

complished in one day by starting early from Cogne. If, however, it were thought desirable to sleep out, we should recommend a push being made over the moraine of the Grand Crou glacier on to the rock buttress by which we ascended. By such an arrangement a very nasty bit of work is avoided (I mean the passage along a shockingly ill-conditioned moraine in the dark), and very good camping grounds would be easily found. At one spot we noticed a cave, which, with a little cleaning out, might easily be made to accommodate six people.

The moral which this paper is intended to convey is, that no mountaineer should visit Cogne expecting to find there guides and appliances fitted for arduous expeditions; but to a party properly supplied with guides from other districts, and after due warning had been sent to the hotel, so as to have the commissariat department properly attended to, we know of no part of the Alps better worth exploring, or where a mountaineer can feel more free and independent than in the Graians.

THE AMPEZZO, SEXTEN, AURONZO PASSES. By M. HOLZ-MANN.

ONE of the most interesting districts in the Dolomites is that which, roughly speaking, is bounded by the Ampezzo road on the west, the Piave, Padola, and Sexten valleys on the south, east, and north. Though the whole circumference measures only about 75 English miles, it encloses such a variety of striking scenery as even in a much larger area may probably not again be met with in all the Alps.

In England the attention of mountaineers has been directed to the district by Mr. Ball in § 61 of his 'Alpine Guide,' whilst parts of it have been described in Messrs. Gilbert and Churchill's earlier work on the Dolomite Mountains, as well as in Mr. Gilbert's later volume on Cadore. In Germany Dr. Grohmann has, in the publications of the Austrian and German Alpine Clubs, given detailed accounts of several of the principal peaks; and Dr. Kurtz has contributed to the third volume of Amthor's 'Alpen Freund' a systematic description of the greater part of the country, which has also been published in a separate form. Yet, even that elaborate paper, which in many instances seems to be based on the reports of others and not on personal experience, does not entirely clear up, and in

some cases rather adds to, the confusion caused by the inaccuracies which abound in different maps.

As I have spent a considerable portion of five seasons in the exploration of the district, and as I have, through the courtesy of the director of the 'K. K. Militair-Geographische Institut' at Vienna, been permitted to study the drawings based on the survey recently made by Austrian engineer officers, I have thought that I might do some service to mountaineers if I were to attempt another sketch of its topography. I have been assured that the new map, which is on a scale of 1 to 25,000, but remains as yet unpublished, has, with regard to the denomination of peaks, &c., been most carefully compiled according to the reports of the local authorities. It seems therefore advisable for the future to adopt its nomenclature in all cases where the other maps do not agree with it, although in several instances, as will be pointed out hereafter, different names are used by the people of the country. Unfortunately the survey stopped at the Austrian frontier. The official maps of the Italian authorities appear to be printed from the old plates, which have been corrected in very few particulars, and they remain unsatisfactory.

In my expeditions I have paid more attention to the passes than to the peaks, not so much because many of the latter had already been conquered by Dr. Grohmann and others, as in consequence of the disappointment which in this district too often attends the ascents of the higher ones. Even in the finest weather I have almost invariably found that the summits at a comparatively early hour of the day become capped with light fleeting clouds, which, though greatly enhancing the beauty of the landscape, completely veil the view when, after several hours' toil, the summits are reached. But these mists seldom, except in really bad weather, descend as low as the passes, which generally are yet high enough to allow of taking a complete survey of the characteristic features of the surrounding country. I therefore intend to confine myself almost exclusively to giving an account of the passes, and to arrange my notes in such a manner as will enable pedestrians to dispense with local guides, whose number is exceedingly small, at least if competent men only are to be considered. Having special regard to the latter aim, I shall also endeavour to omit all purely descriptive and personal matter. But I will here state that, whilst some of my excursions were made without a guide, I have in my wanderings through the Dolomites nearly always been accompanied by Santo Siorpaes of Cortina. When in 1868 I first became acquainted with him, he knew

little beyond a circle of a few miles' radius from his home; but since then he has acquired a very fair knowledge of the whole South-eastern Tyrol and Venetian Alps. He is a first-rate cragsman, and not without experience in glacier work.

The district may roughly be represented as forming an irregular square, one side of which has been doubly bent, and whose four corners correspond to the four points of the compass. Thus, taking Innichen, S. Stefano, Venas, and Peutelstein as the corners, the NE. boundary is formed by the valleys of Sexten and Upper Comelico, the SE. by the Piave, the SW. by the Boita, and the NW. boundary, representing the irregular side, by the road from Peutelstein to Schludersbach, Toblach and Innichen. The whole may be divided into a northern and a southern half by a curved line, formed principally by the long valley of the Anzei, which rises gently from the Tre Ponti to Val Buona. The line then follows the more rapidly ascending track to the Tre Croci pass, and descends by the short Begontina valley to Cortina d'Ampezzo. It is the northern part which I propose to treat of in the present paper, reserving the other half for a future communication. To facilitate the survey it will be of advantage to subdivide the area into five groups, viz. the *Cristallo Group* to the W., the *Cadini Group* to the S., the *Birkenkoft-Dreischuster Group* to the N., the *Popera-Najarnola Group* to the E., and the *Drei Zinnen-Col Agnello Group* in the centre.

I.—THE CRISTALLO GROUP.

This group detaches itself most naturally, as on the E. and NE. it is separated from the others by the broad Mesurina valley, and the deeply-cut trench of Val Popena bassa. On the N. and W. the boundary is formed by the high road from Schludersbach to Cortina, and on the S. by the frequented track over the Tre Coci Pass, coinciding with the boundary of the northern half of the district. Three low passes have to be crossed in making the circuit.

1. *The Gemerk, or Cima vanca* (N.M.) 1,524 m.=5,000 English feet (1,522 m. N.M.).* Starting due W. from Schlu-

* The heights were determined by one of Casella's aneroid barometers specially constructed for the purpose, and after the return to England corrected at the Kew Observatory. The calculations were made according to the formula $H=1836\bar{3}(\log B-\log b)$, when B represents the readings of the barometer in millimètres at the lower, *b* those at the higher stations. The results (H) were then added to the known altitudes of the respective places of departure. It is need-

derbach, the pedestrian immediately passes on his left the opening of the Schönleithenthal, and reaches imperceptibly in 30 min. the watershed, indicated by a tablet as the march between the political districts of Welsberg and Ampezzo, at the foot of another lateral glen, Val Pra del Vecchio. The road bends now SW., running on the right bank of the Rufredo, later on called Bianco and Felizon, passes in 40 min., just before reaching Ospitale, the Val Forame, and, a little beyond the house, the Val Grande. After 20 min. more, near the site of the former castle of Peutelstein, the road turns to SSE. and descends, under the cliffs of the Croda di Pomagagnon, the valley of the Boita in 1 hr. 30 min. to Cortina.

2. *The Tre Croci Pass*, 1,811 m.=5,942 ft. The beaten track ascends ENE., through fields and meadows on the right bank of the Begontina, crosses at the hamlet of Alvera to the left bank, soon returns to the right, and reaches in 1 hr. 25 min. the pass. A more convenient footpath, shorter by about 5 min., keeps somewhat longer on the left bank of the torrent. The track descends into Val Buona at first due E., afterwards bending SE., and brings in 45 min. to Bastian's hut, occupied by Santo's brother. Thence continuing for a short time in E. direction, it strikes on the Alp 'Federa Vecchia' the new road which ascends nearly due N. on the right bank of the Acqua Mesurina, passes the Alp Mesurina, and reaches in 1 hr. 5 min. the lake of Mesurina. In order to get there from the Tre Croci Pass it is not necessary to descend as far as Bastian's hut. At the point where the track bends SE., another runs NE., keeping almost at the same level, but becoming after a little while rather indistinct. The new road is struck after 50 min. at a distance of 20 min. from the lake, passes along its W. shore, and gains in 10 min. the watershed between the Anziei and Rienz.

less to say that the figures are only approximative, as no allowance could be made for a possible change of atmospheric pressure during the time of passing from one point of observation to another. The differences in temperature were likewise disregarded, although the error was reduced to a minimum by carrying the instrument invariably in its case in the same pocket. In accordance with the new map, Cortina was taken to be 1,220 m.=4,003 ft. above the sea, Schludersbach 1,442 m.=4,731 ft., Landro 1,407 m.=4,616 ft., Sexten (St. Veit) 1,310 m.=4,298 ft., Auronzo (the Church of Sta. Giustina at Villa Grande) 892 m.=2,917 ft. The nomenclature of the new military survey, as well as the figures given on the new map for the heights, is indicated by the letters (N. M.). The distances, unless stated to the contrary, are those of a steady pace, exclusive of halts.

3. *The Pass of the Col S. Angelo*, 1,736 m.=5,696 ft. The fall of the road, whilst running along the W. side of the Paludi di Mesurina is slight, but increases on its turning NW., down the Val Popena bassa. Having successively passed the opening of Val Popena alta, the foot of the short glen of Val Cristallin, and the bridge over the torrent which drains Val Fonda, the road joins, after 1 hr., the high road at Schluderbach.

An inspection of the structure of the group will show that the Val Grande cuts off from the main body a considerable limb which forms a long chain of rocks, precipitous on the SW., but more sloping on the NE. side. Over its point of junction with the principal mass of the Cristallo, leads the pass of

4. *La Forca*, 2,114 m.=6,936 ft. Crossing the Felizon at Ospitale, a track runs up the right bank of Val Grande, the upper part of which is generally called Val Padeon, and comes in 1 hr. 5 min. to the Padeon Alp. Thence the path ascends a little more steeply, in 25 min., to the pass. The descent leads into a short ravine, sometimes called Val Popontio, whence the Tre Croci Pass may be reached in 20 min. The chain forming the SW. wall of Val Grande is generally divided into three parts, viz. Croda di Pomagagnon, Croda di Cesdellis or Cerdellis, and the Crepo di Zumelles; but the new map has adopted the following names: Mte. Pezzories, Fiammes Spitz, Pomagagnon, and Creppe di Zumeles. The latter, immediately to the W. of La Forca, is the lowest, and may be crossed at several places. The most frequented passage is by

5A. *The Forcella di Zumelles*, 2,089 m.=6,854 ft. It is reached in 17 min. from the Padeon Alp by crossing to the left bank of the stream and ascending in S. direction through the forest. The descent leads steeply for a short time to the S., then turns SW. down a grass slope, passes over meadows to the hamlet of Grava, and brings in 48 min. to Cortina. Of several other more rarely used passages may be mentioned that of

5B. *Giau longo*, between the last mentioned and La Forca, leading, as the name indicates, down a long grass slope, and

5C. *The Grava di Spiolto*, situated between the highest elevation of the Crepo di Zumelles and the central part of the chain, the Croda di Cesdellis. Between the rocks of the latter and those of the Croda di Pomagagnon is a gap through which leads another recognised pass,

6A. *The Forcella di Pomagagnon*, 2,177 m.=7,143 ft. The track proceeds from Cortina due N. to the hamlet of Chiave, then through larch wood and creeping pine, and up the long Grava di Pomagagnon in less than 2 hrs. to the pass. A

faintly marked footpath descends in 30 min. through the short lateral glen of Val Pomagagnon, on the new map designated as Forcella di Fiamis, to a broad track on the left side of Val Grande. To reach Ospitale it is necessary to follow this track up the valley until, after 5 min., it crosses a bridge to the right bank, where it joins the one leading to La Forca. The distance to Ospitale is 25 min.

6B. *Forcella di Fiamis* is the local name of a depression between the Pomagagnon and the Fiammes Spitz, although the new map, as already stated, gives the name to Val Pomagagnon. Similar to the Val Grande on the W., the Val Popena alta on the E. side cuts off from the main body another limb which, not being of great height or steepness, may also be crossed at various places. It is composed of three parts, viz. Monte Popena, Croda di Bausa Marza, and Croda d'Orieto, although frequently only the name of Croda di Bausa Marza is given to it. It is attached to the central mass at the SE. corner of Piz Popena, corresponding to the southern termination of the Cristallin ridge. At the point of junction the pass of

7. *The Forcella d'Orieto (?)*,* 2,356 m.=7,730 ft., leads through a gap between the Cristallin and the Croda d'Orieto. It is reached by crossing the stream of Val Popena bassa, 30 min. above Schluderbach and proceeding up Val Popena alta, with the mass of the Cristallin to the right during the whole way. The track passes, after 25 min., from the left to the right bank, recrosses frequently from one side to the other, sometimes taking to the dry bed of the torrent, leaves after 20 min. a wooden hut to the left, and ascends again on the left bank more steeply to a higher terrace of the valley, the head of which is closed by the quaintly-shaped towers and pinnacles of the Croda d'Orieto. An ascent of a grass slope in SW. direction brings in 40 min. more to the summit of the pass. The descent is effected by a gully, the smooth rocks of which are in some places bare of debris and require attention. Then follows a slope of debris, at the foot of which the Val d'Orieto stretches S. to join Val Buona. A track soon reappears, by which Bastian's hut may be reached in 45 min. The traveller who intends to go to Cortina ought to face W. shortly after coming on the track, cross the torrent, and follow another path which skirts the base of the lower buttresses of Piz Popena,

* I have marked with a (?) those passes to which I have given names which appear to me most appropriate, having been unable to find out whether they are known by any local names.

and after 45 min. joins the road over the Tre Croci Pass, 5 min. below the summit on its E. side.

8. *The Forcella di Bausa Marza* is the pass on the E. side of the Croda d'Orieto, and may be reached in about 30 min. from the wooden hut below the upper terrace of Val Popena alta, by turning to the SE. after the step has been surmounted. The summit is marked by one of the frontier stones between Austria and Italy. In the descent the line of the frontier may be followed down to the Acqua Mesurina.

9. *The Forcella di Popena* (?) is gained by ascending from a little below the wooden hut in E. direction, and aiming at a depression in the ridge N. of its highest point. The descent leads to the lake of Mesurina.

Into the Val Popena alta leads also a pass which belongs to the central mass of the group, the saddle of

10. *Le Banche*, pointed out by Dr. Grohmann on the occasion of his ascent of the Cristallin. It lies between the summit of the latter and Piz Popena, and connects Val Banche, a glen penetrating into the mass of the Cristallin, with the upper shelf of Val Popena alta.

11. *The Cristall Pass*, 2,800 m. = 9,187 ft., the gap between Monte Cristallo and Piz Popena, was also first described by Dr. Grohmann. The way to it, starting from Schludersbach, enters in 15 min. Val Fonda, sometimes called Val Monte Cristallo, a deep gorge between the Cristallin to the E., and the Rauhkofelschneide to the W. According to the quantity of water in the torrent the track ascends either in its bed or along the right bank, passes up a steep ravine, partly blocked up by rocks, and mounts in 1 hr. 15 min. to a sloping plateau which supports the Cristallo glacier. It is advisable to keep to the right lateral moraine until, after 30 min., a bergschrund is reached, which runs across the whole breadth of the glacier, and which, late in the season, is apt to cause some delay in crossing. (In my own case it necessitated step-cutting for 45 min., as its upper lip, considerably raised above the lower one, consisted of pure blue ice. The summit of the pass was gained in 10 min. more.) The descent to the Tre Croci Pass may easily be effected in 45 min., as it is possible to slide down the snow, or with the moving mass of 'grava' which fills the furrow on the S. side.

12. *The Passo di Stauniès*, 2,844 m. = 9,331 ft., is another fine pass between Cortina and Schludersbach. From the pass of La Forca, which may be reached in 1½ hrs. from Cortina, a ravine called 'Grava di Stauniès' ascends a little E. of N. After 50 min. a lateral furrow, also filled with loose débris,

runs up NNW., and leads, after 45 min. of very fatiguing progress, to the summit of the pass, between the highest point of the Cresta bianca and one of the western Cristallo peaks. The former, only 65 m. higher than the pass, commands a very fine view, and may be gained in a few minutes. On the N. side of the pass, between the Schönleitschneide and the Cresta bianca, is a gently sloping rocky plateau of considerable extent, half covered by a glacier which touches the summit of the pass. At the N. edge of the plateau descends the steep glen of the Pra del Vecchio. By proceeding to the upper end of the Grava di Stauniès, without turning NNW., a cleft immediately to the W. of the summit of Monte Cristallo can be gained, through which another pass might be made if it should be found possible to descend the snow couloir which is seen from Landro between the two highest peaks of the Cristallo, high above the Cristall Pass.

13. *The Rauhkofelpass* (?), 2,651 m. = 8,698 ft., connects Val Pra del Vecchio with Val Fonda. The way to it leads over the above-mentioned rocky plateau to a depression S. of the apex of the angle described by the Schönleitschneide and Rauhkofelschneide. It may be reached in 12 min. from the Passo di Stauniès by moving NE. down the glacier which comes to an end at the pass. Two or three practicable couloirs lead down into Val Fonda to the terrace below the Cristallo glacier. By proceeding N. along, or just below, the crest of the Schönleitschneide one may reach in 18 min., after a slight reascent, a depression at the head of the Schönleithenthal, which connects this glen with that of the Pra del Vecchio, called

14. *The Schönleitenpass*, 2,684 m. = 8,806 ft. The upper part of the Schönleithenthal, enclosed in the slightly diverging ridges of the Schönleitschneide and Rauhkofelschneide, is in reality only a ravine filled with loose débris. It is almost too steep to allow of a safe descent by sliding down with the 'grava,' the whole mass of which may easily be set in motion and follow in a shower of stones. Some remains of avalanche snow now and then afford welcome relief to the feet. After 50 min., near an abundant spring, said to possess medicinal properties, appear traces of a path, which for the greater part has been destroyed by the torrent, and which brings in 15 min. to Schluderbach. The new military map gives to the Schönleitschneide the name of 'Cristall Schönleiten,' which by Dr. Grohmann, in accordance with local custom, is applied to the peak E. of the Passo di Stauniès and S. of the Rauhkofelpass. In the same way the new map designates the northern

termination of the Rauhkofelschneide as Amts Berg, and has at the spot corresponding to the Rauhkofelpass the words 'Ober dem mittleren Cristallthale.' The last pass to be noticed in this group is

15. *The Forcella di Forame*, connecting Val Pra del Vecchio with the steep glen of Val Forame, which runs up from Ospitale to a saddle N. of the third peak in the Cresta bianca, counting from the S. The pass is only a few feet above the NW. corner of the plateau at the foot of the Passo di Stauniès. The new map gives the names of 'Punta del Forame' to the rocks N., and 'Vecchio del Forame' to those S. of the Forcella di Forame, and to both united the general term 'Cristallin.' Only by one inhabitant of Ampezzo did I ever hear the latter name used in reference to the rocks at the head of Val Forame, it being generally applied to the mass between Val Fonda and Val Popena alta. The depression between the first and second peaks of the Cresta bianca is at the head of a second lateral furrow in the W. wall of the Grava di Stauniès. A descent into Val Grande from the depression between the second and third peaks of the Cresta bianca does not appear to be practicable, owing to the steepness of the rocks on the SW. side.

II.—THE CADINI GROUP.

The principal part of this group lies to the E. of the Mesurina valley, but it seems convenient to consider in conjunction with it the low ridge which separates Val Popena bassa from Val di Rimbianco, and terminates in the NW. with the plateau of Monte Pian. Of its circumference the part from Schluderbach over the pass of Col S. Angelo to Val Buona has already been described. Thence the line follows the course of the river Anziei, whose left bank, down to the châteaux of Somprade, is studded with barns for storing the produce of the extensive pasture-lands which gently slope up to the Cadini di Mesurina and Monte Campoduro. The left slope of the valley then becoming steeper, the forest stretches down to the road which reaches the junction with Val Marson in 2½ hrs. The boundary now ascends with the track, which keeps close to the left bank of the torrent of Val Marson, passes the opening of Val d'Onge to the left, crosses to the right bank a little beyond the opening of Val Cengia on the right, passes also Val Campedelle, and mounts in 2 hrs. to the pass at the foot of the southern face of the Drei Zinnen,

1. *The Forcella di Marson*, 2,330 m.=7,645 ft. In the VOL. VII.—NO. XLV.

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descent the line runs along the right bank of Val di Rimbianco, passes the so-called 'Katzenleiter,' enters the valley of the 'schwarze Rienz,' and rejoins, in 1 hr. 40 min., at Landro the high road. The circuit is completed in $\frac{1}{2}$ hr. more by following the road of the Höllensteinthal, more correctly called 'Höhlensteinthal,' past the Dürrensee to Schluderbach.

It has been stated that the ridge which projects NW. from the main mass of the group is low, and as its thickly-wooded slopes are not steep, it can be crossed in many places. But there are three recognised passes. The track over

2. *The Forcella di Mesurina* (?), 1,870 m. = 6,135 ft., starts from the pass of the Col S. Angelo, passes the N. base of the hill, crosses the meadow which drains both towards the lake of Mesurina and the Rienz, ascends along the right bank of the upper Mesurina torrent, and gains in 25 min., near a small tarn, a broad saddle which forms the summit of the pass. Thence descending nearly due N., it strikes, after 15 min., at the Rimbianco Alp, the northern boundary-line of the group.

3A. *The Forcella bassa del Monte Pian*, 1,906 m. = 6,253 ft., is passed by tourists in the ascent of Monte Pian, and may be reached in 1 hr. from Schluderbach by following the road to the Mesurina lake to the point where it bends to the S., and then turning NE. across the meadows. The descent to the Rimbianco Alp takes about 20 min.

3B. *The Forcella alta del Monte Pian*, 2,000 m. = 6,562 ft., may be gained in the same time as the Forcella bassa, by turning off the road a little sooner and facing due N. It is almost exclusively used for the purpose of shortening the ascent of Monte Pian, as the path which leads over it does not continue northward on joining the track coming up from the Forcella bassa. The Monte Pian itself may be considered as the summit of a pass between Val Popena bassa and the Höllensteinthal, as it is not very difficult to scramble down the W. face of Monte Pian, or to descend by a couloir at its NW. corner. In either case Landro may be reached in little more than $\frac{1}{2}$ hour.

On the E. side of the group Val d'Onge cuts off from the central mass the low ridge of Monte Campoduro. Over the point of junction, at the end of the spur which the Cadini send in SE. direction, leads the pass of

4. *The Forcella di Maraja*, 2,111 m. = 6,926 ft., connecting Val d'Onge with the upper valley of the Anziei. The saddle itself, as well as the slopes leading up to it, is covered with rich pasture. The descent on the S. side may be taken in any direction, as the ground does not offer serious obstacles at

any point. Perhaps the most interesting way, commanding very fine views, is that which skirts the S. base of the Cadini, crosses Col di Varda, and descends in about $\frac{3}{4}$ hr. to the lake of Mesurina. The rocks of the SE. spur of the Cadini may be crossed in two or three places.

5. *The Passo Campoduro.* The ridge of Monte Campoduro, when seen from the W., appears more like a long-drawn narrow plateau, at first with a slight inclination towards Val d'Onge, afterwards becoming suddenly much steeper. The E. side, however, shows a line of precipitous rocks of moderate height, supported by a more sloping base. The plateau is most conveniently reached from the Alp of 'le Saline,' and the descent to the Anziei is made by a track down the Val di Molini to Somprade.

Of the passes leading through the central mass of the group, that of

6. *The Cadin della Neve*, 2,382 m. = 7,815 ft., attracts attention in consequence of its being conspicuous from Schludersbach as the gap S. of the highest peak. It is approached from the pass of the Col S. Angelo by following for 10 min. the track to the Forcella di Mesurina, then turning ESE. through the forest, and ascending the steep slope which brings to the gently rising corry on the right of the highest peak. A faintly marked track runs along the N. slope to the lower end of the snow-field which fills the trough of the corry almost up to the crest of the pass, the latter being reached in $1\frac{1}{2}$ hr. The descent continues at first in SE. direction, down a short slope of débris, passes a wilderness of larger fragments of rock, and then turns NE. down Val d'Onge. By keeping along the base of the rocks to the right, the Forcella di Maraja can be reached in 25 min. The pass of

7. *The Cadin di S. Lucan* leads through another corry, NW. of the highest peak of the Cadini, and connects Val Popena bassa with the head of Val Campedelle.

8. *The Forcella di Rimbianco*, 2,186 m. = 7,172 ft., is the pass most frequently used for the passage from the Val di Rimbianco to the lower part of Val Marson. A path from the Alp Rimbianco follows the SE. branch of the stream, ascends after 20 min. a rather steep slope to an upper terrace of the glen, leads up another short slope to another terrace, and, finally, in 30 min. to the pass on the S. side of a cross visible from below. The well-trodden path descends NE. in zigzags into Val Campedelle, enters after 40 min. Val Marson, and joins in 50 min. more the road through Val Anziei.

9. *The Forcella delle Biscie* is another pass, between the

Forcella di Rimbianco and the Forcella di Marson, leading due E. from the Alp Rimbianco into Val Campedelle.

10. *The Forcella della Cima Cadino* (?), the highest pass in the group, connects the head of Val Campedelle with that of Val d'Onge, and leads through a cleft in the highest peak of the Cadini. About 5 min. below the pass of the Cadin della Neve on the Val d'Onge side is the foot of a great slope of débris carried down from the N. wall of the glen. Higher up the slope contracts to a couloir descending from the cleft in the Cima Cadino. The upper part of this couloir is filled with snow, and another snow couloir runs down on the side of Val Campedelle.

III.—THE BIRKENKOFI-DREISCHUSTER GROUP.

Its western boundary line is formed by the Höllesteinthal, that part of the Rienz valley which extends from Schluderbach to the Pusterthal. The road from Landro runs past the lake of Toblach in 1 hr. 40 min. to within a few minutes of the village of Toblach. On the N. the line passes over the plateau of

1. *The Toblacher Feld*, 1,204 m. = 3,951 ft., the watershed between the Rienz and Drave. After $\frac{3}{4}$ hr., at Innichen, it crosses the Drave, which rises on the S. in the wooded slopes of the Neunerkofer and Haunold, ascends the Sexten valley, passes the opening of the Innerfeldthal and the village of Sexten, and stops after $1\frac{1}{2}$ hr. at Moos. As the valley of Sexten ascends in S.E. direction, the E. boundary of the group is reduced to the length of the Fischleintal, which, after 50 min., comes to an end at the opening of the Altstein Thal (N.M.), often called 'Altlasteiner Thal,' on the old ordnance maps 'Val Alteher Berg.' The S. boundary follows the track which leads up the left bank of this valley, gains the undulating plateau of 'Die Böden,' across which it continues in WSW. direction, passes a herdsman's hut, and higher up two small barns, and reaches in $1\frac{1}{2}$ hr.

2. *The Toblacher Riedl*, 2,397 m. = 7,864 ft. (2,391 m. N.M.), the pass between the Paternkofel and the 'Toblinger Knoten' (N.M.), Grohmann's Gwengalblspitz. (The new map gives the separate name of 'Böden Knoten' to the NW. corner of the Paternkofel, although the quaintly-shaped pinnacle, locally called 'der Pater,' from which the name Paternkofel seems to have been derived, rises just at that spot.) The line descends to a marshy meadow, the Rienzboden, drops by a steep zigzag path to the floor of the Rienz valley, passes the Wildgraben on the

right, and shortly after the Val di Rimbianco on the left, and returns in $1\frac{3}{4}$ hr. to the point of starting at Landro.

The Innerfeldthal, a lateral valley of the Sextenthal, penetrates nearly to the S. boundary of the group, thus dividing it into two parts. The head of the valley is closed by the Schwalbenkofl, at either side of which passes connect it with the Altstein Thal and Rienzthal.

3. *The Innicher Riedl*, 2,385 m. = 7,825 ft. (2,385 m. N.M.). About $\frac{1}{2}$ hr. below Sexten a track leads up the Innerfeldthal, and comes in 1 hr. to the dry bed of a small lake, evidently formed in comparatively recent times by the mass of débris carried down from the Dreischusterspitz, right across to the W. slope of the valley, the water having afterwards found a subterranean channel still used by the torrent, which gradually loses itself in the débris about half a mile higher up, and reappears in great abundance about double that distance below this spot. The track, having after 5 min. passed a herdsman's hut, the 'Unterhütte' (N.M.), becomes indistinct as it ascends SSE. in the torrent-bed. After 20 min. it reappears again on the right bank of the broad expanse of débris, called 'Wasserklamm' (N.M.), turns more to the E. on mounting a rather steep, shallow furrow at the side of the right bank of the E. branch of the torrent, and, following this branch to its upper end, reaches in about 1 hr. the summit of the pass at the NE. corner of the Toblinger Knoten. Thence the way descends SE. to the Böden and down the Altstein Thal in 1 hr. to its junction with the Fischleinth. By returning to Sexten the whole round may be completed in little more than five hours.

4. *The Rienzjoch* (?), 2,431 m. = 7,976 ft., is approached from Sexten by the same track as the Innicher Riedl. The two routes separate at the head of the shallow ravine on the side of the E. branch of the torrent. Having ascended this furrow for 10 min., the path strikes the torrent, crosses over to its left bank, continues to ascend steeply between the E. and S. branches, turns after 17 min. to SW. in order to cross the latter, resumes after 5 min. the SSE. direction, recrosses in 7 min. to the right bank, turns immediately after NE. to ascend a short slope of débris and some rocks into which steps have been hewn, resumes in 6 min. once more the SSE. course, and comes in 22 min. over the broken ground of the 'Gruben Alpe' to the crest of the ridge which slopes down on the S. side towards the Rienzboden, the W. edge of which is reached by a steep descent of 15 min. There the track joins that over the Toblacher Riedl. Both to the E. and W. of the pass are

two passages, about 10 mètres higher, which likewise lead to the Rienzboden. They may easily be reached, either by climbing over the rocks rising to the W. and E. of the central passage, or directly without going to the latter; the one to the W. by turning to the right on coming in view of the small stone hut of the 'Morgen Alpe' (N.M.), at the foot of the NE. corner of the Schwalbenkofl, the other by advancing more in SE. direction towards the W. face of the Toblinger Knoten. By moving still more due E. across the Gruben Alp and along the N. face of the Toblinger Knoten, it is easy to effect a variation of the route to the Innicher Riedl.

5. *The Wildgrabenpass*, 2,288 m. = 7,507 ft. (2,285 N.M.), is the deep depression between the Schwalbenkofl and Pullkofl, the latter name being given by the new map to the peak rising immediately to the W. of the pass, and forming the centre of the ridge which receives the name of Schwalbenkofl to the N. and Bautkofl to the S., whilst its W. spur, rising just above Landro, is called 'Steingebirge.' About 1 hr. above Landro the Rienz valley is joined by the Wildgraben, along the right bank of which runs a faintly-marked track. When the torrent carries little water it will, however, be found more convenient to ascend actually in its bed, as the slopes of the glen are covered with loose débris, whilst the larger blocks are more firmly rooted in the torrent. About 1 hr. suffices to reach the summit of the pass. There a track mounts E. to the 'Schwalben Alpe' (N.M.), passes round the Schwalbenkofl, and descends to the Morgen Alpe. On the N. side of the pass a more clearly-marked path descends in 15 min. to a meadow below the 'Oberhütte' (N.M.), standing on the S. slope of the 'Unterebenkofl.' The path then turns to the NE. by following the left bank of the torrent, which in 15 min. unites with that of the Innerfeldthal, and brings in 10 min. to the 'Unterhütte.' Another route from the Innerfeldthal to Landro leads over

6. *The Schwalbenkofljoch* (?), 2,526 m. = 8,288 ft. (2,529 m. N.M.). From the meadow below the Oberhütte, which may be reached in little more than 2 hrs. from Sexten, the way leads a little N. of W., afterwards more to the NW., over the stony alpine pasturage of the 'Innerfeld Alpe' (N.M.), and occasionally over débris and the remains of avalanche snow in 1 hr. to a saddle at the N. end of the Schwalbenkofl, and SW. of a mass of rock, on the old maps erroneously called M. Bull. Between this and the Oberebenkofl a passage may be effected into the Birkenthal, one of the eastern lateral glens of the Höllensteinthal. The direct descent from the Schwalbenkofljoch into the

latter valley leads NW. to a small green tarn, then across the pasture of the 'Schaf Alpe' (N.M.), and down a steep ravine to the road, a little below the 'Klausbrücke.' A shorter route to Landro may, however, be taken by moving round to the W. face of the Schwalbenkofl, descending in SW. direction to the opening of a corry on the W. side of the principal mass of that peak, there crossing the undulating scanty pasture, and re-ascending in 30 min. to the crest of the ridge called 'Hundstall' (N.M.), the 'Eurischbrand' of the old maps, constituting the pass of

7. *The Hundstall Sattel* (?), 2,343 m.=7,687 ft. The descent for a short time follows the crest of the ridge, with the Cristallo straight in front, and the houses of Landro in the depth below, then leads down a very steep ravine, and turns W. on joining the larger one, called Pullthal (N.M.), which descends from the Pullkofl. On approaching the forest the way turns to SSW., the ravine is left to the right, and in 50 min. the high road is struck about 5 min. below Landro.

8. *The Birkenkofljoch*, 2,540 m.=8,334 ft. (2,528 m. N.M.), is yet another pass which connects the Höllensteinthal with the Innerfeldthal. About 55 min. below Landro, or half-way between the Klausbrücke and the lake of Toblach, the Birkenthal opens on the E. side of the road. A path runs up on its left bank, crosses after 40 min. to the right bank, and continues to ascend between two branches of the torrent. After having kept for some time near the N. wall of the glen, the path turns after 25 min. to SE., approaches the S. wall, crosses after 10 min. a broad bed of débris washed down from the rocks of the Haunold Spitz (N.M.), continues along the right bank of the glen, and comes after 30 min. to a small snow-field at the foot of the final slope. An ascent of 35 min. brings to the summit of the pass, the gap between the Birkenkofl and Birkenchartl. The steep descent on the other side allows of rapid progress. The course at first keeps to the trough of the ravine until a track appears on the right bank near the spot where the water breaks forth from under the rocks. The floor of the Innerfeldthal is reached in 45 min. at the Unterhütte.

9. *The Dreischusterjoch* (?), 2,859 m.=9,380 ft. It has already been stated that the Innerfeldthal, at less than 1 hr.'s distance from its junction with the Sextenthal, is barred by a great mass of débris carried down from the Dreischusterspitz. A fine pass across the ridge, which culminates in the latter peak, may be effected by starting from the path on the crest of that barrier in SE. direction. A laborious ascent of 40 min. over débris, followed by 25 min. over a snow-slope, and 30 min.

more over débris, brings to a hollow filled with snow, which drains off through a wide opening on the SW. side of the hollow, overlooking the way to the Innicher Riedl and to the Rienzjoch. The ascent continues in SE. direction up the snow-field, which after 15 min. contracts to a couloir running up to the small rock plateau of the Schusterkofl (N.M.), locally better known by the name of 'Schusterplatte.' The couloir is left to the right, the direction changed to ENE., and the summit of the pass at the SW. corner of the highest peak of the Dreischusterspitz is reached after 15 min. climbing over easy rocks. The descent leads SE., down a snow-couloir, in 25 min. to the semi-circular slope of débris at the head of the large corry, called 'Weiss Lahn.' Then turning E. down the loose débris until after 20 min. vegetation begins to appear, the route descends in 30 min. more to the floor of the Fischleinthäl, whence Sexten may be reached in 40 min. (The pass does not lead over that part of the ridge which Dr. Grohmann has described in his account of the ascent of the Dreischusterspitz, as it would be impossible to reach the pass from the side of the Fischleinthäl in the short space of $2\frac{1}{2}$ hrs., starting from Sexten. On my first ascent of the pass I reached it from the side of the Weiss Lahn, but it required 3 hrs. 25 min. steady walking, including 40 min. step-cutting up the snow-couloir, to gain the summit. Dr. Grohmann evidently first touched the crest of the ridge at the NE. corner of the peak, between it and the Gsöllknoten, whence a descent into the Innerfeldthäl could probably be effected without difficulty down another corry, called on the new map 'Hinter Inner Feld.')

IV.—THE POPERA-NAJARNOLA GROUP.

This group is separated from the one just dealt with by the Fischleinthäl, which thus forms part of its W. boundary. From the junction of the valley with the Altstein Thal, the line continues in S. direction, following the way over

1. *The Forcella di Giralba*, 2,436 m.=7,992 ft. (2,440 m., N.M.) A footpath ascends on the right bank of the Unterbacher Thal, the local name for the lower part of the Oberbacher Thal, crosses after 15 min. to the left bank, passes in 35 min. a shepherd's hut at the foot of the Hohlast (N.M.), or 'Hohe Leisten.' After recrossing in 10 min. to the left bank, and continuing under the W. face of the Hohlast, the track on turning SSE. becomes indistinct, and leads over rocks, a small snow-field, and a slope of débris in 40 min. to the pass, the broad saddle between Monte Popera and the Col Agnello or

Zwölfer Kofl. The descent is taken somewhat E. of S. down the Val Giralba, past a small tarn. Shortly after, a well-marked path appears on the right bank of the torrent, crosses after 1 hr. 20 min. to the left bank, and strikes in about $\frac{1}{2}$ hr. near the châteaux of Giralba, the road through Val Anzei. This which now forms the boundary line, brings in less than 1 hr. to Villa Grande of Auronzo, then passes through Villa piccola and Cella, and turning S., leaves after 50 min. the Anzei before reaching its junction with the Piave. Describing a sharp angle the line then ascends on the right bank of the latter river through the narrow defile between M. Tudajo and M. Piedo, until it comes in $1\frac{1}{4}$ hr. at S. Stefano to the E. point of the whole district. Here bending to the NW., the boundary ascends the Padola valley, more frequently called the Upper Comelico, through which a rather rough carriage-road leads for about 3 hrs., when it quits the river and mounts in a short hour more to the pass of

2. *The Kreutzberg*, 1,632 m. = 5,355 ft. (N.M.) A descent of 1 hr. down the Sexten valley to Moos completes the circuit round the district. A far more interesting pass connecting the valleys of Sexten and Comelico leads over

3. *The Eilferkofeljoch* (?), 2,712 m. = 8,898 ft. The way to it from Sexten goes up the Fischleintal in $1\frac{1}{4}$ hr. to the opening of the Altstein Thal, then turns to the E. and ascends the steep slope first on the left, afterwards on the right bank of the watercourse, until some rocks are reached over which the water from several springs falls in little cascades, and which after 1 hr. may easily be surmounted on the N. side. (The time may be shortened by moving somewhat E. of S. across the 'Stadl Wiese' (N.M.), the meadow which stretches from the foot of the Weiss Lahn to the Altstein Thal, and proceeding through the forest up a stream of débris which branches off from the principal watercourse.) The course then assumes a SSE. direction, ascends the slope of débris close under the cliffs on the left hand, takes after 25 min. to the snow-slope which higher up contracts to a gully of moderate steepness and brings in 35 min. to the summit of the pass. A glacier of considerable size descends on the other side, and several small ones fill the ravines and clefts in the precipices rising above it to the south. By keeping close to the left bank it is possible to avoid the crevasses, to glissade down the whole length of the glacier, and to reach the foot of its terminal moraine in 35 min. The way to Comelico then follows the course of the Risena torrent, and strikes the road in about 1 hr. near the Casera Campotorondo. The pedestrian

who intends to return to Sexten may avoid a great part of the high road by going over

4. *The Arzalbl Sattel* (?), 2,303 m. = 7,556 ft. About 10 min. to the E. of the terminal moraine, beyond a little tarn, on a stony pasture, locally called Arzalbl, a track ascends in N. direction, and leads in 25 min. to the pass. The descent on the N. side zigzags steeply down through rocks and débris, the track disappearing almost entirely, but becoming after 25 min. more distinct at the foot of the slope, close to the right bank of the Weissen Bach torrent, which it follows for 20 min. until it joins the carriage-road somewhat W. of the Kreutzberg, whence Sexten may be reached in little more than 1 hour.

It is especially with regard to the nomenclature of the peaks in the neighbourhood of the Eilferkofeljoch that great discrepancies are found in the various maps, and it seems as if even the new military survey had fallen into error in at least one instance by calling 'Rothwandspitz' the highest peak which is visible from Sexten to the S. of the pass, although the people of the country invariably give it the name of 'Eilferkofel.' The new map does not make it quite clear whether the latter name is applied to a lower summit W. or N. of the pass. But, as most authorities agree in calling 'Rothwand' some rocks which rise above the angle described by the Fischleinthl and the road to the Kreutzberg, it would seem to be more appropriate to designate as Rothwandspitz the great mass which towers immediately above those rocks. On the new map the eastern continuation of this mass bears the name of 'Cretta d'Angelo,' and the point in which the spur terminates is called 'Papern Kofl.' Over the depression between these two leads the pass of the Arzalblsattel. It is not very difficult from the Eilferkofeljoch to reach in about 2 hrs. the summit of the Eilferkofel (Rothwandspitz, 3,075 m., N.M.), by alternately climbing some very rotten rocks and crossing narrow strips of snow. (Two attempts of mine to ascend this summit were frustrated by unfavourable weather. On the second occasion, when in spite of clouds and snow I had advanced to within 10 mètres of the highest point, I was driven back at the last moment. The reading of my barometer indicated the peak to be 30 mètres higher than the number given on the new map, but this was evidently owing to a decrease of atmospheric pressure in the course of the day.) From most points of observation it appears to be the highest peak of the whole group. The new map, however, assigns a height of 3,088 m. to another summit on its SE. side, not visible from Sexten, without mentioning any name. This is the Monte Popera of the inhabitants of the Val Anzei,

a mass of rock the W. base of which touches the Forcella di Giralba, and remarkable for its being topped by a long, almost level ridge. A deep cleft separates it from its E. neighbour, the Monte Giralba, 2,971 m.=9,748 ft., which may be climbed in about 5 hrs. from the châteaux of Giralba. Half-way up, a rather steep wall of rock presents the only serious obstacle to be overcome in the ascent which leads up the NE. branch of Val Giralba. It seems probable that a descent may be effected on the Comelico side, joining the route over the Eilferkofeljoch near the head of the Risenä torrent.

5. *The Forcella d'Ambata* (?), 2,405 m.=7,891 ft. The Val Ambata, a glen E. of Val Giralba, and penetrating deeply into the chain which separates the Upper Comelico from the Auronzo valley, cannot be entered at its opening into the latter, as the torrent has cut only a narrow channel through the rocks. About 20 min. above Auronzo, at the houses of Reane, a path branches off from the road, runs in NW. direction through the meadows, rises more steeply on entering the forest, turns to the N. before reaching the left bank of Val Ambata, and enters the glen only after some time. It brings in 1½ hr. to some sloping rocks thinly clad with forest. Cattle tracks run up on both banks of the torrent, and unite after 35 min. at the foot of a broad slope of débris which descends from the nameless peak on the E. side. A cleft in the rocks to the N., partly blocked up by large boulders, forms the gate to a long upper valley, enclosed by a grand cirque of rocks over the W. side of which it is not improbable that a passage might be found into Val Giralba. The way continues due N. for 45 min. along the almost level, barren ground, and ascends the final slope in 15 min. more. For the first few steps the gully on the Comelico side follows the same direction, but it soon turns towards E., and the steepness of the rocks necessitates climbing over its left bank into a parallel gully at the foot of which descends a broad slope of débris and snow. The pasture is reached in 50 min. on traversing the slope in N.E. direction. Thence a path leads over a low hill, which seems to be the remnant of an old moraine, and the village of Padola can be reached in about ½ hr., but the passage of

6. *The Forcella di Najarnola* (?), 2,352 m.=7,717 ft., may conveniently be combined with that of the previous pass, by turning on the just-noticed moraine to the right, and following one of the numerous cattle-tracks which run S.E. above the belt of forest, nearly parallel with the carriage-road, and bring in 1½ hr. to the Casera Najarnola. The way continues for 10 min. in the same direction to the foot of a large slope of

débris below which a dark green tarn is visible in the forest, in a straight line with the village of Padola, and corresponding to the 'R. Acque nere' of the Italian Ordnance Map. After an ascent of $\frac{1}{2}$ hr. in SSW. direction, the slope contracts to a gully by which the pass, immediately to the NW. of the summit of Monte Najarnola, is gained in 20 min. A few steps of the descent lead SW. into the ravine which falls in SSE. direction, and forms the upper part of the very steep W. branch of Val S. Rocco, on whose left bank a path is met with, which brings in 1 hr. 10 min. back to Auronzo.

To the east of Monte Najarnola the chain which separates the Val Anzici from the Padola valley, instead of being surmounted by a crest of precipitous rocks, changes to a broad-backed saddle, covered with rich pasture. Although rather steep on its SW. slope, and rising to an average height of about 850 mètres above Auronzo, the ridge between Mte. Najarnola and Mte. Piedo may, in consequence of its flatness, be crossed at almost any place, but it is conveniently approached either through the E. branch of Val S. Rocco, or still more so through the deep trenches which the Ostera and Diebba torrents have cut into its mass. Through these glens lead numerous tracks by which the several villages of the Comelico can be reached in two or three hours, and of which three may be said to constitute distinct passes. That over

7A. *Monte Zovo*, 1,778 m. = 5,834 ft., is the least made use of. It ascends either by the left or right bank of Val Ostera, according to the start being made from Villa piccola, or Villa grande, and brings in 3 hrs. to Padola. The traffic between the latter place and Auronzo, however, is generally carried on by the frequented track which passes over

7B. *Colle Castello* and keeps to the right bank of the Diebba; whilst

7C. *The Passo di Piedo*, which ascends the left bank of the Diebba torrent, and descends on the same side of the Rio Mauria, is invariably used by the people of the country in the intercourse between Auronzo and S. Stefano, in preference to the more commodious but longer road running along the right bank of the Piave.

V.—THE DREI ZINNEN-COL AGNELLO GROUP.

Although the new military survey has adopted the name of 'Zwölfer Kofl,' instead of Col Agnello, in consequence of the former being most familiar to the inhabitants of the Sexten valley, the latter has been retained in this paper, as it is the

only one known to the Italians, on whose territory lies the great mass of the remarkable peak. In fact, only its N. edge, which culminates in a perfectly perpendicular precipice of about 2,400 feet in height, surpassing that of the central tower of the Drei Zinnen by nearly 700 feet, touches the Austrian frontier. The confusion which has been noticed with regard to the names of the peaks of the preceding group exists to a still greater degree in the nomenclature of the passes of the central group; the name of Santebüchl, for instance, being applied by various authorities to three different passes, whilst the new map designates by that name not a pass, but a low summit on the NW. side of the Col Agnello.

With the exception of the short piece of road which leads in $\frac{1}{4}$ hr. from the châteaux of Giralba to the entrance of Val Marson, the boundary of this group has already been described incidentally in detailing the circuits round the other groups. In order to recapitulate: from the Val Anzei it passes up Val Marson, over the Forcella di Marson, and down Val di Rimbianco, turns up the valley of the Rienz, leads over the Toblacher Riedl and down the Altstein Thal, follows the track up the Unterbacher Thal to the Forcella di Giralba, and returns to the Anzei by descending the Val Giralba.

1. *The Drei Zinnen Joch* (?), 2,318 m. = 7,605 ft. (2,311 m., N.M.),* at the W. side of the Drei Zinnen, or Cime di Lavaredo, is sometimes used by shepherds for driving their flocks from the Sextner Böden or the Rienzboden to the Rimbianco Alp. The track crosses the Lange Alp, which lies at the N. base of the Drei Zinnen, the distance from the Toblacher Riedl to the Joch being about 1 hr. As it is only 20 min. distant from the Forcella di Marson, without any appreciable difference in level, and is touched by a straight line drawn from Auronzo to Landro, it may also be taken as the most direct route between these two places. The descent leads down a steep glen, called 'Im Loch,' which is jammed in between the 'Sattel Berg' to the E. and the 'S. Marko Knoten' to the W., and joins the Rienz nearly opposite to the Wildgraben. A more interesting way is that over

2. *The Forcella di Lavaredo*, 2,448 m. = 8,032 ft., called 'Lavaredo Sattel,' on the Austrian side. Grohmann and Kurtz give it the name of Sandtebüchel. About 2 hrs. from Auronzo, or $\frac{3}{4}$ hr. from the junction of Val Marson with Val

* I have been unsuccessful in my repeated enquiries to find an inhabitant of the district who had heard the name of 'Nongiere,' by which Kurtz designates the pass.

Anzei, opens the Val Cengia or Ofenthal. The path at its lower end is rarely undisturbed by the torrent, and generally appears first on the right bank near the opening of the steep lateral glen of Val Lavaredo. It crosses in 25 min. to the left bank, returns in 15 min. to the right, just after having passed a forester's hut, turns for some time NW. in order to get to the W. face of a projecting mass of rock, whose N. shoulder is climbed in 35 min. Shortly after, instead of descending a little with the path, it is preferable to ascend NW. to the plateau of the 'Pian del Cavallo,' turning after $\frac{3}{4}$ hr. somewhat more to the W., to the gap between the Drei Zinnen and the Patern Kofl, which is reached in $\frac{1}{2}$ hr. more. The descent, when taken a little W. of N., leads in 25 min. to the Rienzboden where the path, joining that coming from the Toblacher Riedl, turns to the W. and brings to Landro in $1\frac{1}{2}$ hr. A rougher but quicker way follows a steep watercourse which descends nearly due NW. to the Rienz valley.

3. *The Santebüchl*, 2,564 m. = 8,412 ft., known also to the people of Sexten under the name of the 'Bühle,' and called 'Sattel der Pulle' by Dr. Kurtz, is a pass between the Patern Kofl and the Oberbacher Wand. The latter name is borne by the mass of rock which forms the S. slope of the Altstein Thal and terminates at its E. end in the Oberbacher Spitz, better known to the inhabitants of Moos as the 'Einer Kofl.' The way to the pass is identical with that to the Forcella di Lavaredo up to the N. shoulder of the projecting rock mentioned above. Thence the well-marked path proceeds due N., descends a little to cross the torrent which falls in cascades through a cleft in the rocks, and in 15 min. ascends in zigzags to the E. side of the Pian del Cavallo. The way then lies E., passes a small tarn, turns after 20 min. again to the N., to gain in 15 min. another higher shelf of pasture, and in less than 10 min. more the summit of the pass. A ravine filled with débris and patches of snow descends NW. to the Sextner Böden, terminating after 15 min. near a beautiful blue tarn. Thence the regular path leads N. past the herdsman's hut, but it is possible to descend at once the rocks and steep slopes of débris in NE. direction, to strike again after 15 min. into the path on the left hand of the Altstein Thal, and to reach Sexten in $1\frac{1}{2}$ hr. more.

4. *The Oberbacher Joch*, 2,543 m. = 8,344 ft. (2,538 m. N.M.), first crossed by Mr. Tuckett, lies quite close to the previous pass, and can also be reached in about 10 min. from the just-mentioned upper shelf of pasture by ascending the rocks to

the ENE. The descent, however, leads a little S. of E. across the Oberbacher Alp, which slopes down in several rock terraces to the Oberbacher Thal. After $\frac{1}{2}$ hr., at the W. face of the Hohlast, the track from the Forcella di Giralba is met, by which Sexten can be reached in $1\frac{3}{4}$ hr.

5. *The Forcella di Cengia* (?), 2,579 m.=8,462 ft. From the Oberbacher Joch a rocky ridge, culminating in two summits of moderate height, runs in SE. direction towards the Col Agnello. The summit nearest to the Joch throws out the spur which separates the N. and E. branches of Val Cengia, the head of the latter branch terminating at the depression between the two summits. This depression may be reached from the Oberbacher Joch in 25 min. by proceeding on a slightly lower level along the W. face of the rocks rising to the E. above the muddy tarn which is passed on the way to the Santebüchl, and would become the most direct route of communication between the Oberbacher Thal and Val Cengia, if it should be found practicable to effect a descent into the latter valley. On the E. side a furrow of débris slopes down in a curve to the Oberbacher Thal, but below it, on the W. side, lies a small plateau of pasture, similar to that at the foot of the two last-mentioned passes, which is separated from the floor of Val Cengia by a steep wall of rock. Although the plateau itself is easy of access from the pass, the rocks which support it appear to present formidable obstacles to the descent. (Unfavourable weather prevented me from making a closer examination.)

6. *The Lämmerbüchl*, 2,525 m.=8,286 ft.,* locally pronounced Lämperbüchl, is the third pass known by the name of Santebüchl to some of the inhabitants of the district, and it is probably owing to this circumstance that the new map designates by that name the low summit which rises to the SE. of the Forcella di Cengia, the Lämmerbüchl being the depression between this summit and the great tower of the Col Agnello. It has already been mentioned that the highest peak of the latter rises above the Oberbacher Thal, but its mass extends

* The figure 2,366, given on the new map as the height of a point corresponding to this pass, must either be a 'lapsus calami,' or refer to a lower spot. The figure 2,525 m. is the mean of two observations taken on separate days and differing only by 3 mètres. In the one case the pass was reached direct from Sexten, in the other case from the Forcella di Giralba, by traversing the slope of débris at the N. base of the Col Agnello, without descending into the Oberbacher Thal. In other instances my own measurements tolerably agree with those of the recent military survey.

to the Val Marson and Val Anziei on the S., and to the Val Cengia and Val Giralba on the W. and E. And, though it becomes gradually much reduced in height towards the S., yet its steepness is on every side so great as to make it almost inaccessible. Of the four clefts which penetrate from the S. into its mass, the eastern gorge alone is distinguished by a name, that of Val Riva Secca. The inhabitants of Giralba state that it is impracticable to penetrate to the head of the glen. It is decidedly the case with the two clefts in the middle. Through the one to the W., however, which opens about 35 min. from the junction of Val Marson with Val Anziei, it is possible to force a way to the Lämmerbüchl, although in consequence of the steepness and intricate nature of the ground on this side it is preferable to make the passage from the N. From the W. face of the Hohlast, where the tracks to the Forcella di Giralba and Oberbacher Joch meet, an ascent of the slope of débris in SW. direction brings in $\frac{3}{4}$ hr. to the summit of the pass. The way then proceeds for 10 min. on the same level along the W. face of the rocks on the left hand, descends in 10 min. more through a gully into a broad bed of débris which comes down from the E. and here bends towards SW. After $\frac{1}{4}$ hr., on bending due S., it becomes overgrown with a thicket of creeping pine, which makes it advisable to keep close under the wall of rock on the W. side. A very steep descent brings in 35 min. more to the floor of Val Marson. In the ascent from this spot probably not much less than 4 hrs. would be required. (On one occasion when, accompanied by Santo, I attempted to find the pass from this side, we omitted to keep to the watercourse, and arrived after 2 hrs. of very fatiguing work on the crest of the ridge separating the ravine from Val Cengia, near the point at which the growth of vegetation in the former makes way for barren débris. Prevented by the thick growth of creeping pine on the ridge from taking a minute survey of the ground, we then thought it impossible to effect a descent on the E. side, and, rather than return by the way we had come up, scrambled down the precipitous slope into Val Cengia. But the following year, on reversing the route, we found that we had been close to the only place where it is easy to get with a few steps from the ravine to the top of the ridge.)

7. *The Forcella del Col Agnello* (?), 2,594 m. = 8,511 ft. It has been stated that at the foot of the gully to the S. of the Lämmerbüchl a broad bed of débris is met with which descends from the E. The way to the Forcella leads up that slope and reaches in 35 min. its crest, the broad gap S. of the principal

tower of the Col Agnello, conspicuous in all the views of the N. chain of Val Anziei taken from Auronzo. Another slope of débris falls down very steeply into Val Riva Secca, the right bank of which forms, for a great part of its length, a bare wall of rock. The left bank is less steep, but is furrowed by a number of nearly parallel gullies which run down obliquely in SSW. direction to join the principal watercourse. As the latter is passable only at its lower end—a circumstance which seems to have given rise to the belief that the head of the glen was inaccessible—it is necessary to circle round to the left bank, to descend by one or other of the parallel gullies, and when further advance becomes impossible to scramble over the rim on the left hand into the gully next to it. This has to be repeated until the descent into the main gorge presents no longer any serious obstacles. There being often hardly room enough to advance along either of the banks, the bed of the torrent has to be followed: a mode of proceeding which is not very pleasant, as the glen, at least after a night's heavy rain, does not exactly justify its name. Near the opening of the gorge into the valley of the Anziei a faintly-marked track is met with, which leads to the châteaux of Giralba. (Although I did not actually complete the descent from the pass, as the weather was not favourable at the time of my visit, I satisfied myself, on the occasion of my crossing the Forcella di Giralba bassa, that there would be no difficulty in getting to the left bank of Val Riva Secca.)

8. *The Forcella di Giralba bassa*, 2,105 m. = 6,906 ft., connects Val Riva Secca with Val Giralba. About $\frac{3}{4}$ hr. from the foot of the latter valley, and near the meeting of its two branches, a deep furrow runs up the wall of rock on its W. side. Above the burnt stumps of creeping pine on the cone of débris accumulated at the base of that furrow appears a well-marked track which steeply ascends on its left bank, and crosses over to some scanty pasture on the other side. The way to the pass, however, keeps to the furrow itself, and the crest of the ridge is reached in 1 hr. The slope on the other side is too steep to admit of a direct descent into Val Riva Secca, so that it is necessary to move for 20 min. in NW. direction along the base of the rocks on the right hand, which at first necessitates a further ascent of about 15 metres, and afterwards a crossing of the heads of several of the parallel gullies mentioned above, until one of larger size is found which affords a practicable descent. After a rapid downward progress, on approaching the torrent, the traveller has to climb over the left bank into the next gully below it, and to repeat

the process from time to time. Thus the foot of Val Riva Secca is reached in $1\frac{1}{2}$ hr.

It is not improbable that, by climbing the rocks at the head of Val Riva Secca, a pass may be found to the W. branch of Val Giralba. The descent would, probably, lead to the little tarn on the S. side of the Forcella di Giralba.

THE SCHRECKHORN, FROM THE LAUTERAAR SATTEL. By R. PENDLEBURY. Read before the Alpine Club, March 3, 1874.

IN the early part of last July my brother William and I found ourselves, towards the close of a somewhat short Alpine tour, at Grindelwald, in company with Peter Baumann of that place. The rest of our company (we had had a large party earlier in the summer) had already scattered to divers quarters. We however desired, before turning our own steps homeward, to increase the list of 'mountains we had known' by the names of one or two Oberland peaks. Now the Oberland at the present time is rich neither in virgin peaks nor untrodden passes, so that our only ambition was to follow modestly in the steps of the numerous travellers who have climbed the Eiger and Finsteraarhorn. Fortunately, however, or unfortunately, as the case may be, by one of those curious mental processes which so completely defy analysis, the idea of making a new ascent of the Schreckhorn direct from the Lauteraar Sattel gradually developed itself amongst us, though who begat it, or whence it was born, I have not the faintest notion; let it be sufficient that, whoever the special culprit may have been, the idea became so far crystallised that we turned out at six A.M., on July 9, from the door of the 'Adler,' fully resolved to turn it into an accomplished fact. Besides Baumann, there went with us Baumann's *fidus Achates*, Peter Kaufmann, a good tempered, pleasant fellow (of whom, as well as of Baumann, I may here say, once for all, all good things), and an odd porter, very like most other porters, taciturn, or when speaking at all giving his thoughts expression in a most charming patois which was unfortunately quite incomprehensible to our ears.

Our reason for starting so early in the day was that Baumann, with a great notion of the difficulties to be overcome, was bent on passing the night on the Lauteraar Sattel, so as to be able to attack the peak in the very early morning. The plan would have been delightful had not the weather, which