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GENERAL MEETING AND WINTER DINNER.—The annual general meeting will be held on Monday, December 14. The dinner will take place on the following day, and the Picture Exhibition will be open in the afternoon and evening of that day, and throughout the following day, Wednesday, December 16. It is requested that all communications relating to loans of pictures may be sent as early as possible to the Honorary Secretary.

REVIEWS AND NOTICES.

Der Gebirgsbau der West-Alpen. Von Dr. Carl Diener. (Vienna: Tempsky. Leipzig: Freytag.)

The leading object of this work, as stated by the author in the preface, is, after a survey of the structural features of the Western Alpine system, to determine what relation this system bears to that of the Eastern Alps; to define the boundaries of both; and to decide whether, and under what modifications, any of the structural units of the former are continued into the latter. Both Studer and Desor recognised that the structure of the Alpine chain was interrupted beyond the eastern end of the St. Gothard massif and near the Splügen. Mojsisovics was, however, the first, as pointed out by Dr. Diener, to insist upon the actual independence of the Eastern Alps relatively to the Western both in their history and structure, and his researches led him to conclude that the southern chains along the boundary of the two systems afforded proof of an older bow-shaped curve of the Eastern Alps, with its concavity turned towards the Adige, which was anterior to the formation of the half-bow curve of the Western Alps. But while this question is of very great importance, Dr. Diener's treatment of it, though by no means inadequate, yields in interest to his remarkably clear and comprehensive description of the structure of the Western Alps and the relations of their various members to each other.

The author follows in the main Lory's classification of the Western Alps from the Mediterranean to the St. Gothard into four zones, which correspond with the general trend and strike of the mountain chains; and each of these zones is characterised by certain constant or well-recognisable and distinguishing structural features. These zones are:—

1. The zone of Monte Rosa, or the zone of the Inner central massifs.
2. The inner Kalk-and-Schiefer zone of the Western Alps, or Zone of the Briançonnais.
3. Zone of Mont Blanc, or zone of the outer central massifs
4. Kalk-zone of Dauphiné. (Lory's 'Zone des Chaînes subalpines' corresponds with the 'nördliche Kalkzone der Schweizer Alpen'.)

In addition to the zones mentioned, the investigations of Alphonse

and Ernest Favre and Maillard have established the existence of a less constant zone between the last zone and the molasse, extending in three well-marked curves from the Arve to the Linththal, which is called

5. The Zone of the Chablais.

Beyond which comes the zone of the molasse and the chain of the Jura.

Of the zones enumerated, those of Monte Rosa and Mont Blanc are much the most important.

The zone of Monte Rosa, the innermost of the concentric segments of the great curve, the concave side of which bounds the Western Italian plain, extends from near Cuneo, in Piedmont, to the mountain group of the Adula on the north of Lake Maggiore. As distinguished from the other great crystalline zone of Mont Blanc, in which the continuity of exposure of the crystalline rocks is frequently interrupted, the zone of Monte Rosa is a broad, connected series almost entirely made up of gneisses, mica schists, kalk-schists, hornblende, and chlorite schists and serpentines. It comprises on its inner line the central nuclei (Centralkerne) of the Cottian and Graian Alps, of the groups of Monte Rosa and the Mischabel, and of the Ticino Alps, and, near the convex boundary of the zone, the approximately parallel series of the massifs of the Vanoise, Monte Pourri, and the Grand Combin—this second series being limited to the western portion of the zone. The arrangement of the beds is, broadly speaking, comparatively uniform throughout, consisting mainly of a series of regular anticlinals of moderate inclination, affected only by local disturbances in the western part, while further eastwards, in the central portion of the zone, steeper dips and generally more complicated conditions prevail. Here overthrust folds of considerable intensity come in near the northern boundary, while the southern is characterised by step-faults and folds. Commencing with a regular westerly dip in the Cottian Alps, the gneisses and overlying 'grüne Schiefer' and kalk-schists in, at first, an incomplete anticlinal, strike northwards into the Graian Alps, where the anticlinal arrangement is fully developed. The strike turns to N.E., and the gneisses and other crystalline rocks attain their greatest thickness in the district of Monte Rosa, the lowest beds of which, seen at the head of the Val d'Anzasca, are probably the lowest of the whole series, and possibly correspond with the Antigorio gneiss, so well seen on the Simplon road near Gondo. This lowest gneiss of Monte Rosa is followed upwards by garnetiferous mica schists, and these by a series of serpentines, 'grüne-schiefer,' and kalk-mica schists (the same series as that seen in the Cottian Alps), which are again overlaid by the younger gneisses of the Mischabel and Lepontine groups. These gneisses correspond in horizon with the Sesia gneiss on the south side of the Monte Rosa anticlinal, which, after dipping to the S., terminates in a series of step-faults, parallel with the trend of the beds and abuts against a remarkable amphibolitic band extending from Ivrea to beyond the northern end of Lake Como into the Veltlin. The gneisses and schists on the northern side of the anticlinal ultimately abut against the Inner Kalk-zone in an overthrust fold, which causes the

schists and limestones of the Binnenthal to dip under the gneisses. This overthrusting of the gneisses and schists of the greater crystalline zone over the more yielding beds of the Inner Kalk-zone is, in a greater or less degree, a normal feature along the line of junction of the two zones, and in the region of the Lepontine Alps and in Ticino the overthrust is at its maximum. The anticlinal which is so strongly marked in the Monte Rosa and Mischabel groups continues, in a more modified form, in the Ticino Alps, becoming much flatter in the centre until, on approaching the Val Leventina, the beds become almost horizontal. The structural features of the zone near its north and south boundaries are similar to those already noticed in the Lepontine Alps and in the region of the amphibolite band, but the strike has changed from N.E. to E., while on the western slopes of the Val Leventina a tendency to W.N.W. to E.S.E. strike is observable. Beyond this limit a sudden change takes place. Along the eastern side of the Val Blegno and Val Leventina a chain running south from the massif of the Adula extends with a *southern* strike directly across the trend of the Monte Rosa zone. Further east, also, both folding and fractures agree with the new direction of strike, and this chain is the westernmost step of a row of folds with southern strike which make up the mountain system as far as Oberhalbstein. It is clear, therefore, that with the appearance of the Adula system of strike and folds with a certain amount of overthrust folding to the W. over the Ticino gneisses at the line of junction, the zone of Monte Rosa comes to an end.

The amphibolite band of Ivrea already mentioned is the limit of the Monte Rosa zone on the south. Against this band the Sesia and Ticino gneisses are faulted, and it occupies an area of depression. Its south-eastern border corresponds with another fault, and beyond this the Sericite gneiss of Strona appears which has been considered by Gerlach and Taramelli to be the equivalent of the Sesia gneiss. This gneiss dips towards the amphibolite band, but at a little distance becomes anticlinal and dips towards Lake Maggiore. In spite of a certain resemblance to the Ticino gneiss Dr. Diener holds that the Strona gneiss west of Maggiore, with the massif of Monte Ceneri and the Sericitic gneisses along the south side of the Val Tellina, constitutes a uniform structural zone belonging to the Eastern Alpine system, and which is bordered by the southern Kalk-zone of the latter; and he concludes that the zone to which he gives the name of 'Zone of the Veltlin,' together with the accompanying Kalk-zone, is not only sharply divided by the amphibolite band from the zone of Monte Rosa, but differs from the latter both in respect of its development and structure. The common occurrence of overthrust folding in a southern direction in the Veltlin zone, which never occurs in that of Monte Rosa, gives some support to Dr. Diener's conclusion.

In sharp contrast with the zone just described, from which it is separated by the intervening inner Kalk-and-Schiefer zone, the zone of Mont Blanc has been subjected to much greater disturbance, and is a region of intense lateral pressure. Commencing in the Maritime Alps it extends in a curved line of crystalline masses, which are frequently covered up by the mesozoic formations, to the valley of the Rhine near

Chur. The southern portion of the zone from the Maritime Alps to the Pelvoux massif is complicated by the movements which have accompanied the formation of the mountains of Provence. It is sometimes impossible to dissociate this zone from the next following on its outer boundary, the Kalk-zone of Dauphiné, when the crystalline core takes, as it were, an underground course and is covered by the sedimentary beds of the latter zone. This is especially the case in the region between the N.E. end of the Mont Blanc massif and the S.E. end of the Aar massif, where the crystalline schists disappear under the Dent de Morcles, and are covered up by the jurassic beds of the Haut-de-Cry and the Wildstrubel, to re-emerge from under the Balmhorn and Mainghorn. The two zones may be said to blend together in this district, but they resume their original relative positions on the re-appearance of the crystalline rocks. True fan structure is characteristic of the Mont Blanc zone, and is strongly marked in the massifs of the Pelvoux, the Aar, and the St. Gothard. As to its existence in the Mont Blanc massif, which was formerly cited as a typical example, opinions are now sharply divided, Alphonse Favre holding to the old theory, while Lory maintains that the protogine and crystalline schists are arranged synclinally; that the schists belong to the upper or chloritic series, and that the protogine, instead of being the oldest rock of the crystalline series, as formerly held, is the youngest. The crystalline centres of this zone are the Maritime Alps, the massifs of the Pelvoux, Les Rousses, the Belledonne, Mont Blanc, and the Aiguilles Rouges, the Aar massif, and the St. Gothard massif. In all these there is approximately vertical arrangement of the gneisses and crystalline schists. Carboniferous strata occur in the massifs of Les Rousses and of the Aiguilles Rouges, and in the latter group the conglomerates at the base contain fragments of protogine and of crystalline schists showing foliation, and similar phenomena have been observed in the group of Les Rousses. This foliation being anterior to the deposition of the strata in which the fragments are found points to pressure and possible elevation of the foliated rocks before the carboniferous epoch. This inference has previously been indicated by Bonney. There is ample evidence of great earth movements and elevation subsequent to the deposition of the carboniferous strata. Triassic and liassic formations rest unconformably on the abraded edges of crystalline schists, which in several localities include carboniferous beds within their folds. Mountain chains therefore must have been formed at some period between the formation of these carboniferous strata and the trias epoch. Undoubtedly the movements during the later miocene period were more general, and are now more apparent, but they also tended to obliterate the evidences of older earth movements. North-east of the Dent de Morcles no carboniferous strata have been observed in situ in this zone, except a small infold in the district of the Tödi.

In the Bernese Alps along the whole line of contact of the Mont Blanc zone with the northern Kalk-zone is a region of intense northerly overthrust folding, and lateral pressure reaches its maximum between the Jungfrau and the Gstellhorn where the infolding of the sedimentary beds of the Kalk-zone into the crystalline series is horizontal.

Beyond the Haslithal the relations of the two zones become less complicated and the unconformity is more obvious. Eastward beyond the Reuss the crystalline schists are covered up gradually by the sedimentary beds of the Tödi group, and appear for the last time below the mass of the Calanda near Chur. Beyond the Rhine valley, therefore, concludes Dr. Diener, the zone of Mont Blanc has no continuation.

The inner Kalk-and-Schiefer zone, which separates the two great crystalline zones, extends in a well-defined continuous band from the Gulf of Genoa to near Reichenau in the Rhine valley. It is an area of depression and intense folding, accompanied by great parallel fractures along the greater part of its contact with the other zones. Sedimentary formations from the carboniferous to the eocene are represented, while crystalline rocks of the older series are almost entirely absent. In the districts of Briançon and the Tarentaise a series of sandstones (passing into quartzites), dolomites, gypsum beds, and rauchwacke attain a considerable development, and associated with these is a great thickness of crystalline rocks of a type differing from the great masses of crystalline schists of the two other zones, which are known as 'Glanzschiefer' or 'schistes lustrés,' the age of which has not been satisfactorily determined and which have given occasion to much controversy. While Lory, on account of their supposed infraposition to rhætic beds with *Avicula contorta*, and their superposition to the sandstone and dolomite series just mentioned, assigns them to the trias, the Swiss geologists Heine, Von Fritsch, and others claim the north-eastern extension of the series in the Val Bedretto, Val Piora, and the Lukmanier as liassic or jurassic, because certain fossils have been supposed to be found therein near the Nufenen pass and the Lukmanier, and they also bring this forward as an instance of the conversion of sedimentary rocks into crystalline by dynamic metamorphism. Bonney combats all these views. He proves that the alleged occurrence of fossils in the crystalline rocks in both the localities mentioned rests upon an error in identifying an undoubtedly sedimentary rock with an unfossiliferous crystalline one, the juxtaposition being probably due to folding or faulting, and maintains that the conclusion arrived at as to the conversion of jurassic rocks into crystalline schists falls to the ground; while as to Lory's claim that the 'schistes lustrés' are a part of the trias, he admits the probability of beds of triassic age being infolded among the 'schistes,' but contends that there is no ground for including the whole series of those rocks, the greater part of which, he maintains, have a true crystalline facies, in the trias. Dr. Diener agrees with Lory as to the triassic age of a considerable portion of these schists in the south-west part of the zone, and is even inclined to admit the schists of the Binnenthal into the same series. But in the case of the Val Bedretto and Val Piora schists he upholds Bonney's contention, and is of opinion that the occurrence of jurassic fossils in *some* of the beds of the series which may have undergone a certain degree of metamorphism is by no means sufficient to establish the jurassic age of certain other associated schists of a highly crystalline facies which appear to belong to an earlier type. He shows that the series of rocks to which the

collective name of 'Bundner Schiefer' has been given consists of at least four different classes of rock, and that the objection just quoted in respect of the Val Bedretto and Lukmanier beds applies equally to these. Jurassic fossils have only been found, or, rather, said to be found, in the kalkschiefer or 'Bundner Schiefer' within this well-marked zone, while outside its limits in the strike of the St. Gothard or Adula massifs no fossil has ever been found in the kalkschiefer, or, in other words, where in a limited zone kalkschiefer and jurassic beds are crushed and folded together into what appears to be one series, the jurassic fossils which may be found are sometimes attributed to the kalkschiefer, in which, however, outside the zone and without the accompaniment of jurassic beds, no fossils have been found.

In the south-west of Piedmont the zone extends into the Ligurian Apennines in a series of highly-inclined folds and troughs, where a talcose gneissoid rock of great thickness occurs between the carboniferous and the trias. The evidence on which Zaccagna assigns these intermediate beds to the permian is not considered by Dr. Diener as unassailable. The course of the zone is then traced to the Val Ferret and the Valais, and the remarkable section between the little St. Bernard and Mont Blanc is described. Near the former pass the boundary of the zone with that of Monte Rosa is a fault combined with an overthrust fold, and the carboniferous sandstones are seen dipping south-east towards the fault and against the crystalline schists of the Ruitor. Under these sandstones dips the talcose gneissoid rock, just mentioned, and again under these dip beds of gypsum, quartzites, and rauchwacke, and then the limestones of the Cramont. All these are in inverted order. From this point as far as the Allée Blanche all the foregoing beds, except the carboniferous, are repeated, but in normal succession and with little variation of dip, showing a complete synclinal fold. This is faulted against the jurassic strata of the Allée Blanche, which rest on the gneiss of Mont Blanc. The reversal of the triassic beds is continued into the valley of the Drause, and when the carboniferous strata are brought into contact with the crystalline rocks of the Monte Rosa zone, the former are pushed over the mesozoic strata and are again, in their turn, overthrust by the mica schists of the Grand Combin. Throughout the Western Alps the direction of these overthrust folds is almost invariably towards the outside curve of the chain, and cases of the reverse folding are rare, and generally due to the development of fan structure, as on the south side of the St. Gothard massif. This zone, after leaving the trough of the Valais near Brieg, continues along the Binnenthal into the Val Bedretto, across the Lukmanier and the Greina pass into the Lungnetz, and dies out before reaching the Rhine Valley.

The three preceding zones describe concentric curves, stretching uninterruptedly along the whole range of the Western Alps. It is otherwise with the outer sedimentary zones, and especially the two to be now referred to—the Kalk-zone of Dauphiné and the 'Zone des Chablais.' They form in no sense coherent zones, but seem to replace each other, the Chablais zone especially supplementing or replacing the Kalk-zone, when the latter thins out on approaching the chain of

Mont Blanc, or disappears between the Dent du Midi and the Aar massif. Both are composed chiefly of jurassic, cretaceous, and early tertiary formations, and in both the folding is very strongly developed. Commencing with the Maritime Alps, the Kalk-zone forms an independent curve projecting to the S.W. Then comes the Kalk-zone proper of Dauphiné, surrounding the southern extremity and western side of the Pelvoux massif in a curve exceeding a semi-circle, finally striking N.E. along the massif of the Belledonne in the direction of Mont Blanc. In this district the zone is subject to great longitudinal faulting, and the outer part strikes away north, partly under the miocene formation, and ultimately forms the range of the Jura, the boundary line, before actual separation, being a fault running along the strike through Rencurel, by Voreppe, to Chambéry, where the molasse of the Swiss miocene plain commences.

On approaching the Arve the Kalk-zone curves round to the east, but soon resumes its normal N.E. strike towards the Dent du Midi; its breadth is considerably diminished between the Arve and the Rhone, but here, as it were in compensation, the 'Zone des Chablais' commences on the N.W., and extends in three irregular curves from the Arve, near Cluses, to the Linththal, and is separated from the kalk zone and the zone of Mont Blanc by a well-marked fault along the whole line. The course of the Kalk-zone is then traced along the north-west flank of the Aar massif, a region of intense folding and overthrust, and further through the Glarus Alps. Dr. Diener describes this district in detail, and gives reasons for disagreeing with some of Heim's explanations of the double-folding of the southern part of these Alps. Unlike the two zones last described, the Kalk-zone extends beyond the Rhine into the Vorarlberg, curving round the triassic promontory of the Rhatikon and the strike of the former assimilates itself to that of the latter, which is N. and S. on the western side, while on the northern it turns to E. and W., and its folds, like those of the Adula, have a distinct tendency to a westerly overthrust. Beyond the Rhine the Kalk-zone resumes its normal strike, and, bordered on the south by the trias zone of the Eastern Alps and on the north by a belt of eocene sandstones, thins out gradually until it dies away a little distance beyond the Iller. The eocene sandstone belt continues, replacing in a manner the Kalk-zone, and is a recognised member of the Eastern Alpine series. It is worthy of remark that in the Flysch of the Vorarlberg occur instances of isolated crystalline rocks similar to those of the Habkerenthal, and in some measure to the singular masses of granite found at Tanninges, in Savoy, near the junction of the Kalk-zone with the 'Zone des Chablais.' One of the masses in the last-named locality is $1\frac{1}{2}$ kilometre long. It is equally difficult to imagine the glacial origin of such a mass and to explain its occurrence by weathering or denudation from a former granitic surface.

In the western part of the Eastern Alps it is shown that a marked uniformity of structure prevails in the group of the Adula and in the triassic groups of Oberhalbstein and Arosa, on the south-west of the crystalline mass of the Silvretta. The lines of folding and fracture

run north and south in the southern part, and trend N.E. in the northern parts of these groups. There can be little doubt also that both the Arosa group and the Rhätikon are parts of the same eastern trias zone, separated from each other by the Flysch area of depression of the Prättigau. This conclusion is rendered inevitable by the fact that the strike and folding of these groups are in the same general direction, and conform almost exactly on the west and north with those of the Silvretta, and also by the inclusion of triassic strata in the folds of the latter massif on its extreme western boundary.

The author claims to have established the following conclusions:—

1. That the Adula system, striking approximately at right angles to the trend of the zone of Monte Rosa, cannot be a part of the Western Alpine system, but is structurally connected with the northern trias zone of the Eastern Alps.

2. In the outer zones of the Eastern Alps, where these are immediately opposed to the eastern end of the zone of Mont Blanc, the normal E. and W. strike of the former is changed to a southern one, or at right angles to the strike of the latter zone. There can, therefore, be no continuation of the zone of Mont Blanc into the Eastern Alps.

3. The Adula group and the Rhätikon are interrupted segments of a curve, the convex side of which is turned to the N.W., and extends across the strike of the Western Alps, and this curve is analogous to that formed by the latter round the Piedmontese plain.

An important argument is also drawn in favour of the structural independence of both divisions of the Alps from the widely differing conditions of deposition of triassic strata which existed in each, those of the Western Alps being characteristic of shallow water, while the trias of the Eastern Alps is in great part a deep sea formation; and the author points out that the structural boundary of the Eastern Alps agrees with the western limits of the extension of the Austro-Alpine trias, the most westerly beds of this facies occurring in the Splügen district on a part of the Adula system. The work concludes with a summary of the great movements which have played a part in the elevation of both divisions of the Alps. The occurrence of folding of the schists in the pre-carboniferous period does not, in the author's opinion, justify the inference that mountain ranges must then have existed. Evidence of a pre-triassic upheaval is limited in the Western Alps to the zone of Mont Blanc. Dr. Diener holds that there is no reason to suppose that the zone of Monte Rosa was in any considerable degree affected by the earth-movements of that period: no carboniferous strata have been found therein, and the apparent conformity of the so-called permian beds of the Vanoise to the underlying schists, if their doubtful permian age is conceded, would indicate an absence of great disturbance. In the central zone of the Eastern Alps the evidence of a pre-triassic elevation is even plainer and more general than in the western zone, and in the Adula group triassic strata lie unconformably on the folded crystalline schists which strike almost at right angles to the direction of the Mont Blanc zone, so that even at this early date the rudiments of the two independent

curved chains of Eastern and Western Alps existed, and had assumed the general direction of strike which they now exhibit. But, as the author is careful to point out, if the principal folding and elevation of the zones of Monte Rosa and the Briançonnais are to be assigned to the miocene period, it involves the necessary conclusion that the Adula group was affected by the same or a later series of movements, inasmuch as the schists of that group cut off the continuation of the former zone, and are overthrust against both zones where it comes in contact with them.

The foregoing is a summary, necessarily incomplete, of some of the chief points of interest in this comprehensive treatise. That the author's main conclusions are fully established it would perhaps be premature to affirm; but he makes out a very fair case for the independence of the two great curves of the Eastern and Western Alps, and with regard to the structural geology of the whole of the western system the book contains probably the clearest and most general description, brought down to the latest researches, which can be found in any single work. The scheme is well thought out and elaborated, and the ultimate aim is never lost sight of. Dr. Diener's intimate knowledge of the wide range of the literature of his subject is quite remarkable, and the extraordinary number of references in the present volume to the researches and writings of others in the same field attest the scrupulous care which he bestows on all points connected with his theme.

J. E.

A Handbook for Travellers in Switzerland. Part I. Switzerland without the Pennine Alps. Part II. The Alps of Savoy and Piedmont, the Italian Lakes, and part of the Dauphiné. 18th edition, thoroughly revised, with travelling maps, plans of towns, &c. (London: John Murray. 1891.)

Mr. Murray has again been most fortunate in his editor. The sixteenth edition (I have not seen the seventeenth) of his 'Handbook to Switzerland' had the advantage of being remodelled by a writer specially qualified to deal with the literary form and treatment of the subject, besides possessing a firm grasp of details, and the initials appended to the new one, just issued, are the highest possible guarantee for the almost flawless execution of the task of bringing up information to date.

Mr. Coolidge must be universally admitted to be more accurately acquainted than any Englishman, and probably than anyone living, with the minutiae of Alpine topography, and his long experience in dealing with such materials, combined with his wide knowledge of historical and other subjects connected with Switzerland, constitutes him an ideal editor of such a work. That his task has been carefully and thoroughly performed an examination of these volumes must convince everyone, and criticism has rather to give place to a brief statement of some of the special points which characterise them. Amongst these are an improvement in the form and type of the two indices; the addition of much valuable matter in the introduction, bringing it well up to date; a useful enlargement of the list of hotels at desirable halting-places; fresh and fuller descriptions of towns, and greater clearness and completeness in their plans by the introduction of colour and

additions of new hotels, public buildings, &c. ; more distinct colouring of snow- and ice-covered regions in the maps; full engraving of that of the 'W. valleys of the Pennine Alps,' which was previously *au trait*, and the introduction of a useful new one of Davos Platz and its neighbourhood, together with fresh and valuable topographical details and important additions to the bibliography of the subject.

Per contra I will just notice two or three matters which have caught my eye, lest I should be thought to have read with too exclusively rose-coloured spectacles. Part I., forming the first volume, excludes the Pennine Alps, and, though the text of Part II. deals with them fully, its title scarcely suggests the fact. In the list of some of the 'most remarkable summits' in the various groups the omission of the Mönch and Eiger (in VI.) seems regrettable. At p. 61 of the introduction there seems to be a slip where '*Infusoria* of the genus *Disceræa*' are subsequently referred to as 'plants.' Again, at p. 91 the total of the German-speaking population should be 2,092,479, instead of 2,992,479. From the title of the map of the Italian Lakes 'No. 2' should have been removed. The plan of Aosta (p. 533) seems misplaced, and should, I think, have been inserted at p. 523. The maps of the Lake of Lucerne, the Bernese Oberland, and the Italian Lakes would be more handy for reference if they had faced the other way (forwards instead of backwards), as the bulk of the text which they illustrate follows them.

However these are minor points, and, having taken some pains to form a correct judgment, it gives me great pleasure to find these volumes such as we should have been led to expect from the past achievements of the editor on rock, snow, ice, and paper. It would be difficult to give them higher praise, and publisher, editor, and public may be alike congratulated on the completion of such a thoroughly satisfactory piece of work. F. F. T.

Zwei Kaukasus-Expeditionen. Von Andreas Fischer.
(Bern: Schmid, Francke.)

Mr. Fischer's narrative, which appeared originally in the pages of the 'Bund,' is now published in the form of a small volume containing several phototype illustrations and a map of the Bezingi and Dych-su districts. The two expeditions described are that of Messrs. Donkin and Fox, whom the author's brother accompanied as guide in 1888, and that of the search party in the following year.

After briefly tracing the 1888 expedition as far as the Dumala Glacier, Mr. Fischer relates his own experiences with the search party—the journey from Meyringen to Vladikavkaz, the ascent of Kazbek, the crossing of the Ceja, Saluinan-chiran, and Bashil-su Passes, and the discovery of Donkin and Fox's last bivouac.

The incidents of travel and impressions of Caucasian scenery are described with freshness and vigour, and the fact that they are related rather from the guide's point of view than from that of the 'Herr' gives Mr. Fischer's account of them a special interest. In the concluding pages, which are devoted to a comparison of the Alps with the Caucasus, the surpassing grandeur of the eastern mountains is freely acknowledged.