

SOME EXPERIMENTS IN MOUNTAIN TELEPHOTOGRAPHY WITH INFRA-RED AND COLOUR FILM

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Read before the Alpine Club, October 4, 1938

THE slides I am going to show tonight were taken on three different kinds of film: panchromatic, infra-red and kodachrome. Furthermore, lenses of three different focal lengths were used. Before putting on any slides it may be as well if I give a few notes about this material and equipment, some of which may not be familiar to all the members present.

First, film. Everyone has experience of panchromatic film, and the only slight novelty to be found in the slides I am showing is that many of them were taken with a light red filter with a factor of about eight or ten, instead of with the more normal green filter. There is to my mind little doubt that the light red filter (which is not to be confused with the infra-red filter referred to later on) is more effective in dealing with haze than the green filter. It has, however, to some extent the disadvantage from which infra-red films also suffer to a more marked degree, that green is rendered light grey or almost white. In mountain photography, however, little green is met with, and what there is, is usually not the bright green of English lawns, but the sombre green of pine trees which is practically unaffected by the red filter. Furthermore, the sky comes out very dark, which gives an unreal effect and is often undesirable. The only other disadvantage of the red filter is that it demands about three times as long an exposure as a green filter. This is, however, not a serious matter when modern superfast panchromatic films with a speed of 31 Scheiner are used.

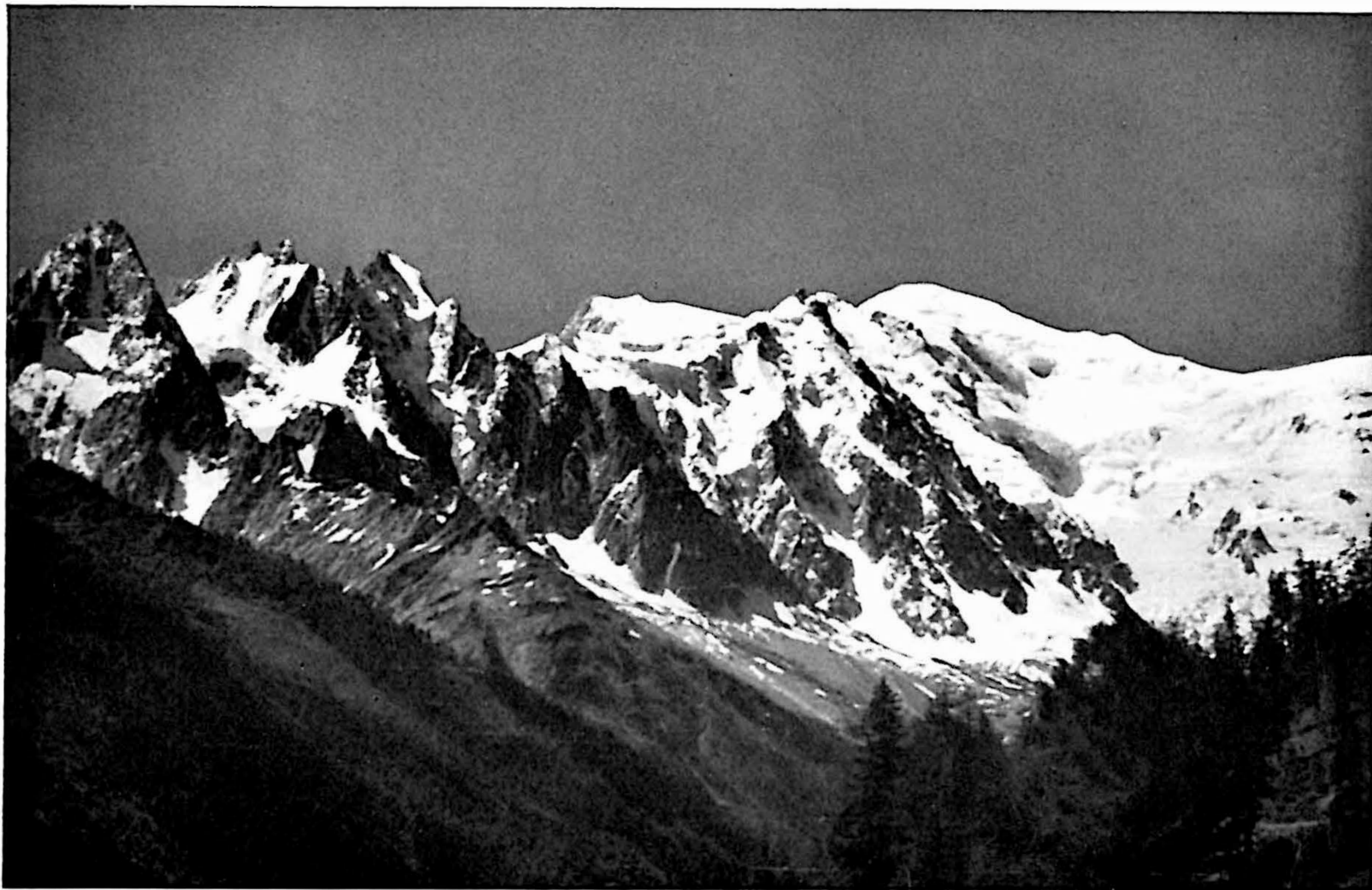
The second type of film with which I have experimented is infra-red, made by Ilfords, Ltd. This film is very tricky to deal with. The filter with which it is used is extremely dark and permits almost no ordinary visible light to pass. Even if you look straight at the sun it is only possible to distinguish a bright spot, and it is still an abiding miracle to me that one can take photographs through it. It is thus very much darker than the



Photo. D. L. Busk.]

MT. BLANC GROUP FROM COL DES MONTETS. Panchromatic and green filter 5-cm. (standard) lens.

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Photo, D. L. Busk.

MT. BLANC GROUP. Detail as before, except for 10.5-cm. lens.

light red filter used with panchromatic film and can only be used with infra-red film. The result of using this filter is that the picture is taken by means of infra-red rays which are invisible to the human eye. It is in consequence extremely difficult to tell how much exposure to give, and only experiment will help the photographer to work this out. It must be borne in mind that infra-red light does not vary directly with the visible light and that on two days when visible light conditions appear to be exactly similar, infra-red light conditions can be entirely different. This is, to say the least of it, unsatisfactory from the photographer's point of view, particularly when it is added that no exposure meter has yet been constructed to register infra-red rays. In general, I have found that f. 4.5 and $\frac{1}{20}$ th of a second is the normal exposure on a sunny day on glaciers. A major peculiarity of infra-red rays is that in my experience they are not reflected from snow and ice as are the visible rays of the spectrum. In consequence, one gives about the same exposure to a view of the English countryside in full sun, as to a picture of a snow scene in dazzling light both reflected and direct.

The most exaggerated virtues have been claimed for infra-red film. It is popularly supposed that one can take photographs in thick fog of peaks hundreds of miles away. This is far from being the case. Any watery fog or mist of the London variety is impenetrable, and as far as my experience goes it is only 'distance haze' and smoke haze which are penetrated with much greater ease by infra-red rays than by visible rays. There is no question that infra-red photography, particularly when combined with long-focus lenses, produces amazingly clear results in circumstances that defeat ordinary films and filters. I hope to illustrate the comparative results in a moment or two.

The disadvantages of infra-red film are, however, serious. First there is the difficulty already alluded to of gauging the correct exposure; secondly, the grain of the film is as yet comparatively coarse and its latitude small, not more than one stop each way as compared with at least two each way for the modern panchromatic films; thirdly, the colour distortion is serious, green appearing as white, so that the average lawn appears as though covered with snow; fourthly, the film is very slow, about 14 Scheiner. Finally, the focus of the lenses has to be corrected if the infra-red filter is used. Some lenses (such as the Zeiss Tessars) are already corrected, but most other lenses have to be screwed out varying distances in order to bring the picture into focus. I must confess that I still find it very difficult to remember to do this. It should, however, be noted that the film

can be used without the filter, in which case it is the ordinary visible light rays which leave the impression on the emulsion. Without the filter there is of course no haze penetration and no colour distortion, and the film is much faster, about 21 Scheiner. No lens connection is necessary when the filter is not used.

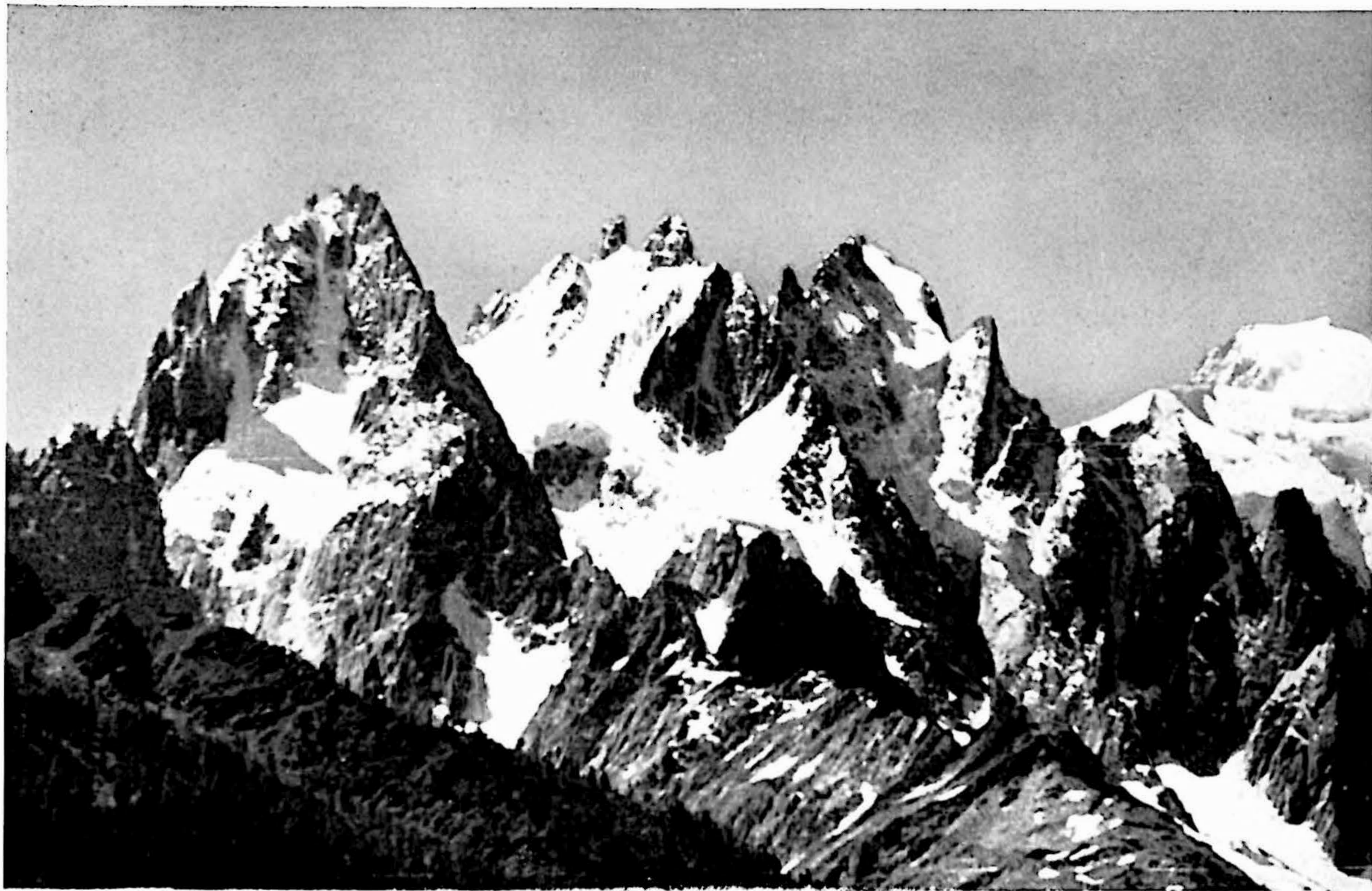
On balance, it seems to me after two years' experience that the disadvantages of infra-red film outweigh its advantages, and I consider that panchromatic film with a red filter gives results almost as good and far more reliable.

Of kodachrome there is little to say. I cannot hope to rival the brilliant results achieved by Frank Smythe and shown to the Club recently, but I hope that a few views nearer home, especially those taken with telephoto lenses, will not be without interest. As regards the use of the film it need only be emphasized that it is very difficult to begin with owing to the small latitude (not more than half a stop each way), and that the colour photographer has to view his subject with a different eye, achieving his effects not by balancing light against shade, but by balancing one colour against another in as far as possible equal lighting, since unequal lighting changes the colour values. Mountains are by no means the ideal subject for kodachrome, since one is so often faced by the extreme contrast between open snowfields and dark rock. I have found that the special Kodak haze filter, which does not affect the exposure, gives clarity to distant mountain views.

So much for the film used. The lenses were, first, the standard Leica 5 cm. lens with a maximum aperture of f. 3.5, which I consider more satisfactory for mountain photography than the ultra-fast f. 2 lens, since the former can be stopped down to f. 18, while the latter can only be stopped down to f. 12.

Secondly, a very light 10.5 cm. lens specially constructed for mountaineers and others who have to carry their loads on their own backs. This lens, in case with finder, weighs $13\frac{1}{2}$ oz. and does not require a tripod. Its maximum aperture is only f. 6.3, but Leitz now have on the market an improved lens of 9 cm. focal length and f. 4 which I have not tried.

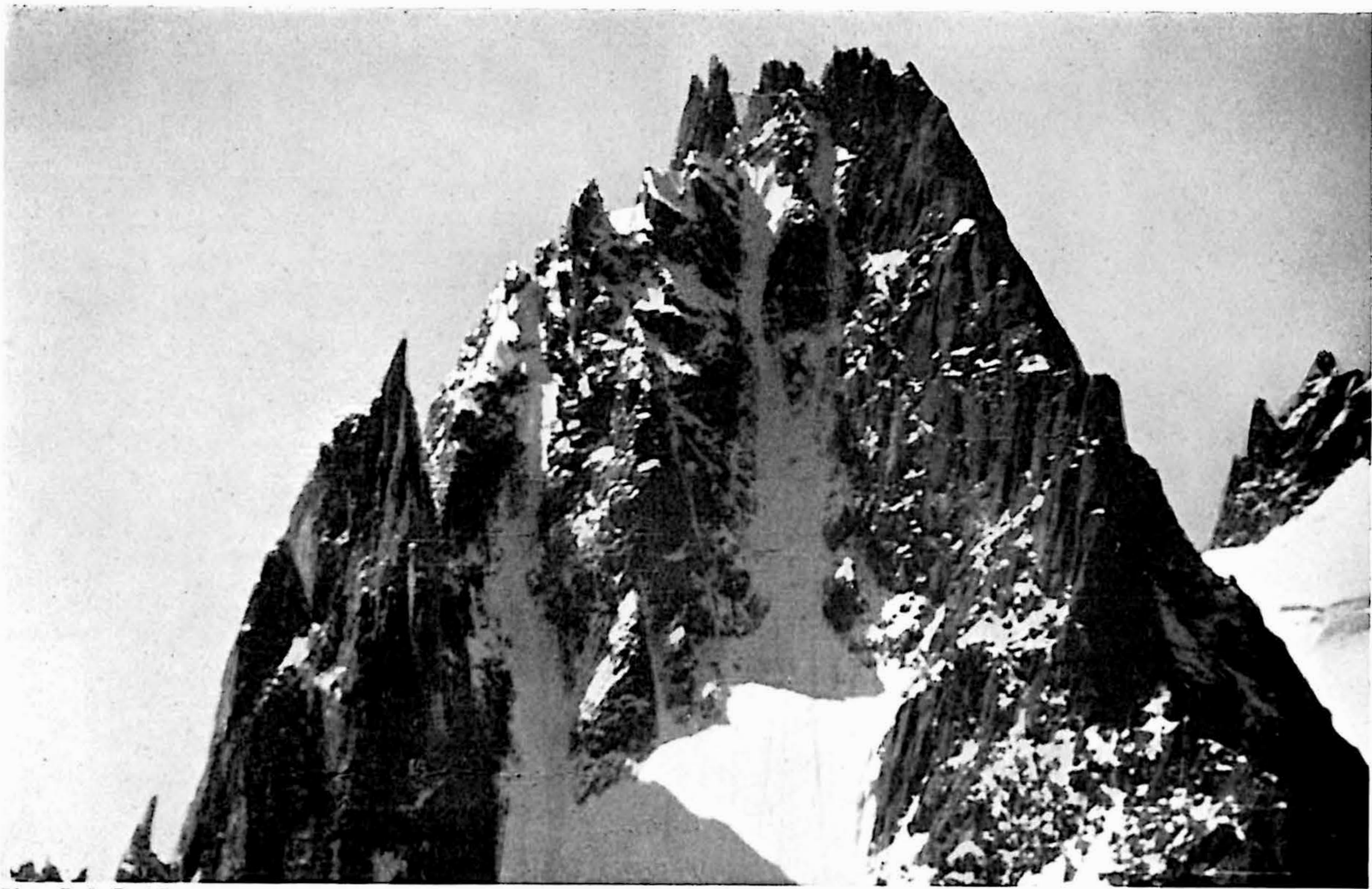
Thirdly, I have recently been using a 20 cm. telephoto lens with a maximum aperture of f. 4.5. This is usually sold with a reflex attachment instead of a finder, but, as this attachment is very heavy and costs almost as much as the lens, I got Leitz to make at small expense a simple collar to screw in between lens and camera. A mask was then fitted on a wire frame finder, and this, while not entirely accurate, has worked satisfactorily. Leitz have not yet developed an ordinary optical finder for this lens. With the long focus lens it is almost essential to use a



Photo, D. L. Bask.]

THE CHAMONIX AIGUILLES. Detail as before, except for 20-cm. lens.

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Photo, D. I. Busk.]

GRAND CHAMOIS AND GREPON. Through telescope, magnification 12 diameters, distance 8 miles.

tripod, which of course adds to the weight to be carried. The lens itself, in case, turns the scale at $2\frac{1}{4}$ lb.

Finally, I tried the rather entertaining experiment of taking photos through a large Zeiss telescope giving a magnification of 12, 24 or 42 diameters. This method is so simple that I am surprised it has never been attempted before. Obviously only the best telescopes are suitable, and even with these definition is not very good, particularly round the edges of pictures and at the higher magnifications. I was able to achieve quite good results with a magnification of $\times 12$, and fair pictures at $\times 24$, but at $\times 42$ it was almost impossible, even when taking pictures at $1/200$ th of a second, not to blur the photograph by movement, and moreover the light transmission of the lens is low at the higher magnifications.

All that one has to do is to set the focussing scale of the telescope to zero and hold the camera close up against the eye-piece. Needless to say a tripod must be employed, and as the particular telescope I was using was binocular, its weight precluded its use on expeditions. With stand it would have been a full porter's load, so I only took views from the valley. I can, however, see no reason why fine telephotographs should not be made through an ordinary $\times 8$ prismatic field-glass. It would be perfectly easy to devise a tripod and a screw-on attachment for the camera and the other eye-piece of the glass would serve as a finder.

It may be asked why all this cumbrous apparatus is necessary when one can easily enlarge part of a negative and thus obtain a 'telescopic' effect. This procedure is, however, difficult when miniature film is used, since its small size renders it impossible to enlarge indefinitely. Moreover, colour film cannot as yet be enlarged at all. Finally, it is easier to compose a picture if one is using a telephoto lens and finder, rather than relying on enlarging part of an ordinary negative. In general, however, I must let my slides speak for themselves.