manner. Mr. FitzGerald's object is to watch the effect of the various altitudes on the system, and from this to see whether it is possible to climb higher peaks in the Himalayas.'

REVIEWS AND NOTICES.

Ice-work, Present and Past, by T. G. Bonney, D.Sc., LL.D., F.R.S., F.S.A., F.G.S., Professor of Geology at University College, London, Fellow of St. John's College, Cambridge, and Hon. Canon of Manchester. London: Kegan Paul, Trench, Trübner & Co. (Limited), 1896. (295 pp. 24 illustrations.)

PROFESSOR BONNEY'S latest work is peculiarly valuable as presenting in clear and not needlessly technical language the ripe judgment of one specially qualified, both as an eminent geologist and an accomplished mountaineer, to pronounce an opinion on the subjects dealt with. If, indeed, the trumpet at times gives an uncertain sound on some of the numerous vexed questions connected with the formation of the Boulder Clays, the causes of Glacial Eras, &c., this is more than compensated for by a caution, and fairness, and confession of inability to speak the last word on many points, which add to the value of the author's judgment when—as in dealing with the subject of the agency of glaciers—he distinctly ranges himself in the ranks of those who, whilst admitting their abrasive power, deny their erosive action as a main factor in valley formation.

Beginning with 'Existing Evidences of Ice-work' we have two full and masterly chapters on 'Alpine Glaciers, Past and Present,' and 'Arctic and Antarctic Ice-sheets,' which will probably appeal specially to those familiar with the facts, and, therefore, to the readers of the 'Alpine Journal,' giving as they do a very interesting summary of the data, interspersed with allusions which relieve the mass of details from dryness. Commenting, for instance, on 'blocs perchés' he says 'most invaders set up monuments to commemorate their advance; the ice-king makes them memorials of his retreat.' Speaking of the valley of the Aar, he writes (p. 15), 'The dominant outlines of the valley are those indicative of the action of water, for it is V-shaped in section. It has been filled with ice, it has been modified by ice, but it has been blocked out by running water and the ordinary atmospheric forces. No one accustomed to travel in non-glaciated, as well as in glaciated regions can fail to decipher the familiar characters of ordinary rain and river action, though these are sometimes blurred by the palimpsest writing of the ice-scribe.' He subsequently (p. 21) quotes (from Heim) a calculation by Professor Helland, that all the glaciers of the Justedal only remove annually a layer 0·003 inch in thickness from the entire surface beneath the ice, and from this a considerable part must be deducted as being derived 'from the stones which help in the work, or washed down by glacier streams from the surface of the ice, or swept beneath it as débris by lateral torrents.'

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The following summary (p. 25) embodies the results of the observations on glaciers—(1) 'That, in glaciers of moderate size, such as those of the Alps, the amount of ground moraine is small, not only in comparison with that transported on the surface, but also absolutely; (2) that the ice, even under apparently favourable circumstances, though it may act as an *abrasive* agent, has practically no power to excavate; and (3) that its movements, whatever be the explanation, resemble those of an imperfect fluid.'

The succeeding chapter on 'Arctic and Antarctic Ice-sheets' opens with the remark (p. 38) that 'Land-ice has left its marks on the alpine region, but in Greenland it is still in possession. The Glacial Epoch belongs to the past in the one, to the present in the other. Every process which has sculptured the surface and formed the glacial deposits of lands wherein a milder climate now prevails should be found at work in Greenland and the adjacent parts of the arctic region. Here the results which, in more southern countries, are subjects for conjecture, should be actual matters of fact.' Then follows a very clear and interesting résumé of the most recent and accurate information on the conditions accompanying glaciation in high latitudes, from which Professor Bonney draws conclusions (p. 65), of which it may suffice to quote the first—'Certain conditions must exist before an ice-sheet can be formed. These are (*a*) a climate so severe that the mean annual temperature is below 32°; (*b*) a fair, if not a considerable amount of precipitation, chiefly in the form of snow; and (*c*) a large land area to act as a gathering ground.' It is pointed out (p. 67) that 'a great accumulation of ice may be the result of moderate precipitation with a very low temperature, or of a large snowfall with a somewhat milder climate.' The chapter concludes with an account by Mr. Russell of the huge Malaspina glacier in the Mount St. Elias group in Alaska, covering an area of 1,500 square miles. In one part of this vast accumulation of ice 'the forest covering the greater portion (p. 73) of the lowlands extends up over the moraine-covered bluff of ice, and thence inland on the surface of the glacier for four or five miles. The face of the ice-bluff is so covered with boulders, earth, and vegetation, that it is seldom one has so much as a glimpse of the ice beneath.'

Part II. is entitled 'Traces of the Glacial Epoch,' and its first chapter deals with the much disputed question of 'Lake-basins and their connection with glaciers,' the 'Parallel roads of Glen Roy,' &c. The arguments on the part played by glaciers in the excavation of rock-basins are very fairly and fully stated, and the case for the opponents of this view, based on the non-erosive character of existing ice-streams, is strengthened by a reference to the fact that 'of two important valleys in the Alps, one has a lake and the other has not; in one mountain-chain lakes are comparatively frequent, in another very rare, if not altogether wanting—as, for instance, in the Himalayas, the Caucasus, and the Pyrenees.' Those who do not accept what may be called Professor Ramsay's theory hold that the phenomena of lakes may be satisfactorily explained by attributing the larger lake-basins to differential movements of the earth's

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crust, a view which receives valuable confirmation from some remarkable facts connected with the great lakes of North America (p. 92), where various elevated beaches are found, and, as in the case of Ontario, vary in height at different points from 368 ft. at the W. end to 972 ft. to the N.E., thus showing differential 'uplifts' or 'warpings' of a very extensive character which would account for the barrier requisite to constitute the water basin. Professor Bonney admits (p. 94) that 'the controversy is far from being decided,' but perhaps its present state may be not unfairly summed up as follows:—'The frequent coincidence of lake-basins and glaciated regions is favourable to the one hypothesis, while the direct evidence generally is adverse to the excavatory action of ice, except under very special circumstances, and in some cases it accords better with the other hypothesis.'

Next follows (p. 94) a very interesting description of the various theories on the formation of the parallel roads of Glen Roy, none of which seem to avoid all the difficulties of the problem 'which (p. 107) is likely to remain, for the present, among the controversial questions of geology.'

In the second chapter of Part II. the subject of the origin and distribution of the English boulder clays and 'streams' of erratics is discussed in considerable detail; but (p. 163), though 'there is general agreement as to the majority of the facts stated, the greatest discord exists as to their interpretation.' One school of geologists attributes them to the action of land ice at a time when the land stood at a somewhat higher level than at present during the Ice Age, whilst the other (p. 163) 'believes in much greater changes of level, in consequence of which the land at first was rather higher than it is at the present time; then it slowly sank until the submergence on the western side of England amounted to not less that 1,400 ft., but on the eastern it probably was not more than half as much. By this school the boulder clays in the main, and the mid-glacial sands and gravels, are supposed to have been deposited under water, being diverse in date and composite in origin.' The arguments on both sides seem to be stated with great impartiality, but to refer to them in detail would be to exceed the limits of such a notice as this. Professor Bonney admits (p. 186) that 'in the present state of our knowledge a choice has to be made between hypotheses each of which involves serious difficulties.'

A chapter on 'Ice Work in Europe and Other Parts of the World' completes Part II., and it soon becomes apparent that the problems presented by glacial phenomena in North America offer no less difficulty, and produce no less division of opinion, than they do in this country.

Part III.—'Theoretical Questions' commences with a very valuable and carefully worked out chapter on 'Temperature in the Glacial Epoch,' in which it is shown that a very moderate reduction of temperature would suffice for the production of a condition of glaciation adequate to account for the facts, especially as (p. 231) 'it must be remembered that the size of an ice-sheet depends

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upon the amount of precipitation quite as much as upon the lowness of the temperature.' By a series of simple calculations (p. 233) seemingly based on reasonable premises, it is concluded that the conditions of the problem would be satisfied by a reduction of the mean annual temperature to the extent of 20° in the Welsh, Cumbrian, and West Highland regions, of 18° in the Alps, and of 15° on the north side of the Pyrenees, in the Schwarzwald, Grandes Vosges, Sierra Guadarrama, Sierra Nevada, Corsica, the group of the Gran Sasso d'Italia, the Atlas Mountains, and the Caucasus; whilst a drop of 6° to 8° might suffice for New Zealand. So that (p. 238) 'a reduction of 15°, or at most of 18°, ought to bring back a large area of Europe and the district around the Mediterranean to the condition which prevailed in the Glacial Epoch, though perhaps it would be hardly sufficient for the British Isles.'

In the next chapter 'The Possible Causes of a Glacial Epoch' are dealt with, and reasons are given for the conclusion that (p. 249) 'no hypothesis in explanation of the Glacial Epoch is admissible if it involves any very serious alteration in the distribution of sea and land.' The influence of the Gulf Stream, elevation of the land, changes in the ellipticity of the earth's orbit, the precessional movement of its axis of rotation, and irregularity of heat emitted by the sun are all passed in review, and in turn dismissed (p. 260) as 'inadequate, or attended by grave difficulties. It is, therefore, probable that some factor which is essential for the complete solution of the problem is as yet undiscovered; or, at any rate, the importance of one which is already known has not been duly recognised.'

The succeeding chapter, on 'The Number of Glacial Epochs,' may be briefly summarised in the concluding sentence (p. 269): 'So far, then, as the existing evidence at present goes, a Glacial Epoch appears to have been a very rare, perhaps an almost unique, episode in the history of the earth.'

Chapter IV., completing the work, deals with 'Glacial Deposits and General Principles of Interpretation.' It is there (p. 270) argued that 'evaporation must precede precipitation . . .' and 'hence alterations in the magnitude and distribution of the oceanic areas will cause some variation in the rainfall of the globe. These, however, in late geological times are not likely to have been large enough to affect seriously the total precipitation, though they may have materially influenced that of particular regions. But if the Glacial Epoch resulted from a diminution of the sun's heat, and a consequent general lowering of the temperature all over the globe, evaporation and precipitation would be alike affected. In such case, assuming the Gulf Stream to follow its present course, the rainfall (or snowfall) on the British and Scandinavian coasts would be less than it is at present. . . . Thus (p. 271), the vast polar ice-caps of glacial ages imagined by some geologists seem hardly better than "the baseless fabric of a vision," for they would require conditions mutually antagonistic—that is to say, a large precipitation and a much lower temperature.'

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The chapter concludes (p. 276) with an application 'of the knowledge obtained by a study of the Alps and Greenland to determining the physical geography of Britain during the Glacial Epoch. That its hill regions have been occupied, in some cases almost buried, by glaciers, that it retains in many districts indications of the action of ice, all are agreed; but the form which this ice assumed is the question in dispute.' For the 'ice-sheet' we must postulate (1) a non-insular condition, and a general 'uplift' of some 600 feet; and (2) a fall of 18° to 20° in the mean annual temperature. 'The alternative hypothesis (p. 283) that floating ice was the chief agent of distribution of boulder clays and erratics in the lowland districts' is, in Professer Bonney's opinion, 'associated with serious difficulties,' such as the assumption of 'a greater mobility in the earth's crust than a majority of geologists at the present time would be willing to admit. For not only the necessary upheaval, but a movement quite as great in the opposite direction, must be crowded into the Glacial Epoch, for the ground at the beginning of it is generally admitted to have stood rather above its present level.' After an enumeration of other and more special difficulties, Professor Bonney concludes thus (p. 288): 'Probably, however, the final verdict in this difficult trial in the Court of Science will not be pronounced till more information has been obtained, and Polar regions have been more thoroughly studied, with a view of learning the effects, habits, and physical properties of large masses of ice. Still, we may, perhaps, say that enough has already been ascertained to enable the student to distinguish how far an hypothesis is an induction from facts, and how far it is an offspring of the imagination.'

In endeavouring to give a general idea of the contents of this very valuable and interesting contribution to a fascinating subject, I have been compelled to omit many facts and arguments in support of the conclusions arrived at, but I trust that I have said enough to show that the volume is the outcome of wide and well-digested knowledge, combined with a happy literary facility for making the numerous difficult questions involved intelligible not only to the class of readers for whom 'The International Scientific Series' is especially designed, but also to the general public. To mountaineers in general, or, indeed, to anyone desirous of an intelligent preparation for a visit to Alpine regions, Professor Bonney's 'Ice-work,' and Sir J. Lubbock's 'Scenery of Switzerland,' are warmly to be recommended. The volume is printed with exceptional accuracy, and about the only error which has caught my eye is that, in the map (p. 69) of the great Malaspina glacier, the height of Mount St. Elias is given as 15,350 feet, whilst in the preceding page it is accurately enough put at 'about 18,100 feet,' the exact figure being, I believe, 18,015. In conclusion, I would put in a plea for the substitution for 'Glacial Epoch' of some such expression as Glacial Era, or Ice Age, as 'epoch' clearly denotes a point from which a computation begins, or a fixed date when one period closes and another commences.

F. F. TUCKETT.

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Sport in the Alps: an Account of the Chase of the Chamois, Red Deer, Bouquetin, Roe Deer, Capercaillie, and Blackcock, with Personal Adventures and Historical Notes, and some Sporting Reminiscences of H.R.H. the Late Duke of Saxe-Coburg Gotha. By W. A. Baillie-Grohman. (London: A. and C. Black. 1896.)

Mr. Baillie-Grohman is fortunate in finding a comparatively open field in the subject-matter of his latest volume. As he remarks in his preface to the work under review, the literature of Alpine sport is singularly scanty. While of the making of books upon mountaineering there is seemingly no end, I know of only one in the English language—and that is nearly forty years old—which deals exclusively with chamois-hunting and the kindred branches of Alpine venery. It is to the task of filling this void in the literature of the subject that Mr. Baillie-Grohman has addressed himself. Few men could be better qualified than he for the undertaking, and he is much to be congratulated upon the book which is the result of his labours.

The first chapter deals with 'Chamois-Hunting in the Old Days,' and the author apologises, quite unnecessarily, for what he fears may prove dry reading, but which is, in my opinion, among the most entertaining portions of the book. It is a delightful miscellany of ancient Alpine hunting lore, and much more interesting than, for example, his somewhat lengthy descriptions of the shooting-boxes and parties of royalties and German excellencies. Mr. Baillie-Grohman has had access to many sources of information which are beyond the reach of most writers upon the subject, and he has succeeded in unearthing much quaint and readable material. The weapons employed in mediæval mountain venery appear to have been singularly varied, ranging from javelins and cross-bows to fire-tubes and matchlocks. In later and more degenerate days even cannon were employed, and a certain noble duke appears to have once endeavoured to 'brown' a large herd of chamois with howitzers from the foot of the mountain!

There are many people in this country who seem to think that the chamois is a practically extinct animal, and that the chase of the nimble mountain antelope is nowadays a mere make-believe. I commend to their notice Mr. Baillie-Grohman's interesting chapter on the number of chamois in the Alps. He quotes figures published by the Austrian Government, and tells us that there are in the Salzburg mountains alone more than 22,000 head. He calculates that about 11,000 chamois are shot annually in the Alps. Of course the vast majority of these are killed in preserved shoots, and it is lamentably true that the game is rapidly decreasing in Switzerland and other unpreserved ground. Every other peasant one meets is a hunter now, and the introduction of breechloaders and repeating rifles has decimated the herds to such an extent that good sport is quite unobtainable in *chasses* open to the public.

On the fertile topic of the difficulties and perils of chamois-hunting the author naturally has somewhat to say. As a good sportsman

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he of course prefers stalking to driving; and he brings out very clearly the immense difference between shooting over preserved and unpreserved ground. In the big drives of royal (or archducal personages chamois may be bowled over as easily as roe deer in Scotland, whereas the stalker in peasant shoots finds the game both scarce and wary, the ground probably difficult, and himself pitted against the best native talent. A further distinction may be drawn between hunting among the snow- and glacier-covered peaks of the High Alps and the same sport as practised in the lower mountains of the Tyrol and Bavaria. In the former, leaving climbing difficulties out of the question, the distances are much greater, and fatigue is apt to tell upon the hunter's shooting, while, the game being often pursued above the extreme limits of vegetation, it is more difficult to move noiselessly. To sum up, chamois-driving in a well-stocked preserve and stalking on, let us say, the crags of the Wetterhorn or Mettenberg, where many a too adventurous Oberland *Jäger* has lost his life, may be regarded as at the opposite poles of danger and difficulty.

The portions of the book devoted to the Alpine stag and stag-hunting contain, like those dealing with the chamois, much quaintly illustrated antiquarian lore and many interesting facts of natural history. Mr. Baillie-Grohman's comparison of Continental with Scotch deer is much to the disadvantage of the latter, and his remarks on the causes of the sad deterioration which has taken place in the heads and the weights of Highland stags are well worthy of attention. The dimensions he gives us of some Hungarian antlers, almost rivalling those of wapiti, and the size of the stags that bore them, appear truly astonishing. His hunting-grounds in the Alpine and Hungarian woodlands are admirably pourtrayed, and the following picturesque description of a forest scene in the Carpathians is worth quoting:—

> Around, below, and also partially above me great green billows of forest stretched away, broken here by a patch of barrenness, where rocks of fantastic shapes rose far beyond the surrounding ocean of tree-tops, there by sylvan glades that seemed to penetrate into the very heart of the forest. Right at my feet, a quarter of a mile off, lay a bigger glade, its peculiar bright green colour betraying the marshy nature of the ground. Thereabouts, or a little beyond, I concluded the stag was calling.

The stags are hunted in the rutting season, when 'the lusty champions of the forest, whose virile passions, to the utmost inflamed, cause them to battle with a sturdy vehemence betrayed by no other wild creature in the wild realm of nature.' Their whereabouts in the wood is betrayed by their roaring to the stalker, whose practised ear enables him to gauge the size of the animal by the volume of sound which he emits. It is no easy matter, however, to ascertain his exact locality amid the dense foliage, and one shoots, in nine cases out of ten, 'not at stags, but at brown patches momentarily visible between trees that hide the rest of the animal's body.'

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The chapter on the bouquetin and the chase thereof displays, as might, perhaps, be expected, a less intimate acquaintance with the subject than characterises the remainder of the volume. It contains, nevertheless, some interesting information. Mr. Baillie-Grohman pays a just tribute to the memory of the late King of Italy by reminding us of the debt which sportsmen and naturalists owe him for preserving in the mountains of Cogne the race, elsewhere extinct, of Alpine ibex. By a curious slip the author speaks, in another part of the book, of 'the practically extinct bouquetin;' but happily there is no fear at present of this most interesting beast ceasing to exist. He mentions that there were five hundred to a thousand of them in 1877, when Victor Emanuel last visited his beloved Alpine retreat. There are two or three times as many now, and I think he is wrong in supposing that they are less jealously guarded than formerly. It is true that the punishment he mentions of nine years' imprisonment for killing one of the King's bouquetin is not, as he seems to imagine, still enforced. This barbarous penalty, savouring of those dark ages when a sporting prelate caused a wretched peasant, who had killed a stag that ravaged his crops, to be torn in pieces by the archiepiscopal hounds, was reduced a few years ago to two years' imprisonment; and now only a moderate fine, coupled with the confiscation of the poacher's weapon, is inflicted. A visitor to the King's magnificent preserves will hardly confirm Mr. Baillie-Grohman's statement that the bouquetin is the rarest big game in the world. He is also mistaken in saying that the King has not hunted ibex since 1894, as he had a grand battue in the summers of both this and last year. Various efforts have been made to introduce the bouquetin from the Italian Alps into Austria, but for climatic and other reasons the experiments appear to have met with but partial success.

The description of the roebuck and its chase is less interesting from a sporting than a natural history point of view, though it almost makes one hold one's breath to hear that the annual bag of roe in Austria-Hungary alone certainly exceeds 100,000 head. There are several interesting illustrations of large and curious roebuck horns and monstrosities of heads. To the general reader this chapter, as well as that upon capercaillie and blackcock shooting, will probably prove less interesting than those on the larger game.

Concerning marksmanship and the choice of rifles Mr. Baillie-Grohman's remarks are worthy of study, though of course on such vexed questions there must always be much difference of opinion. He avows a preference for the ·400 or ·450 Express over the new small-bores, though he admits that the latter have the advantage in their smokelessness and comparative noiselessness. I can thoroughly endorse his observations on the injury done to chamois hunting-grounds by magazine or repeating rifles. The 'pyrotechnically inclined' sportsman armed with a repeater who, after missing his first shot, 'pumps lead' at the game as long as it is in sight, does an infinity of mischief by scaring the herds. The author suggests

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that a good way of schooling oneself to shoot carefully is to limit one's supply of cartridges.

Mr. Baillie-Grohman is at variance with me on the subject of the difficulty of hitting chamois. He thinks they are decidedly easy: in my humble opinion they are distinctly difficult, and I am content to know that the majority of stalkers are on my side, including such a veteran sportsman as Mr. E. N. Buxton in his excellent work 'Short Stalks.' I should like to explain that when I spoke of 'failures ranking with successes in the proportion of about four to one' I was speaking, not of shots, but of stalks, and those in unpreserved ground in the High Alps. Mr. Baillie-Grohman is careful to explain that some of his shooting has been done on easy ground, and at elevations not exceeding 4,000 ft. None the less it is evident that his aim is very deadly; and I cannot help thinking that, as he tells us that in his early muzzle-loading days he 'rarely missed,' and that his average 'was for whole seasons but little above the number of shots fired,' he strains modesty somewhat in describing himself as only a moderately good rifle shot.

These and the like, however, are mere critical details which in no way mar the merits of the work as a whole. The volume is admirably got up, the text and illustrations, which are very numerous, being both excellent; and the style is eminently bright and readable. It should appeal alike to the sportsman, the naturalist, and the mountaineer, and as a fellow votary with the author at the shrine of the *Gemsjagd* I can only conclude by cordially wishing him the success that his book deserves.

HUGH E. M. STUTFIELD.

L'Homme devant les Alpes. Par Charles Lenthéric, Ingénieur en chef des Ponts et Chaussées. Librairie Plon. (Paris, 1896.)

M. Lenthéric is favourably known to some of us by several books dealing with the antiquities of the coast of Provence. Their success—one of them has been 'crowned by the French Academy' and another recently translated into English—has, unfortunately, encouraged him to a larger literary venture. 'Unfortunately,' we must say, for this work on the origins, physical and historical, of the Alpine region is, as a whole, unequal and imperfect, and is defaced by a crop of errors in matters of elementary detail so abundant as to impair our confidence in the author when higher matters come under consideration. The scheme of the work demanded almost encyclopædic knowledge in its compiler. Beginning before the world was, M. Lenthéric sets himself to deal in turn with all the most disputed problems in geological and anthropological science and primitive history. He stops on the way with a light heart to prove 'that it is possible to make the story of Genesis and its summary account of the different periods in the creation of the world agree with all the hypotheses, all the doctrines, and all the discoveries of science, soundly and honestly interpreted.' He is ready to define the difference between 'revealed religions,

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Judaism, Christianity, Mahomedanism,' and 'mythologies'; and he finds it in the divinisation by the latter of a crowd of natural objects, amongst others sources and mountains. He fails, however, to produce any respectable local gods for the Alpine summits, and is consequently reduced to such shifts as are exhibited in the following passage:—

'Pen was essentially the genius of the great mountains. He gave his name to the whole section of the Alps that extends from the Little St. Bernard to the St. Gothard—the Penninæ Alpes, the Pennine Alps—and includes in its mighty frame the highest summits of Europe, Monte Rosa, the Cervin, the Simplon, Mt. Blanc.' This sentence—we pass over its slips in detail—shows surely a strong tendency to put the cart before the horse. *Pen* in its various forms—in Scotland, Italy, Spain: Ben, Pania, Peña—is a Keltic word for the head of anything, hence for mountains. Jove, as the protector of travellers, was hailed as Penninus on the Alps, just as Apollo was hailed as 'Delius et Patareus' by Greek sailors. One might as well write of the god--Pat! The Pennilacus of the Peutinger Tables has nothing to do with the tarn on the Great St. Bernard. It was the station at the head of the Lake of Geneva.

M. Lenthéric is content to give the popular derivation of Alps from the root *alb* (*white*). He has not noted the fact that it is the part of the Alps which is not white, but green, which is known distinctively and locally as 'the Alps;' that several minor chains, seldom or never snowy, bear a similar appellation; and that the one distinctive mark of the regions known as Alps in Keltic lands is that they are regions of pasturage. In dealing with the classical passes he boldly states (p. 388) that Polybius says that Hannibal crossed the Mt. Genèvre. How much weariness would the world have been spared had this been exact! He quotes Varro frequently, but not on the question of the Western Passes.

It is, however, in the simplest matters that M. Lenthéric's carelessness is most conspicuous. In his orographical chapters he indulges in a series of statements which must make even the ordinary tourist ask, 'What next?'

To take no note of ordinary misprints, we are told that 'Blumishalp' (*sic*) may be translated 'l'Alpe des Fleurs'; that the 'nom caractéristique' of the Monte della Disgrazia 'rappelle les pénibles efforts nécessaires pour le gravir'! The name is probably due to the inundations caused by one of the torrents flowing from its flanks. From the Superga above Turin, M. Lenthéric assures us that the eyes can embrace the plains of the Po and the semicircle of the Alps 'from the Apennines to Switzerland, to the lagoons of Venice, and the promontory of Istria.' One of his compatriots, it is true, long ago thought he saw from Mont Blanc 'Venice floating like a halcyon on the waves of the Adriatic.' But our author, in his scorn of the laws of nature, has here surpassed every one—unless Thackeray's Little Billee!

The Col de Bernina, we are informed, leads from 'Samaden and

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St. Moritz, the last towns of Switzerland, to Bormio and Sondrio, the first of Italy, between glaciers and frozen lakes, and 'à travers d'immenses champs de névés.' Poschiavo and Tirano are forgotten, and this description of a pass crossed by a carriage road lined with hospices, and traversed in summer by thousands of tourists and in winter by hundreds of wine-carts, is, to say the least, picturesque.

The road of the Julier, we learn, is 'à rigueur carrossable,' that of the Maloya 'à peu près carrossable,' the Fluela a mulepath! Needless to add, the new road over the Grimsel is ignored. The final chapter deals with Alpine railways, and here M. Lenthéric is more at home and furnishes some interesting facts and figures.

M. Lenthéric, doubtless, is an authority in matters connected with his own profession. He has read widely. He writes elegantly, though with an occasional tendency to superabundant ornament. But his subject has been too vast for him, and he has not approached it in the proper spirit. There is an ample field for students who are ready by careful investigation of local nomenclature, of dialects, of customs and of types, to throw light on the distribution of the various primitive races—Iberian, Etruscan, Keltic—which have colonised the Alps. A writer versed in the old chronicles or even in current German literature might glean much valuable information on the story of the Alpine passes. There are records of Saracenic incursions and Teutonic migrations to be worked out. But these tasks require a less discursive and more accurate treatment than that of M. Lenthéric's latest volume—which, despite its numerous references, cannot be considered as a work of any real scientific value.

La Chaîne du Mont-Blanc. Carte au $\frac{1}{5000}$ème dressée sur l'ordre de Albert Barbey par X. Imfeld, Ingénieur, d'après les relevés, les mensurations et la nomenclature de Louis Kurz et d'après les documents existants. Kümmerly Frères. (Berne, 1896.)

The Chain of Mont Blanc has, since Forbes mapped the Mer de Glace, and Mr. Adams Reilly led the way in correcting and improving the early French surveys, been a favourite field for the private mapmaker. Colonel Mieulet and M. Viollet le Duc both produced sheets which in execution were of unusual pretensions. M. Imfeld, who is responsible for the technical work of the map now before us, is one of the Federal staff and familiar with its exquisite methods, which have carried colour-printing to a pitch of perfection unattempted, and even undreamt of, in our own Government establishment at Southampton. In their latest sheet the Swiss cartographers have succeeded, by the combination of the most delicate hill-shading with contour lines, in uniting scientific accuracy and graphic delineation. In the new map of Mont Blanc now before us no contour lines have been attempted. The omission was, we learn, deliberate. No doubt there are arguments in favour of the course adopted, particularly in a map the primary object of which is not scientific. In all other respects the new map is a

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worthy rival to the official Swiss survey. The snow region is depicted with much, and generally, as far as we can test it, accurate detail. There is not, however, enough rock shown on the N.W. face of the Aiguille du Goûter, and the buttresses of 'La Tour Ronde' have not, we think, been quite accurately depicted. The selection of paths is generally judicious, the nomenclature has been carefully considered, the colour-printing is clear and accurate. In short, a better map for its purpose—for the use of mountaineers—could hardly be produced. The only technical criticism we are inclined to make is that, in the absence of contour lines, the relative steepness of the snows is somewhat confused by the system of lateral illumination employed.

Bollettino del C.A.I., vol. xxviii., or No. 61. (Torino: 1895.)

The 'Bollettino' opens with an 'In Memoriam' notice of Father Denza. The graphic and full account of the Valle di Saint-Barthélemy,* by SS. Canzio and Mondini, has already had attention called to it in these pages. S. R. Gerla writes a description of his praiseworthy explorations in the mountains of Dèvero (Lepontine Alps). S. A. von Rydzewsky narrates his ascent of the Cengalo from the N., and gives an illustration which will make everyone who looks at it long to try the peak himself. This is followed by an exhaustive monograph on the Adamello group, by S. P. Prudenzini, for which all visitors to and writers on that district will be grateful. S. P. Gastaldi takes us to the little-visited Chambeyron group in the Cottians. S. G. Bobba revisits the Grand Paradis District, for which he has already done so much. He gives charming pictures of the Becchi della Tribulazione, from photographs by S. Vittorio Sella. We heartily congratulate him and S. O. de Falkner on their conquest of the central and northern peaks of the Becchi respectively. Want of space prevents us doing justice to S. Bobba's paper. S. L. Cibrario writes of the Bessanese, 'le Cervin du Val d'Ala,' as an enthusiastic French climber dubbed it. S. Gonella tells the story of the Duke of the Abruzzi's energetic and successful campaign. The narrative, which is lavishly adorned with excellent illustrations, contains a letter from Mr. Mummery, who climbed the Matterhorn by the Zmutt ridge with the Duke. Science is represented by S. A. Galassini, and 'La mort de Tartarin,' by S. Guido Rey, concludes a volume which quite reaches the high standard of its predecessors.

Ueber Eis und Schnee. By Gottlieb Studer. New edition prepared by A. Wäber and H. Dübi. Vol. I. (Bern: Schmid, Francke & Co. 1896.)

Attention was drawn in these pages † to the issue of the earlier parts of the new edition of Vol. I. of this classical work. This

* *Alpine Journal*, vol. xviii. p. 133. In King's *Italian Valleys of the Alps* (London: 1858), c. viii., will be found an interesting description of this valley and an amusing account of the author's adventures there.

† *Alpine Journal*, vol. xvii. p. 52.

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volume has now been completed by the issue (in October last) of Part IV. It contains what are called the 'Northern Alps,' that is, roughly speaking, the high ranges north of the Rhone and Rhine valleys, from Martigny to Coire. The editors have done their very difficult work of bringing an old book up to date very well. Instead of the 300 pages of the first edition, we have now 528 (including 16 devoted to a short sketch of the life of the author). The old scheme is followed with a few modifications, so that this first volume describes the Bernese, Titlis, Damma, Tödi, and Glarus Alps. Of course, in a collection of so many names, dates, &c., a few slips were inevitable, but many of them have been corrected in a list of 'errata' at the end. We miss, however, any mention of the Uri Rothstock, which appears all right in the old edition. It seems, too, a pity that neither edition describes the Dent de Morcles, Grand Moeveran group, which certainly merited a brief mention. An odd slip occurs at p. 383, in the account of the famous race up the Lauterbrunnen Breithorn in 1865. The new edition states that Herr von Fellenberg's party beat that of Messrs. Hornby and Philpott by 15 min. But Herr von Fellenberg, in his original narrative,* says that the difference was only 10 min., and this version is given in the old edition of Studer (i. p. 255). It might have been noted that the English party † reduce the difference to 5 min. But the fact that a reviewer is obliged to discuss such trifles shows how well the new editors have executed their task. It is much to be hoped that they will receive sufficient encouragement to induce them to re-edit the two other volumes of Studer, so as to complete the work in its new form. Students of Alpine history will find this new edition quite indispensable.

W. A. B. C.

Die Schweizerische Landesvermessung, 1832–1864 (*Geschichte der Dufourkarte*). Published by the Federal Topographical Bureau. (Bern: 1896.)

This officially published work will interest all those—and their name is legion—who have had occasion to use either the great Dufour map of Switzerland, or the Siegfried map, which is simply a revised edition of the original large scale survey made for the Dufour map. Beginning with a brief survey of the state of Swiss cartography before the appointment of Dufour in 1832, as head of the Triangulation Commission, this book gives (from the official documents and correspondence) a very minute and interesting account of the way in which that survey was carried out in the different cantons, of the criticisms made on the first sheets (issued in 1845), and of countless other details. As the Swiss map, in either form, is by general consent the finest survey of a difficult mountain country yet published, it is very convenient to have in a compact form the history of the rise and progress of such a great undertaking. A photogravure of Dufour, after the portrait by Ary

* *S.A.C. Jahrbuch.* iii. p. 308.

† *Alpine Journal*, ii. p. 210.

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Scheffer, is prefixed to the book, which is rendered very useful by an excellent and detailed index. W. A. B. C.

Aus den Bergen. Wanderungen durch Graubünden und Tirol. By E. Walder. (Zürich: F. Schulthess. 1896.)

This little work is made up of a number of papers, some of which were originally published in the now defunct 'Schweizer Alpenzeitung,' of which the author was formerly editor. Save one on the environs of the Vereina Club hut, not far from Klosters, in the Prättigau, and another on the Hoher Riffler, in the Tirol, they describe the Lower Engadine, with some of its little known side valleys, and the mountains at the west end of the Rhätikon, which are included in the miniature principality of Leichtenstein. Naturally, therefore, no very thrilling adventures are narrated in this little work; but it may serve to draw attention to some corners of the Alps which are not very well known to English travellers, although they are easily accessible. The seven woodcuts are rough, and scarcely improve the book. W. A. B. C.

L'Argentera et ses Ascensionnistes. By Michel Gilly. (Nice: 1896.)

It seems desirable to draw attention to this very thorough monograph on the monarch of the Maritime Alps (3,317 m.), which appeared in the sixteenth 'Bulletin of the Maritime Alps Section of the French Alpine Club.' Those who are interested in this district know how complicated the Alpine history of the Argentera has been, and will gratefully appreciate the painstaking labours of M. Gilly, who has solved pretty well all the difficulties that have arisen on this subject, and has also compiled an account (in the style of the 'Climbers' Guides') of all the routes up this fine peak. From a table at the end of this pamphlet, we learn that but seven authentic ascents of the south and highest summit have been made between 1879 and 1895, all but two being by French climbers. A photograph of the peak, taken from the Cima di Nasta to its S., is prefixed, and is said to be the first photograph ever published, previous views having been reproductions of drawings. But the author has overlooked the two views given in Sir Martin Conway's 'The Alps from End to End,' though these are, unfortunately, but drawings after photographs. As the Argentera commands on one side a view of the Mediterranean coast, and on the other of a considerable section of, perhaps, the least known portion of the Alps, it is much to be hoped that some day a complete panorama from the summit may be taken, and published. This would prove that it is not always the highest and most frequented summits which are the finest belvederes. M. Gilly has been one of the most persevering explorers of the Maritime Alps, and has now crowned his previous labours by this 'definitive' monograph on the loftiest point of that range. W. A. B. C.

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