REVIEWS.

THE LAKE DWELLINGS OF SWITZERLAND.*

The industry of a number of years has brought man into connection with geology. The patient investigation of tumuli, of shell mounds, of caves, and of the drift have carried him back, not indeed to the time of his appearance upon earth, but at any rate for a space into which the imagination finds it hard to penetrate. The transition however from the times antecedent to history into those where history begins demands more ample illustration. Curiosity about the contemporary of the mammoth may be satisfied for the moment by a knowledge of little more than his bare existence; but the mind craves for detail about our ancestors of a nearer age; and great as was the mass of facts which had been brought together before, the discovery of the lake dwellings of Switzerland broke upon the world almost with the force of a revelation. No other place had been able to show so continuous a sequence or so rich a variety of remains. Elsewhere for the most part the primitive man told his story by what he left behind him in dying; there it became always possible to study him with minuteness as he lived. The importance of the investigations which have since taken place has produced its natural fruit. Each new dwelling as it came to light has brought forth its swarming progeny of memoirs, and a copious literature has summed up and speculated upon the general results. Fortunately this literature is one which has been tinctured less than is usual with antiquarian bitterness. A theory of successive wars of conquest corresponding to the ages of stone and bronze is one which can be debated without interference from those outer prejudices which enlisted themselves in virulent strength against cave men and implements from the drift. The facts at least are beyond dispute, and deductions in leaving them untouched must of necessity be comparatively harmless. Most therefore which has been written about the lake dwellings is free from polemical taint and stands in some ascertainable relation to established facts. But these merits are susceptible of degree; and the greater the quantity of mere facts which are blended with inevitable theory in an antiquarian work the larger are the pleasure and the advantage which the reader is likely to reap. Dr. Keller may at any rate be praised for having collected a very large number of facts, and for offering them in a very bare form. His method is therefore in principle sound. But a sound antiquarian mind is apt to produce very dull writing; and Dr. Keller must be confessed to be guilty in this direction of flagrant sin. His translator is even worse. Dr. Keller himself may allege that six separate reports presented at different times to the Antiquarian Society of Zurich can hardly be

* *The Lake Dwellings of Switzerland and of other Parts of Europe.* By Dr. F. Keller. Translated and arranged by G. J. E. Lee, F.S.A., F.G.S. London, Longmans, 1866.

expected, without entire recomposition, to furnish materials for a consecutive volume. He can only be blamed for its absence of arrangement in that he has sanctioned the form in which it has been put before the English public. If Mr. Lee had been contented to follow the unavoidable irregularity of the original his modesty might have been praised by the same mouth which disputed his judgment; but in translating he has seen fit to change the 'order' of the whole, and in changing has left a chaos. He has forfeited the praise of modesty, and has betrayed notions of method upon a level with those which may have characterised the race of lake dwellers themselves. Forbidding however as is the mould in which Dr. Keller and Mr. Lee have between them cast their information, the book is upon the whole the best upon the subject which has yet appeared. On the one hand its deductions are more sober than those of some writers—sometimes perhaps almost too sober; on the other hand it presents the fullest and most authoritative description which has yet been compiled of the remains discovered up to the present time in by far the larger number of the settlements. To the 'Lake Dwellings' may be referred both those enthusiasts who are careless about the toil through which the fullness of knowledge may be obtained, and those more ordinary readers who wish for a particular description of some settlement at which they may think of glancing as they pass by the lowlands of Switzerland on their way to a keener enjoyment. Such as care simply for a general view of the subject may still content themselves with the compact summary in which Sir J. Lubbock has stated everything which is really essential with a definiteness of argument and a clearness of presentment which will be searched for in vain in the pages of Dr. Keller.

Lake dwellings have become identified primarily with distant antiquity and with Switzerland because the remains of those which existed in the waters of that country revealed the traces of a prehistoric people. But even at the present day towns similar in their mode of construction lie scattered over the world, and history tells us of the past existence of others. The authority of Herodotus combines with contemporary evidence to prove for how long a time the fishermen of Lake Prasias have lived upon their lake. Some bas-reliefs brought from Kouyunjik may commemorate the conquest of a tribe dwelling in the lower Euphrates; and Hippocrates seems in describing a people living upon the Phasis, to point to habits identical with those which still continue in the far East. Tcherkask is built upon the Don, and perhaps the huts raised on piles by fishermen of the Bosphorus may represent there the last relics of antique custom. The villages of the Dyaks are described in language which might be applied almost without change to the old settlements of Switzerland; and in many places in the East, especially in Borneo and New Guinea, the habit of lake dwelling seems extensively to prevail. Even in America Ojeda found lake dwellings upon the site of Venezuela, and Vasco Nunez was baffled in Dabaybe by a tribe which lived in huts stretching from trunks to trunks of trees, which grew out of a watery swamp. But all these instances are either the product of exceptional circumstances among a people whose common practice is different, or are

merely the last indications of a departed custom. At some period of uncertain remoteness there is evidence that the habit prevailed not only in Switzerland, but in most parts of Europe. In Norfolk, in Wigton, in Laaland, in Pomerania, in Brandenburg, in Bavaria, in Carinthia, and in Italy the piles and sometimes further remains of lacustrine habitations have been discovered. Every year adds largely to the number of settlements known to exist outside the limits of Switzerland, and the frequency of their occurrence in that country, which alone has been exhaustively searched, can best be seen by reference to the long list which will be found at the end of this paper.

Either contemporarily or at a like stage of development the people who inhabited a broad band stretching across the whole centre of Europe abode for some inexplicable reason, wherever circumstances allowed, in dwellings which required more labour for their erection than houses built on shore would have wanted and which, while obviously in some respects dangerous, cannot be seen to have afforded in other ways either peculiar safety or peculiar convenience. Antiquarians have been unwilling to accept the simple belief that they formed the everyday houses of their owners; they have supposed them to be places for sacrificial rites, or to be forts in which a population living commonly on shore might find refuge in times of peril. But the various evidences of ordinary life, and the absence of anything which can be decisively identified with religion was fatal to the former hypothesis; and the apparent continuity of their occupation seems to have compelled an abandonment of the second idea. Against the latter a more decisive objection might be urged; stages connected with the shore only by narrow bridges might be strong against enemies who coming from a distance could only operate on land, but the next village supplies the chief foes of a savage tribe, and against an attack from canoes a lake dwelling was peculiarly weak. A firebrand stuck into the bridge on a windy night, and a few lighted arrows among the thatched house roofs, would easily have destroyed the settlement and its inhabitants at once. However the practice of building lake dwellings arose, it is impossible to believe that mere safety was aimed at by combining inflammability with ease of access and difficulty of escape. A strange notion has indeed been entertained that they may have been intended to protect their inhabitants from the inroads of wild beasts. But besides that wild beasts are nowhere known to be or ever to have been aggressive, it would be absurd to suppose that a people who could cultivate their fields and pasture their herds upon the shore should be obliged to fly to the water for escape from hordes of wolves and armies of bears. We must remain content to acknowledge ignorance as to the circumstances under which so strange a habit declared itself. All that seems certain is that lake dwellings were used as places of permanent abode, and therefore, of course in a certain sense as fortresses. In Ireland no doubt the tradition of their use so far remained that the old or similar foundations were employed to support stockades, which served as fastnesses down to the beginning of the seventeenth century. All those which were used in this manner were apparently situated in small lochs and disconnected with the shore. They were consequently as likely to have been kept in existence because

they readily lent themselves to new wants as because the old reason for their use still operated in full. It cannot be concluded that the numerous settlements which thickly line the shores of larger lakes were set in their strange position primarily for the object of defence, simply because other lake settlements were under other circumstances used for defence alone. Beyond the analogy of Crannoges nothing but bare assumption can lead to a definite theory of any kind as to the original reasons which prompted the choice of water as the foundation for a town; and a presumption that the custom in Switzerland was uselessly transmitted, like a meaningless animal habit, from a life spent under other circumstances may perhaps be got from the alleged fact that piles were even driven into dry ground to give superfluous support to the upland settlement of Ebersberg.

If the question as to why the lake dwellings were built must for the present remain unsolved, no such uncertainty fortunately affects the method of their construction. Above the water they seem to have been in all cases essentially alike; but their foundations could be laid in two ways. Sometimes masses of fagots, alternating with layers of brushwood mixed with clay or gravel, were piled upon each other till the top was brought upon a level with the surface of the water; a number of piles were driven in to keep together the heap; and a floor upon which the houses were built overlaid the whole. This kind of substructure, like the Irish Crannoges of analogous formation, has as yet been found only in the smaller lakes, where a muddy bottom would have allowed foundations composed of piles alone to sink too deeply, and where the mass of water was not sufficient to be raised by wind into destructive waves. It seems also to be so far more ancient than the alternative method that no instances have been discovered in which fascine dwellings are associated with bronze remains; but so far as can be judged from the manner in which the timbers which occur are morticed together, and from the fashioning of the pottery, scraps of which are found among the débris, the people who inhabited them seem to have differed in nothing from those who erected more artificial stages upon piles alone. The latter kind of dwelling from its greater solidity could be built under more varied conditions. Sometimes, as at Wangen, the villages were built close to the shore and seem to have been protected by palisades; much more frequently they were placed at a greater or less distance from it; in some examples they were pushed out for a space of three hundred yards. In the latter case the water was often deep, and it was not rarely that an entire settlement was placed upon piles hardly less than thirty feet long. It is calculated that in the settlement of Robenhausen 100,000, and that at Wangen 40,000 piles, must have been used; and though these were villages of unusual size it is obvious that enormous labour must have been expended before the smallest cluster of huts could be erected by men whose only tools were a fragment of stone and a fire. It is difficult to realise the length of patient industry which must have been applied to fell a single tree by the help only of a stone hatchet; to sharpen the trunk with fire might be a simpler and quicker operation; but to drive it through five feet of earth by means of

wooden hammers or clumsy blocks of stone was again a work hardly less severe than the original creation of the pile. When a sufficient number of these piles had been sunk sometimes at random, more commonly in regular order, the platform upon which the cabins were to be built had to be set upon the top. Logs ten or twelve feet long were fastened by wooden pins to the heads of the upright trunks which had been chopped to an even height, and a boarding of planks was again pegged to the rougher basis of the floor.

So far there is no question about the mode of construction; it is less certain how the huts themselves were built. Their framework was probably made of logs connected by wattles of smaller branches; the many morsels of clay which have been discovered still marked with the impression of wattling, prove that they were coated either outside or inside with unbaked earth; the plentiful remains of straw and reeds seem to indicate that they were thatched; the flat stones which still often lie *in situ* upon the flooring show the size and the nature of the hearth; the invariable presence of clay weights is held to indicate that each hut had its loom; and grounds exist according to M. Troyon for asserting their shape to have been round, according to Dr. Keller for declaring them to have been usually rectangular, and in some cases for fixing their size at about twenty-seven feet by twenty-two. On the whole the latter opinion seems to be the more consistent with a somewhat meagre range of facts; and the analogy of the more perfect remains the discovery of which has been announced within the last few weeks from Daber in Pomerania would lend to it additional probability.

Beyond this nothing is known of the dwellings themselves; but the objects which have been found in them are such as almost to enable us to reconstruct a picture of the life which their inhabitants passed. In their tools, their weapons, the bones of the animals which they ate, the grain which they cultivated, and the wild fruits which they gathered, in the fragments of material which could only have come from distant countries, even in the seeds of tares which in lurking among the corn betrays the origin of their cereals, are revealed or suggested the progress of their handicraft, the changes which took place in the nature of their food, something of the aspect of the country in which they lived, something even of the lines which trade may have followed, and along which comparative civilization may have come.

It is useless to enter into any description of the form of the weapon and implements of the stone or even of the bronze age. Most people are acquainted with the usual shapes of stone and bronze celts and of arrow-heads; the more exceptional implements it would be useless to describe without the help of figures; and it is more interesting, as it is of more importance, to note of what materials they were made. Whether or not commerce, in the proper sense of the term, existed in that earliest age when stone and bone were the only materials employed for the manufacture of tools or weapons, it is certain that much of the stone then in use was of a kind which cannot be found in Switzerland. Flint was brought from France; but nephrite, the appearance of which is not uncommon, is believed not to occur within the limits of Europe, and jade is almost certainly of Eastern origin. It is difficult to believe

in regular commerce, but it is equally difficult to understand that passing from hand to hand, which not being commerce, could yet according to Sir J. Lubbock introduce foreign materials in considerable quantities. His own example drawn from the tumuli of the Mississippi, the intercourse by which Humboldt accounts for the large quantity of gold found in Hispaniola and Florida, the trade which at the present day penetrates Africa in all directions, and a hundred other like instances would rather lead to the supposition that it is very easy to underrate the amount of barter which may take place among very savage tribes and the distance to which objects may be transmitted in regular course. Single specimens are not so significant, but the glass bead found at Wauwyl in a habitation of the earliest stone period, and that of amber which was discovered at Meilen, must have come, the one from Egypt or Phœnicia, the other presumably from the Baltic. The probabilities of commerce are increased, or the direction of immigration is shown, by the wheat the barley and the flax which were grown by the lake people ; the two former are identical with the species which used to be cultivated in Egypt; the *Centaurea cyanus*, the seeds of which are mixed with the corn, finds its home in Sicily ; the flax is of a kind which is native to the Mediterranean countries; and a weed (*Silene Cretica*) which is found in conjunction with it is now unknown to the north of the Alps.

The knowledge which is afforded by vegetable remains is far from being bounded by a stray indication of the direction of lines of importation. Thanks to the preserving power of fire, we see in a vast mass of carbonized remains the fruits which were eaten by the ancient Swiss and the fabrics with which they clothed themselves. Cakes of unleavened bread, equivalent to a weight of forty pounds had they been newly baked, were gathered at Robenhausen; elsewhere grain, roasted and coarsely ground, has been discovered in the earthern pots which were used for its storage; wild apples sometimes in quantities so large as half a peck in a single place, and pears dried for winter consumption, occur profusely; the wild plum, the cherry, the raspberry, the blackberry, the beechnut, and the hazelnut must have been eaten; the seeds of the dog rose, the elder, and the dwarf elder abound; carraway seeds, and those of the water-lily, the water chestnut, and some pines, may perhaps exhaust the vegetable resources of the lake dwellers.

Their animal food was not less varied. The remains of about seventy species of quadrupeds, birds, fishes and reptiles lie in the relic beds; and the marks of knives and the fractures which show that the bones had been broken open for their marrow, attest the indiscriminate appetite which enjoyed or was forced to content itself alike with a fox or a sheep. Probably like most savages the lake dwellers felt a hard pressure upon their means of subsistence, and the remains, numerous as they are, which are everywhere found may only register the distant occasions on which a victory or a death permitted the slaughter of their scanty herds, or on which unusual fortune in the chase could afford the rare luxury of an animal meal. Much the larger portion of their meat was obviously obtained by hunting. The bones of stags and oxen

equal in number those of all the other species together; but of the five varieties of the latter the urus and the aurochs were wild; pigs existed in a domesticated state, but a sort of wild boar, which Professor Rütimeyer calls the *Sus scrofa palustris*, supplies by far the greater number of the bones which belong to the hog tribe; and the fox, the marten, and the roe are as abundant as the goat or the sheep. Here and there the badger, the hedgehog, and the beaver are found in some quantity; more rarely the ibex, the chamois, the bear, the wolf, and the elk seem to have succumbed to the traps or the weapons of man.

More interesting even than these remains are those which indicate the extent to which animals had been domesticated; and supposing the careful and ingenious observations of Professor Rütimeyer to yield results as accurate as he believes to be given, it is possible in all cases to distinguish between the bones of a wild and tame species, and so to settle definitely the position occupied by the latter in the economy of the stone period. He has recognized in a huge ox which occurs at Concise and Chevroux, an animal only before known through fossil relics in the diluvium of Italy to exist as the contemporary of the mammoth and the hippopotamus; and he has discovered that though it most commonly roamed at large in the forest, yet that sometimes it was also domesticated. As the settlements where it appears lasted through the stone into the bronze age, the date at which this variety was tamed may be somewhat doubtful; but the species of ox most frequently occurring in the earliest and in later times alike is identified with that which still prevails over the whole south of Switzerland. Sheep, never common, increase in number as the age of stone draws to a close; and there seems to be a doubt whether the hog was domesticated at all before that of bronze began. In the stone age therefore we find ourselves in face not indeed of the earliest, but certainly of very early efforts on the part of man to bend wild animals to his use; and by the altered proportion of tame to wild beasts in the bronze period the course of progress in this respect is distinctly marked.

Two classes of objects yet require to be mentioned before proceeding further. The clothing of a people who lived so largely upon the products of the chase might be expected to consist in some measure of skins, but it is not without surprise that we learn of the practice of tanning. The scraps of leather which have been preserved are not numerous, nor is it possible to guess at the manner in which it was cured. Some means of treating it were however certainly known. The examples of woven fabrics are more frequent, and suffice not only to show the material but the method of manufacture. String, ropes, nets, and stuffs of various kinds were made chiefly of flax, but partly also of the fibre of lime trees and of reeds; the stuffs were not destitute of ornament, and M. Paur upon the evidence of the clay weights and the patterns has reconstructed, with more or less of probability, the loom which was employed. Earthenware has been found in great quantities. Unluckily it is usually broken into small pieces, and it is only possible to distinguish the more common forms, to perceive that the ornamentation was rude, and to decide that the vessels were made without the assistance of the potter's wheel. Two

sorts appear to have been manufactured—the one composed of coarse clay, mixed with small pebbles that the material might the better resist fire, the other formed of loam mixed sometimes with charcoal, and now and then painted with graphite. The shape was usually cylindrical. Sometimes the plainness of the surface is relieved by a row of knobs; sometimes the pressure of a cord, of the end of a stick, or of the finger nail gave it a rudimentary ornament; occasionally an endeavour is vainly made to introduce the more difficult refinement of a curve. As the enthusiasm of Dr. Keller has heightened in his copy the merit of the so called leaf ornament on the Wangen vase, it may be broadly asserted that no representation of animal or vegetable form has yet been met with; and that in this respect therefore the Swiss were far inferior to the more ancient contemporaries of the mammoth in France.

Such were the arts and such the condition of the lake people during the period which from the absence of metal is called the stone age. Gradually in the progress of many centuries this state of things began to change; the forests must have been partially cut; the pastures became more ample; the number of wild animals diminished; sheep and oxen grew more common; bronze began to take the place of stone as the material out of which weapons and implements were made; the occupation of deeper waters evidences better tools and larger resources; bracelets and earrings prove some margin of labour and means beyond what was demanded by the wants of simple animalism. Population at the same time probably extended itself more generally over the country. To whatever extent villages existed upon dry land during the stone period none of their remains have at least been discovered, though several burial places remote from water are supposed to belong to that age; but the settlement of Ebersberg, the relics of habitations at Gorgier in Neuchâtel and on the plateau of Granges in Soleure, pottery which has been found on the Salève, and less definite traces which betray themselves at Windisch near Vilten, and on the Uetliberg, may all be referred with certainty to the succeeding period. Curiously enough the lake dwellings of this age seem as yet to be almost confined to the lakes of Sempach, Morat, Bienne, Neuchâtel, Geneva and Luissel, that is to say, they occur almost entirely in the extreme west of Switzerland, and are, except in two instances, wanting in the east. It has been supposed from this that the stone period lasted for a longer time in the east than in the west, and that the people of the Lake of Constance used flint and serpentine alone at a time when those in the basin of the Thièle had finally adopted bronze. The supposition may possibly be true, but its improbability must be allowed to justify the scepticism of Sir J. Lubbock; and a more reasonable solution of what without doubt is a difficulty may perhaps be suggested by the mainland settlements, which so far as is at present known, would appear to have sprung up more commonly during the time when metals certainly prevailed. That fewer lake villages belong exclusively to the bronze than to the stone age would seem to show that a tendency to abandon the water had commenced by the time when bronze was introduced, and it is not inconceivable that this tendency may have pronounced itself at an earlier period in the Lakes of Constance or of Zurich than on those

of Geneva or Neuchâtel. The small number of remains which have as yet been found upon land at all, and the high probability in any given instance that all traces of a settlement would be obliterated by the long succession of subsequent generations deprive of significance the fact that nearly as many such spots in the west as in the east give evidence of having been occupied.

Whether or not any movement into villages built upon the land accompanied more or less generally the growing prosperity which came with advancing time, it is certain that pasture was much more extensively occupied than in the age of stone, and that the animals of the forest had decreased. The bones of the ox become decidedly more common than those of the stag; the aurochs disappears, and the formidable urus only remains in a state of domestication. Pigs, undoubtedly tame, predominate over the boar; sheep increase in quantity; and foxes yield their place to dogs, the type of which, intermediate between that of a hound and that of a pointer, declares their use, and proves a development from the inferior examples which are found in the earlier dwellings. The remains of man himself, strangely wanting before, appear though still with rarity in the habitations of the bronze period; and half a dozen skulls are insufficient to permit conclusions to be drawn with safety from their characteristics. The industry of the bronze age seems in most things to have in no wise altered its processes and to have very little improved its results. Similarity of vegetable remains indicates, if it indicates anything, that agriculture had not rendered superfluous the gathering of wild seeds, tiresome to collect in large quantities, and deficient in nutriment when eaten. The linen fabrics are identical with those of the former age. Pottery assumes slightly more elegant forms, and circles and spirals are added to the angular ornaments of the stone period; but the potter's wheel is still unknown, and the material if somewhat finer is essentially the same.

In implements however and in weapons progress is far more apparent. Axes, arrows, and knives retain their ancient shape; but swords, lances, and sickles are found for the first time; and pins, buttons, fish-hooks, needles, earrings, bracelets and rings are even frequent. Swords, short, double-edged, and straight, may be supposed from their rarity to have been reserved for the chiefs; and two poniards coated with silver, in the collection of Col. Schwab, must have been precious in the last degree. Ordinarily bronze celts were the weapons of ordinary use, and the immense variety of their shapes no less than their great actual number would prove the universality of their diffusion. The stone age melted into the bronze age, but although stone celts continued to be used even into the Middle Ages, metal must have become sufficiently common long before the appearance of iron to supersede generally the implement of flint or serpentine.

How then did metal first come to Switzerland at all, and whence was so large a quantity derived? Dr. Keller believes that the lines of communication which are suggested or proved by vegetable relics may be held to account first for the advent, and then for the spread of copper and of tin either separately or in combination. He points to the early association of the Phœnicians with Cornwall, to the difficulty

of imagining that tin could have come by the more direct route of Gaul, to the high probability of the existence of continued communication with the Mediterranean. He thinks that bronze was a subject of barter with the Etruscans, or with nations who had received it from them, and that most of it, even in late times, was imported as a compound metal and not in its component elements. To this M. Troyon and others reply with a different theory. They suppose that the people of the age of stone were violently displaced or destroyed by a new race, who advancing from Asia brought with them a knowledge of metals and of the processes necessary for their extraction from the ores. It is said, and with justice, that all Europe could not have been supplied by the Phœnicians, that no part of it, except perhaps Hungary,* offers evidence of an age in which the use of copper preceded that of bronze, and that it is impossible to conceive the idea of compounding copper and tin to have arisen simultaneously with their first discovery. It is alleged with high probability upon the evidence of the deposits at La Tinière that the age of bronze must have lasted between 3,000 and 4,000 years, while the Phœnicians certainly did not discover Cornwall till between twelve and fifteen centuries before our era. Finally it is asserted that the bronze of the Etruscans, of the Greeks, and of the Egyptians always contains traces of lead, and that the bronze of Switzerland and northern Europe is as invariably free from it. Neither theory is as a whole satisfactory. On the one hand there is no sufficient evidence of a great Asiatic irruption; on the other it seems necessary to throw back the age of bronze considerably before the time which, so far as we know, any dependence upon Phœnician commerce would mark as that at which bronze was introduced into Switzerland. The facts of which the truth is established beyond any doubt whatever are meagre enough. Copper occurs in France near Lyons and in more distant places; in Switzerland, in the Val d'Anniviers, in Glarus on the Mürtschen Alp, and in the Grisons near Andeer and Ilanz. That of the Val d'Anniviers is found close to mines of nickel and cobalt; and an analysis made by M. von Fellenberg shows that nickel and cobalt are present in Swiss bronze and in Swiss bronze alone. Tin is worked in Saxony, and traces of ancient mines have lately been found in Limousin, in La Marche, and in Brittany. A bronze mould for casting has been found at Morges; drop-shaped refuse from crucibles was mixed with implements at Estavayer and Echallens; at the latter

* In the absence of any information as to whether the two apparently copper celts found at Maurach and Sipplingen have been analysed, it is impossible to be sure that they may not have to be classed with the so-called copper implements of Ireland, which invariably contain a certain, though not large, proportion of tin, and therefore only indicate a dearth of the latter metal at a particular place or time. It may often have been difficult to obtain enough of a metal which had certainly to be imported from a considerable distance; and the composition of Swiss implements furnishes a hint of irregular supply. The proportion of tin found in the bronze of that country varies from six to eighteen per cent. Occasionally of course it may have been impossible to get tin at all; and the celts of Maurach and Sipplingen, even if made solely of copper, would probably only indicate a moment of absolute privation. Moreover no conclusion can be drawn from two examples which may have been imported, possibly from Hungary.

place pure copper has been found in crucibles in the immediate neighbourhood of bronze celts still marked with seams from the mould in which they were cast; and at Estavayer a bar of pure tin has been preserved. At some period therefore during the bronze age bronze was cast in Switzerland, some at least of the implements were made from Swiss copper, and it would be curious if all those chosen for analysis should happen to have owed that part of their composition to an unusual source or to have been cast at the end of the period. Probably therefore most of the bronze used by the Swiss was cast at home, and from copper of home production. If so it would be less forced to imagine that their tin was imported from France, which had already supplied them with flints, than to compel a reluctant chronology to bring the Phœnicians into regular communication with the west. But it remains to be asked, and probably the question will long remain unanswered, whether the knowledge of metals was the result of a slowly growing civilization in which the people of western Europe made this knowledge for themselves; or whether occasional communication with the East may have brought a few specimens, a hint of how the material was composed, perhaps a stray native of some place where mines existed who could find in the new country the ores which he was accustomed to work in his own. One fact only at present seems to point to the direction in which these questions may hereafter be solved. Copper implements may of course be found in some place where the knowledge of metal may gradually have been gained under circumstances which forbade its transmission to the west of Europe, until after many ages perhaps it struck men's minds that it would be well to fuse two metals together. But that any such place should have existed on this side of the Ural mountains or of the Caucasus is hardly probable; and unless something be discovered to show that Europe has passed through a stage of copper, the mind is almost compelled to look to Asia or to Eastern Africa as the source from which bronze came, perhaps only as a rarity, or perhaps though with less likelihood as an article of regular traffic.

In the foregoing pages some of the chief facts which are known about the lake dwellings during the two periods to which they for the most part belong have been put together in a fragmentary and imperfect manner. It would extend a review already lengthy into wearisome bulk were yet another period added to the list. But the transition from bronze to iron almost trenches upon the province of actual history. The pottery of the iron age is altered to the Roman type. Gaulish and Massaliote coins have been dug up on the battle-field of Tiefenau, and the lake dwellings dwindle alike in size and in number. At some time towards the end of the vast bronze period the habits of the population changed, and when hostile contact with civilization gave materials for history, the inhabitants of Switzerland were already a strong people, living upon the land, wielding iron swords, driving in chariots, and clothing themselves in coats of mail. A few fishing villages sparsely scattered along the lakes remained, as in the Limmat they lingered till the end of last century; but lake dwelling had ceased as a general custom, and the relics which have come to us from the age of iron,

however interesting they may be in themselves, need hardly be described before closing the register of that curious phase of human development with which they were accidentally connected. Here then we shall stop, adding only a list which we may be allowed to hope will supply an object for many a walk in parts of Switzerland which we Alpine men are perhaps too ready to neglect.

List of the Lake Dwellings in Switzerland, Savoy, and North Italy.

The more important settlements and those of which the remains are most easily seen are marked with a dagger, †. Those in which stone remains are found are followed by an S; those where bronze occurs by a B. In places where both stone and bronze implements have been discovered, and where those of one or the other kind predominate, an asterisk affixed to the S or B respectively indicates to which class the larger number of remains belong. The settlements to which no letter is affixed have yielded implements of neither kind. In all instances in which exceptional objects or iron implements have been found the place of their discovery is mentioned.

BODENSEE.
- Haguenau. S.
- Bodmann. Southern settlement. S.
- Bodmann. Northern settlement. *S.B.
- Lützelstetten. S.
- Mainau. S.
- Nussdorf. S.
- Maurach. S. Amber bead. Part of a copper celt.
- Unter Uhldingen. *S.B. Forty iron implements.
- Sipplingen. S. One celt of copper; sixteen iron implements.
- Markelfingen. S.
- Allensbach. S.
- †Hegne. S.
- Iznang. S.
- Hornstad. S.
- Gaienhofen. S.
- Hemmenhofen. S.
- †Wangen. S.
- Stein.
- Oberstaad. S.
- Neuenburger Horn. S.
- Feldbach. S.
- Steckborn. S.
- Berlingen. S.
- Ermatingen. S.

NEAR FRAUENFELD (to the west of the town).
- On Island.
- †Niederwyl. S. (Fascine dwelling).

NUSSBAUMENSEE (north-west of Frauenfeld.)
- On Island.

PFÄFFIKER SEE.
- †Robenhausen. S. Though no bronze implements have been found during the careful search which this settlement has undergone, the discovery of half-a-dozen crucibles, of three lumps of melted bronze, and of a lump of copper, lead to the belief that it must have been abandoned or more probably destroyed in the earliest days of the bronze period. Three successive settlements at different times on the same spot; two burnt, the third abandoned.
- Irgenhausen.

GREIFENSEE.
- Riedikon. S.

ZÜRICHER SEE.
- Zürich.
- Mänedorf. S. Crucible found.
- †Meilen. S. One bronze celt and an armilla of bronze; amber bead.

ZUGER SEE.
- Zug. S.
- Koller. S.
- S. Andreas, near Cham. S.
- Herschbach, Zwieren, Bathing-place at Zug — (?) Existence of lake dwellings at these places doubtful.

BALDEGGER SEE.
- Near the mouth of the Aa.
- In four other places on what is now dry land; remains not investigated.

SEMPACHER SEE.
- Schenken. S.
- Island at north end. S. Head of one bronze hair-pin.
- Mariazell. S.B.*
- Margrethen.
- Between Nottwyl and Sempach.
- Between Sempach and Eich. S. One bronze celt.

MAUENSEE (west of Sempacher See).
In two places.

WAUWYL (west of Sempacher See).
†In bed of reclaimed lake. S. (Fascine dwelling). Glass bead.

INKWYLER SEE (west of Herzogenbuchsee).
Island in middle. S.

MOOSSEEDORFER SEE (north of Bern).
Two dwellings, one at east, and one at west end. S.

LAC DE BIENNE.
†Nidau. S.B.* The settlement here is upon a Steinberg, or heap of stones artificially made for the protection of the base of the piles. The area of the Steinberg is from 2½ to 3½ acres. A bit of spiral gold wire and a gold plate; several iron objects of a late period; string of glass and jet beads.
Graseren.
Sutz. B. One flint flake.
Lattringen. B.
Möringen. B.
Near Hageneck. S.B.
Peters Insel. One bronze pin.
Small island south of Peters Insel. S.B.
Above Ligerz.
Vingelz (2,950 feet from shore, in fifteen feet of water).

LAC DE NEUCHÂTEL.
†Marin. ? S.B. Remains chiefly of the iron age; rings and beads of glass.
Hauterive. S.
Monruz.
Crêt. Apparently of iron age.
Auvernier. Two settlements S and B respectively; that of the stone age on a Steinberg nearly two acres in extent.
Colombier. S. Two settlements.
Between Colombier and Cortaillod. Remains of Roman times only.
Cortaillod. S.B.* Several iron and gold objects and string of amber and glass beads; three settlements.
Bevaix. B. Three settlements.
Chez les Moines. S. Fragments of Roman tiles.
Near St. Aubin. S. (Steinberg).
†Concise. S.B. Good example of a Steinberg.
Between Concise and Onnens.
Between Onnens and Poissine.
Corcelettes. S.B.
Port à la Reine, near Corcelettes, to the west. A rectangular enclosure of three rows of piles, with the interstices filled in with pebbles.
Tuilleries.
Les Uttins. Two settlements, the one at a distance of 1,850 yards, the other at a distance of 2,200 yards from the lake, in an alluvial plain formed since their erection by the washings from Mont Chamblon.
Clendy.
Between Camp Pitet and Cheseaux.
Yvonand.
Near Chables.
Font. S.?
†Estavayer.
1. Settlement close to the shore. S.
2. Settlement 130 yards from the shore. B.

La Crasaz. Two settlements; that near the shore, S.; that further from the shore, B.
Below Corbière. Roman water-jug. (? whether this is not identical with the bronze settlement of La Crasaz).
Forel. Roman tiles.
West of Chevroux. S.B. 'Great' iron fork.
Chevroux. S.B.
Gletterens. B. Roman tiles.
Between Gletterens and Port Alban. B.
Port Alban. S.B.? (Marked as of bronze age in Dr. Keller's map; but mentioned in his list of settlements on the Lake of Neuchâtel as yielding stone implements only.)
Between Port Alban and Chabrey. S.
Champmartin. S.? (Steinberg.)
Between Champmartin and Cudrefin. S.?
North of Cudrefin (Steinberg).
Between Cudrefin and A la Sauge.
A la Sauge. Pottery; Roman tiles and handle of Roman amphora.
Pont de la Thièle (Zihlbrücke). S. Along the shore of river, under and on both sides of the remains of Roman bridge. See calculation of length of time since this settlement was formed, quoted by Lubbock.

LAC DE MORAT.
At the northernmost corner of the lake
Montellier. S.B.* (Steinberg.)
Opposite the monument of the battle of Morat (Steinberg).
Greing. S.B.
South-west of Greing.
Faoug (Steinberg). Roman tiles.

North of Chandon.
Opposite Chandon (Steinberg).
Near Vallamand (Steinberg).
Guevaux.
1. Near shore. B.
2. Farther out from shore (Steinberg).
Between Guevaux and Motier; two settlements.
Motier. Stone celt; iron javelin; Roman tiles (Steinberg).
Near Praz; two settlements.

LAC DE GENÈVE.
La Tinière, near Villeneuve. Traces of settlement ascribed to stone age at 19 ft. (Troyon 21 ft. 8 in.) from the surface, and of one of the bronze age at about 12 ft. For calculations of length of stone and bronze ages, based on the time required for the accumulation of the deposits in which these remains were found, see 'Bulletin de la Société Vaudoise des Sciences Naturelles,' vols. v. and vi., and Lubbock.
Vevey. S. Near the church of Ste. Claire, at a depth from the surface of the ground of 37 ft., one stone hatchet and range of piles; Roman remains 12 ft. nearer to the surface.
Creux de Plan, between Vevey and Gonelles.
Cully.
Lutry.
Pully.
Cour. Bones which have apparently been notched by instruments of metal.
Vidy.
St. Sulpice. Pottery which is referred to the bronze age.
†Morges. B. Silver necklace-bead.
Les Roseaux, close to Morges. S.?B. Many iron sickles.
St. Prex.
Rolle. B.
Nyon.
Versoix.
Les Pâquis.? Close to Geneva. (Troyon does not consider that the piles at this place, and those within Geneva itself, are beyond doubt so old as the bronze age).
Geneva.? From the Île de Rousseau towards Cologny for a long distance.
La Belotte.
La Gabieule.
Bassy.
Moulin, above Hermance. Pottery of the bronze age.
Fabrique Canton, above Hermance.
Creux de la Tougue. B.
Beauregard.
Messeri.
Nernier. Settlement partly in what is now dry land, ascribed to stone age.
Yvoire.
Thonon. B.
Evian.
Amphion.

LAC DE LUISSEL (near Bex.)
Remains found in 1791. B.

LAC D'ANNECY.
Roseley. Early pottery.
Sevrier.

LAC DE BOURGET.
Bay of Grésine Saint-Innocent, north of Aix.
Opposite Saut de la Pucelle. B.?
Entrance of Canal of Savières.

NEAR ARONA.
Peat-moor, formerly lake, of Mercurago, south of Arona. S.B.
Peat-moor of Borgo Ticino.?
Lake or pool at Gagnano.

NEAR IVREA.
Peat-moor of San Martino. S.?

LAGO DI VARESE.
Isolino. S.
Cazzago.
Bodio. Three settlements. S.B.
Bardello.

LAGO DI GARDA.
Peschiera. B. Several copper implements.
Isola di Secchi. Two settlements.
S. Felice. Three settlements.

LAGO DI FIMON. S.

HANNIBAL'S PASSAGE OF THE ALPS.*

One can never feel confident that any controversy is finally closed. There are people outside lunatic asylums who still believe that Copernicus was an impostor, that the earth is a fixed plane and the sun in motion about it. There are mathematicians still confident of squaring the circle, in spite of proof, as cogent as can be given short of demonstration, that the thing is literally impossible. Still more inevitably, and less unreasonably, is this the case with respect to controversies on past events. Though the data remain as they have been for ages, eager disputants always think they can deduce from them some new view, or at least some new chain of argument in favour of an old view; and even if new data should be discovered, they would either discredit them, or twist them round to suit their preconceived opinions. The dispute as to the route by which Hannibal crossed the Alps is one of these irrepressible and utterly hopeless controversies, and Mr. Law and Mr. Ellis, especially the latter, are typical disputants. If Mr. Law could produce Hannibal's hat, with his name in full written inside it, from a chink in the rocks on the Little St. Bernard, we should half expect Mr. Ellis to argue that it had been blown thither from the Little Mont Cenis; and we are not quite sure that Mr. Law would not treat with equal scorn a similar piece of evidence adduced in favour of Mr. Ellis's favourite pass. We have no hesitation in avowing our distinct preference for Mr. Law's theory, if one must have a theory at all: but we are more disposed to agree with the remark of the Dean of Christ Church, in his Roman history, that 'the controversy will probably last for ever: the data seem insufficient to enable us to form a positive judgment.' At any rate the question is hardly worth so much angry ink-shed: and though it is true that, as the Bishop of St. David's says of clerical declarations, 'there is no law to prevent an Englishman from wasting his paper and his ink,' we cannot treat the result as much more valuable than waste paper. Since however Mr. Ellis and his friends have had the field to themselves, until the publication of Mr. Law's present work, from a date before the foundation of the Alpine Club, and since it may be assumed that the general assent of the Club is accorded to the view which is ably summarized in Mr. Ball's Guide by one of its earliest and most distinguished members, we cannot refrain from noticing this new outbreak of 'Hannibal's passage on the brain' (as the disease may be styled), if it be only to show that the Alpine Club by no means abjures the right of private judgment.

There are two modes of dealing with a question of this kind, which relates to the details of a fact that certainly happened somehow or other,

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* *The Alps of Hannibal.* By William John Law, M.A., formerly Student of Christ Church, Oxford. London: Macmillan & Co. 1866.

An Enquiry into the Ancient Routes between Italy and Gaul; with an examination of the Theory of Hannibal's Passage of the Alps by the Little St. Bernard. By Robert Ellis, B.D., Fellow of St. John's College, Cambridge. Cambridge: Deighton, Bell & Co. 1867.

and depends for its solution upon rather scanty and not altogether concordant authorities. First, we may consider what is most likely to have been the course of events, on such *a priori* grounds as may be available, and then see how the authorities accord with what seems in the nature of things most probable. This method obviously entails the danger of unduly discrediting or twisting the authorities to suit the pre-conceived theory: but it may easily be the best plan if the evidence is really unsatisfactory. The other method is to rely wholly on the authorities, and discard probabilities altogether, using observation only to discredit modes of interpretation which involve actual impossibilities. So few things happen in the way *a priori* most likely, that probabilities are at best a very unsafe guide, ; but trusting entirely to the authorities usually results in making them out to be a great deal more certain and minute than they really are. We do not presume to say whether in the present controversy Mr. Law or Mr. Ellis has followed either method strictly, but they certainly exemplify the evils of both in a greater or less degree.

Mr. Law almost worships the authority of Polybius, an accurate and pains-taking writer in general, who wrote very soon after the event, and took special pains to verify this part of his narrative by crossing the Alps himself in Hannibal's track. But after all he gives scarcely a single name (deliberately, on the ground that the barbarous names would be meaningless to his readers), and very few geographical details; and we all know how differently two travellers will describe the same route, according as one feature or another strikes the eye or the imagination. It is no wonder that Polybius is not more explicit: in the first place he was writing a history, not a guide-book, and moreover there was not in his day, nor for many centuries afterwards, a single human being who possessed a clear general idea of the structure of the mountain country between Gaul and Italy. For his age Polybius is unusually intelligible and correct in these matters, and we hold it clear that, if stress is to be laid on his every detail, the theory of Hannibal's passage by the Little St. Bernard is by far the most reasonable, in fact that no other is consistent with true canons of interpretation. The fault we find with Mr. Law is that he rides his hobby too hard, and would have us believe that the matter is as certain as Napoleon's passage of the Great St. Bernard before Marengo. Dr. Arnold, with his marvellously keen eye for geography, may have been over severe upon Polybius, and have expected more of him than was possible in the second century B.C.; but the present writer follows Arnold throughout, both in thinking that the description of Polybius cannot be accurately identified, and also in holding, both on the authority of Polybius so far as he can be relied on, and on the probabilities of the case, that Hannibal did cross the Alps by the Little St. Bernard.

Mr. Ellis has satisfied himself that the Little Mt. Cenis was Hannibal's pass, whether by a study of the geography, by a comparison of all the so-called authorities, or from Polybius alone (who is really the only authority on the subject worth a farthing), we need not here enquire. He admits that every expression in Polybius must be minutely explained, and for this purpose is obliged to devise the singular theory

that Polybius tells everything twice over, first in short sentences of summary and then in detail. It would be impossible for us to give any full account of the reasons why he thinks this method is to be adopted, so that we must refer readers desirous to test the theory for themselves to Mr. Ellis's pages, simply remarking that, from the nature of the case, every historian must occasionally resort to such a practice, though we have never heard theories of interpretation built upon the instances. However, even admitting these rather extensive premisses, we cannot say that we are much more ready to swallow the conclusion, and we are inclined to think that Mr. Ellis will best support his cause by arguing upon the probabilities and letting Polybius alone. There are undoubted difficulties in the way of accepting the Little St. Bernard theory, and Mr. Law does not ignore them, though he does his best to explain them away. The *a priori* difficulties of getting Hannibal over the Cenis may be less, though the present writer does not so estimate them; but certainly if Polybius is to be gospel, the Cenis must be discarded.

We are delighted to find that both the disputants virtually disregard the authority of Livy, who has in fact no claims to consideration except on the old hypothesis that whatever a classical author says must be true, and who has done more harm to real historical knowledge than perhaps any man who ever professed to write history. There have not been wanting modern writers who took him as their guide in this controversy, and were led, as by a will-of-the-wisp, up and down all manner of Alpine valleys. If Livy means anything definite at all, a point of which no one who has ever studied his geography, or even his narrative of facts, will feel very confident, he means that Hannibal crossed by the Mont Genèvre, which in later times was a known and frequented pass, indeed the only one, except the Little St. Bernard, which was habitually used by the Romans. But Livy is not consistent with himself: he agrees withPolybius in taking Hannibal's army up the Rhone far beyond the opening of the Durance valley which leads to the Mont Genèvre, and his partisans were put to great straits to get them back again. However, we may consider Livy extinct as regards this controversy, as well as the theories which ingenious people have propounded in favour of the Great St. Bernard, some pass under Monte Viso, and even the Simplon. The question has narrowed itself, always supposing that no new and eccentric combatant enters the arena, into a rivalry between the Little St. Bernard and the Cenis, with a recognition of Polybius as the only authority, the doubt being, not to the authors now before us but to lookers-on like ourselves, how much respect he is properly entitled to.

We have no intention of entering at length into the details of the controversy, as we do not feel bound to satisfy ourselves or our readers that every word of Polybius can be clearly, accurately, and consistently explained. The famous λευκόπετρον may easily be the Roche Blanche of the Little St. Bernard, or any number of white rocks on other passes, and no amount of argument can identify it certainly. Polybius' rock may, for all we know, have been disintegrated, and have lost its conspicuous character entirely in the twenty centuries which have elapsed

since he observed it. There is no real view of Italy from the summit of either of the rival passes, and therefore some explanation must be found for Polybius' statement that Hannibal cheered his men on the top of the pass by pointing out Italy to them. Mr. Ellis takes him up a peak very near the Little Mont Cenis for this purpose, Mr. Law construes the words to mean that he pointed out the unquestionable fact that Italy lay at their feet. We need not choose between them, we are content once more to deduce the inference that Polybius did not write a guide-book. Much discussion has arisen about the snow which caused such difficulties and disasters to the Carthaginian army; but for various reasons we cannot attach much importance to it, as an argument for or against any route. The objection that snow does not usually lie all the year through nor fall so early in autumn, applies equally to both passes; but there *was* the snow, and Polybius' account of the new snow lying on the old will be felt by all mountaineers to be the most graphic and obviously truthful portion of his narrative. The suggestion that very possibly the climate was then colder than at present, has not, so far as we know, been imported into the controversy: most persons have deemed it enough to assume that the year of Hannibal's passage may have been exceptionally cold. It would however, more reasonably explain the *double* fact of old snow lasting through the summer, and fresh snow falling early in autumn, if we adopted this hypothesis, which is in accordance with the theory, now supported by some eminent authorities, that explains the ancient glacial periods by means of the precession of the equinoxes.

We have expressed considerable respect for Mr. Law and his theory, and somewhat less for Mr. Ellis's; but the founder of the illustrious fraternity of Alpine travellers seems to demand a further tribute from us. What if we try to take Hannibal into Italy by a pass higher and more creditable to his mountaineering genius than any yet proposed, and select for that purpose the Col du Géant! Manipulation of times and distances on a theory less exacting than Mr. Ellis's would easily bring the Carthaginian army into the valley of Chamouni, and for the descent into the Italian plain Mr. Law is with us throughout. There is a tradition, obviously of great historical value, that the Col du Géant was formerly a working pass; and the snow difficulties of the descent are exactly what many of us have there experienced, and all have heard of. There is a most conspicuous λευκόπετρον in Mont Blanc—the objection that the mountain is white with snow and ice, not from white rock, being no obstacle to an active minded commentator; for after all snow and ice are crystalline and solid, and therefore most truly rock. Finally the difficulty about ἐνάργεια τῆς Ἰταλίας vanishes at once, for no one who has stood upon the Col du Géant on a clear day will doubt the propriety of saying that from thence Hannibal might have pointed out to his soldiers a superb view over Italy.

THE NORTH-WEST PENINSULA OF ICELAND.*

Ten years ago Iceland was a country comparatively unknown to English travellers. A few scientific men had, from time to time, been attracted thither in the pursuit of science, hoping to find there a fresh field for the study of natural history, or with the view of adding new specimens to their botanical or ornithological collections; a few yachtsmen had, now and then, visited its coasts; a few travellers had at intervals been led thither by the spirit of adventure and curiosity; but still Iceland lay far wide of the ordinary beaten track of travel, and the man who had climbed Hecla, or looked down the pipe of the Great Geysir, was generally regarded as a traveller of more than ordinary mark. Even of those who had reached this Thule, scarcely anyone had made a tour of any considerable extent except Henderson, who, in the early part of this century, traversed the greater portion of the island on a mission for the distribution of Bibles amongst its inhabitants, and whose Journal still retains its place as the best and most interesting book of Icelandic travel. Other travellers were for the most part content to have visited the Geysirs and Hecla, or, at all events, to have explored the lava-fields between Reykjavik and Cape Reykjanes and the sulphur mountains of Krisuvik, and none of them ever penetrated very far into the country. But of late years not only has the number of travellers in Iceland considerably increased, but also those who have gone there have made far more extended tours than used to be thought of. Now every summer the little steamer which voyages between Copenhagen and Reykjavik carries several parties of Englishmen to Iceland, and all the easily accessible districts in the island have been visited by one or other of our countrymen. The number of accounts of recent tours in Iceland, published in the last few years, affords a remarkable illustration of the increased attention which English travellers have turned towards that country. The travels there of Lord Dufferin, Captain Forbes, 'Umbra' and his friends, Mr. Baring-Gould, Mr. Metcalfe, and others, will probably at once present themselves to the recollection of most of our readers, many of whom must already be more or less acquainted with descriptions of the scenery and the people of this singular island. But notwithstanding all these different accounts of travels in Iceland, there remained two large districts altogether unknown to us. One of them, the Vatna Jökull, in the south-eastern corner of the island, is an immense ice-field calculated to occupy an area of about 3,000 square miles. We believe that no exploration of this has ever yet been even attempted; the sterile deserts which almost encircle its trackless ice-fields have hitherto guarded it from approach; and no more is known of it than such outlying portions as may have been seen by the few travellers who have skirted the southern coast or

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

ridden across the Sprengisanðr by a rarely used track. The other unknown district was the Peninsula which stretches out from the north-west extremity of the island into the ocean beyond the Arctic circle. The missionary Henderson visited the shores of this Peninsula nearest to the mainland, but the northern parts of it were still unexplored by any but natives when Mr. Shepherd, in 1862, made the expedition into it of which he gives an account in the little volume before us.

This tour was Mr. Shepherd's second visit to Iceland. It was undertaken partly from a wish to explore the North-west Peninsula and the Vatna Jökull, and partly with the object of making certain ornithological inquiries, which required his presence during the breeding season. Accordingly, he determined to set out as early in the season as possible, and he and his two companions arrived at Reykjavik towards the end of April. This was much too early for a journey in Iceland: the ponies, which during the winter months are turned out to pick up what they can for themselves, were not yet in a condition to stand the fatigues of the journey; there was not sufficient grass for them to live upon; the roads were still impassable with snow and slush, and guides were not procurable till later on, when the fishing season should have ended. These difficulties occasioned much delay; and though by the help of a good-natured friend the travellers were enabled to reach Thingnes at the head of Borgarfjörðr on the 9th of May, yet they were unable to commence their travels in earnest until the end of that month. Meanwhile they had to encounter weather 'dreadful beyond conception, which not only made a tent thoroughly untenable, but actually forced them to beat a retreat from Reykholt, where they had taken up their quarters, back to Thingnes. At last they set out and reached their first camping ground on Arnar-vatns-heiði, a high table-land forming the western part of the large desert which occupies the whole of central Iceland. Here they had expected to find the undiscovered breeding-place of many birds whose summer *habitat* was unknown, but in this they were disappointed; and after four days spent in the dreary solitudes of this stony, boggy wilderness, where there was only just enough grass to keep the ponies from dying, and the weather brought nothing but wind, sleet, and fog, the travellers packed up their tent and moved on northwards towards the Peninsula. A most pleasant change in the weather greeted them soon after they reached the northern coast; and their ride along the shores of Húnaflói, an immense ocean bay, which separates the Peninsula from the mainland on the east, seems to have been delightful. The sun and sky were warm and clear above them; the travelling was better, the grass smooth and green, and as they followed the coast line of Húnaflói, or wound round the heads of the fjörðrs, magnificent views were often obtained of the sombre, massive headlands and snowy peaks, which looked over the blue waters of the bay. The people, too, along this coast seemed well-to-do; their farms were better cared for, their buildings neater, their tûns greener than any others Mr. Shepherd had seen in the island, and there was a general appearance of wealth and comfort among them which is rarely to be met with among Icelanders.

It is rather surprising to find such well-to-do farmers in this northern

and exposed country, where 'the mountains and valleys seem to be torn up and dashed to pieces by the fury of the elements,' and in places the beach is strewn with the dead bodies of sea-fowl killed by the 'furious winter rages' of Arctic storms; but possibly the well-being of the people is to be attributed, at least in great measure, to these very storms, which throw up on their shores such immense quantities of drift-wood as to cover the whole coast line. Leaving the coast of Húnaflói, Mr. Shepherd and his companions crossed the hills to the shores of Isafjardardjúp, a long fjörðr, which, running into the land from the north-east, divides the northern part of the Peninsula into two heads. Each of these heads is crowned by a large snow mountain; the northern by Dránga, the southern by Glámu Jökull. The travellers successfully accomplished an ascent of the Dránga Jökull, but, unluckily, the weather was very unfavourable for the occasion. They were enveloped in mist and rain until they reached the top, and then the fog only rose for a few minutes before it again shut out the view from them. The ascent does not appear to have been attended by any difficulty. The top of the mountain, like those of many of the Icelandic Jökulls, was a flat dome; its height a little less than 3,000 feet. At Isafjörðr, a small Danish trading port on the south shore of Isafjardardjúp, the travellers found a vessel shortly about to sail for Skagafjörðr, a bay on the north coast of the mainland, and they gladly accepted an offer by the ship-owner to give them and their baggage a passage there, whilst their ponies were driven in easy stages round to the same point by land; for the ponies were beginning to suffer much from the fatigues of the journey, and the route by land back out of the Peninsula would be long and tedious. Mr. Shepherd gives an interesting account of the island of Vigr, an eider-duck colony, which he visited from Isafjörðr. The ducks are most strictly preserved for the sake of their down, and this island where they breed is perfectly infested with them; they swarm especially round the one farm-house upon it, and their nests occupy every possible hole and cranny, from the turf slopes of the roof to the scraper at the door. The ship, unfortunately, sailed before Mr. Shepherd and his friends had expected, and they were compelled to abandon their intention of exploring Glámu Jökull and Stiga-hlið, the surturbrand mountain of the district, but they managed to reach a spot nearer to Isafjörðr, where a small quantity of this curious mineralized wood is to be seen *in situ*.

The travellers reached the Skaga fjörðr safely, and after having been rejoined by their guides with the ponies, pushed on across the country by way of Akreyri to Myvatn. This part of the island, as well as that through which Mr. Shepherd returned to Reykjavik, has been traversed and described by former travellers, and he has judiciously compressed into a small space his account of this part of his tour; but he has added to his sketch of the country some interesting notes with regard to the species and habits of the water-fowl at Myvatn. He intended from Myvatn to have made an attempt upon the western side of the Vatna Jökull, but found the Sprengisandr impassable from the depth of the snow, and was forced to abandon the intention; and the vast ice-fields of the Vatna still remain unexplored. But, notwithstanding that

Mr. Shepherd did not succeed in accomplishing all he had hoped to do, and that he encountered during his journey a good deal of unfavourable weather, he seems to have made a very pleasant and interesting tour, and he has given us in this little volume a very pleasant and interesting account of his wanderings. The book is simply written in a modest and unaffected style. The author never thrusts himself unnecessarily before his readers, and his book is singularly free from both the two great besetting sins of travellers—egotism, and attempts at fine writing. It is a simple, unvarnished account of what he did and what he saw during his journey such as might have been written in his own journal. But, on the other hand, it is not a mere monotonous record of travel, but the narrative is interspersed with amusing incidents by the way, and descriptions of Icelandic life and scenery. The former are told with simple touches of quiet humour; the latter have in them a sense of reality which can scarcely fail to bring the scenes before our imagination, and whether Mr. Shepherd is describing the wonderful beauties of an Arctic midnight, or the dreary wastes of the 'ever-to-be-avoided heiði,' his reader has the satisfaction of feeling as if he had almost a personal acquaintance with the country through which he accompanies the author.

SCHEUCHZER'S ITINERA ALPINA.*

Alpine travelling, in its modern acceptation, dates from but a very few years back. The travels of Saussure form the great epoch to which we can trace the serious exploration of the glacier regions. Before Saussure's time, however, there was a race of travellers who were gradually opening up the great European playground; they scarcely caught a glimpse of the beauties which we admire; but in a queer fashion of their own they were beginning to pry into some of the more obvious phenomena. It is curious to turn over their pages and speculate as to the charms by which they were chiefly attracted. They had not yet learnt to appreciate the sublimities of the mountains, but they thoroughly enjoyed the freaks and eccentricities of nature. An intermittent spring, a circular rainbow, a rock with a hole in it, gave them intense delight, as indeed is still the case with the British cockney; a man to whom Snowdon is nothing but a dirty and inconvenient mound will fall into ecstasies at a rock shaped like the late Duke of Wellington's nose. The faculty—whatever it may be—through which the mountains appeal to our emotions, remains dormant after we have begun to appreciate the more striking oddities. The attitude of these travellers in regard to science was analogous. They had none of the general views which have been since developed; but they were beginning to deal with certain detached problems; the real 'fairy tales of science'—those which were invented during the twilight of modern thought—still retained a certain credibility; legends such as those which Sir Thomas

* Ὀρεσιφοίτης *Helveticus, sive Itinera per Helvetiæ Alpinas regiones facta annis* 1702–3–4–5–6–7–9–10–11 *a* Johanne Jacobo Scheuchzero. Lug. Bat. 1723.

Browne records in the history of vulgar errors were lingering in their minds; the nature of dragons was gravely discussed whilst the foundations of geology were being slowly laid; theories about the mystic virtues of certain gems come side by side with acute guesses about meteorology or the motion of glaciers; and, in short, these critics often remind us of children who still look upon nature as a great collection of quaint toys and ingenious puzzles, but whose curiosity is a proof of intelligence and will soon extract really valuable results from what is apparently mere play.

Scheuchzer is an example of this class. His collection of travels, published in 1723, is a fat solid quarto, whose very outside suggests the style of the contents. Each of the journeys opens with an elaborate dedication of complicated Latin sentences. The first four are dedicated to the Royal Society of London, who published the earlier journals. There are strange engravings, two of which are printed at the expense of Sir Isaac Newton. The towns are very clearly represented; but the views of scenery and the maps are curiously inferior. The maps are of that order in which an eruption of equidistant pimples represents the mountain ranges; or sometimes the rivers are bordered by long lines of sugarloaves—each like its neighbour—and crowded as close as they will stand. These symbols, however, are more like the original than the bulbous excrescences which do duty for hills in the engravings. There is a picture of the 'Montes Glaciales Grindelianes,' which is stated to have been drawn 'ad vivum' by an 'insignis pictor topiarius 'Meyerus.' It is a very accurate likeness of the waterfall by which the Serpentine discharges its superabundance into Hyde Park, consisting of large regular blocks (which may be ice or rock or wood), with a stream pouring over them in the centre. The wildest conjecture fails to suggest the spot from which the 'insignis pictor' drew the glaciers or the view which he took of their structure. Some of the other drawings have a closer resemblance to their originals. The Gemmi, for example (whose name, we may remark, comes from gemitus, 'quod nonnisi cum crebris et maximis gemitibus superetur'), has evidently impressed the artist. He has drawn a cliff up which there winds a corkscrew path, strongly reminding us of the edge of the old-fashioned frill on a gentleman's shirt-bosom. Two other interesting, but unluckily vague pictures, give us tolerably faithful likenesses of the Rhone, and the lower Grindelwald glacier. Some points about them are rather uncertain; though, on the whole, they seem to imply that there can have been no very marked alteration in the glaciers since their time. The domelike shape of the Rhone glacier and the final icefall of the Grindelwald are clearly indicated, though the mountains above take the usual fantastic shapes. On turning to the letterpress, we find a corresponding uncertainty as to the nature of the glaciers or 'montes glaciales.' On the one hand, Scheuchzer had certainly a clear notion as to some of their phenomena, and indeed in a passage (of which the substance is noticed by Professor Tyndall) gives the first theory as to their motion. He started what has since been known as the dilatation theory—that is, that the glaciers are propelled by the freezing of water within their fissures. He also observes, as we may notice, that the

polar icebergs are probably caused by the breaking off of glaciers. On the other hand, he was no iceman, and evidently had the vaguest impressions as to their extent and shape. He entertained a notion similar to that which was suggested to the early observers of Mont Blanc, that the glaciers of Grindelwald were overflowing from a big hypothetical valley behind the Oberland screen of cliffs. There are two glaciers, he says, in Berne, one between the Eiger and Mettenberg, and the other between the Mettenberg and Schreckhorn or Wetterhorn, 'qui utrique per vallem montis Mettenberg conjunguntur, et propriè hi duo unicum constituunt.' He follows up this information by a queer list of glaciers. There is one, he says, on the Scheideck; others in Uri; some near the source of the Rhine; 'in monte Kibhalpen etiam est mons glacialis;' another again by the Mons Silvius to which the Salassi gave the name of the Mons Rosæ; and so on through a short list, which conveys the impression that he looked upon these montes glaciales as unaccountable lumps of ice sporadically distributed throughout Switzerland.

Scheuchzer had, however, travelled a good deal within sight of glaciers. He describes amongst other tours his passages of the Splügen, the Maloya, the Julier, the St. Gothard, the Furca, and the Gemmi. He probably did not much enjoy the labour. Indeed there is something pathetic about his account of some of his ascents. He failed to get quite to the top of Pilatus, 'partim propter corporis lassitudinem, partim propter longinquitatem viæ adhuc metiendæ'—causes which have hindered a good many ascents before and since. As he observes with great force in another place, 'anhelosæ quidem sunt scansiones montium,' although he admits that the labour may be much sweetened by agreeable conversation. His scientific zeal led him to encounter a good deal of severe exertion; he made a number of barometrical observations, which for some reason brought out singularly erroneous results, always very much below the true height; and he collected and described a very large number of plants, of which he gives careful engravings. But it is also plain that the agreeable conversation had great charms for him. He picks up and records the eternal stories still to be found in guide books; how travellers on the Gemmi have their eyes bound to prevent giddiness; how the bells in one district are near the ground to prevent the sound spreading upwards and starting avalanches; and many other familiar legends. There is a glacier accident, precisely similar to one recorded by Mr. Longman in the first number of this Journal as having happened on the Aletsch glacier; and the chamois hunters—whose fertile imagination seems to have been already at work—plied him with characteristic anecdotes.

Of the chamois, indeed, or 'rupicapræ,' as he calls them, he takes rather a peculiar view. He records the common anecdotes as to the danger of hunting them; but he inquired more particularly into their internal economy. The chamois, it is known, have sometimes in their intestines the concretions known as bezoar stones, to which people formerly attributed imaginary medical properties. Scheuchzer seems to have inquired strictly of his hunters what chamois were thus endowed, whether, for example, those on one side of a valley had them oftener

than their neighbours, and whether they were any the better for it. Certain chamois, it was said, possessed the invaluable power of 'impenetrabilitas;' they were invulnerable to a musket shot; and this was attributed by some to their feeding upon a certain herb. Scheuchzer summarily puts this down amongst 'anilia deliramenta;' but he cannot doubt that certain chamois, though not absolutely invulnerable, were at least very hard to kill; and he thinks it highly probable that these tough chamois were the fortunate animals whose insides produced the 'ægagropilas.' The power to produce such excrescences resulted from a general strength of constitution which made them literally indifferent to powder and shot.

This marvel, however, is nothing to a somewhat similar discovery which follows. Scheuchzer found an object in a museum at Lucerne, to which he says there is nothing similar 'in regum, principum, privatorumque museis.' This is nothing more or less than a draconita or dragon-stone. Now a dragon-stone must be procured in this wise. First you must find a dragon asleep. Then you must make him sleep sounder either by scattering soporific herbs near him, or (which Scheuchzer admits to have a fabulous sound) by incantations. You may then proceed to cut the stone out of the dragon's brain; but if he should wake during the process or die in a state of consciousness, the stone will be spoilt. The difficulty of carrying out this programme, considering the acknowledged rarity of dragons, is so great that some sceptics doubt the authenticity even of the solitary specimen at Lucerne—but wrongly. For, if the poor man who sold the stone had been an impostor, would he not have invented some more out-of-the-way story and said that it came, for example, from the farthest Indies, instead of simply claiming to have cut it out of a sleepy dragon; and, which is still more convincing, could the stone have otherwise cured all those ailments—exceeding in rarity and intensity even those for which Holloway's pills are a specific—of which many persons testify that it has relieved them? Suppose the stone had been mere marble or jasper, it might perhaps have cured hæmorrhages—but dysenteries and fevers and a whole catalogue of most various diseases? Never! Scheuchzer having demonstrated that this stone was cut from a dragon, proceeds to prove that dragons exist. People profess to doubt it, but there is a strong *à priori* probability that in a district so full of rocks and caves as, for example, the Rhœtian Alps, dragons must exist. Moreover, he adduces a great variety of eyewitnesses, including a man who slew a very ugly dragon, with a cat's head, protuberant eyes, and 'caudâ pedali' (which appears from the engraving to mean, in defiance of classical Latinity, that the dragon frequently stood on his tail) transfixing it with a pointed stick. It was very seldom, however, that dragons allowed such a near approach. As a rule, they were met by a person described as a 'vir quidam probus,' who came home and told his story, very sick and with trembling legs. These unparalleled symptoms, together with a remarkable giddiness, he generally attributed to a specific influence of the dragon. This indeed is fully credible when we look at the awful pictures of the brutes—for the 'vir probus' was always able to give an accurate de-

scription from which the dragons had their portraits drawn. There are scaly dragons and slimy dragons, dragons with wings and feet, dragons with two legs and four legs, with and without wings, and sometimes without wings or legs, but with objectionable heads with semi-human features, and an expression at once humorous and malignant. Some species of dragons again have crests, and some are without (unless as Scheuchzer is careful to suggest, the male dragons alone may be crested), and one is exactly like a crocodile with a turkey's head and wattles. The most marvellous is a heraldic-looking dragon of which it is hard to say whether he has three claws and a head, or four claws without a head, for the head with its singular processes is just like a claw; and perhaps the most facetious dragon is that which we have endeavoured to reproduce. Conceive an Alpine traveller meeting such a beast in the forest by twilight just as he is approaching the hospitable hearth of M. Seiler!

Scheuchzer admits with true impartiality that some of his dragons may be fabulous, and grants to rationalizing interpreters that the peasants sometimes call torrents dragons. But, on the whole, after comparing these Swiss specimens with various 'exotic' dragons, 'satis superque constat' that there are such beasts and indeed many species, and he ends by giving seven characteristics which distinguish dragons from serpents—including the fact that they breathe so hard as to draw in, not only air, but the birds flying above them—after which we quite agree in his conclusion, 'nunc tempus est, ut promoveamus pedes.'

We should be doing Scheuchzer a gross injustice if we left our readers to suppose that this remarkable ebullition about dragons was a fair specimen of his writings. His botanical researches were evidently extensive, and a large part of his travels concerns regions which are of no peculiar interest to the Alpine Club, but with regard to which his information is probably accurate and interesting to antiquarians. Moreover, he has evidently taken much trouble in constructing maps and visiting regions then little known. He gives a careful list of passes which shows that the Gries and the Théodule and others of the minor snow passes were then well known and often traversed. The difficulties were, of course, exaggerated, and he is moved to a most devout expression of thankfulness on his safe return from an expedition over the Splügen, and back by the Maloya and Julier. He looks upon the mountains throughout with a certain horror, but fully recognises their utility. How, but for them, he asks, would those rivers be supplied which fertilize the lower parts of Switzerland? He is a zealous supporter of the claims of the Alps to be the highest mountains in Europe, and takes some trouble to prove, in the course of his argument, that rivers generally run down hill. Indeed the study of these early travels is a striking proof of the difficulty which the most cultivated travellers must have found in appreciating Alpine beauties in those days of painful and dangerous journeying. The one great attraction to the Alps seems to have been the hot springs, and he describes with great length and minuteness the baths of Pfeffers, St. Moritz in the Engadine, and Leuk. But we have abundant proof that the beauty of the snowy Alps (Alpes, he says, quasi Albi because covered with ice) had not

yet dawned upon travellers; thus in describing the Lake of Thun he mentions that the highest mountains near it are the Niesen and the 'Mons Stockhornius,' which are rivals for the primacy; but he says nothing of the exquisite view of the Bernese Oberland which gives to the Lake of Thun its almost unrivalled beauty, and his picture is taken with the back of the spectator towards the Jungfrau. The two mountains which then claimed to be the highest in Switzerland seem to have been the Titlis and the Tödi. Those who enjoy the charms of Alpine scenery by the help of good roads and comfortable inns owe some gratitude to the first explorers, who ventured into the wild recesses of the mountains without either of those great aids to due æsthetic appreciation of scenery.

ILLUSTRATIONS OF ALPINE SCENERY.*

There would seem at first sight as great a contrast between the two books we propose to notice, as it would be possible to imagine between any two works relating to similar subject-matter; and in many respects this is of course true. But apart from the fact that the letter-press of both is by the same author, there exists, underlying the apparent and wide difference, a connection between them which may enable us best to bring out the characteristics of each by comparing them together. Of both the illustrations are the essential portion, the text merely subordinate; in both the illustrations are very good of their kind, though the kinds are extremely dissimilar, both in style and purpose. Mr. Bonney does not pretend to be an artist, and his sketches have been made, as he himself says at the outset, 'to obtain a clear idea of the orography of the country.' They are such sketches as a conscientious surveyor of a mountainous country will make on all occasions, to explain and arrest his trigonometrical records, such as Mr. Reilly, for instance, has made in great numbers round the chain of Mont Blanc. Their interest and value will of course be appreciated only by mountaineers, and not by all of them, but only by such as, like Mr. Bonney, 'are never quite contented with an Alpine view, however beautiful, until they are able to identify every summit in it.' Moreover guides there are none in Dauphiné, and the traveller who visits that inhospitable region will often be indebted to Mr. Bonney for knowing the names of peaks, and the real relation of passes. Mr. Walton, on the contrary, is a painter, and not a geographer. He has the sense to see, what very few artists will see, that the peaks have a meaning in their forms, and that wilfully to alter those forms is to destroy the meaning; and consequently he is more faithful in his mountain outlines than the vast majority of painters. But still his subjects are chosen

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* *Outline Sketches in the High Alps of Dauphiné.* By T. G. Bonney, M.A., F.G.S. London: Longmans. 1865.

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

for pictorial effect, which is often inconsistent with topographical clearness; and his constant practice of shrouding part of the view in mist renders this especially marked. More geographical knowledge may be acquired from studying one of Mr. Bonney's plates than from Mr. Walton's whole series. On the other hand, there is more artistic beauty in the worst of Mr. Walton's pictures than in all Mr. Bonney's. It could not be otherwise; each has had a distinct aim, and has attained it with more or less uniform success.

It is almost a pity that Mr. Bonney did not cast his Dauphiné experiences somewhat more into guide-book form. His style is not very lively, though it possesses the clearness and accuracy less often acquired; and his adventures were not remarkable. Indeed, he himself professes to avoid incidents of travel, inasmuch as a great part of his little volume has already seen the light (chiefly in the pages of this Journal), and to study only to afford information. Much of the latter he has certainly given, few men are better qualified to do so, especially about Dauphiné; and we most heartily commend the man who, being in the position of the 'needy knife-grinder,' is equally candid in confessing it. Still his book assumes the form of a diary of travel, and one has to follow Mr. Bonney's track oneself in order to get the full benefit of his narrative, whereas it is every mountaineer's first wish to strike out a plan for himself. The descriptive text accompanying Mr. Walton's pictures is, we are inclined to think, a much more favourable specimen of Mr. Bonney's powers as a writer. The introduction, in which he calls attention to the influence of geological structure upon mountain form (a matter which one would be inclined to suppose too obvious for mention, were it not for the obstinacy with which artists disregard it), is not a mere imitation or dilution of Mr. Ruskin's views in 'Modern Painters,' but derives much of its force from his own observation of instances.

Whether Mr. Walton deserves all the praise he receives, whether in truth 'every stroke of his pencil means something, and means right,' we are hardly prepared to say; but we are quite ready to admit that he surpasses, in regard to the truthfulness of his drawing, every painter of Alpine scenery known to the public, with the single exception of Mr. Mac Callum. This may seem scanty praise to those who are acquainted with the preposterous rubbish which every year does duty for Alpine pictures in the Exhibitions, and is duly lauded by art-critics who never saw a mountain. We will therefore vary the phrase, and say that Mr. Walton is not merely superior to the herd of Alpine artists but different in kind. They cannot paint anything worth looking at, for they never set about it in the right way; he, at any rate, tries to represent the mountains faithfully, and often with great success, while even his comparative failures are not contemptible, for they are honest efforts to do right. But our readers may easily judge for themselves of Mr. Walton's merits. The splendid volume now before us is perhaps rather large for a drawing-room table, but it would ornament one infinitely more than the average of illustrated books which one sees there displayed. Moreover there is an exhibition of his pictures now open, which will show his actual work, though bestowed on less interesting subjects. For the present series of plates we need only say

that everything which is possible to chromo-lithography has been done for them, and that they by far are the most satisfactory reproductions of Alpine pictures which we have ever seen. Something no doubt is lost in the process of translating by mechanical means the expression of the painter's mind, even as something is lost in trying to express upon canvas the inexpressible glories of nature; but enough is left to convey to those who cannot see the original scenes a very adequate idea of their beauty, and to stimulate the mountaineer's memory to clothe the picture on which he is gazing in all the gorgeous hues of nature's colouring.

MISCELLANEA.

GRINDELWALD IN WINTER.—*To the Editor of the Alpine Journal.*—Dear Sir,—A winter expedition to the Alps is sufficiently novel to induce me to trouble you with a brief account of ten very pleasant days which Mr. H. Walker and I passed at Grindelwald last December.

We arrived there on the evening of the 16th, in very unpromising weather. About three weeks before, there had been an extraordinarily heavy fall of snow, which had been three feet deep in the village itself; but this had been succeeded by rain, which had reduced the depth to about one foot. During the day of our arrival, and the subsequent night, more snow fell; but by the next evening the weather had cleared entirely, a hard frost set in, and during the whole of our stay we had a succession of cloudless days followed by moonlight nights of unspeakable splendour. With a view to chamois hunting we had come provided with guns, but it was necessary to allow the fresh snow to become consolidated before venturing on the mountains, and in the interval we amused ourselves in the pursuit of foxes and hares, following their traces in the snow. Game was not plentiful, but the search for it kept us on our legs from dawn to dusk, and led us about the valley in all directions. We saw the mountains from every possible point of view, and were kept in a chronic state of delight at the exquisite scenes upon which we came at every step in our rambles through the pine woods densely laden with snow.

By the 20th chamois hunting was considered safe, and, game having been reported on the Mettenberg, we slept that night at the Eismeer chalet. To reach this was a rather difficult and dangerous piece of work; the path, which as every one knows is carried along the brink of a precipice, being converted into a steep slope of snow or ice, requiring much step-cutting and the use of the rope. The hut was more or less full of snow, and, after an uncomfortable night, we started at 2 A.M., and by 6.40 had reached a point on the side of the Mettenberg, called the 'halb mond,' at a height of about 9,500 feet. Below this point chamois had been seen the day before, and our porters had