somewhere about 7,000 feet up on the outlying sides of the Ram Koond, and could get nothing but chupatties to eat. He asked for some more Loonghis, or head-dresses, and knives, to give as presents, to be sent to him. He was still in good hopes of getting passed on. The line he hopes to work through will be in the direction of the Kunar River, towards Chittral, and should he be successful, he expects to come out of this unknown region towards Cashmere. As the whole of this country is mountainous, and is formed of the southern slopes of the unexplored Hindoo Koosh, I am sure that all readers of this will wish Major Tanner success and a safe return, from his raid into Kaffirstan.

June 2—Fort Battye.—I enclose a sketch made to-day from this place, as it gives a good view of Sikaram and the Tukht Peak. The drainage of this part of the Suffaid Koh comes down to the Murki Kheyl Gorge. The Murki Kheyl is the tribe living at this place, and they give the name to the stream, which is the one flowing past the camp of General Sir Samuel Browne's Division, at Suffaid Sung, Gundumuck.

NOTE ON THE TOPOGRAPHY OF THE GROUPS OF THE MEIJE AND OF THE GRANDE RUINE. WITH A MAP. BY HENRY DUHAMEL.*

In the 'Annuaire du Club Alpin Français' for 1875 I pointed out (pp. 319, 320, 327) some errors in that part of the French Ordnance Map, which comprises the district of the Meije. Inspired by the wish of completing these rough preliminary observations, I have been led to undertake a more detailed examination of the topography of the central portion of the Dauphiné Alps, known as the Pelvoux district; and I now lay before those interested in Dauphiné the results of my inquiry, as far as it has yet proceeded, believing that, though incomplete, it is best to place them at once in the hands of my colleagues of the Alpine Club. I hope by this means, while continuing to pursue my researches, to advance the prospects of a perfectly accurate map of the Dauphiné Alps, and to make it, not so much the work of one person, as the product of the united labours of the various Alpine clubs.

First of all, I must state that the triangulation of the French engineers is of unimpeachable accuracy. Many apparent mistakes on their maps will be found, on reference to the minutes of the War Office in Paris, to be either errors in engraving or in the observations of the would-be corrector. In 1878, in the course of 160 observations,† made with instruments of precision, my results did not differ in any marked degree from those of the engineers; whilst with barometers I rarely obtained results similar to theirs, especially anywhere near the crest of a ridge, where the atmosphere is always more or less disturbed. I have no wish to pass a severe judgment here on baro-

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* Mr. Coolidge has kindly translated the following article.

† It may be of interest to note that during August 1878, in the course of my explorations, the average deviation of the magnetic compass was 14°·4.

metrical observations; but, in my opinion, the degree of accuracy which is claimed for them is often much exaggerated.

The principal cause of the actual mistakes in the French Ordnance Survey of Dauphiné was the total absence of guides in the district in 1853, about which time the survey was made, which of course prevented the officers from exploring the upper regions of the Alps. It is impossible to mark the exact position of every pebble, and the retreat of the glaciers has altered in a considerable degree the appearance of the various peaks and ranges. But apart from minutiæ like these, a comparison between the map of the French Ordnance Survey and that accompanying this paper will reveal differences of sufficient importance to make it of use to point them out. May I take this opportunity of expressing my hope that the various Alpine clubs will come to an understanding to consider each year, and to approve or reject the new names assigned by climbers to peaks and passes explored by them? This method would have the double advantage of doing away with all petty personal questions, and of contributing to fix the nomenclature of the Alpine ranges, and of thus avoiding embarrassing synonyms for the same point. So much by way of introduction. Let us now proceed to our proper subject.

The group of the Meije, taken in the widest sense, includes the mountainous region bounded by the Romanche, the Col des Cavales, the Brèche du Rateau, and the Col de la Lauze. We will reserve for a future paper that portion of this district situated to the west of the Brèche de la Meije.

The main ridge of the Meije gradually sinks from W.N.W. to E.S.E. It consists of an extremely jagged arête, in which we can distinguish three distinct summits, viz. the western peak (3,987 m.=13,081 ft.), the central peak (3,970 m.=13,026 ft.), and the eastern peak (3,911 m.= 12,832) [the first ascent of this peak was made by M. Duhamel, August 20, 1878], of which the last named only is covered with perpetual snow. Following the crest of the ridge to the W. from the W. peak, we have the Pic du Glacier Carré (3,860 m.=12,665 ft.) above the snowfield of the same name, the 'Doigt' and the 'Epaule.' From the summit of the E. peak the ridge turns abruptly to the S., and we have (from N. to S.) the Pavé (3,831 m.=12,570 ft.), the Col des Cavales, the Grande Ruine (3,754 m.=12,316 ft.), the Roche Faurio (3,716 m.=12,192 ft. and the Ecrins (4,103 m.=13,462 ft.). The whole of this long ridge from the Brèche de la Meije to the Ecrins is composed of two rocks, granitoid protogene, alternating with dark green chloritic and amphibolic schists. It is also remarkable for the steepness of the slopes to the W., of which the best examples are the wall of the Meije near the Glacier des Etançons, above which the Pic Central rises (975 m.= 3,199 ft.), the precipices of the Grande Ruine and those of the Ecrins. On the E. side, on the contrary, the snow reaches very high and there are few sheer descents.

From the Pavé there runs almost due E. a rocky crest, ending in the three Pics de Neige du Lautaret, the height of the most easterly of which is put at 3,537 m.(=11,605 ft.) by the engineers. [It was first climbed by M. Nérot, September 19, 1878.] Midway rises the Pic

Gaspard (3,880 m.=12,730 ft.), [the first ascent of this peak was made from the side of the Glacier des Cavales by M. Duhamel himself on July 6, 1878; the last eighty mètres are described as difficult], a fine rocky peak in shape like a fan, soaring above the left bank of the Glacier du Clot des Cavales, which it supports, and which extends to the foot of the Pavé. On the E. flank of the Pic Gaspard flows down the magnificent Glacier Supérieur des Cavales (which is quite distinct from the Glacier des Cavales properly so-called), the névé of which communicates with the Glacier du Pic de Neige, this latter being in fact a mere branch of the former. The N. slope of the ridge extending E. from the Pavé descends to a branch of the great Glacier de l'Homme, known in the district as Glacier du Lautaret, ice couloirs from which run nearly up to the summits of the Pavé and the Pic de Neige du Lautaret. It is only separated from the Glacier de l'Homme (from which it should not be distinguished) by a rocky spur descending from the E. peak of the Meije (3,911 m.). From the upper portion of this spur an arête runs N. to the Bec de l'Homme (3,457 m.). About midway rises a small rock, about 10 m. high (=33 ft.), which, having been used as a bivouac by several climbers, is known as the Rocher de l'Aigle (3,445 m.=11,303 ft.). From the W. summit of the Bec de l'Homme (3,457 m.=11,342 ft.) the arête in question runs on northwards to the Pic de l'Homme (2,904 m.=9,528 ft.), while another ridge descending to the E. forms the N. boundary of the Glacier de l'Homme. From the E. summit of Bec de l'Homme (3,430 m.= 11,254 ft.) flow down two small glaciers known at Villard d'Arêne as Glacier du Bec (the more northerly) and Glacier de Selleveille (that to E.). Parallel to the crest, extending from the Bec to the Pic de l'Homme, we have another which rises by the Serret du Savon (3,256 m.=10,683 ft.) and the Tête des Corridors to the central peak of the Meije. It separates the Glacier de la Meije (also called Glacier de la Brèche) from that to which has been given the local name of Glacier de Tabuchet, a word which is the equivalent of glacier in the patois of the district. Before leaving the group of the Meije, I may note that the upper snows of the glaciers on the N. face of the Meije abut on the wall of the Pic Central. From this point they descend in three main streams. The first, on the E., passes between the E. peak of the Meije and the Rocher de l'Aigle, and forms the Glacier de l'Homme. The second, or Glacier de Tabuchet, flows to N. between the Rocher de l'Aigle and the Tête des Corridors. The third falls in magnificent séracs from the Col des Corridors and the left bank of the Glacier de Tabuchet above the Serret du Savon (3,256 m.) to the Glacier de la Meije, of which it is the principal tributary.

Group of the Grande Ruine.—Between the basin of the Glacier du Clot des Cavales and that of La Plate des Agneaux rises a huge promontory running E. and W., the crest of which is so torn and jagged as to recall the teeth of a saw. The peak, which forms its eastern extremity, is known by the natives as the Roche Méane; it is figured in the 'Annuaire du Club Alpin Français' for 1876 (p. 251). The junction of this promontory with the main ridge between the Meije and the Ecrins is marked by a point of the Grande Ruine, 3,721 mètres

high (=12,209 ft.). The northern face of this promontory is vertical, save near the peak of 3,721 mètres, to the E. of which a long couloir of ice descends to the Glacier du Clot des Cavales. The southern slope is much less steep; a detached buttress forms at the base of the arête a sort of elevated basin. The principal summit of the group, the Grande Ruine properly so-called (3,754 m.=12,316 ft.), composed like the rest of this portion of the chain of a fine rose-coloured granite, is situated to S.W. of the peak of 3,721 m., from which it is separated by the Brèche Giraud-Lézin, [this pass was first crossed by M. Duhamel, August 13, 1878; the rocks on the western side were excessively difficult] (3,598 m.=11,805 ft.). It has a certain resemblance to the Rouies and the Ecrins; on the west side it falls sheerly away; on the east a snow-slope reaches nearly to the summit. The Col de la Casse Déserte (3,510 m.=11,516 ft.) lies between the Grande Ruine (3,754 m.) and the summit marked 3,697 m. (=12,130 ft.) From the central and highest summit of the group (3,754 m.) a spur descends to S.E., dividing the upper portion of the Glacier de la Plate des Agneaux (known locally as Glacier de la Casse Déserte) from the glacier which flows immediately from the Grande Ruine, and which formerly joined the Glacier de la Plate des Agneaux.

To the south of the peak (3,697 m.) the ridge, very shattered just here, rises in the peak of the Tête de Charrière (3,442 m.=11,293 ft.) and then sinks to the Brèche de Charrière (3,261 m.=10,699 ft.). To the north the Col du Clot des Cavales (3,128 m.=10,360 ft.) limits the group of the Grande Ruine. On the eastern flank of the Grande Ruine we may distinguish three sets of glaciers. The first is unimportant, and reaches to the foot of the Col des Cavales. The second and most considerable abuts on the base of the wall formed by the three principal summits of the group (3,754 m., 3,721 m.,* and 3,697 m.), and is made up of four distinct branches, of which the northernmost leads to the Col de la Grande Ruine (between the peaks marked 3,721 m. and 3,309 m.), the second to the foot of the Brèche Giraud-Lézin; the third, which is the highest snow in the group, to the Col de la Casse Déserte; and the fourth flows from near the summit marked 3,697 m. Between this last summit and the Tête de Charrière there is a somewhat extensive glacier, and there is also a snowfield at the foot of the Brèche de Charriére.

New Map of Dauphiné.—M. Paul Guillemin, one of the most distinguished French explorers of Dauphiné, has just published a photographic reduction on a scale of $\frac{1}{80000}$, of the 'Carte du Pelvoux' (scale $\frac{1}{40000}$), in which he has corrected many mistakes, inserted the names of all the new passes recently made in the district, and indicated the position of the huts built or in course of construction by the French Alpine Club or the Société des Touristes du Dauphiné. This map is indispensable to any one wishing to know the present state of Dauphiné exploration. It may be obtained from M. Jacques Garcin, 50, Rue Childebert, Lyons, mounted or not, for the sum of 3 fr. 50 c. post free.

W. A. B. Coolidge.

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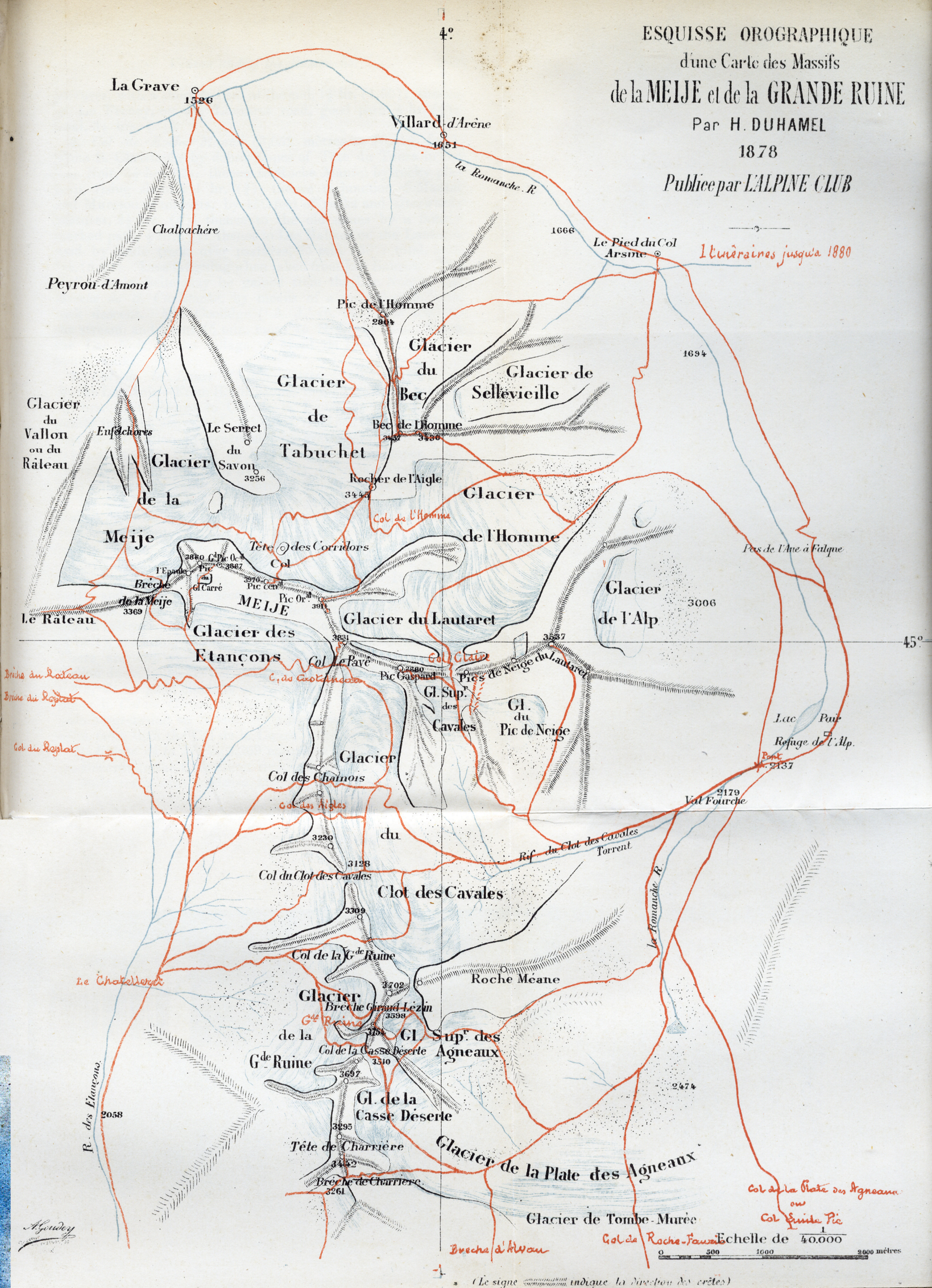
* On the map, instead of 3,702 m., the true number must be 3,721 m.

ESQUISSE OROGRAPHIQUE
d'une Carte des Massifs
de la MEIJE et de la GRANDE RUINE
Par H. DUHAMEL
1878
Publiée par L'ALPINE CLUB



THE MEIJE.—M. Duhamel has kindly pointed out a slip in the narrative of his attempt on the Meije in the third 'Annuaire' of the Club Alpin Français, which I have reproduced in my article on the Meije in the February number. The height of his cairn, according to his calculations, is 3,480 mètres, and not 3,580. This correction should be made at p. 125, line 10; p. 126, n. ‡; and p. 136, line 4 from bottom, of my article.—W. A. B. COOLIDGE.

ALPINE NOTES.

GLACIERS AND METEOROLOGY.—The following note was addressed last autumn to Mr. R. Scott of the English Meteorological Office, by Dr. Hann of Vienna:—'It is very difficult to account satisfactorily for the retreat of the glaciers, and in fact this has not yet been done. No help is afforded by observations of the quantity of the rainfall or of the temperature of the air, at least from the point of view from which these have hitherto been considered. It is possible that it may be necessary to compare, not the annual mean, but the *mean at different seasons of the year*, in search of a variation, which may be connected with the great retreat of the glaciers. It is much to be desired that meteorologists should pay greater attention to this phenomenon than they have hitherto done, as it seems to me that the periodical variations in the volume of glaciers may indicate more precisely (*or*—are a more sensitive indicator of) changes in climate than the observations (? of quantity of rainfall) made at our meteorological stations. We have here no doubt the aggregate result of many causes, but this is an advantage, even though it may increase the difficulty of tracing out separately the operation of each cause. I think it would be a good thing to suggest at the next Congress, that all the known facts relating to the retreat of the glaciers should be brought together, or at least that a digest should be made of the literature of the subject, which is very scattered, and scarcely within the reach of professional meteorologists. This would be a fitting task for the different Alpine Clubs which, at least the German Club, devote themselves in some degree to the advancement of science. If we could arrive at as complete a knowledge of the facts as possible, we could then ascertain how far they can be accounted for by our meteorological observations. I believe most sincerely that it would be well worth while to encourage such investigations, and ask for your support in promoting this object.

'DR. J. HANN.'

R. H. Scott, Esq., Meteorological Office, London.

Mr. Scott has sent circulars to the foreign Alpine Clubs, calling their attention to the subject, and at the second Meteorological Congress, held at Rome this year, a resolution was passed in the following terms:—

'Le Congrès attire l'attention des Météorologistes sur l'importance de mesurer les variations dans la longueur et l'épaisseur des glaciers