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Mr. Shiel will not be offended when we say he has fallen greatly below the neglected original, from whom he has borrowed not merely his story, but *his principal characters*, (we make the latter part of this assertion in the face of a disclaimer in his preface;) but if forgetting what he has done, and estimating at its proper value the applause of a giddy audience under the influence of scenery, music, and powerful acting, he will remember that poetry is an art, like other arts, in which the gifts of nature are to be improved by discipline, study, and practice; that his own line demands a peculiar acquaintance with the workings of nature, and an earnest pursuit of the laws and felicities of language; and if therefore he will bestow more labour both on the conception of his characters, the arrangement of his plot, and the clearness and natural flow of his diction, we think we may safely promise him a higher rank than he has yet attained.

ART. VI.—*Sur l'Elévation des Montagnes de l'Inde, par Alexandre de Humboldt.*—Paris.

THERE is, perhaps, no man living who has made, in his own person, and collected from others, so many facts and observations connected with the various atmospherical phenomena as the Baron de Humboldt. His essay on 'Isothermal lines and the distribution of heat over the globe,'* was an able and elaborate production. Fond as he sometimes is of generalizing from a small number of insulated facts, he proceeded in that with all the caution which the delicacy and difficulty of the subject required. In the Memoir before us, more confined in its object, but still closely connected with the former, we cannot say that he appears in quite so advantageous a light. He had, in truth, fewer data to proceed upon; and indeed the only motive which could have induced him to write at all on a subject, of which the little that was known had already appeared in the Asiatic Researches, must have been a desire of extending the information contained in that work, for the edification of the Parisian philosophers; and his conclusions, as might be expected from the want of facts, are now discovered, by actual experiment, to be exceedingly erroneous.

We attach no censure to the arguments employed by M. de Humboldt on this occasion; they are grounded on principles the soundness of which, in Europe and America, he had himself experimentally proved. In the one country, he had the advantage of comparing his own observations with those of Saussure, Deluc,

* In the 'Mémoires de Physique et de Chimie de la Société d'Arcueil.'—Tom. iii. Paris. 1817.

Ramond,

Ramond, and other men of science and research; in the other, he was not only in the possession of the observations made by Condamine, Ulloa and Bruguer, but, as he tells us, had had an opportunity 'of profiting by the advantages which the lofty *plateaus* of the New Continent offered, to examine the temperature of the strata of superincumbent air,—not from mere insulated facts, the fruits of a few excursions towards the summit of a volcano, but from a collection of a great number of observations made from day to day, and from month to month.' Here then he might theorize with confidence: but he had no such advantages with regard to the elevated regions of central Asia: the few data collected by Messrs. Crawford, Colebrooke and Webb, even supposing them to be accurate, (of which some doubt was entertained,) related only to the altitude of a certain number of the peaks of mountains which, M. de Humboldt admits, are not to be taken as the measure of the magnitude of mountain ranges. In the absence, therefore, of well ascertained facts, he applies to the mountains and elevated plains of this unexplored and unknown part of the Eastern world, (and he could not well do otherwise,) the data with which Europe and America had supplied him. These, however, as we shall presently shew, are utterly at variance with experiments recently made in the midst of the chain of the Himalaya and the extensive table-land of Tartary. The barometrical observations, which we have just received in a valuable manuscript communication from Captain Webb, will, we are sure, convince M. de Humboldt, as they have convinced us, that his theory of isothermal lines will require a very considerable modification when applied to the continent of Asia: and we are led to hope that Professor Leslie will likewise perceive, that the ingenious system,* on which he has constructed his 'curved line of the lower point of perpetual congelation,' is wholly inapplicable to these elevated regions; though it might be found sufficiently accurate for most of the parallels of latitude in all parts of the globe, provided the earth had been covered with water, or its surface one vast plain.

The name of Captain Webb is not unknown to our readers. After receiving an excellent education in the mathematical school of Christ's Hospital, he procured a commission in the military service of the East India Company; where his superior abilities in practical mathematics soon brought him into notice, and, after the experience of a few years, acquired for him the appointment of surveyor of Kumaon. Previously to this, he had been the principal observer in all the expeditions to discover the sources of the several branches of the Ganges; and had ascertained, by every means that good instruments and trigonometrical observations could afford, the height

* In the 'Supplement to the Encyclopædia Britannica,' vol. iii. Article '*Climate*.'

of

of no less than twenty-seven peaks of the Himalaya range. In his new situation of surveyor of Kumaon his attempts to pass the Himalaya mountains have been incessant. In 1816 he advanced to the Tartar station of Tuklakot, and through the pass of Lebong, in the hope of obtaining permission to visit the sacred lake of Manasarowar between which and the place where he then was, there interfered only the Kailas mountain, or rather that end of it which connects it with the Himalaya. The Tartar chief who opposed his passage was exceedingly civil, but said that his orders were positive; that in future none would be allowed to cross that mountain from the southward side of India; and that the Deba or governor of Ghertop had been removed from his government and ordered to Lassa, for having permitted two Englishmen to visit the lake: these, it appears, were Captain Hearsay and Mr. Moorcroft. The altitude must have been very considerable, as the snow lay deep on the ground in the pass of Lebong, at the end of May; and at a much lower elevation, in the end of September, Captain Webb was shut up for seven days by a fall of snow, which buried the surrounding country to the depth of two feet and more. He had at this time no barometer with him.

In the year 1817 he succeeded in carrying a good barometer to several places near the base of the great chain of the Himalaya mountains; and in 1818 made a number of observations with no fewer than five good ones, the results of which he had an opportunity of comparing with contemporary observations made at Calcutta. In 1819 he proceeded nearly to the base of those lofty peaks which tower above the temple of Kedar-nath whose altitudes he had previously determined by triangulation,—at a great distance however, and under very small angles. But he had now an opportunity, at this temple, to observe one of the peaks under an angle of elevation equal to 26° 15′ 15″, and this gave him a result which, he says, 'agreed as well as could be expected with the position and altitude he had formerly assigned to it.' The temple itself, according to the mean of results given by five barometers, is 11,897 feet above Calcutta, or about 12,000 above the level of the sea, yet no snow remained in the immediate vicinity of the temple later than the beginning of July.

At this Temple, in a spot unseen before by any European eye, Captain Webb received (and we notice the circumstance with some emotion of pride and pleasure) a copy of our Journal. It was No. XXXIV., in which it may be recollected that we freely stated all the difficulties we felt in reconciling the enormous elevation of the Himalaya mountains, as resulting from Captain Webb's trigonometrical operations, carried on as they necessarily were at such an immense distance from them, and seen by him under such small

angles. We examined the facts stated by Mr. Moorcroft relating to the Nitee Pass and the great plain behind, to which the mountains serve as a supporting wall or buttress; and, taking for our guide the theory which in Europe has been found to correspond with sufficient accuracy to ascertained facts, we drew conclusions with regard to the elevation of this Ghaut and the table-land to which it leads, as erroneous, it now appears, as those of the Baron de Humboldt; so little applicable is that theory to the upper regions of India and Tartary.

'The receipt of the Quarterly Review created,' Captain Webb says, 'in his mind an anxious desire to verify or refute our conclusions on the spot, which he knew his barometers would enable him to do.' With this view he determined at once to set forward, and to try his success at the Nitee Pass through which Mr. Moorcroft had entered the plain of Tartary: and the communication we are now about to lay before our readers is the result of the journey.

Kedar-nath is one of those numerous shrines, which neither difficulties nor dangers, neither mountain-roads, nor fierce torrents, nor steep precipices can deter the pilgrim from visiting, in order to perform those duties which are enjoined by the Hindoo religion —a religion which, Captain Webb justly observes, seems to delight in practically demonstrating to its deluded votaries 'that rugged as is the path' to that region of beatitude, to which in fancy they are pressing forward, its ministers endeavour, by every means which human ingenuity can devise, to render it yet more intolerable by wantonly strewing it with additional thorns.

The extraordinary instances of the pious frauds and inventions of the priests of Brahma, and the credulity, the fanaticism and the self-devotion of their followers, cannot be perused without feelings of indignation at the one, and of compassion for the mental imbecility and bodily sufferings of the other. The object, Captain Webb tells us, of so many toilsome journeys to this spot is nothing more than a misshapen mass of black rock, supposed to resemble the hind quarters of a buffalo; and the legend attached to the temple thus records the transmutation.

Kedar, (one of the Dii minores,) being pursued by the giant Bheem-sing, was overtaken near the spot where the temple now stands. With admirable presence of mind he transformed himself into a buffalo, and joined a herd of those animals then grazing in the vicinity. Scarcely, however, had he assumed his new shape when Bheem-sing was in the midst of them, and suspecting the trick, devised a notable expedient for detecting the object of his pursuit. Placing himself in an attitude something like that of the Colossus of Rhodes, he compelled the whole herd to pass singly between his legs; all went through but poor Kedar, whose unwieldy carcass (for the

the god had ill-calculated his bulk) was jammed midway. Before Bheem-sing could execute vengeance on his enemy, however, the violence of Kedar's struggles caused his body to separate into two parts; the head and shoulders, diving underground, reached Nepaul (where they may still be seen) by a subterraneous passage; the rump remained a trophy to the giant.

If this idle legend was intended only to amuse the people, it would merely be ridiculous; but it is taught and believed, that at this black rock, the sins of the body may be expiated, and an intimate union with the ethereal essence of the deity be accomplished, by the voluntary sacrifice of life. The self-devoted victim is first required to distribute his property and his apparel among the Bramins; and is then directed to proceed in a state of nakedness, till he reaches the gorge of a snowy defile, when, having arrived at a perpendicular precipice of tremendous height, he is ordered to leap into the horrible abyss beneath—nor are victims wanting for this dreadful sacrifice.

'A few days (says Capt. Webb) before my arrival, three females of middle age had dared this fearful ordeal; but, strange to relate, had returned to the temple, after having sought death in vain for three days and three nights, in the midst of snow and without food, being unable to discover the precipice. One of these infatuated beings died a few hours after her return to Kedar-nath; the other two had been placed under a shed by the way-side, and asked for charity as I passed. One of them was likely to recover, with the loss of both feet and one hand; but the extremities of the other were in such a terrible state of mortification, that a few days must have terminated her misery, aggravated as it was by the perfect conviction, as she told me, that the God had rejected her sacrifice, and shut his ear to her prayers.'

Leaving, then, this scene of human infatuation, misery and imposture, Captain Webb proceeded without loss of time. On his arrival at Josimath, which may be considered as the commencement of the defile leading to the Nitee Pass, he unexpectedly encountered (a circumstance sufficiently discouraging to his hopes) one of the East India Company's civil servants, Mr. Traill, Commissioner for the Affairs of Kumaon, proceeding on a mission to the frontier, with a view to open a commercial intercourse with the Tartars. So thin, however, was the population, and so scanty were the supplies which this mountainous district afforded, that it was deemed inexpedient for the two *camps* to proceed in company, lest they should incur the danger of famine.

Captain Webb and his attendants were therefore left behind, and Mr. Traill proceeded on his mission. He reached the village of Nitee, the most advanced spot which is inhabited in the British possessions, where he experienced a severe attack of illness. He had

had sent forward, however, a person to announce his approach, who on his return informed the Commissioner, that the Tartar chiefs had declined all intercourse, and that they had pushed forward piquets of cavalry towards the pass, to dispute his advance into Tartary, should any such attempt be made. These untoward circumstances, and the state of Mr. Traill's health, decided this gentleman to return immediately to Josimath, in the neighbourhood of which Captain Webb had found him, and where he had fortunately been detained by the violence of the periodical rains, during the interval of the Commissioner's absence.

Discouraging as this repulse might appear, Captain Webb determined at once to try his success with the people of the frontiers; conceiving that, as the road was now open, and as he had on a former occasion gained a little insight into the Tartar character by an intercourse with some of their chiefs at Lebong, he might prevail on them to allow him to pass the mountains: with this view, having obtained from Mr. Traill a small investment of goods intended for the border market, he set out in the garb of a trader, and passed with the natives as a 'Feringhee Beópar,' or Christian merchant.

In pursuing the same road to the Pass as that taken by Mr. Moorcroft, he had an opportunity of verifying many of the observations of that enterprizing traveller; among others, he found both the cypress and cedar, whose existence was doubted by Mr. Colebrooke, though they were not of those enormous dimensions given by Moorcroft, especially the cedar, for which Captain Webb supposes he must have mistaken the *deodar*, a tree which grows to a very large size. Both the species of cedar were, in fact, small, and one of them crept along the ground. The cypress appeared to be the *C. horizontalis*. The pinus strobus was very common; and a new species, to which Dr. Wallich, the Company's botanist, has given the specific name of *Webbii*, is described as having the habit and leaves of the silver fir, and the cones of the cedar. The berry-bearing yew was of frequent occurrence. Dr. Wallich, in speaking of the acquisitions made by Captain Webb in these more than Alpine regions, mentions 'several new and stately pines and junipers, the yew, walnut, horse-chesnut, hazel, birch, poplar, rhubarb, some highly interesting sorts of grains used by the Tartars, besides a great variety of others, accompanied with extremely important observations on their habits, cultivation and use.'

Without entertaining any doubt of the difficulty of respiration felt by Mr. Moorcroft in ascending the Ghaut, we observed that much more elevated regions had been ascended, without such an effect being produced, and therefore conceived that it might arise from his ill state of health. Captain Webb, however, confirms his statement, not only from the evidence of his own sensations, but from

from that of the mountaineers themselves, who are as sensible of it as strangers; and he further assures us, that neither horses nor yaks are exempt from its influence. The natives call it *Bis-kee-huwa*, or the poisonous atmosphere, and conceive it to be owing to the effluvia of certain flowers, and that it is induced by walking or exertion of any kind.

'Every person (says our traveller) complained of loss of appetite for many days after our arrival at Nitee. For my part, I felt exactly those sensations which precede an attack of ague, with great oppression, increasing action of the heart, and of the viscera. But one man, who was with me, suffered one of those attacks to which the Bhoteas are subject, in the commencement of the season, and which they consider to be more directly produced by the *Bis-kee-huwa*. He had descended to the margin of the river about day-break, and while re-ascending, lost at once the use of his limbs and of his recollection; animation was not indeed quite suspended, but it appeared to me only a milder fit of apoplexy. His extremities became cold: and after vainly attempting his recovery by friction, and applying hot stones to his palms and feet for several hours, I ventured to give him an emetic; a large quantity of *foam* was thrown up, and in two or three days he recovered. I believe this secretion of foam is a peculiar effect of inhaling noxious vapours.'

On his arrival at Nitee, Captain Webb deemed it prudent to remain a few days, to negociate for the removal of the Tartar piquet of cavalry, and for his own honourable reception at the boundary; two points which were at once acceded to in consequence of a voluntary proposition on his part, to engage not to pass the frontier without a regular passport. Captain Webb, on a former occasion, had witnessed the ceremonial under which such engagements are made, and experienced the fidelity with which they are kept. The ceremony differs but little from the breaking of a sixpence between two lovers; the object to be broken, in the Tartar custom, which is probably as old as the world itself, being a more vulgar material —a common stone, a fragment of which is carried away by each of the contracting parties, and set up in some convenient place as a memorial and evidence of the agreement.

Proceeding from the village of Nitee towards the Ghaut of that name, Captain Webb was met, about one day's march on the British side of the frontier, by a deputation of respectable inhabitants from the town of Daba, who immediately entered into a friendly conversation with him. The confidence they thus at once shewed for an entire stranger was owing, in some degree, as Captain Webb soon discovered, to the accidental arrival at Daba (during his negociations at Nitee) of his old Tartar acquaintance, the ex-governor of Tuklakot, who being relieved from his office in the usual routine of three years, was now on his return to Lassa, his native city; and had made a strong impression on the

governor of Daba, in favour of Captain Webb. No objections were opposed to his advance as far as the frontier; and such was their confidence that he would not transgress that limit, that when Captain Webb proposed, on their leaving him, that one of their horsemen should remain behind to see that he kept the treaty, he was told it was not necessary; and that they had no apprehensions of his breaking the agreement.

The visitors now intimated a wish to inspect his merchandize, acquainting him, at the same time, that no barter or purchase could be allowed till permission should be received from Gertop, to the government of which that of Daba is subordinate. The bales were accordingly opened, the articles admired, and admitted to be prodigiously cheap.

'An old gentleman, to whom I gave a pair of spectacles to assist him in his task, made a most minute schedule of the whole, and of the prices fixed to each article; it was then proposed to me to return to Nitee, after I should have visited the Pass, at which place an answer was promised on the fifteenth day, and, if favourable, the goods would be taken off my hands; and so sanguine were they in their expectations that it would be so, that they actually gave commissions for the greater part of the articles, to some of the Booteas residing at Nitee.'

On the following day, the troop of horse set off towards home, leaving Captain Webb at leisure to make his observations on this interesting Pass, unobserved and unmolested. Punctually, as it had been settled, two Tartar horsemen returned on the fifteenth day, with the reply from Gertop, which stated the impossibility of compliance, without authority from the Viceroy of Lassa, whose decision was promised to be obtained and communicated, at the opening of the market on the following year: the people of Gertop had very little doubt of obtaining permission to trade at any mart, which might be opened on the British side of the frontier; but a reference, it was added, would be made by the Viceroy to the court of Pekin for further instructions:—if so, we have not much hesitation in saying that there is an end to all amicable intercourse with Tartary; the Chinese government being already far too jealous of our progress on the side of Nepaul and Bootan, to admit, if they can help it, any closer intercourse with their Tartar provinces.

The barometrical observations made by Captain Webb in the Nitee Pass are very interesting and important, as giving results utterly at variance, as we before stated, with M. de Humboldt's isothermal lines of temperature, and inconsistent with the facts, and the theory on which the tables of 'the lower limit of perpetual congelation' have been constructed. Every one must be aware that these tables are subject to anomalies, and that allowances must necessarily be made for various local circumstances. Accordingly,

Accordingly, in forming some estimate of the elevation of the Nitee Ghaut above the sea, from Moorcroft's description, we conceived that a deduction ought to be made for the immense mass of mountain ranges, backed by an extensive table-land, and for their great distance from the sea; circumstances which, in ordinary cases, might be supposed to increase the refrigeration of the super-incumbent atmosphere, and, consequently, to lower the tabular point of permanent snow. Just the reverse, however, are the results of Captain Webb's observations; and we have so much confidence in the care and accuracy with which they were conducted, that not a shadow of doubt remains in our minds on the general correctness of them.

The observations made by Captain Webb on the crest or highest ridge of Nitee Ghaut, taken on the 21st August, at 3 p. m. by the mean of four barometers, the thermometer standing at 47°, gave a mean of 16.27 inches.

From a journal of the weather kept by Colonel Hardwicke, at Dumdum, about 50 feet above the sea, it appears that, on the two days preceding, and two days following, the one on which Captain Webb observed in the Nitee Ghaut, the state of the barometer and thermometer, at 2 p. m. was as under:—

		In.		
August	19th.	Barometer	29.46	Thermometer 88°
	20	. . . . .	29.46	 84
	21	. . . . .	29.48	 85
	22	. . . . .	29.48	 84
	23	. . . . .	29.65	 81
		Mean .	29.51	. . . . . 84.4

The difference of elevation corresponding with these observations, between the Nitee Ghaut and Dumdum, is 16,764 feet.

Dumdum above the sea . . . . + 50

Height of the Pass above the sea . . 16,814 feet.

As compared with a diary kept by Mr. Colvin, (but not complete for the five days, and the observations made at noon when the barometer generally stands higher than at 2 p. m.) the altitude of the Pass would be 16,976 feet; but the comparison with Col. Hardwicke's instruments is so satisfactory, that 16,814 feet may be taken for the height of Nitee Ghaut above the level of the sea. Yet not a vestige of snow appeared in the Ghaut, nor on the projecting shoulder of the mountain ridge, rising about 300 feet on the left or western side of the Pass; so that we may assume the height of the lower point of congelation, on the northern side of the Himalaya Mountains, at not ess than *seventeen thou-*

sand feet! We say the *northern* side, because it would appear that, on the southern face of this enormous chain, the lower point of perpetual congelation differs very considerably from that on the opposite side; though neither on the southern face does the line of perpetual snow agree with the theory of Humboldt, Leslie, Kirwan, or any of the tables constructed in Europe. Thus Kedar-nath, on the verge of perpetual snow, was found, as we have stated, to be 11,897 feet above Calcutta, or 12,000 feet above the level of the sea; being about 700 feet higher than Leslie's table would give for the height of this temple. Captain Webb had previously ascertained that the village and temple of Milem, in lat. 30° 25′ were, one 11,512, the other 11,790 feet above the sea, both of which, according to theory, would have been some hundreds of feet within the limit of perpetual snow; yet, here he found extensive fields of buck-wheat and Tartaric barley, occupying the space between the village and the temple. The following year, on the 21st June, 1818, on a ridge of mountains south of the Dauli river, he ascertained, barometrically, the elevation to be 11,790 feet above the sea, being considerably within the limit of eternal snow according to theory; yet, says Mr. Colebrooke, 'his encampment, where the observation was made, was surrounded by flourishing woods of hoary oaks, long-leaved pine, and arborescent rhododendron; and the surface was clothed with a rank vegetation of herbs.'* Nay more, from an observation made the following day, on the summit of the *Pilgointi-churhai* Pass, he concluded the elevation to be more than 12,700 feet above the sea, yet no snow was visible, and the black soil was clad with creeping plants, and flowering herbs, in luxuriant abundance; and, the shoulder of a mountain, on the one hand, rising still higher, was without a vestige of snow, and appeared, as far as the view extended through the mist, enamelled with flowers; on the other hand, a sloping declivity exhibited a forest of birch, pine, and rhododendron.

Considerable as these anomalies are on the southern side of the great Hindoo range, they dwindle into nothing when compared with those which Captain Webb subsequently discovered to exist within the Ghaut, and on the northern side of that range. The crest of the Nitee pass, where the observation which gave 16,814 feet for its elevation was made, appears to be close to its northern extremity, and so situated as to command a view across the great elevated plateau or table-land, known to the Hindoos by the name of Undes or Oon-des, 'the region of *Wool*,' it being from this lofty country that the Cashmere manufacturers are chiefly supplied with the material from which their celebrated shawls are made.

* Quar. Journ. of Lit. Scien. and the Arts. No. XIII.

It

It is part of that country marked in our charts with the name of Little Thibet,—a name however which Captain Webb found to be unknown to the Tartar Chief with whom he conversed at Tuklakot, and derived, as he conjectures, from *Teiba*, signifying, in the Ghorcali language, 'high-peaked mountains.'

Faithful to his contract, Captain Webb did not presume to advance beyond the crest of the Ghaut; but as he could from thence discern the Sutledge river winding through the plain to the westward, he observed the angle of depression, which the nearest point of this river made with his station; and from this angle, and the distance, he calculated the elevation of the lowest part of the table-land, (which is of course that through which the river flows,) to be about 14,924 feet: and in coming to this conclusion, he could not be far amiss. The angle of depression was no more than 1° 28′ 10″, and the distance which he assumed for the nearest part of the river was 15·5 British miles, taken from Moorcroft's map;—'and as the distance (says Captain Webb) in that map which I had actually travelled over, appeared to be tolerably correct, or at least agreed tolerably well with my measurement, I conclude that there is still less chance of its being erroneous, where his route lay over a comparatively level surface.' This testimony, it is but justice to observe, is highly creditable to the accuracy of Mr. Moorcroft, and his Hindoo pundit, whose *four-feet strides* furnished the only means of his measurements.

Notwithstanding the enormous elevation of fifteen thousand feet, so far is this table-land of Tartary from being buried under eternal snows, and uninhabitable by man or beast, as theory would suppose it to be, that the banks of the Sutledge afford the finest pastures for myriads of quadrupeds throughout the year. The town of Daba too, which Mr. Moorcroft informed us was a mere summer residence, appears to be tenanted in all seasons. In the neighbourhood of this place, and near Doompoo, both considerably higher than the bed of the Sutledge, Captain Webb was informed that the finest crops of a grain called Ooa were gathered, from which the natives make their bread. There is a species of barley of this name or something like it (awa), which is cultivated by the Booteas on the southern side of the Himalaya mountains; and Captain Webb supposed, from its appearance, the Ooa of the plateau to be also a barley. Dr. Wallich, however, an experienced botanist, has pronounced it, from the specimens sent to him by Captain Webb, to be a new species of wheat. But whether barley or wheat, the meal which it yields is said to be remarkably fine. 'To an *unlearned* observer,' says Captain Webb, 'the Ooa while in the ear resembles barley, (*bearded*, we suppose) but when deprived of its husk, wheat.' This hardy grain, growing at the elevation of fifteen thousand feet, may

may prove of the utmost importance to Great Britain; as it would unquestionably thrive well in the Highlands of Scotland and the Hebrides; and might not be an unimportant article in the projected cultivation of Dartmoor, and other elevated moors, which, from their bleak and exposed situation, have been deemed unfit for the cultivation of grain. Samples of this Tartar grain have been sent to Sir Joseph Banks, and in better hands it could not possibly be placed.

Whether there be any remarkable degree of heat developed in these elevated regions, we have not the means of knowing experimentally; but the fact can scarcely be doubted. The summers, however, are exceedingly short, commencing about the middle of June and ending about the middle of August, scarcely ever extending to the close of that month. Even so early as the 10th of August, we are told by Mr. Moorcroft, the thermometer in the morning fell to 32°, and his tent was covered two inches thick with snow; on the 28th, near the Nitee pass, the mercury stood at 28°, and the ice was 2½ inches thick. How then does this grain ripen? Is the degree of temperature which produced the 'tamarisk shrubs of eight feet high,' seen by Mr. Moorcroft on the banks of the Sutledge, and the 'two very beautiful poplar-trees, in which were many goldfinches,' sufficient to ripen barley? or was Captain Webb misinformed? We know, at least, that a particular species of this grain does ripen on the southern side of the Himalaya, at an elevation of eleven or twelve thousand feet. It is true, as we find from Mr. Traill, that there the temperature varies during the hottest part of the day, from 60° to 75° of Fahrenheit, in the shade, and in the night is not lower than from 45° to 50°; that the sun shines out during his whole course, and that scarcely a shower of rain ever falls. This shining out, however, in a clear blue sky, and at such an elevation, would rather retard than hasten the ripening of the crop, the upper regions of the atmosphere acquiring, in such a state, an increased capacity for heat.* 'After the middle of August,' says Mr. Traill, 'the weather becomes very precarious. From that period, none of the inhabitants are suffered to ascend to the tops of the surrounding mountains, or to use fire-arms in the neighbourhood of the villages; as the occurrence of either of these events at that time, is found from experience generally to occasion a fall of snow above, and a frost below, by the latter of which the ripening crops would be wholly destroyed.'†

* In the clear blue sky of the valley of Chamouni, if the crops should not have ripened towards the end of the season, the peasants make fires of green wood, on the two sides of the enclosing mountains, the smoke of which uniting in the middle, forms a kind of cloudy canopy, which is found not only to prevent the escape of radiated heat, but to increase its intensity and to check the descent of frost.

† Royal Institution Journal, No. XIII.

This

This is neither superstition, nor a mere vulgar error. The sudden concussion of the air is well known to produce very extraordinary effects. Thus the inhabitants of the valley of Chamouny are aware, that the discharge of a fowling-piece, or even loud speaking, would bring down an avalanche, or break off some of those huge icy pinnacles, known by the name of *aiguilles*, rising out of the glacier. The firing of a musket by the late discovery ships, in one of the bays of Spitzbergen, shivered in pieces an enormous iceberg, whose fragments covered a square mile of the surface of the sea. With regard to the 'fall of snow, and the frost,' it must be recollected, that any sudden concussion of the air, when in a calm state, at or below the freezing point, will produce an instantaneous congelation of the suspended vapour; just as water cooled below the temperature of melting snow will remain liquid, but is immediately congealed on the slightest concussion; or, as Glauber's salt, dissolved in warm water, will, if shaken, when cold, crystallize at once, and assume a solid form.

Whatever be the cause, it is now pretty certain that an extraordinary degree of heat does prevail in the summer months on the elevated plain of Tartary; otherwise the point of the curve of congelation, in the 30th parallel of latitude, could not be higher here, as it is, than under the equator on the continent of America: for the limit of perpetual snow on the side of Chimboraço is, according to the observations of Baron de Humboldt, at an elevation of 15,747 feet, whereas that in the Nitee Ghaut is, as we have seen, at not less than 17,000 feet, or 1,253 feet higher than the former, and at 5,500 feet, or more than a mile, higher than it ought to be in that parallel of latitude, according to the table constructed by Professor Leslie.

The only explanation, which this anomaly seems to admit, is just contrary to that which would be applied to the comparatively small mountain masses of Europe, or other parts of the world; as in the instances of the Pic of Teneriffe, and the Abyssinian Geesh, the one at 13,000 having no snow for three or four months, the other, by Bruce's account, from 14,000 to 15,000 feet, being without snow at all times, owing, it is thought, to their peaked forms and their proximity to the sea. In the Himalaya and its northern plateau, we have a vast extent of elevated land, which rises out of central Asia, as M. Pauw has observed, like the boss of a shield; whose extensive surface, instead of cooling the superincumbent atmosphere, has the effect of raising its temperature, by the radiation of the heat collected from the rays of the summer sun; while the surfaces of slender pointed peaks, affording not the means of such radiation, suffer the heat to mount into the higher strata, where the capacity for caloric is greater. M. de Humboldt observes, that these

these mountainous ranges of central Asia, and the vast plains which they support, form an immense mass of elevated land, stretching from Daouria on the East to Belur-tagh, on the West, through forty-seven degrees of longitude, and from the Altai on the North, to the Himalaya on the South, a mean breadth of twenty degrees of latitude:—presenting thus a surface of regions more or less elevated, equal to 3,266,500 square British miles, scarcely one of which is known in modern times, though it formerly contained the flourishing cities of Balk, Samarcand, Bokhara, Cashgar, &c., and was, as some have conjectured, the cradle of the human race. The Kylas, however, which joins the Himalaya in an acute angle, within the sides of which is the sacred lake of Manasarowar, appears to be the highest ridge; for behind it the waters flow northerly, by north-westerly, and north-easterly; shewing that, in all these directions, this vast plain declines in a gradual slope, interrupted only by insulated mountain masses, or broken ranges. In crossing one of the gorges of the Kylas on the 15th and 16th of July, Moorcroft experienced a hard frost at night, beds of frozen snow lay in the ravines, and splashes of snow half melted in various parts, all which denoted a higher elevation than that of the Nitee pass. Baron de Humboldt further observes, that the Cordilleras of the Andes, though they extend from North to South one hundred and twenty degrees of latitude, are not more, generally speaking, than from two to three and very rarely from four to five degrees in breadth. It was no doubt a want of consideration of this great difference in the extent of surface, that led the Baron to make the erroneous comparison of the elevation of the great plateau of Tartary with that of the province of Los Pastos, in the Andes, the mean height of which he states only at 3000 metres, or 9,928 English feet.

This conclusion of his is the more remarkable, as the explanation which we have offered of the high degree of temperature, at the extraordinary elevation of the plains of Tartary, seems to coincide with the doctrine laid down in Baron de Humboldt's essay on Isothermal lines. 'As the heat,' he says, 'of high regions of the atmosphere depends on the radiation of the plains, it is conceived that, under the same geographical parallels, one may not find, in the system of trans-atlantic climates, the isothermal lines at the same elevation above the level of the sea, as in the system of European climates.' Had this observation on the difference caused by the radiation of plain surfaces occurred to him when writing on the height of the plains of Tartary, he would scarcely have thought of comparing the effects of the latter with those of the very circumscribed plains of Los Pastos.

Besides, the extraordinary effect produced by radiation on elevated plains of vast extent had been demonstrated by him in the instance

instance of the great height which the line of perpetual congelation reaches on the mountains rising out of the plain of Mexico. This line he finds by actual experiment to be, in lat. 19°—20°, at 15,090 feet above the sea, which is much higher than it ought to be according to theory; by Professor Leslie's table it would only be at 13,560 feet, making a difference of 1,530 feet, occasioned no doubt by the radiation of the plain. This effect is also obvious from the small difference in the height of the lower point of congelation on the side of Chimboraço, nearly under the equator, and on the mountains of Mexico, in 20° of N. latitude, the former being 15,746 and the latter 15,090 feet, making a difference only, in twenty degrees difference of latitude, of 656 feet—whereas, according to Leslie's table, the difference ought to be 1,729 feet.

With every reasonable allowance for the peculiarity in the magnitude, form and situation of the land of central Asia, the enormous difference between the results of Captain Webb's observations, and those of the tables computed on a mixture of facts and theory, would almost lead us to suspect the accuracy of this officer's observations, as we certainly should have done, had they been made with a solitary barometer; but the mean of four instruments, all of the best kind and acting well together, can scarcely be considered as doubtful; and the knowledge and experience of the observer will not permit us to call in question the accuracy of his experiments. We regret, however, that he was not allowed to proceed as far as the Sutledge, to mark the height at which the mercury might have stood in the tube in the bed of that river, and to ascertain how far, on a comparison with the elevation obtained trigonometrically, it corresponded with that elevation; and thus to ascertain whether the density of the atmosphere, as well as its temperature, had suffered any variation from the mean density of the air at the same elevation in other parts of the world—but mostly we regret it, as the great plain would have afforded to Captain Webb an admirable opportunity of obtaining the heights of the peaked summits of the Himalaya range, by angles taken at the extremities of so elevated a base, and at so short a distance from them; and of comparing those new results with those of his former observations, made under such disadvantageous circumstances, as to leave the correctness of them somewhat doubtful.

While Captain Webb remained in these elevated regions, he collected a variety of objects of natural history, and a few organic remains, among which were some fossil bones, which he says, the cognoscenti in Calcutta seem to consider as belonging to the human species; and, 'as I observe (he adds), that M. Cuvier in his essay denies that any such have yet been discovered, it will be gratifying to the curiosity of geologists should the fact be so established.' The fact,

fact, however, has *not* been established; M. Cuvier's theory is yet safe; and the 'cognoscenti of Calcutta' have proved themselves not very *cognoscent* in these matters. The bones have been carefully examined in London, and pronounced *not* to belong to the human species, but (from a comparison made in the excellent collection of the College of Surgeons) to the deer family: they are considered however as objects of curiosity from the position in which they were found—in a bed of gravel on the side of the Kylas mountain, 16,000 feet above the level of the sea—a height at which it is more than probable no organic remains had hitherto been discovered.

We have pleasure in adding that, assisted by Dr. Wallich in the part of natural history, it is the intention of Captain Webb speedily to publish a narrative of his proceedings in that most interesting part of the globe, in which he has passed so many years of his life.

ART. VII.—*A Letter respectfully addressed to His Royal Highness the Prince Regent on occasion of the Death of her late lamented Majesty.* By Lysias. pp. 20.

IF the value of a publication were to be estimated by its magnitude, the pamphlet at the head of this article must be doomed to stand low in the scale of merit; and, amidst the larger works to which our attention is usually directed, might probably pass unnoticed. But if we regard less the size of a book than the subject of which it treats, and the spirit and ability of its composition, the case will be altered; and Lysias will have no need to shrink from the presence of his more portly contemporaries:—

Μικρὸς μὲν ἦην δέμας, ἀλλὰ μαχητὴς.

The design of this address is to submit to the attention of the Prince Regent (by the recent dispensation of Providence, now placed in a station yet more exalted) the importance of maintaining the order and purity of his court. Individuals may possibly differ in the construction which they would affix to the terms 'order and purity'; and from the influence of education, the force of habit, or the nature of the society in which they are usually to be found, some persons would probably condemn in the detail what others, who concur with them in the general principle, would as cordially approve; but upon the main question itself, whether it be desirable to preserve from moral contamination the palaces of kings, he must be either very wicked or very foolish, who would answer in the negative.

It is an indisputable fact that the manners of the higher classes of society must, under any circumstances, produce considerable effects upon the ranks below them. This will be more especially the case in a free country; where every man is acquainted with the