

another accumulation of stratified gravels, which form in many places a series of terraces above the alluvial plains of the existing rivers.'

Connected with the subject of glacier extension is another question, namely, as to the origin of the considerable lakes which are so commonly found in subalpine districts. M. de Mortillet advanced the opinion in 1859, that the lakes had existed before the glacier period, but had been filled up with alluvial matter, and then re-excavated by the action of ice upon the incoherent alluvial strata. In support of this view, he pointed out that at the lower end of the great Italian lakes are found ancient beds of stratified alluvium containing pebbles which have come from the higher Alpine regions, and which could not have reached their present position unless the bed of the lakes, supposing them to have existed, had previously been filled up. Professor Ramsay about the same time suggested that the lake basins were not of pre-glacial date, but had been excavated in soft miocene strata by the action of ice.

These views are contested by Sir Charles Lyell, who bases his arguments on the position and direction of the lakes, and their entire absence in several areas where they ought to have existed if they had been produced by the cause assigned. He likewise asserts, contrary to Professor Ramsay, that alluvial deltas belonging to a pre-glacial period, are to be found on the borders of some of the lakes, especially that of Zürich. He further argues that, inasmuch as the upper strata of ice move more rapidly than those at the bottom, if the lake basin were filled with ice, the discharge would be entirely effected by the superior and faster moving strata, and that the lowest would be motionless or nearly so, and would exert very little, if any, friction at the bottom. His own theory as to the origin of the lake basins is, that they have been caused by unequal movements of upheaval and subsidence at or about the glacial period. At the same time he admits that the ice has contributed to the effect in some degree, both by its direct power in scooping out shallow basins where the rocks are of unequal hardness, and indirectly by preventing cavities from being filled up with sediment and by heaping up mounds of moraine matter.

Our limited space has compelled us to notice very briefly the author's views on these topics, and we must refer our readers to the work itself for a more complete exposition of them, as well as for his treatment of the question bearing directly on the main subject of this interesting volume, as to the existence of human life on the earth during, or antecedent to, the glacial epoch.

R. C. N.

NOTES AND QUERIES.

THE COL DES BOUQUETINS.—Towards the end of August 1862, Mr. Digby and I reached the châlet of Abricolla with the intention of passing over to Prerayen by the Glacier de Mont Miné, and the saddle which the Federal Engineers have named in their map the Col des

Bouquetins. The distant view of the glacier—which is obtained from the Abricolla Alp—revealed, however, that a maze of séracs, broken to all seeming as much as those of the Col du Géant, stretch from Mont Miné to the Grandes Dents; the evening was too far advanced to allow of closer examination; it was a matter of some moment to cross the next day; we were ignorant of what might lie beyond the plateau which crowned the ice-fall; and we therefore unwillingly chose a more certain, but probably a less interesting route, by the western arm of the Glacier de Ferpèche. Its general direction is evident, the particular course may be infinitely varied, and it will probably be enough to say that the way lies up the middle of the glacier till progress is barred in front by ice cliffs, which are easily turned by a moraine descending from the upper level of the glacier. A belt of séracs follows, to thread which, when we passed, required a little tact; and finally an undulating tract of névé leads to the foot of a backbone of rocks, mingled with snow and ice slopes, which connects Mont Miné with the Tête Blanche. The point where we climbed the rocks is about one-third of the distance between the former and the latter mountain, and probably no better spot could be chosen; the slopes of Mont Miné itself are very inviting, but there would be a descent on the other side of several hundred feet, and again a fresh ascent to the level at which we gained the snow plateau of the Col des Bouquetins; while, were the ridge skirted till it almost loses itself in the névé near the Tête Blanche, a great circuit would be needlessly made. The rocks are of coarse red granite, steep, but affording firm hold. From their summit, which is the real col, a line should be taken to immediately under the Tête Blanche, where some *débris* fallen from its cliffs gives easy access to the snow field which lies above the rocks of the Col de Valpelline. The rest of the pass follows, of course, the well-known route down the Zardezan Glacier.

It is not often that there is occasion to find fault with the map of Dufour, but I cannot refrain from pointing out the absolute absurdity of the dotted line with which the col has been marked. It leads by an utterly impracticable ice cliff from a part of the glacier where no one ought to be, to another part equally out of the way; it can only mislead, and ought to be entirely disregarded. The Federal Engineers are also in error about the height of the col, no doubt because the highest point is not visible from the lower glacier. The rocks, when we passed them, were clearly above the level of the Col d'Erin, and the plateau underneath is not more than fifty feet lower; it may therefore be assumed, even if the plateau be taken as the col, that the pass is more than 11,400 feet above the level of the sea. W. E. HALL.

ALPINE BYWAYS: II.—*From St. Nicholas to Susten by the mountains.* So good an account appears in Murray of the first portion of this route, that it is only necessary to add a few remarks on some points. It is a great pity that so many travellers pass through St. Nicholas, without stopping time enough to make the excursion to the chapel of Jung or Jungen, a white building on the summit of the cliff immediately overhanging St. Nicholas. It can be reached in two hours by a very steep path, in some parts a mere staircase cut in the rock, but practicable

I was told for mules, though I think riding *down* would be hardly safe. The view from the chapel is superb, comprising the Oberland, the Monte Leone, the Saas Grat traversed by the eye from base to summit, like the Jungfrau from Murren, the Weisshorn towering overhead on the right, and the whole of the valley of the Visp, backed by the Monte Rosa range from the Lyskamm to the Theodùle pass. I think the statement in Murray that Monte Rosa itself is visible is incorrect. A nice clean little inn has been built at Zmeiden in the Turtmann Thal, to which the path from St. Nicholas descends after crossing the col. It is charmingly situated, standing by itself in a green meadow on the bank of the stream, with some small rocky knolls cropping out of the turf. I hope its civil hostess will have more visitors next year than last; as at present the unfrequented solitude of the spot may be inferred from the fact that during the evening I spent there, I saw no less than six weasels running about within fifty yards of the door. Hence to St. Luc in the Einfisch Thal is well described in Murray. From thence, besides the ascent of the Bella Tola, the magnificent panorama from which is engraved in Berlepsch's new guide to Switzerland, a most interesting excursion may be made to the wonderful abyss called the Illgraben, or Les Eboulements. It may be reached in about two hours, and may be visited in descending either to Sierre or Susten, the latter being, I think, the preferable route, as it is more picturesque, and passes the lonely little tarn called the Illsee. The whole mountain has the appearance of having been first cleft open by some convulsion, and then, a great portion of it being a soft red sandy soil, the rains have widened and deepened the chasm, causing frequent landslips, till now it has become an irregular funnel-shaped hollow not less than 1500 feet deep, with an aperture towards Susten, the outlet of a small stream. The sides are very precipitous, and the upper edge on the side towards the Rhone valley is merely a thin crust, forming an arête too narrow to be traversed. The peasants have a story of a bear having taken up his quarters at the bottom a few years ago. The route from St. Luc to Susten starts from the back of the inn, and is at first a cart road through a pine wood, gradually mounting and passing some way above and to the right of the village of Chandolin. About an hour from St. Luc you cross a torrent on the right by a wooden bridge; and leaving the path strike up the moorland slopes, bearing to the right towards a depression between the Illhorn and the Schwarzhorn. I found my way entirely by Studer's map, as my guide, Moritz Andermatten, who had accompanied me from Zermatt, had never been this route before. On reaching this little col, about two hours from St. Luc, you see the Illsee close at your feet, on the bank of which is a chalet where milk can be procured. Hence the path zigzags down the ravine of the torrent from the Illsee, but before descending far it is advisable to leave the path, and striking left for a few minutes reach a point commanding a view right into the Illgraben. The finest point of view, however, is from the edge of the chasm towards Sierre, and a detour of about an hour might be made to this when above Chandolin, before mounting to the Illsee. The whole descent to Susten is very fine, passing through a dense forest of grand old pines, with lateral peeps on the left into the Illgraben, and thence

descending by pastures and châteaux and afterwards a second pine wood before reaching the flat of the Rhone valley. Six hours would be ample from St. Luc to Susten, and the whole route is practicable for mules.

F. ELLIOT BLACKSTONE.

THE CLARIDEN GRAT.—Can any mountaineer give an account from personal experience of the pass from the Linth Thal to the Maderaner Thal and Amsteg, across the Clariden Grat? It is just alluded to in Murray and other guide books, but I have never met with any particulars respecting its height, the difficulties (if any), or the time required for surmounting them.

F. E. P.

GREEN SHADOWS ON SNOW.—On the 16th of September, last year, I ascended the Gross Glockner in company with two friends. At 5.30 A.M. we were upon the long ridge which forms the snowshed of the Pasterze and Leiter Glaciers. The morning, upon the mountains, was perfectly clear and cloudless, though the valleys were filled with mist. The sun had not yet shown himself above the mountain ramparts which bounded our view towards the east, but a gorgeous fringe of fiery orange light, which rested upon the whole length of the mountain range, heralded his rising. I had been looking at this magnificent effect of the sunrise, when, happening to turn, I was surprised to see that our shadows upon the white snow at our feet were of a pale, though decided, green colour. Wishing to make certain of the fact, I asked one of my friends to look at the shadows and tell me what colour they were; and he immediately answered that they were green. This colour they retained for about ten minutes, until the sun had shown himself above the eastern range of mountains.

E. THURSTAN HOLLAND.

FOREIGN ALPINE CLUBS.—We have to record the formation abroad of two societies, according to the example set by the English Alpine Club, though not mere imitations of that peculiarly English fraternity. In Vienna was formed, last year, an Alpen Verein on a very extended scale, whereof any person interested in the Alps may become a member, whether he be a climber or not. The special object of this society is the exploration of the Austrian Alps, and the improvement of guides, roads, and accommodation in the little-known mountain regions of Germany. Within the last month a Swiss Alpine Club has also been founded, which proposes to make complete and systematic explorations, not merely of the great peaks, and of passes leading from one inhabited place to another (most of which have been already accomplished by the English club), but also of every part of the ranges from which the first class mountains rise. They also project the erection of night stations in the higher regions of the Alps, and the selection and education of able guides,—schemes which, if carried out, will be of great use to all travellers, and ought to obtain the pecuniary support, as well as the hearty sympathies, of English mountaineers.

SWISS PENSIONS.—So many persons being interested in knowing where healthy exercise and pure air, with a certain quantity of "creature comforts," may be obtained at a moderate expense, the following list of some of the most desirable pensions in the Alps may be found useful:—

Stachelberg, in the Canton of Glarus, accommodation excellent, at six or seven francs per day. Mineral baths. A very large and complete establishment.

Poschiavo, a nice little inn on the Italian side of the Bernina Pass; delicious trout from the lake.

Sonnenberg, immediately above the Grütli, five francs per day without wine; sixty or seventy people assemble here in August and September; new milk may be had every morning at six; one may bathe in the Lake of Seelisberg.

Champery, at the foot of the Dent-du-Midi, in the lovely Val d'Illicz, one of the cheapest mountain pensions in Europe, four and half francs per day; the living very fair.

Comballaz, said to be the highest pension in the world, 5,000 feet above the sea, in the Val des Ormonds, very comfortable, but does not command much view; five francs per day.

Hôtel du Mont Joli (St. Gervais, Savoy), six francs per day; the luxuries of a town in a quiet country village; near the Glacier of Bionnassay and the Col de Voza.

Hotel de la Dent Blanche, Evolena, in the Val d'Erin, good rooms, but a party should write beforehand, as the supply of provisions is liable to fall short. This is not a pension strictly, but, as at most other hotels in Switzerland, an arrangement may be made for a few days at pension prices.

St. Luc, in the Val d'Anniviers, a charming spot, with a view of the Matterhorn from the windows. The landlord, Pons, is a trustworthy guide, and has mules and side-saddles.

Engstlen, near the summit of the Joch Pass, rough, but clean, on a very secluded piece of table-land, with a small lake; four francs per day.

The Frohn-alp, on the east side of the Urner-see, nearly opposite Sonnenberg, an elevated and very airy spot. R. W. E. FORSTER.

* * In the September number of the 'Alpine Journal' will be published a summary of all new ascents and remarkable expeditions made during the summer, to as late a date as may be found possible. For this purpose the Editor requests mountaineers to furnish him, at their earliest convenience, with memoranda of all new and interesting expeditions which they may happen to make. He would also be glad to receive contributions to the series of *Alpine Byways*; under which heading it is intended to give notes of excursions which, though near the great routes and generally practicable for ladies, are unnoticed or insufficiently described in the guide books.