

and bare, with the white summits of all the great peaks of the Oberland rising singly above it.

But Mr. Browne's theme is *glacières* and not scenery, so perhaps we have no right to quarrel with any omission with respect to the latter topic, when his account of the ice-caves is so perfect. It is probably necessary to serve a considerable apprenticeship to visiting *glacières*, before one can expect to appreciate them properly. One must be very keenly interested in the investigation before one can reconcile oneself to darkness, the perpetual smell of tallow candles, and crawling on one's hands and knees over muddy, stony floors. And the imagination must be a powerful one that can see the beauties on which Mr. Browne dilates so enthusiastically by the dim light of a single dip. However, though we cannot in honesty say that we could discern much beauty in the Schafloch, the one *glacière* which opportunity has allowed the present writer to visit, there was much that was curious and novel in it. Our own advice to travellers would be, to explore one ice-cave as completely as time and opportunity will permit; and if one person in a hundred cared to visit a second except for the sake of scientific investigations, we should be very greatly surprised.

With regard to the scientific part of the subject, when it has been cleared of the legendary marvels due to the imagination of the few peasants who have half known and wholly feared the *glacières*, there does not appear to be much that is not easily explicable. The general formation of the ice-caves is very closely analogous to the stalactitic and stalagmitic formations in the limestone caverns, though of course the ice columns form very much more speedily, and, unlike the stone ones, are liable to melt again; and there seems no difficulty about accounting for the temperature in the caves remaining low enough not to melt all the ice. The most curious phenomenon observable in these caves is in the interior structure, so to speak, of the ice itself. The icy floor of the cave is found, on being cut into with an axe, to be composed of a congeries of hexagonal prisms of uniform shape, though very different sizes, which are easily divisible with a knife; and this is found to be the case in all the *glacières*, so far as has been observed, without exception. But we must refer our readers to Mr. Browne's book for what he has to say on this and other minor points connected with the formation of the ice-caves; and we may safely say that, whatever the value of his scientific conclusions, of which we do not pretend to judge, a more painstaking and accurate observer will seldom be found.

NOTES AND QUERIES.

ALPINE BYWAYS. XII.—*The Brunni Pass from Amsteg to Disentis.*
 —The excellent inn opened this summer in the Maderaner Thal may be advantageously reached by the hills which bound the valley on the N. After walking an hour from Amsteg, a path on the left leads in $1\frac{3}{4}$ hrs. by a steep and little-sheltered ascent to the hamlet and lake (1,413 m.=4,636 ft.) of Golzern—an exquisite spot, and well worth the labour and scorching the walk inflicts. But the guides will suggest

a further ascent to the huts of Bernetsmatten and the point above it (about 7,000 ft.), which requires another $1\frac{1}{2}$ hrs., and I doubt whether this is 'lohnend.' Nothing is gained but a view over the plateau of the Hüfi Glacier, and a sight of the Tödi, which does not, I think, raise that grand mountain in one's respect. From this point to the inn, by the track which approaches so near to the Hüfi that it may be visited with very little additional fatigue (there is a more direct but extremely steep path), took 2 hrs. of very quick walking, and there is on the way a most symmetrical view of the Grosse Windgelle, with the Staffel Glacier beneath, which ought not to be left unmentioned. This expedition requires upwards of 6 hrs. of actual walking.

From the new inn, where I slept that night (16th September), a steep descent leads to a bridge across the Kerstelen bach, whence there is a well-traced path into and up the wild glen called the Brunnithal, almost to the glacier. This path has no difficulty whatever, nor would there in ordinary years be any on the glacier itself: but in 1865 the glacier had wasted so remarkably that changes from its surface to the rocks and back again were frequent, and in one instance, at least, required a good deal of caution. The E. moraine abounds in crystals, and very pretty specimens can be found without the slightest trouble. On nearing the summit the col is seen nearly S., across the glacier; but on the left hand there is a snow-saddle, to the top of which a détour, both short and easy, should be made. It overlooks the Val Cavardiras, and presents the finest view of the day, embracing the Catscharauls, the Little and Great Tödi, the Piz Rusein or Stockgrön, the Piz Uräun, and a host of other peaks, named and unnamed, of hardly less importance. In ascending to the Sand Pass from the Vorder-rheinthal, this saddle is plainly seen, and it is possible to descend from it into the Val Rusein; but that route to Disentis must be thrice as long from this point as that by the Brunni Pass, which lies between the Piz Cavardiras and the Piz d'Acletta, and is marked 2,736 m. on the Federal map. This year there was a considerable bergschrund, and a steep though short ice-slope above it requiring steps. Some distance below, the glacier is hollowed out in a most singular manner; in early spring the Föhn rushes over the low col, upon the new-fallen snow, driving it round and round, and when the frost has fixed it the glacier looks like a vast whirling cauldron, stirred by some giant's hand, or like Edgar Poe's Maelstrom. On the right there is a grand view of apparently uninterrupted glacier leading to the peak of the Oberalpstock, 2,000 ft. above, which may be gained in about 3 hrs., and on the S. the view over the Medelser Gebirge and glacier is very fine. The descent is through the Val Acletta, and is easy and pleasant going after the first precipitous couloir of rock and débris (some 250 ft.), and a great mass of boulders beneath it, have been traversed.

From the new inn my time was, in ascending (leisurely), about 5 hrs., of which over 2 were on the glacier; in descending (very quickly) to the Krone (an admirable inn), at Disentis, $2\frac{1}{2}$ hrs., excluding all halts. My guide was Ambrose Zraggen of Silenen, whom Mr. Ball calls Kragger.

THOMAS BROOKSBANK.

ICE-AXES.—We have received the following letter of comment on the

form of axe recommended by the Special Committee of the Alpine Club, in their report which appears in No. 7 of the Alpine Journal:—

DEAR SIR,—In venturing to criticise the form of ice-axe constructed in accordance with the recommendation of a special committee of the Alpine Club, we trust that we may not be thought to undervalue the services rendered by the gentlemen who composed it.

Some mountaineers have urged that it is a work of supererogation to carry an axe when you have provided a guide to do all the work of step-cutting—‘to keep a dog,’ in fact, ‘and bark yourself,’—but, apart from the pleasure of occasionally taking a turn at leading, and the convenience of being able to enlarge or complete steps just sketched out, as it were, by the leader (thus permitting him to push on more rapidly), it might happen that, from accident or illness, the services of a guide might suddenly cease to be available, and then it would be in the highest degree important for the traveller to be able to take his place.

To beginners the axe can scarcely be recommended. Upon rocks or when glissading it is dangerous in inexperienced hands both to the owner himself and to his comrades, and it would generally be found less serviceable to him than an alpenstock. However, in working along steep slopes of snow, the adze-shaped blade affords such admirable anchorage that pattern No. 1 of the committee's axes may be selected with advantage, and is comparatively free from risk to the beginner. Greater breadth of blade is, however, desirable. Our principal objections to the Club axes are these:—

They are badly balanced; do not, in consequence, ‘handle lively;’ and are, in details, clumsily designed. This, we venture to say, would be the verdict of any good practical tool-maker or tool-user. The result is that, when a blow is delivered, a considerable portion of the force which should have gone to the work in hand is resolved, and takes the form of an ugly jar to the hand and arm of the striker.

Whoever has seen the American backwoodsman's axe-handles, as shown at the Exhibition of 1862, and has compared them with those commonly in use in this country, will understand how strength and thorough efficiency may be combined with elegance of form and even apparent fragility, by a judicious proportion between the various parts. How the same thing may be done in the case of an ice-axe we now proceed to point out.

1. *The Iron Head.*—The pick should project about 7 to $7\frac{1}{4}$ inches, and the adze-blade about $6\frac{1}{4}$ to $6\frac{1}{2}$ inches from the centre of the shaft, that is, the total length of the iron is about $13\frac{1}{2}$ inches.

To be really useful, however, the adze should have a breadth of from $2\frac{7}{8}$ to 3 inches, which greatly increases its holding powers on soft snow and, of course, the security of its bearer also. The two points, which need not be very sharp, should be steeled and slightly hardened, and the weight of the head alone should be 1 lb. 14 oz.

2. *The Shaft or Handle.*—The length of the shaft will of course vary according to individual taste and height; but on the whole, the most generally useful length for men about 5 feet 11 inches in height is from 45 to 50 inches over all. The section at the top should be elliptical, the diameters about $1\frac{7}{8}$ and $\frac{7}{8}$ inches; at the bottom circular,

with a diameter of about one inch, these two sections gradually falling into one another at about a foot from the spike. With these proportions the axe will deliver a blow with a springy, swinging action, which greatly increases the effect produced, besides being far less fatiguing.

3. *The Spike*.—A shoulder of the same diameter as the ring should be forged upon the spike, and this latter should be secured by a single rivet passing through the ring, wood, and shank. This arrangement will prevent dirt and water from getting into the grain of the wood and causing it to rot, and the spike itself will never come out or get loose.

If desired, the axe head is very easily made removable, two nuts, only $\frac{3}{4}$ in. thick, being the only projections on the top. If these are properly fitted and well screwed up at the commencement of the journey, the head may be used for weeks without the slightest risk of loosening. Indeed, from slight rusting, it usually becomes more firmly fixed every day.

The Committee recommend that the iron straps should be at the ends of the short diameter of the wood. From this we wholly dissent, on the ground that in such a position the wood is more likely to split, from the action of the rivets in cutting, than if they are opposite to the cutting edges, whilst they tend to prevent that springy action of the shaft which we have above described.

We are, dear Sir, yours very truly, { F. F. TUCKETT.
T. S. KENNEDY.

A WINTER ON THE ST. THÉODULE.—M. Dollfuss-Ausset, whose name is well known to all Alpine travellers, as the owner of the Pavilion on the Aar glacier, and as one of the earliest and most persevering investigators of glacier theory, is this winter conducting a new and bold experiment. During the past summer he repaired and strengthened the hut on the St. Théodule, and stored up there a great quantity of fuel and provisions, in order that it might serve as a winter habitation for persons engaged in meteorological and other observations. We believe that he commenced on August 1 a series of observations which are intended to be made continuously for a year, and that when he was himself obliged by the approach of winter to quit his post, he left behind three guides, trained by himself in the art of making observations, to continue the work until spring. There is good reason to believe that the decrease of temperature for additional elevation is much less in winter than in summer, though the St. Bernard is the only place continually inhabited, of elevation sufficient to give data on which this theory is founded. The experience of M. Dollfuss' guides will, it may be hoped, be of great value in solving this and many other interesting scientific questions. And great credit is due, both to the veteran meteorologist himself for devising and arranging so complete and costly an experiment, and to his guides for their courage and hardihood in undertaking to carry it out.

THE LAST ALPINE NOVELTY.—M. Dollfuss-Ausset is only just in time to secure for himself the credit of placing the first winter observatory among the everlasting snows. The 'Phare de la Loire' has recently

published an account, which we append below, of a far grander scheme, which commends itself to every mind by its simplicity and feasibility. It is to be supposed that that respectable journal, in attributing the scheme to an English engineer, intended a mild joke on the daring ideas propounded by some of our engineers; but the Alpine Club should at least determine, as whole or part owners of property to be interfered with by the proposed works, the terms on which their co operation will be given.

Observatory on the Summit of Mont Blanc.

The Ascent rendered easy for children, and even for the infirm.

‘Under the above title we have received from London the extremely curious details of one of the most practically original ideas of the age. We will attempt to reproduce it as briefly as possible for our readers, who will have the first tidings of it, since we believe that no mention of it has as yet appeared in the press of France or even of England.

‘All persons are aware that an ascent of Mont Blanc, the highest point in the Alps and in Europe, cannot be made without enduring fatigue and encountering innumerable perils. It is moreover one of the most expensive (about 2,000 fr.) in consequence of the number of guides and porters who must be taken for the three days during which the expedition lasts. Struck by these different inconveniences and by the accidents, both ancient and modern, of which this part of France has been the scene, an English engineer who has paid several visits to the marvellous valley of Chamouni has thought of a mode of rendering this monarch of mountains accessible to all, by the reduction of the cost to a moderate sum and the removal of all fatigue and danger. The following is the plan which he has just submitted to the Alpine Club of London, and which has been entirely approved by them.

‘From Chamouni as far as the Montanvert, the road which so far presents no danger is to remain as at present. But starting from this point, where the danger and the severe fatigue commence, a tunnel is to be sunk into the bowels of the mountain. Instead, however, of being horizontal, this tunnel is to have a considerable incline, so that, one end beginning near the Montanvert, the other end may open on the actual summit or quite close to it. A tramway being laid down in this gallery and fixed engines being erected to work it, a whole caravan of tourists may be transported in a few minutes, without fear or fatigue, and at a comparatively moderate cost, to those regions which cannot now be reached except at the risk of one’s life and after enduring infinite hardships.

‘If the scheme of our engineer only met the requirements of the numberless tourists who annually visit that sublime region, and who would come in still greater numbers, this alone would be something; but he has also thought of turning it to the advantage of science. With this object an observatory, surely the best situated in the world, will be solidly built on the Calotte. There, during the whole summer the chief savants of England and France will be able to devote themselves to the study of astronomy, of terrestrial magnetism, and other branches

of physical science. Is it not wonderful? Need we say that *auberges* and other resting-places will be established wherever possible, that the upper end of the tunnel will be guarded against the storms of winter, and that the entrance will be guarded by a keeper living there constantly? All this may be taken for granted, as well as many other things which in this rapid sketch we have omitted to notice.

'There being no other difficulty in the execution of this project than those which attend the construction of all tunnels, the only real obstacle is the expense. Some millions must be forthcoming. But what is that for the accomplishment of a work of this kind, one which will render incalculable services to science, and create for tourists a place of pilgrimage absolutely unique?

'Moreover it need not be thought that this enterprise would be a bad investment of capital. It is reckoned that annually 20,000 to 30,000 persons visit Chamouni, all of whom make one or more excursions to the neighbouring heights. Of this number half at least, taking a very low estimate, would go to the top of Mont Blanc by means of the tunnel, as soon as ever it was opened. Further, if an open air tramway led from Chamouni to the entrance of the tunnel, there would not be a single traveller who would not make the ascent. Therefore, charging 50 francs for the ascent, which at present costs twenty times as much, there would be, for only 15,000 tourists, a yearly revenue of 750,000 francs, which is again something. These figures, estimated at the lowest point, would obviously be exceeded. As science on the one hand, and the towns of Chamouni and Geneva on the other, have, as well as the Alpine Club of London, every interest in the accomplishment of this plan, there is reason to believe that before long France will be endowed with this new wonder of this world.'

PROPOSED ENGLISH CHURCH AT GRINDELWALD.—M. Bohren, the landlord of the Adler Hotel, has given a piece of ground close to the hotel as a site for an English church, and is engaged in obtaining plans and detailed estimates for the building. As it is calculated that a sum of about 3,000 francs will suffice for the erection of a sufficiently large church, we may confidently hope that a very short time only will elapse before M. Bohren will be able to begin building. The church will be under the charge of the Colonial and Continental Church and School Society, which has for two or three years past maintained a chaplain at Grindelwald during the summer months. Contributions will be received by the Secretary of the Society, the Rev. L. B. White, 9, Serjeants' Inn, Fleet Street, and by the Editor of the Alpine Journal.

THE GABELHORN.—The following account of the second ascent of this mountain, made from the Zinal side on July 7, was found among the papers of the late Lord Francis Douglas at Zermatt, addressed to the Editor of the Alpine Journal. We have appended in explanation a note by Mr. Moore, who, with Mr. Horace Walker had made the first ascent on the preceding day from Zermatt.

'We had made two previous attempts from Zermatt in vain. In the first attempt we ascended the Unter Gabelhorn, leaving Zermatt at 11 o'clock at night, but, at 3 o'clock on the following day, found ourselves only at the foot of the Gabelhorn, and had to return. In the second

attempt, we reached the summit of another peak of the Gabelhorn, about 13,000 feet in height, which lies immediately to one's left in crossing the Trift pass from Zermatt, but the arête connecting this with the Gabelhorn was found impracticable. I cannot conceive why this mountain has no name. It is very often mistaken for the Gabelhorn.

'*Third Attempt.*—Left Zinal at 2.30 and reached the foot of Gabelhorn at 6 o'clock. Halted 30 minutes for breakfast. Left at 6.30; and, at 8.30, after traversing some steep slopes and cutting our way up some walls of ice, we arrived at the base of the rocks leading to the summit. In some places those rocks, intermingled as they are with steep ice slopes, presented greater difficulties than I have ever yet encountered. It took us 4 hours to mount these, and we arrived at the summit at 12.30 (10 hours, including rests). There we found that some one had been the day before, at least to a point very little below it, where they had built a cairn; but they had not gone to the actual summit, as it was a peak of snow and there were no marks of footsteps. On this peak we sat down to dine, when, all of a sudden, I felt myself go, and the whole top fell with a crash thousands of feet below, and I with it as far as the rope allowed (some 12 feet). Here, like a flash of lightning, Taugwald came right by me some 12 feet more; but the other guide, who had only the minute before walked a few feet from the summit to pick up something, did not go down with the mass, and thus held us both. The weight on the rope must have been about 23 stone, and it is wonderful that, falling straight down without anything to break one's fall, it did not break too. Joseph Viennin then pulled us up, and we began the descent to Zermatt. Leaving at 1.30, we reached the foot of the rocks on to the glacier at 5.30, having been delayed an hour in leaving the arête to join the rocks where a wall of snow intervened, down which the guides cut a path while I sat on the arête and smoked. From thence it took us $4\frac{1}{2}$ hours to reach Zermatt, as the guides wasted much time in eating as usual, and we reached Zermatt with a full moon at 10.30 P.M. The rocks on this side are not easy, but are nothing to those on the other, which, in addition to difficulty, present an undoubted danger from avalanches, as a tremendous glacier overhangs them nearly all the way to the summit. In some places we saw immense blocks of ice which had come down across the very path we were going. Guides: Peter Taugwald of Zermatt and Joseph Viennin of Ayer. Peter Taugwald acted admirably, and really showed himself a first-rate guide. Joseph Viennin makes a good *second* guide in an expedition like this; but if he had been leader, I may safely say we never should have reached Zermatt.

'This will make a capital pass for those who have already gone over the Trift Joch and Col de la Dent Blanche, and being much higher, commands far finer views. A good guide will be indispensable, and the descent to Zinal will always be found a matter of great difficulty.'

FRANCIS DOUGLAS.

The summit of the Gabelhorn is a ridge about fifty yards long, running almost north and south. From it project three rocky points, of which the northern is the lowest by a few feet. The central point, to which we went, is the real summit, the southern point being very little lower. Adhering to the face of the rocks composing the latter, was a

lump of snow (the remains probably of a much larger mass) which had been blown up by the wind so that it very slightly overtopped the true summit. When standing up, we looked well over it, but when sitting down, it was a little above us. We did not go to it, as it completely overhung the precipice on the Zermatt side, and would evidently give way if trod upon. To a party ascending from Zinal, the real character of this snow cap would probably not have been visible, which will account for Lord F. Douglas' party venturing upon it. We built our cairn on the northern or lowest of the three points, because there were more loose rocks available for the purpose than on the actual summit.

A. W. MOORE.

TWO FATAL ACCIDENTS TO GERMAN MOUNTAINEERS.—The first of these has been described at length in the *Times* by Mr. Hawker, and we cannot give a better narrative of it than from his letter.

'On the 23rd of August M. Hüpner, of Dresden, and Eugène Imfanger left Engelberg with the intention of trying to make a new route from that place to Engstlen by the "Stand," a steep and rocky buttress of the Titlis. Imfanger, it is said, was opposed to the excursion on account of the supposed difficulty of the rocks. M. Hüpner was, however, not entirely inexperienced in Alpine climbing, having visited Engelberg for eight consecutive summers, and made many tours in the neighbourhood. They started, and, as is often the case, the rocks, which at a distance had looked so formidable, presented on a closer acquaintance no insurmountable difficulties, and were ascended in safety. They had arrived at the upper part of the Titlis, and in crossing an ice-slope were within thirty paces of the other side, where they would have reached the main névé and been close to the usual route followed in the ascent of the Titlis, when, as it appeared from the tracks which were afterwards found, M. Hüpner, who was five or six paces behind the guide, slipped, and, with the rope by which he was attached for a radius, he described a quadrant, marking his course by scratches on the ice. On falling to the perpendicular his weight drew the guide downwards. Imfanger was provided with a short-handed axe, and also with an alpenstock. At the moment of the accident he must have been using the latter, for it seems he turned at once with his face outwards, placed the alpenstock between his legs, and endeavoured with all his might to arrest the descent. But the fatal *glissade* once begun was not to be stopped; they slid together for about fifty yards down the gradually increasing slope, and then fell over some precipitous rocks on to a moraine 700ft. or 800ft. below.

'The following week I escorted a large party, including five ladies, up the Titlis. I took two porters from Engstlen, who had assisted in the recovery of the bodies, and they pointed out to me privately (for the particulars and locality had not then become generally known) where the accident had happened.

'The slope was by no means steep; I should think hardly over 30 degrees, but increasing rapidly as it approached the precipice. The ice on the upper part of the mountain was covered by a thin coating of old partly frozen snow, which, though in places not more than half an inch thick, generally afforded such foothold that, except at one crevasse,

not a single step had to be cut for the ascent of our party. It was in this rough snow that the marks were found which showed how the accident had happened.'

Poor Imfanger has left a family of nine children, the eldest a boy of sixteen; and as he has always borne a very high character, it is to be hoped that every requisite aid will be forthcoming for his bereaved family.

The second accident happened in descending the Gross Venediger. Two students from Erlangen, and a guide from Neukirchen, named Nussbaumer, had made the ascent, and in descending a snow-bridge over a crevasse, gave way under one of the students, his companion and the guide having crossed safely. There being no rope with the party, no immediate aid could be given to the unfortunate man, who had fallen nearly 100ft.; and as it took nineteen hours to fetch a rope from Neukirchen, he was frozen to death. This incident will recall to many readers the melancholy fate of Mr. Watson, who perished in the Tyrol some years ago under very similar circumstances. English mountaineers, intending to visit little-known regions, must take their own ropes, and must trust to their own judgment in enforcing the use of the rope where they deem it necessary or advisable.

THE GAMCHI GLACIER.—DEAR SIR,—The route described by Mr. Brooksbank across the Gamchi glacier, between the Seefinen Furke and the Dündengrat, is one that has long been known, though perhaps not so generally as it deserves, being much preferable to the long descent into the Kien-thal, and re-ascent on the opposite side. I passed it on the 7th Sept. 1859, in company with Messrs. Milman, Winder, and De Gex. Our guide was Ulrich Wenger of Grindelwald, who had crossed it once previously, but did not claim the credit of having been the discoverer of it. Yours truly, R. C. NICHOLS.

ALPINE ROPES.—SIR,—I should be glad if some member of the Alpine Club would give an opinion on the following points—

Would not metal eyes, as used on shipboard, and spliced into bights of the Alpine rope, be stronger than any knot, and easily (having one at each end, and one, say every twenty feet or so) hook on to the belts by strong snaffles?

Also, has anything been ascertained as to the strength of splices, belts, and snaffles?

In artillery and engineering work, it is common to insert a piece of stick in a knot, in order, by taking it out, to render it easier to undo the knot subsequently. Would this give strength to the rope for our purposes?

Faithfully yours, MARSHALL HALL.

HUT NEAR THE MÖNCH JOCH.—A hut has been erected during the past summer at the southern foot of the Mönch, very near to the col between that mountain and the Trugberg. The planks which had been carried up from Grindelwald for the purpose of building it were lying still unused on August 29th; but about three weeks afterwards, as we are informed, the curé at Grindelwald and Herr Aebi of Berne spent the night there, before ascending the Viescherhorn.