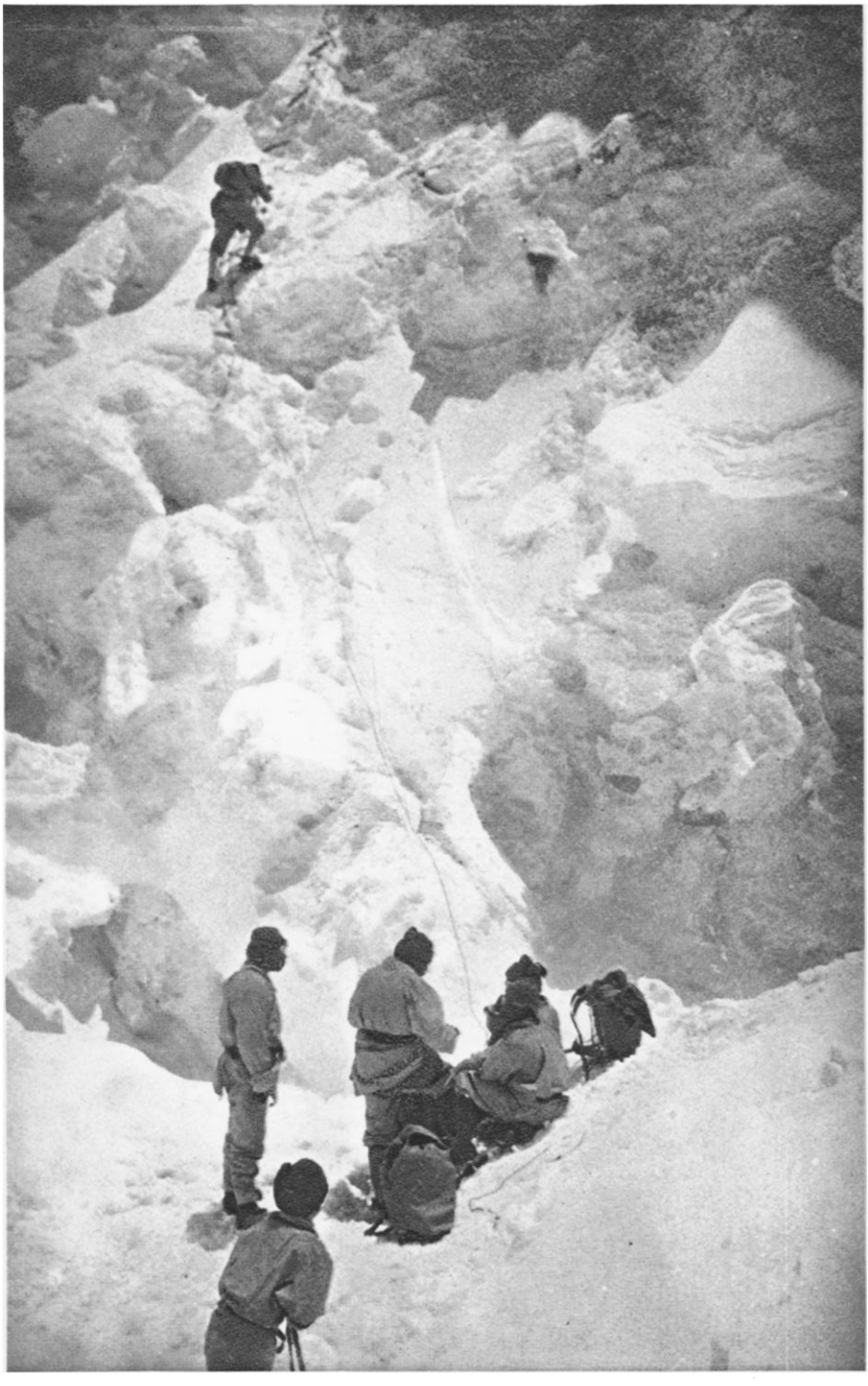
1. THE NORTHERN CLIFFS OF MOUNT EVEREST FROM THE RONGBUK GLACIER

2. ICE PINNACLES AND LAKE, EAST RONGBUK GLACIER

3. THE TROUGH, EAST RONGBUK GLACIER, LOOKING DOWN TOWARDS CAMP II.



4. THE FLOOR OF THE TROUGH, EAST RONGBUK GLACIER



5. THE ROPE LADDER BELOW THE CHIMNEY, SLOPES OF THE CHANG LA

6. THE CHANG LA AND HEAD OF EAST RONGBUK GLACIER FROM NEAR CAMP III.

7. THE ROUTE TO THE CHANG LA

8. THE UPPER SLOPES OF THE CHANG LA

9. ROUTE ON THE UPPER SLOPES OF THE CHANG LA

10. THE CHIMNEY

11. ROUTE UP THE CHIMNEY

12. GYACHUNG KANG AND CHO UYO, FROM ABOUT 25,000 FEET

Phot. by T. H. Somervell

Phot. by T. H. Somervell

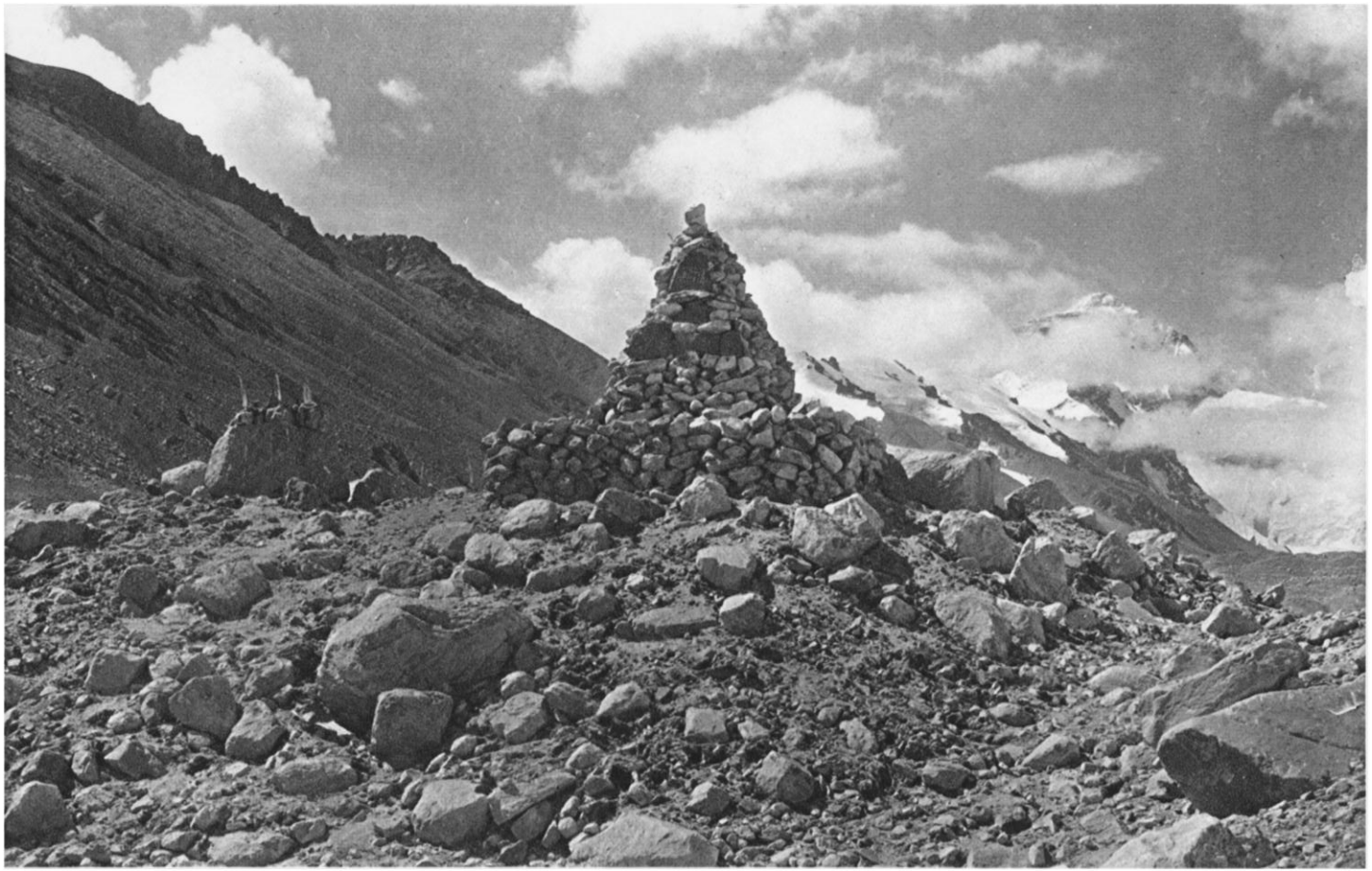
13. COL. NORTON APPROACHING THE HIGHEST POINT OF HIS CLIMB AT 28,200 FEET

14. LOOKING NORTHWARD FROM 28,100 FEET ON MOUNT EVEREST

Phot. by T. H. Somervell

Phot. by T. H. Somervell

15. LOOKING WESTWARD FROM 28,100 FEET ON MOUNT EVEREST



16. THE MONUMENT TO THOSE WHO DIED ON THE THREE EXPEDITIONS. BASE CAMP, RONGBUK VALLEY

But Fortune had again ceased to smile on us. Snow fell all night and all the following day until 3 p.m. It was quite impossible to do anything but lie in our sleeping-sacks and hope for the best. That night (May 22) the temperature fell to 56° of frost—the coldest ever recorded in an Everest Expedition. The morning of May 23 was, however, an improvement—a cloudless, brilliant day. The wind had dropped, but the air was keen and cold. Odell and I got off at 9.30 with seventeen porters bound for Camp IV. The mountain towered above us, sharp and clear in every detail. The party was going well and all were in good spirits. At one of the frequent short halts on the glacier the men were discussing the mountain and saying how easy it looked to climb. They asked me whether they would be allowed to go to the top or whether it would be climbed by Sahibs only. Again we were frustrated, for shortly after mid-day snow started to fall. Instead of a brief hour's walk to the foot of the Col three hours were required. The slopes of the Col were in a dangerous condition, and we deemed it unsafe to take laden porters on. Accordingly we made a dump at the furthest point reached and retreated to Camp III.

At about 5 p.m. Hazard arrived, but with only eight of his party. While he had gone ahead piloting his men along the steep traverse at the top of the Col, four of them had lost their nerve and remained there marooned. This was a terrible situation, especially as it transpired that a load of mixed porters' rations for Camp IV. had been accidentally dropped over an ice cliff and the marooned party had nothing but barley meal to eat. Further, conditions all seemed to point to a real monsoon current. Norton therefore decided that while the rest of us were to evacuate Camp III. and get the men back to lower camps, he, Mallory, and Somervell were to tackle the arduous and dangerous work of rescuing the four marooned men. Were men ever faced with such a task? They were themselves far below par, from previous exertions and hardship, Mallory's cough and Somervell's throat being really bad. Their chances of being avalanched were considerable. What if they failed to bring off the rescue? What would they do if they found some of the marooned frostbitten and unable to move? The Sherpa porter is very superstitious. These men might by now have gone off their heads with fright and hurled themselves down the ice slopes. The porters told me some days later that during their night on the North Col they had distinctly heard the fierce barking of the watch dogs, guarding the Goddess' abode.

The rescue party can have slept little, thinking over what lay before them, and listening to the soft snow falling and lessening their chances of success. They started from Camp III. about 7.30 next morning, going so badly that their hopes of accomplishing the rescue were very low. Up the Col they led in turns, and so came to the last traverse. This was covered with fresh snow, which looked as if it might avalanche

at any moment. Somervell was now leading. Norton and Mallory belayed the rope and prepared to hold if Somervell slipped. The four marooned porters were waiting on the other side. It was doubtful whether the rope was long enough. Somervell cut steps all the way across, constantly stopping to lean his head on his arm and cough. He reached the end of the rope, and found he was 5 to 10 yards short of the goal. The men must cross to him—with no rope! The first came over safely and proceeded towards Norton and Mallory. Just as the second was joining Somervell the last two men slipped and began to slide towards certain death, but they miraculously pulled up in a few yards. Somervell was now superb, and perfectly cool. He told the two men to remain still whilst he passed the second man back along the rope, joking the while, so that one of the two men sitting shivering on the edge of the ice cliff actually gave a short bark of laughter. They sat like statues. Somervell then drove his axe in up to the head, pulled the rope tight, passed it round his axe, and so made enough rope to reach the men with one arm at full stretch, holding the very end of the rope with the other. He dragged them up in turn by the scruff of the neck and passed them along to safety. It was a first-rate performance.

It was now 4.30 p.m. One man was badly frostbitten in the hands (he subsequently recovered) and two others slightly in feet and fingers. The men behaved splendidly on the way down, but the rescuers had their work cut out to bring them in. In the chimney, Norton held the full weight of the badly frostbitten man no less than four times, and Mallory and Somervell were, as usual, towers of strength. They reached Camp III. at 8 p.m. It was a gruelling day, but a triumphant success.

Meanwhile the second evacuation had taken place, the climbers being distributed at Camps I. and II. So ended Round 2.

We came to the conclusion that after all they had gone through only fifteen of our porters would be fit for further efforts at any great heights. These were collected in Camp I. and formed into a *corps d'élite*, called "the Tigers." On the efforts of this little band our success now very largely depended. It may possibly be thought from this that the Porter Corps as a whole was a failure. Let there be no misunderstanding on this point. True, the majority had shot their bolt, but they had performed some stupendous feats of carrying, often on several successive days, and under terrible conditions. And as for the "Tigers," we never really got to the bottom of what they could do right up to the end.

On May 27 a council of war was held in Camp I., and from this point the story will be continued by Colonel Norton, our leader and the inspirer of all our efforts.

V. THE CLIMB WITH MR. SOMERVELL TO 28,000 FEET

Lieut.-Col. E. F. Norton

On our arrival at Camp I. after our second retreat, it was evident that we must re-cast our plans. For neither the very reduced number of dependable porters nor the time available before the threatened arrival of the monsoon justified any hopes of carrying out our full original programme.

Very briefly, the original plan was an attack on the summit by two parties of two on the same day—one with oxygen from a camp about 26,500 feet, one without from a camp about 27,300 feet, the parties to act independently but to afford mutual support if necessary. In the event of failure the programme was to be repeated with necessary modifications by the remaining available climbers.

Our revised plan was settled after two days' discussion at No. I. Camp. In this nearly all the party took part. It was decided unanimously to scrap oxygen and to attack the mountain by a series of attempts starting from the North Col on successive fine days, each attempt to consist of two climbers with the irreducible minimum of equipment and porters.

Our decision to abandon the oxygen and to climb in parties of two were dictated by the following considerations:

As regards the oxygen: Firstly, neither the number of porters on whom we could now count even to reach the North Col, nor the time before the monsoon, which we expected any day, were sufficient to enable the necessary number of oxygen cylinders to be got up, for so far we had only got a few cylinders to a dump halfway up the slopes to the North Col.

Secondly, the verdict of Odell and Bruce—the only ones so far to test the oxygen apparatus—was very pessimistic as regards its effects.

As regards the parties of two: First, there being only seven available climbers, the use of parties of three would have cut down the possible number of attempts to two, and it would have been almost impossible to arrange for these to be adequately supported.

Secondly, each attempt would have required an extra tent besides other equipment and stores.

Thirdly, two men climb more quickly than three.

In this connection it must be remembered that the whole of Mount Everest above the North Col is an easy rock peak.

The sequence of parties decided on was: 1st, Mallory and Bruce; 2nd, Somervell and myself. Odell and Irvine were to be in support at Camp IV. and Hazard at Camp III. The last three were to constitute a reserve for a third attempt.

On June 1 Mallory and Bruce started on their attempt from the North Col, where Odell and Irvine were already established. Somervell

and I slept that night at No. IV. Camp. On June 2, the weather being still fine, we two started at 6.30 a.m. with six porters, who carried loads of 20 lbs. or slightly less, for No. V. Camp, which Mallory and Bruce had presumably established the day before.

No. IV. Camp lay some 200 yards north of the actual Col, to reach which it was necessary to cross a confused jumble of ice and snow cut up by crevasses. Hence you emerge on to the Col and traverse it just below its crest on the further (or western) side. At this point we suddenly found ourselves in shadow and exposed to the full force of the west wind, which blighted us as the first frost of winter blights the dahlias.

The whole of this day's climb and the next was so uneventful that there is little to say about it. We followed the blunt angle which roughly divides the north face of the mountain into two parts. This is known as the North Ridge, and connects the North Col with the North-East Shoulder.

The route was familiar to us from our experience of two years before. The going is all slabby limestone rock at a fairly steep angle, varied by frozen scree with occasional patches of snow, and is entirely without difficulty or danger. When descending it is possible, by deviating a few yards, to glissade down on good hard snow for the last 2000 feet above the North Col.

After climbing for some time we were much disconcerted to see Mallory, Bruce, and their porters descending to meet us. Their explanation was simple but conclusive. Apparently the wind on the previous day had completely taken the heart out of their porters, and this morning not even Bruce's influence and command of the language could induce them to go any higher.

This breakdown of the first party enabled us to reduce our porters to four, one of whom climbed unladen, as a reserve man.

No. V. Camp, where we spent the first night, was pitched a little on the eastern side of the ridge, and so was somewhat sheltered from the west wind. Here, on the morning of June 3, I had some difficulty in inducing three of our four porters to continue the ascent. Their condition had not been improved by the fact that two of them had been injured by a fall of stones, probably dislodged from the crumbling platform built up for our tent; one of these men had a nasty gash across the knee-cap.

I owe it to the three men who came up to the scratch that you should hear their names. They were Narboo Yishay, Llakpa Chedi, and Semchumbi, the last having the cut knee. All honour to a gallant man. He was lame for two months after.

No. VI. Camp was pitched in a cleft in the rock on the actual ridge, and we estimated its height at some 26,800 feet. Its position was dictated principally by Semchumbi's knee and the necessity for getting the porters down to No. IV. Camp in good time.

I have little doubt that, on a future occasion, some improvement could be made on the heights of both Nos. V. and VI. Camps; this is one of the factors on which I base my confidence in ultimate success.

At both Nos. V. and VI. Camps we spent the evening in the hateful routine of high-altitude cooking.

It sounds simple. While one member of the party fetches snow from a neighbouring snow-bed his companion gets the cooker going and opens tins of food, such as pemmican, sardines, biscuits, jam, sweets, and tea. More trips to the snow-bed follow to enable thermos flasks to be filled for to-morrow's breakfast and climb, and for washing up.

I can give you no better idea of the conditions in which one works at these altitudes than by telling you that these apparently simple operations are most exhausting and call for some determination.

We spent very fair nights at both high camps; in fact, I slept really well at No. VI. Camp, which proves that we had learnt something of how to make the best of a high camp since the time two years before when four of us spent what I might describe as a most unfair night at 25,000 feet.

The first entry in my diary for June 4 is "Somervell pretty seedy with throat." I have already mentioned this throat trouble; it was much aggravated at these heights by the repeated intake of cold dry air catching the back of his throat.

He was handicapped by this throughout these three days. Late this same evening he very nearly choked, and was only saved by coughing up the obstructing matter along with a lot of blood. That he achieved what he did in this condition was a remarkable performance.

We started at 6.40 a.m., having been much delayed by the necessity of boiling snow for breakfast, for our thermos flask had got rid of its cork in the night, and shed its contents inside my sleeping-bag.

I have not much to say about the climb, and this not by reason of any dulling of the intellect or memory—for this is, I believe, a myth—but because there is so little to tell.

The weather was ideal, with singularly little wind. Even so, clad in two suits of windproof clothing and two sweaters, I found it very cold. Sitting in the sun I shivered so much that I once thought I had fever on me, and took my pulse. I was surprised to find it only some twenty above normal.

But against men in our condition the lack of oxygen was obstacle enough even in such favourable weather. Our pace was lamentably slow; on anything like a steep slope I consistently failed to realize my ambition of achieving twenty consecutive steps without pausing with fore-arm on bent knee, to puff and blow. Somervell's throat further slowed him down. We had to sit down and rest frequently.

So long as all went smoothly one achieved some degree of mechanical plodding, but trip or slip and the effort at recovery set one panting

furiously to make up for the deficit of oxygen caused by the extra exertion. Step-cutting in the rare patches of hard snow was exhausting work.

After a short distance on limestone scree and a few small snow-beds, we got on to the 1000-foot deep band of yellow sandstone which runs nearly horizontally across the whole face of the mountain. We traversed it diagonally, and headed for the base of the final pyramid, keeping below and roughly parallel to the crest of the north-east ridge all the way.

The going on this sandstone band was absolutely easy and almost devoid of snow until we approached the big couloir which cuts off the final pyramid from the great eastern shoulder of the mountain.

Here, at noon, Somervell finally succumbed to his throat trouble, and I went on alone.

I soon got on to much steeper rock as I turned a corner to enter the couloir. The slabs now were very narrow and sloping, like tiles on a roof; they were frequently covered with snow, which here was powdery like coarse salt and concealed without supporting. The general angle was steep enough to make a slip probably fatal.

I went very slowly and had more than once to retrace my steps and find another route; my rate of progress was also affected by the fact that I was beginning to see double—a premonitory symptom of snow-blindness, I suppose—with the result that by one o'clock I was but a short distance on the western or summit side of the big couloir, and perhaps 80 feet higher than where I left Somervell.

Here, in the shelter, the powdery snow was thickest, and I was confronted with a steep climb of some 200 feet before I could again traverse to the right and so gain the north face of the final pyramid and an easier gradient.

It was obvious I could not reach the summit in time to return in safety, and it was very doubtful if I had the strength to go so far in any case. So I turned back and rejoined Somervell by 2 p.m.

The view from the highest point we reached was, to me, disappointing, as is often the view from an aeroplane, for one looked down on all the surrounding mountains and the beauty of their outline was lost. It was a remarkably clear day, and one could detect snow peaks dimly appearing over the northern horizon like little teeth. They must have been hundreds of miles away.

The descent was uneventful for me, but very painful for Somervell. Nightfall found us on the big snow-bed a little below No. V. Camp, and the electric torch came into use; perhaps an hour later I succeeded in making myself heard at No. IV. Camp, whence we soon saw a light coming to meet us and a voice shouted that they were bringing an oxygen cylinder.

I shouted in reply again and again, "We don't want the d—d oxygen; we want drink." My own throat was not at its best, and I remember how feeble sounded my querulous wail, "We want drink! we want drink!"

losing itself in that vast waste of snow and ice glimmering under the stars. Odell and Mallory met us well above the North Col, and by 9.30 had escorted us into No. IV. Camp, where Irvine was brewing drink for dear life.

As we lay in our sleeping-bags that night Mallory told me how he had organized a new attempt with oxygen. He and Bruce had been down to No. III. Camp to try and collect sufficient porters for an attempt on a minimum scale. This they had done by making use of some of the men who had already been to No. V. Camp with them, supplemented by three or four others whom the continuance of fine-weather conditions had brought up to the scratch.

Mallory had arranged for Irvine to accompany him, and was prepared to start the next day but one. It will be remembered that Geoffrey Bruce was *hors de combat*. I was entirely in favour of the plan, which now represented our last chance of success.

The following morning I was snow-blind and took no further part in active operations. So I now leave Odell to tell the story of the final stage in which he played so notable a part.

VI. THE LAST CLIMB OF MALLORY AND IRVINE

N. E. Odell

Norton has described only too modestly his and Somervell's remarkable attempt on the summit and their return to the North Col on June 4, the same day that Mallory and Irvine had come up from Camp III. The latter had climbed the 2000 feet from Camp III. to Camp IV. in the fast time of two and a half hours, evidently in an endeavour to prove to themselves the efficacy of oxygen. June 5 was spent resting at the North Col camp, Irvine and I re-testing and putting final touches to the oxygen apparatus.

A few words may be said on the nature of Camp IV. and its surroundings. Perched on an ice-ledge in roughly the same position as the camp of 1922, it had four tents. A high wall of ice rising on the western side gave comforting protection from the prevailing chilly winds from that direction. The ledge was broad enough and long enough to allow comfortable movement all around the tents and leave an ample margin of clean snow for water-supply—a point that concerned me as camp cook. During my eleven days' residence there I experienced all sorts of weather conditions, not the least remarkable being two days when the sun temperature at midday was 105° F. while the air temperature at the same time was only 29°. I shall never forget some of the sunrise effects over the sea of peaks to the east, Chomo-Lönzo and Makalu standing supreme among them.

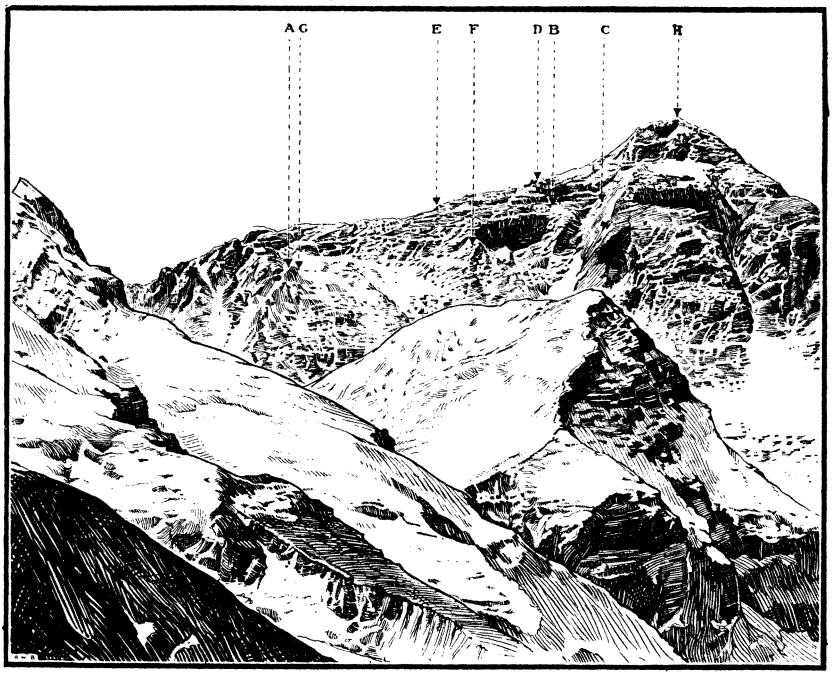
To reach the actual saddle of the North Col and the foot of the North Ridge of Mount Everest it had been necessary in 1922 to make a way from the camp ledge towards the North Peak and then back again along the crest of the col. On the occasion of our first reaching the site of Camp IV. on May 20, Mallory and I had forced a rather complicated route from the southern end of the ledge direct up to the col. This route, though a little treacherous from two doubtful snow-bridges, proved to be negotiable until the end.

At 8.40 on the morning of June 6, in brilliant weather, Mallory and Irvine left the North Col Camp for Camp V. They took with them five porters carrying provisions and reserve oxygen cylinders. They used oxygen, and in the opinion of the porters travelled well. On June 7, when they were going from Camp V. to VI., I went up in support to Camp V. with the one porter that was available. Soon after my arrival Mallory's four porters arrived from VI., bringing me a message which said that they had used but little oxygen to 27,000 feet, that the weather promised to be perfect for the morrow's climb, and that he was sorry the cooking stove had rolled down the mountain side just as they were leaving Camp V.—which meant a cold supper and breakfast for me. As Nema, my porter, was suffering from mountain sickness I sent him down with the four others to the North Col, and having the tent to myself and a couple of sleeping-bags, I kept sufficiently warm to sleep well that night. Next morning broke clear and not unduly cold. After a breakfast of cereals, and a little macaroni and tomatoes, I started my solitary climb to Camp VI., taking with me provisions for that camp in case of need. My plan was to make a rather circuitous route out on to the northern face, to examine the structure of the mountain. Mist soon began to form, and although the wind remained light I found myself immersed now and then in squalls of sleet and light snow. By the glow of light above me I could sometimes see that I was experiencing worse conditions than Mallory and Irvine probably were at their higher altitude.

At about 25,500 feet I came upon a limestone band which to my joy contained fossils—the first definite forms found on Everest. The lower part of the mountain is formed of a variety of gneisses, and on these rest a mass of rocks, mainly altered limestones, which compose the greater part of its upper half. Here and there have been intruded granitoid rocks, but these are relatively little in amount. The general dip of the series is about 30° northward, and since the slope of this face of the mountain above 25,000 feet is about 40° to 45°, the effect is to make a series of overlapping slabs nearly parallel with the slope and presenting a number of little cliff faces often up to 50 feet in height. These slabs are often sprinkled to a varying depth with *débris* from above, and when to this is added freshly fallen snow, the labour and toil of climbing at these altitudes may perhaps be imagined. It is not the technical difficulty

so much as the awkwardness of a slope usually not quite steep enough for the use of one's hands.

At about 26,000 feet I climbed a little crag, which could possibly have been circumvented, but which I decided to tackle direct, more perhaps as a test of my condition than for any other reason. There was perhaps 100 feet of it, and as I reached the top there was a sudden clearing above me and I saw the whole summit ridge and final peak of Everest unveiled. I noticed far away on a snow-slope leading up to the last step but one from the base of the final pyramid,* a tiny object moving and approaching the rock step. A second object followed, and then the first



MOUNT EVEREST FROM THE BASE CAMP

The drawing is made from a telephotograph taken at the Base Camp (16,500 feet) about 11 miles from the summit. The north-east shoulder (27,300) above A is half a mile nearer the Base Camp than the summit (29,002): consequently it appears relatively too high in the photograph, and the slope of the ridge too gentle.

A marks the position of Camp VI. (26,700 feet) and G the point reached by Mallory, Norton, and Somervell in 1922, which was probably misidentified and placed too high in the theodolite measures of 1922, made in very difficult circumstances; F just to the left of the dark patch is the point reached by Finch and Geoffrey Bruce in 1922. B is the point reached by Norton and Somervell in 1924, and the former went on to C. Mallory and Irvine were last seen at D, the "second step," the "first step" being at E. The identifications of these points have been made on the photograph by Colonel Norton.

climbed to the top of the step. As I stood intently watching this dramatic appearance, the scene became enveloped in cloud, and I could not

* Not the position indicated in illustration *Geogr. Journ.*, vol. 64, No. 2, opposite p. 160, but the rock step to the left of this beyond the snow patch.

actually be certain that I saw the second figure join the first. I was surprised above all to see them so late as this, namely 12.50, at a point that according to Mallory's schedule should have been reached by 10 a.m. at latest. I could see that they were moving expeditiously as if endeavouring to make up for lost time. True, they were moving one at a time over what was apparently but moderately difficult ground, but one cannot definitely conclude from this that they were roped—an important consideration in any estimate of what befell them. I had seen that there was a considerable quantity of new snow covering some of the upper rocks near the summit ridge, and this may well have caused delay in the ascent. Burdened as they undoubtedly were with the oxygen apparatus, these snow-covered *débris*-sprinkled slabs may have given much trouble. The oxygen apparatus itself may have needed repair or re-adjustment either before or after they left Camp VI., and so have delayed them. Or both these factors may have been operative.

I continued my way up to Camp VI., and on arrival there about two o'clock a rather severer blizzard set in and the wind increased. After a short rest I realized it was just possible that, baulked by earlier bad weather higher up, Mallory and Irvine might be returning, and the concealed position of Camp VI. would be almost impossible to discover in the blizzard. I remembered also that Mallory had told me in his note that he had left his compass at Camp V., and asked me to retrieve it. So I went out in the direction of the summit, and having scrambled up about 200 feet and yodelled and whistled meanwhile in case they happened to be within hearing, I then took shelter for a while behind a rock from the driving sleet. After about an hour's wait, realizing that the chances were altogether against their being within call, I found my way back to the tent. As I reached it the storm, which had lasted not more than two hours, blew over, and the whole north face of the mountain became bathed in sunshine. The upper crags were visible, but I could see no signs of the party. The little tent at Camp VI. was only just large enough for two, and if I remained and they returned, one of us would have had to sleep outside in the open—an altogether hazardous expedient. But apart from this, Mallory had particularly requested me in his last note to return to the North Col, as he specially wished to reach there himself after their climb. Leaving Camp VI. therefore about 4.30 and going down the north ridge in quick time, I took to the snow near Camp V. and glissaded down to the North Col, reaching the camp at 6.45. That night Hazard's brew of soup made from a mixture of at least six varieties went down really well. I was surprised, though, to find that I was not suffering from thirst—that bugbear of Everest—to anything like the extent I had expected.

We watched till late that night for some signs of Mallory and Irvine's return, or even an indication by flare of distress. Next morning we scrutinized through field glasses the tiny tents of Camps V. and VI.

far up above us in case they had returned late and had not yet started down. But no movement at all could be seen. At noon I decided to go up to Camp V., and on to VI. next day, and I arranged a code of signals with Hazard, who remained at the North Col. Two porters came with me and stayed the night at Camp V., but in the morning I had to send them back to the North Col on account of indisposition. It was a bitterly cold night and we slept little if at all. Using oxygen, I started off from Camp V., and when within an hour or so of VI. I came to the conclusion that I was deriving but little benefit from the oxygen, which I had been taking only in moderate quantities from the single cylinder that I carried. I switched it off and experienced none of the feelings of collapse and panting that one had been led to believe ought to result. On reaching the tent at VI. I found everything as I had left it: the tent had obviously not been touched since I was there two days previously. I dumped the oxygen apparatus and went in search along the probable route that Mallory and Irvine had taken. There was a bitterly cold west wind, and now and then I had to take shelter behind rocks to restore warmth. After a couple of hours' search I realized that the chances of finding the missing men were indeed small on such a vast expanse of crags and broken slabs, and that for any more extensive search towards the final pyramid a further party would have to be organized. I returned only too reluctantly to the tent, and then with considerable exertion dragged the two sleeping-bags up a precipitous snow patch plastered on the little crag above the tent. With these sleeping-bags placed against the snow I had arranged with Hazard to signal down to the North Col Camp the results of my search. It needed all my efforts to cut steps out over the snow-slope and then fix the sleeping-bags in position, so boisterous was the wind. But fortunately the signal was seen 4000 feet below, though the answering signal I could not make out. Closing up the tent and leaving its contents as my friends had left them, I glanced up at the mighty summit above me. It seemed to look down with cold indifference on me, and howl derision in wind gusts at my petition to yield up its secret, this mystery of my friends. If it were indeed the sacred ground of Chomo-lungma—Goddess Mother of the Mountains—had we violated it? was I now violating it? And yet as I gazed again there seemed to be something alluring in that towering presence: I was almost fascinated. I realized that no mere mountaineer alone could but be fascinated; that he who approaches close must ever be led on, and oblivious of all obstacles seek to reach that most sacred and highest place of all. It seemed that my friends must have been thus enchanted also: for why else should they tarry? In an effort to suppress my feelings, I turned my gaze downwards to the North Col far below, and I remembered that other of my companions would be anxiously awaiting my return, eager to hear what tidings I carried. Alone and in meditation I slowly commenced my long descent. But it

was no place for silent contemplation, for buffeted by storm-blasts that seemed to pierce one through, it needed all one's attention and calculation to negotiate safely the exposed slabs of the ridge and prevent a slip on their *débris*-sprinkled surfaces. I quickened my pace lower down, but at times found it necessary to seek protection from the biting gale behind rocks and assure myself that no symptoms of frostbite were imminent. Hazard had seen me coming, and sent his one remaining Sherpa to meet and welcome me at the foot of the ridge. Arrived at the North Col Camp I was pleased to find a note from Norton and to discover that I had anticipated his wishes that I should return to Camp IV. and not prolong my search on the mountain, seeing that the monsoon seemed likely to break at any moment. Next day Hazard, the porter, and myself, leaving the tents standing, evacuated the North Col Camp and went down in good weather to Camp III., and later in the day with Hingston and Shebbeare to II., reaching the Base Camp on the 12th.

I have already mentioned the possible reasons why Mallory and Irvine were so late in reaching the point at which they were last seen, at an altitude which Hazard later determined to be about 28,230 feet, and I must now very briefly speculate on the probable causes of their failure to return. They had about 800 feet to surmount to reach the top, and if no particularly difficult obstacle presented itself on the final pyramid they should have got there about 3 to 3.30. This would be three or four hours late on Mallory's schedule, and hence they would find it almost impossible to reach Camp VI. before nightfall, allowing five or six hours for the return. But at the same time it must be remembered there was a moon, though it rose rather late, and that evening it was fine and the mountain clear of mist as far as could be seen. In spite of this they may have missed the way and failed to find Camp VI., and in their overwrought condition sought shelter till daylight—a danger that Mallory, experienced mountaineer that he was, would be only too well aware of, but find himself powerless to resist: sleep at that altitude and in that degree of cold would almost certainly prove fatal.

The other possibility is that they met their death by falling. This implies that they were roped together, which need not be inferred from their observed movements when last seen. It is difficult for one who knew the skill and experience of George Mallory on all kinds and conditions of mountain ground, to believe that he fell. Of Sandy Irvine it can be said that, though altogether less experienced than Mallory, he had shown himself to be a natural adept and able to move safely and easily on rock and ice. Such had been my experience of him in Spitsbergen, Norway, and on our home mountains. They were hampered of course by the oxygen apparatus—a very serious load for climbing with —as Mallory had mentioned in his last note to me. But could such a pair fall, and where technically the climbing appeared so easy? Experts have done so, under stress of circumstances or exhaustion.

It has been suggested that the oxygen apparatus failed and thereby rendered them powerless to return. I cannot believe this, for from my own personal experience, to be deprived of oxygen—at any rate when one has not been using it freely—does not prevent one from continuing, and, least of all, getting down from the mountain. Mallory in his last note to me said they were using little oxygen, and that they hoped to take only two cylinders each from Camp VI.

Hence I incline to the view first expressed, that they met their death by being benighted. I know that Mallory had stated he would take no risks in any attempt on the final peak; but in action the desire to overcome, the craving for victory, may have been too strong for him. The knowledge of his own proved powers of endurance, and those of his companion, may have urged him to make a bold bid for the summit. Who of us that has wrestled with some Alpine giant in the teeth of a gale or in a race with the darkness, could hold back when such a victory, such a triumph of human endeavour, was within our grasp?

The question remains: "Has Mount Everest been climbed?" It must be left unanswered, for there is no evidence. But bearing in mind all the circumstances that I have set out above, and considering their position when last seen, I myself feel it is very probable that Mallory and Irvine succeeded. At that I must leave it.

A word in regard to the oxygen and the benefit derivable from it. I think that its importance has been exaggerated, and provided one has acclimatized at a sufficiently high altitude, say 22,000 or 23,000 feet, one can do practically as well without it. I am prepared to go further, and claim that oxygen used liberally may be regarded as a source of danger, preventing the user from proper acclimatization and greatly increasing the chances of his collapse if the apparatus break down. My own experience with the present apparatus is that its weight of about 30 lbs., combined with its bulk, quite obviates any advantage to be gained from it. It is interesting in this connection to compare Geoffrey Bruce's opinion in 1922 with his experience of it this year. I believe I am right in saying that he found he derived altogether less benefit from it this year than he expected he would. And this I feel sure was largely due to his higher degree of acclimatization. An interesting physiological point is that all members of the expedition who had been out before, acclimatized quicker than the new-comers. Finally, I consider that if oxygen be used by a high-climbing party in the future, if only in small quantities or as an emergency measure, it must be carried in an altogether lighter apparatus. Whether it be available in the gaseous state as at present, or can be carried in the much more convenient form of a liquid, is a matter for immediate research. But my firm belief is that Mount Everest can be climbed without oxygen.

MEMORIAL SERVICE AT ST. PAUL'S CATHEDRAL

So soon as the tragic news that Mallory and Irvine had died on the mountain was published in a brief telegram on June 21, their colleges at Cambridge and Oxford arranged Memorial Services—at Magdalene on June 24 and at Merton on June 25; and on the following day a service was held at Birkenhead, from which town both came, and where their parents live. Several of Mallory's comrades on former expeditions members of the Mount Everest Committee, and the Joint Secretaries attended the services in the College Chapels, and Sir Francis Younghusband, the original chairman of the Committee, was present at the service in St. John's, Birkenhead. At this time nothing but the bare news of the accident was known.

When the tragic and glorious story of their climb to a record height within about 700 feet of the summit became known, it was evident that the celebrations of October 17, already fixed for the reception of the Expedition on their return, must assume a double character, of sorrow for the fallen, and high appreciation of the heroic exploits that marked those great days of June. It was therefore resolved by the Committee that the authorities of Saint Paul's should be asked to allow a solemn Memorial Service in the Cathedral, to precede the meeting in the evening at the Albert Hall.

This service was attended by great numbers of Fellows of the Society and Members of the Alpine Club, who filled the whole space under the Dome, and by a large congregation of the general public. His Majesty the King, the Prince of Wales, the Duke of York, and Prince Arthur of Connaught were represented. All the members of the 1924 expedition, and several of previous expeditions, were present, with the Mount Everest Committee, many members of the Council R.G.S. and of the Committee A.C., and delegates from many British Climbing Clubs. The lesson was read by the Dean; the full choir of the Cathedral sang the service; and the Bishop of Chester gave a most eloquent and moving address which, by his kind permission, we print in full. The Mount Everest Committee have expressed their thanks to the Dean and Canons of the Cathedral, and to the Bishop of Chester, for their most willing help in this solemn tribute to the memory of the two climbers who died on Mount Everest, perhaps in the very hour of their triumph.

ADDRESS BY THE RIGHT REVEREND HENRY LUKE PAGET, D.D., LORD BISHOP OF CHESTER

Ps. lxxxiv. 5: "*In whose heart are Thy ways.*"

Many no doubt know what stands for these words in the Latin Version of the Psalms; a version used even more largely than ours,

and more familiar in its beauty to a vast number of our fellow-Christians—*Ascensiones in corde suo disposuit:* He has set ascents in his heart; or, as we should phrase it, He has set his heart on ascents.

It meant for the Psalmist no steep or dangerous climb. It meant at most a long and tedious journey, the sort of thing that is a venturesome undertaking to a quiet soul who lives at far distance from the Temple and the City of God. But it led him upwards, it led him to the place he wished to reach. Whether in memory or in anticipation, the road was dear to him. He had set his heart on it: he loved the upward path. It was fixed in his affection. *Ascensiones in corde suo disposuit.*

Far different from the attraction of that easy pilgrimage is the Challenge of the heights which has drawn into closest fellowship many of those who are here to-day. A great unanimity gives intense significance to your assembling in the House of God. For the lovers of the heights are a brotherhood more intimate, more closely united, more affectionately disposed to one another than almost any other group of men. It is as natural as it is beautiful that before your great meeting this evening you should meet here to remember, as in God's presence, those whose names are written in your Records in letters of gold.

It is not for us timid pedestrians to pretend that we understand your love of the heights. But if even from a distance and from some miserably lower level we have looked from afar upon the mountains, or known the silence of the snowfields, and the widening vision, and the exhilarating keenness of the air and the perfect azure of the skies (and you are good enough to believe that even the humblest climber may breathe the Spirit of the Mountains), can any one wonder at the fascination those mountains have for the real climber, that you have so set in your hearts the love of the heights? "Ascensiones in corde suo disposuit." Might it not almost be the motto of the Alpine Club?

It is simply because they both came from our county and diocese of Chester that I am asked to speak to-day. I am bidden, so far as such a thing is possible, to represent the homes from which they come, and those who love them best. They, I am sure, understand and value very highly what you wish to express by your presence. They are grateful to you for it. I got them to tell me something of the boyhood and early years of their glorious sons. In each instance there was the like story of quiet modest strength, of infinite perseverance, of a great and tender love of home, of a transparent purity of heart, of the deep and simple things that make fathers and mothers very thankful and very proud. I wish you could have been with us at Birkenhead, where, nearer home, an assembly not less significant, though it may be less august than this, tried to show its love for them and theirs.

And as we read what was so lovingly written, with all the eloquence of its reserve, it was not difficult to see in it the presage of what was to follow at Winchester and Shrewsbury, at Cambridge and Oxford, in the

Alps and in Spitsbergen, and at last on Mount Everest. It was the same Leigh-Mallory who veiled the grace and brilliancy of his leadership under the impenetrable cloak of his modesty; who when something like disaster occurred insisted on claiming responsibility for it, and when an incredible presence of mind on his part saved the lives of others never let us know that it was he; who reminded us that in a matter like this we all are comrades! Yes, and the same Andrew Irvine who, with all his brilliant, his amazing, his premature attainments as a climber, would laugh as he set himself to the humblest task, or use the splendour of his giant strength to bear the burdens of other men.

"Ascensiones in corde suo disposuit." Was it only the love of the high mountains that was set in hearts like these? No; but rather that with the love of the mountains was the ascent of spiritual altitudes, splendid peaks of courage and unselfishness and cheerfulness, such as are reached not necessarily by the surefooted and the clear-headed, but always by the compassionate, the brotherly, and the pure in heart.

For indeed the record of Mount Everest may well help men, if not to feel the mystery of the mountain, yet surely to enter more deeply, more reverently, into the spirit of the mountaineer.

Thankful as we are for what the Expedition is able to tell us of the way and the attempts and the great achievement and for its marvellous pictures, it is perhaps as a human record and a human document that it speaks most clearly and speaks to us in St. Paul's to-day. The indomitable cheerfulness, the amazing courage of it, the brotherly kindness and loyalty one to another, the passion for work, the refusal of praise. You have indeed set *Ascensiones* in our hearts: you have helped us more than you think to seek those things which are above; Whatsoever things are true and honourable, just and pure, lovely and of good report, if there be any manly virtue, if there be any praise, you have helped us to think on these things.

George Mallory, Andrew Irvine, lovely and pleasant in their lives, in death were not divided.

It seems as though when God means us to learn He is wont to clothe that by which He teaches us in some form of simple and solemn beauty, of which it is hard to mistake or resist the appeal. So it is here! The cloud clears away for a moment and you are allowed to see the two men making steadily and strongly for the summit. That is the last you see of them, and the question as to their reaching the summit is still unanswered; it will be solved some day. The merciless mountain gives no reply!

But that last ascent, with the beautiful mystery of its great enigma, stands for more than an heroic effort to climb a mountain, even though it be the highest in the world—*Sic itur ad astra.*

Think of it how you will: as the ascent by which the kingly spirit goes up to the House of the Lord; as the ascent through death to endless

life; as the ascent by which the men of clean hands and pure hearts ascend into the hill of the Lord and rise up in His Holy Place; as the way He went who said, "I go to prepare a place for you, that where I am there ye may be also."

> "Lofty designs must end in like effects,
> Loftily lying,
> Leave them—still loftier than the world suspects,
> Living and dying."

For they indeed go from strength to strength, who have set their hearts on the heights.

THE MOUNT EVEREST PHOTOGRAPHS

SINCE the main expedition followed exactly the same route as in 1922, the pictures sent home by Captain Noel and his collaborators in the photographic work of 1924 show for the most part scenes and incidents already familiar to us from the work of previous expeditions. The long route over the Jelep La into the Chumbi Valley and thence to the Rongbuk over the high Tibetan plateau by Kampa and Tinki and Shekar must be by this time the best photographed route in the world, and in the great collection of pictures stored at the Society there is material for study of scenery, costumes, architecture, and Lama ceremonial which is in great part still unworked.

From the great number of photographs already received this year—and there are more to come—we have with the help of Colonel Norton chosen a set which illustrate more particularly the detail of the mountain and its approaches. The highest pictures were taken by Mr. Somervell on his climb with Colonel Norton to over 28,000 feet without oxygen on June 3 and 4. Most of the others are believed to be by Mr. Bentley Beetham, but until Captain Noel's return there was some uncertainty about this, and we have been obliged to publish them without any attribution when they were not evidently by Mr. Somervell. Mr. Odell was, by an accident, without the use of his camera during his remarkable series of high climbs; and we shall never know what pictures may have been secured by Messrs. Mallory and Irvine.

Increased knowledge of the mountain has never shown more than one possible line of ascent: that found by Mallory, Bullock, and Wheeler in 1921. After the attempts of 1922 there was some talk of a possible alternative by getting at the North Col from the west; but no one has suggested a radically different way, and as the photographs become more successful the northern cliffs and north-west ridge (No. 1) look ever more formidable. The glacier below these cliffs is only about 19,000 feet above sea, the height of Camp II., and there does not seem to be much chance of establishing a series of higher camps on this side.

The fantastic ice-scenery of the East Rongbuk Glacier has lost nothing of the picturesque in the interval between the second and third expeditions. The ice-wall of the tributary glacier that comes in above Camp II. is there much the same ; but we do not recall anything in the 1922 pictures to equal the lake and ice pinnacles of Plate 2. In the evacuation of Camp III. at the end of the 1922 season Captain Morris described how with the onset of the monsoon the pinnacles were crashing and tumbling in all directions, so that in a few days the landscape was unrecognizable. It remains, we think, to be explained how pinnacles of this height, seemingly the remains of a thick glacier in rapid dissolution by evaporation or melting, are re-created from year to year.

A very remarkable feature, special to the East Rongbuk Glacier, is the " trough." In 1922 a route was made across it. This year the route followed it for a long way, and we may hope to have a detailed study of it. From first descriptions it seems to be connected with a medial moraine, which in its lower stretch appears upon the floor (No. 3), and at last rises up as an embankment above the general level of the glacier. The curious problem is, if it is a central moraine that is the prime cause of the trough, why is nothing of it visible where the trough starts ? It is described as dipping down gradually and smoothly from the nearly level surface of the glacier, with a smooth floor and steep walls that gradually get higher, until as in No. 4 it makes a smooth broad road of ice and snow among the pinnacles.

The lamentable experience of 1922 made it essential this year to choose a route to the North Col that should be free from risk of avalanche : and we are fortunate in being able to illustrate very clearly how this was done. Those who have read the dispatches will remember the chimney, and the rope ladder made for it by the " well-known firm of Odell and Irvine." No. 5 shows the bottom of the chimney and the lower end of the ladder, leading up out of the icy chasm that appears to the ignorant eye so wanton an exaggeration of the difficulties. But the reasons that compelled this difficult route are evident when we examine the following three pairs of pictures, wherein the lower of each pair has been marked by Colonel Norton to show the exact track that was made.

Photographs Nos. 6 and 7 show the ice-cliffs of the North Col, and the head of the East Rongbuk glacier, much more rugged than they have appeared before. The photographer has chosen the light to bring out the details of the crevasses in strong relief : so that it is not right to compare with No. 13 of October 1922 and No. 12 of December 1922, and to conclude that the ice-walls were more formidable this year than in 1922 ; they were much the same. But there is much evidence that the glacier had changed greatly. Col. Norton relates that he reached Camp III. this year in mist and snow. When it cleared away the scene seemed unfamiliar : for the upper reaches of the glacier were strangely

terraced, and standing up above the lateral moraine, looking different from the glacier of 1922.

Plate 6 is taken from somewhere just above Camp III. The route to the North Col lies along the lateral moraine, and to avoid the treacherous slopes turns away to the right behind the rock slope. It reappears, as marked in Plate 7, just at the critical point better studied in the succeeding pictures.

The leading principle in making the route seems to have been that safety from avalanches is secured on the lower edge of a crevasse. The long curved crevasse which in 1924 cut right across the principal ice-slope was well placed, but had a nasty break in its lower edge. The route (Nos. 8 and 9) gained the northern end of the crevasse and turned south along its eastern lower edge until it was forced to descend into the chasm (left-hand edge of Nos. 10 and 11, which are taken looking along the face of the col towards the mountain, nearly at right angles to the axes of 8 and 9). There are no pictures of the descent, but the floor of the crevasse is well shown in No. 4.

The rope ladder is shown in No. 10 leading up through the chimney to the broken lower edge of the great crevasse, seen very much foreshortened. The track bends away to the right round the curve of the ice-slope, and re-appears high up and far away in the top right-hand corner of No. 11, corresponding to the extreme top of the track marked on No. 9, which gives a clear view of the long section hidden in No. 11 by the curvature of the slope.

This was the normal route. In the quite desperate adventure of the rescue of the porters on May 24 Mr. Somervell followed the rather lower (chain-dotted) track in the upper part of No. 11; and after study of this photograph we may begin to appreciate what was involved in that rescue, or what it meant to bring Colonel Norton down snow-blind through the chimney on June 6.

Camp IV. was pitched nearly in the same place as in 1922, and Plate 6 of December 1922 is so like the photograph of the camp taken this year that it will serve very well to illustrate it. But there was one difference. It was no longer necessary to start towards Changtse in order to gain the north-east ridge of Mount Everest. The route shown in No. 7 led straight towards the mountain from Camp IV., but disappears from the sight of Camp III. soon after it has crossed the crevasse where presumably was the snow-bridge mentioned as insecure but sufficient.

No. 12 of the present series should be compared with No. 7 of December 1922 taken by Captain Finch. It is evidently taken from a point on the northern arête at about 25,000 feet: rather higher than the point from which Finch took his picture, as may be seen by comparison of the Lingtren peaks in front of Gyachung Kang, the high peak in the middle of the picture. The large mass to the left is Cho Uyo, and the twin peaks partly enveloped in cloud are probably Cho Rapsang, west

of the Khombu Pass, lettered BG and BF on No. 17 of October 1921. Mr. Hazard has now definitely confirmed Major Wheeler's position for the head of the West Rongbuk Glacier: it lies immediately below the cloud in No. 12 at the southern end of the slopes of Gyachung Kang. Here is an almost flat glacier pass, and the watershed runs from Lingtrennup (in the middle distance on the left) across to Gyachung Kang and on to Cho Uyo. The photographs which made the West Rongbuk Glacier appear to come from much further west are deceptive.

It is interesting to compare No. 12, taken at about 28,000 feet, with No. 3 of December 1922, taken at about 26,800 feet. In both the camera is pointed upwards, so that the slope is foreshortened and made to appear much less steep than it is. The line of the arête between the smoother snow and the rocky face shows that No. 12 is taken further to the left than No. 3: the arrangement of the horizontal bands shows that it is taken much higher up. In No. 3 of December 1922 there are heavy rocks in the foreground. Just above the left-hand corner of the top rock is seen the "second step" reached by Mallory and Irvine. Below and to the right of this are dark patches, which can be easily identified in our present No. 12, wherein Norton is seen in the middle distance approaching a cleft between two black pieces of cliff. In the older picture Norton's position would be about 0·4 inch right and 0·3 inch down from the edge of the second step. He went on and got across the great couloir which comes down from the foot of the final pyramid, but gained little more in height, and estimated that he was nearer 300 feet than 100 below the second step: he disclaims the 28,200 feet attributed to him in the title of Pate 12; it was nearer 28,100.

All the photographs of the high climbing in both years show this very unattractive ground on the northern face of the mountain, rough slabby stuff, rarely difficult in the technical sense, but dangerous from thin snow and loose scree on slabs awkwardly tilted. Only Mallory and Irvine have ever reached the crest of the ridge between the summit and the north-east shoulder. They alone have looked down the cliffs which are shown in the telephotograph taken by Mallory himself in 1921 (No. 8 December 1921). It will be necessary to have this negative examined under magnification, to see if it is possible to identify the detail on the ridge. Somewhere near, and probably to the left of the black marking on the skyline, is the second step; and if they fell it may be on this side that they lie.

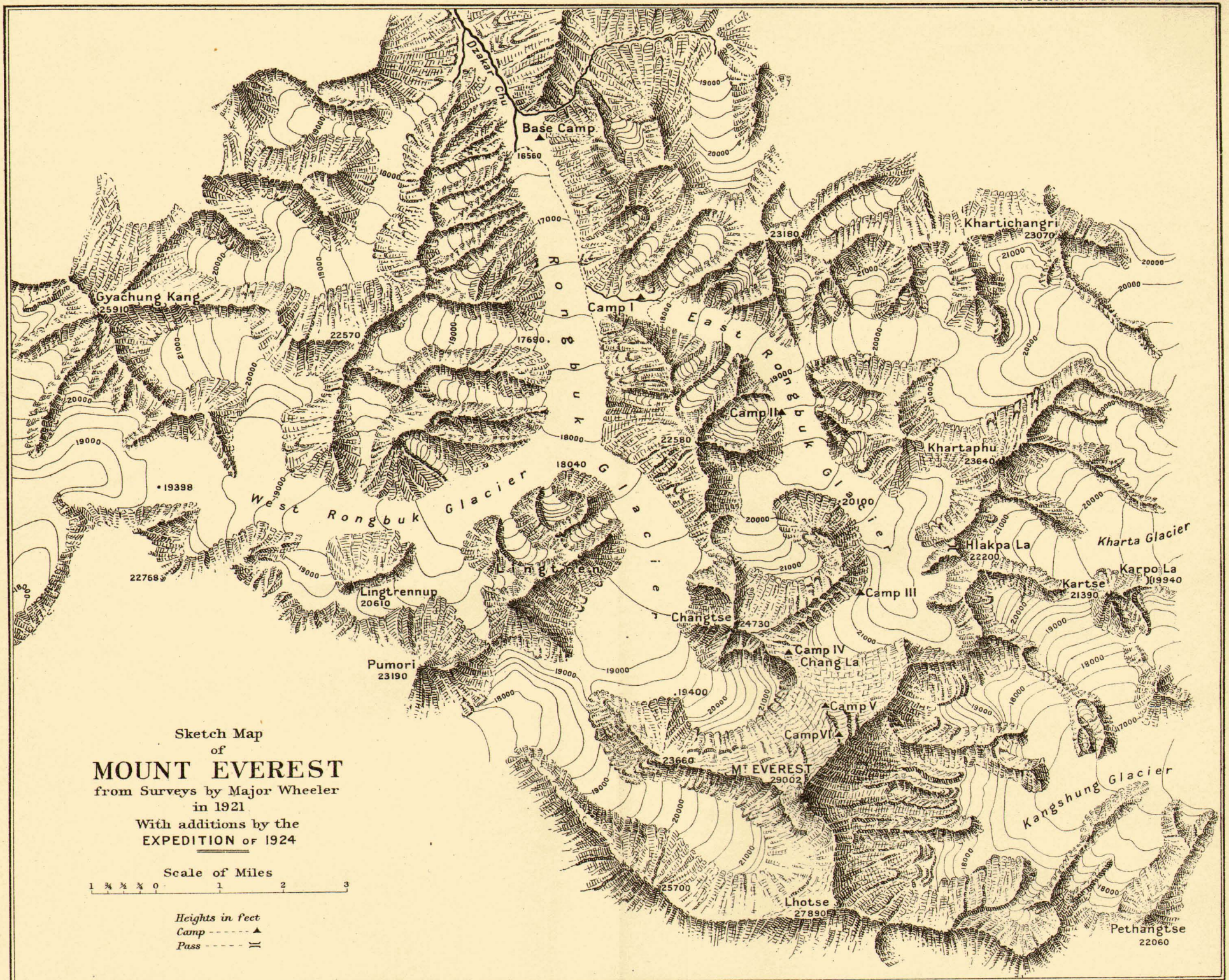
The most interesting of all, in many ways, is No. 14, taken by Somervell from 28,000 feet looking northward clear over Changtse to the main Rongbuk Valley. The Base Camp is somewhere about the patches of snow near the upper edge and the left-hand corner. Camp I. is below the sharp snow peak, Camp II. beyond the tributary glacier's junction with the East Rongbuk. Camp III. is somewhere in the right-hand bottom corner, and Camp IV. on a ledge just to the right of and below

the narrow North Col which stretches across the foreground with steep rock on the left and equally steep ice-cliffs on the right. It is instructive to compare this picture with No. 6. It has seemed a puzzle how the North-Col ice was fed, for the slopes above it are mostly bare rock, and the photographs gave the impression of a great thickness of ice on a rather flat top. It now looks as if the substructure of the col is a knife-edge reaching really to the level of the ice on its western edge ; and that all the mass of ice on its eastern slope may be fed from the snow accumulating in the lee of the col during the prevailing westerly winds. The black summit on the left overlooking the Rongbuk Valley is what looks like the summit of Changtse (the North Peak) in front of the cloud in No. 1. It is not the summit, which lies away to the left in No. 1, and in No. 14 is somewhere, not easily identifiable, on the ridge that runs almost vertically below the snow peak, probably at the junction with the long straight crest that goes off to the right in front of the East Rongbuk Glacier.

Plate 15 is taken from the same point as No. 14, but looking westward and rather more towards the south than No. 12, so that Gyachung Kang comes on the right-hand edge, and the view just includes in the left-hand top corner a high dark mountain that must be Gaurisankar, though as that mountain is some 3000 feet lower than Cho Uyo and twice as far away, it is clear that the camera must be tilted, and the picture too high on the left. The fine peak a little to the left of the centre is Pumori ; the other peaks await identification from Wheeler's map as completed by the last expedition : not quite an easy matter, as the Lingtren peaks are from this aspect confusingly unlike the view of them from the Rongbuk Glacier.

Finally, No. 16 shows a pious deed well done. Dr. Kellas in 1921, seven porters in 1922, Mallory, Irvine, and a Gurkha N.C.O., have fallen in the reconnaissance and the two seasons of assault. The monument to their memory erected before the expedition left the Base Camp in 1924 will be revisited in 1926 : and we like to hope that the climbers safe returned from the summit in that year may be able to add a sentence to the inscription, that Mallory and Irvine died after reaching the summit in 1924. That would seem to be the most fitting end to the great adventure whose third stage is recorded and illustrated in this number of the *Journal*.

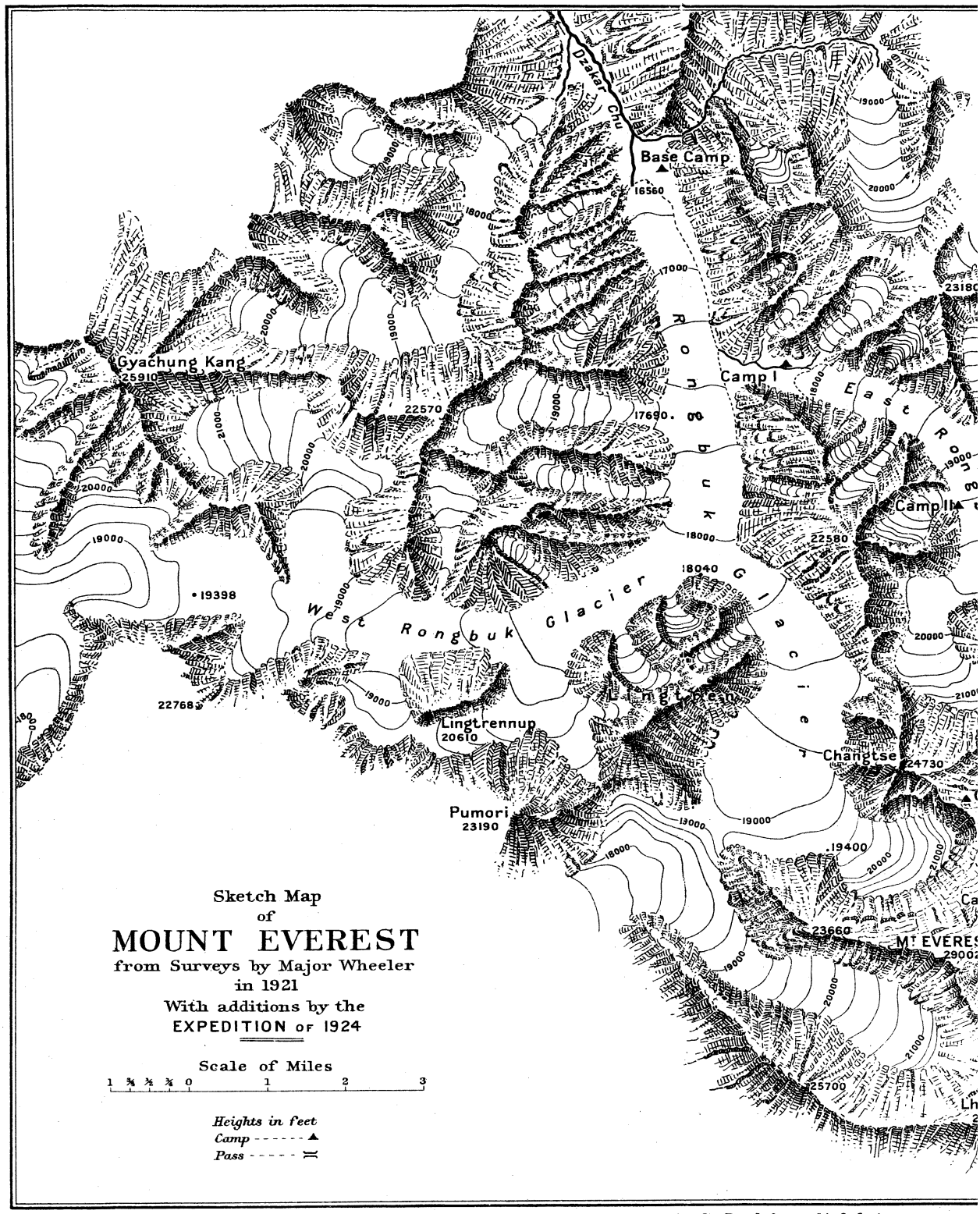
The sketch-map which follows page 504 has been made from the surveys of Major Wheeler in 1921, with various additions from the work of the 1924 expedition, and occasional correction from photographs. The principal geographical result of this year is to confirm the result of Major Wheeler in 1921, that the West Rongbuk glacier comes from a very flat glacier pass south of Gyachung Kang, and that the glacier beyond descends steeply into Nepal.



Sketch Map
of
MOUNT EVEREST
from Surveys by Major Wheeler
in 1921
With additions by the
EXPEDITION OF 1924

Scale of Miles
1 ¾ ½ ¼ 0 1 2 3

Heights in feet
Camp ------ ▲
Pass ----- =



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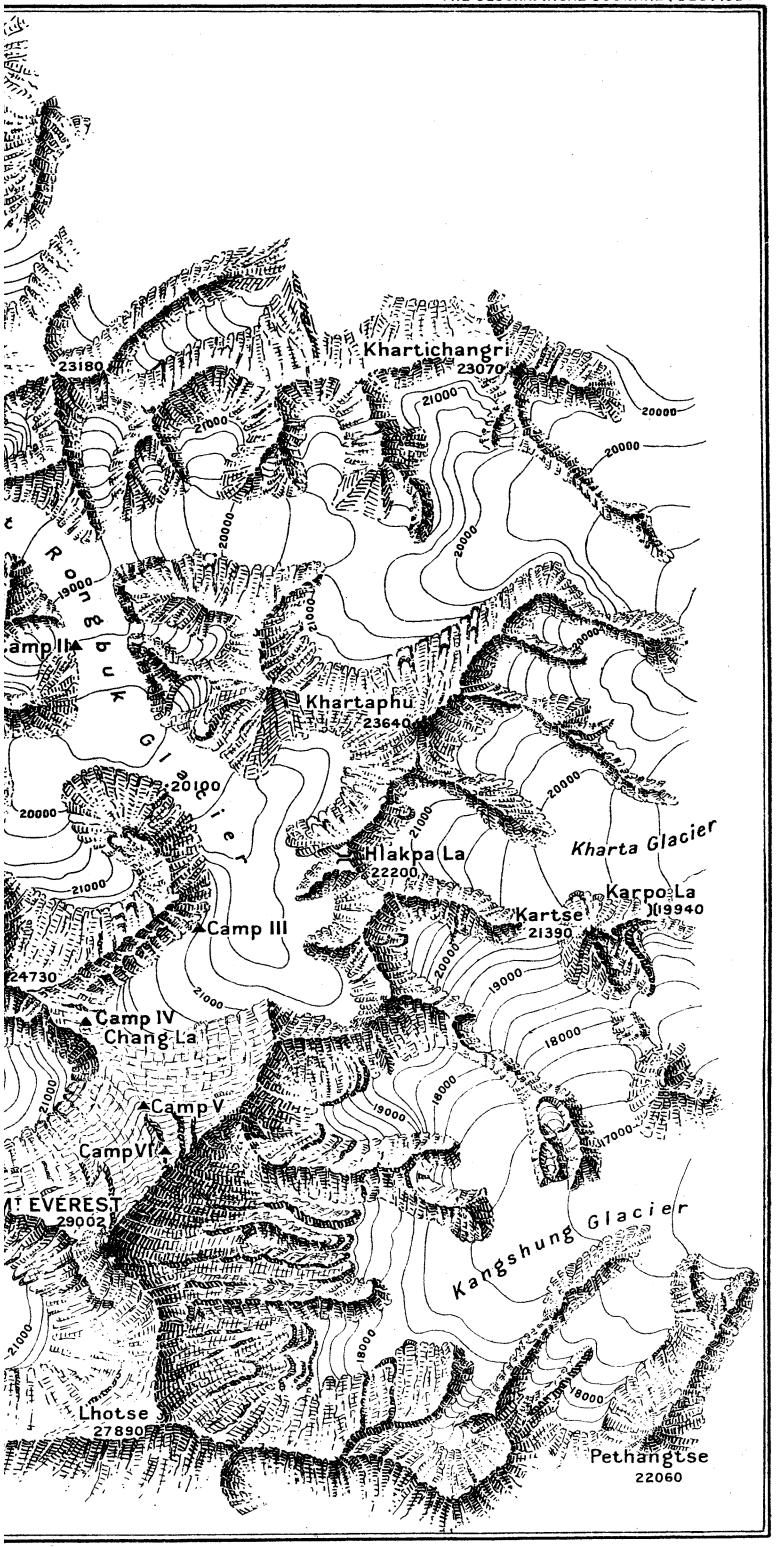
Published by the Royal Geographical Society


Khartichangri
23070
23180
21000
20000
Rongbuk Glacier
Camp II
Khartaphu
23640
Camp III
Hlakpa La
22200
Kharta Glacier
Karpo La
19940
Kartse
21390
24730
Camp IV
Chang La
Camp V
Camp VI
EVEREST
29002
Kangshung Glacier
Lhotse
27890
Pethangtse
22060
19000
18000
17000

EVEREST

aims at reproducing the atmosphere of the chief cities of Spain, particularly Seville, Cordoba, Granada, and Madrid. It may be thought that Mr. Bell is more successful in his treatment of village life and peasant habits of thought than in his portrayal of the more strenuous existence of the larger cities. While the casual traveller will find the book interesting, it will appeal with greater force to one who knows the language, the history, and the literature of Spain, for an extensive if not exhaustive study of these Mr. Bell rightly considers a necessary preliminary to a full appreciation of the country and its people. Naturally, few controversial subjects are dealt with, and although the book abounds in historical allusions the political situation is left untouched. It may be doubted however whether, as Mr. Bell believes, bull-fighting is destined to be replaced by the pelota. It would appear to be more probable that the rising generation of Spaniards will satisfy their sporting instincts on the tennis-court and the football-ground, for both in Madrid and in Seville matches already draw larger crowds than the bull-ring can accommodate.

G. B. B.

ASIA

Shelton of Tibet.— F. B. Shelton: New York: George H. Doran Company. 1923. $7\frac{1}{2} \times 5$, pp. xiv. + 320. *Illustrations.* $2 *net.*

In this book the writer gives some account of the work of her husband, an American Baptist Medical Missionary, mainly in Southern Tibet, where he lost his life by mischance on one of his journeys in the interior. A considerable part is composed of letters from relatives and friends, and while the volume as a whole scarcely lends itself to anything in the nature of a formal review, it contains several items of unfamiliar interest.

A singularly detailed familiarity with human anatomy appears to prevail among the common folk. It is declared that "perhaps there is no people on the globe who know so much about the construction of the body as the Tibetans, and yet who have so little medical knowledge or so few remedies. The facts of anatomy are learned from one of their modes of burial, the body being dissected and fed to the birds."

Illness of all kinds is believed to be the work of evil spirits, hence the importance assumed by the "devil dances" and similar forms of exorcism, to which attention was drawn in the remarkable moving pictures and their accompanying music by Dr. Howard Somervell in the lectures descriptive of the second Everest expedition.

A further terror to life for the Tibetan, and his helplessness in the face of the unseen, are disclosed in the firm and widespread belief in the ability of his enemy to "*pray him to death*"!

In the prevalence of superstitions so universal and so malignant, ample justification is afforded for work such as that undertaken by Mr. Shelton—work which aims at enlightening the minds of this people with a teaching that brings a new outlook on life and some of its problems, and furnishes them with the means of remedying many of the physical ills to which human flesh is heir.

W. W.

South Indian Hours.— Oswald J. Couldrey, I.E.S. (retired). London: Hurst & Blackett, Ltd. 1924. $8\frac{1}{2} \times 5\frac{1}{2}$, pp. 288. *Illustrated by the Author.* 18*s. net.*

The part of India between the Eastern Ghats and the mouths of the sacred Godavari is out of the beaten track of travellers, and was accessible with difficulty before the opening of the East Coast Railway in 1900. At Rajahmundry, a country town just above the head of the delta, Mr. Couldrey spent