COLOUR PHOTOGRAPHY IN THE HILLS

By C. DOUGLAS MILNER

Read at the Alpine Club on November 6, 1951.

It is, I think, impossible for anyone to speak in this Club on the subject of photography without considerable diffidence, not only because we have many excellent photographers among us, but also because of those who have gone before. I am reminded by Mr. Donkin's presence to-night that it was his distinguished grandfather who first showed photographs to the Club 'by means of a limelight lantern,' an innovation that has been of abiding value in our proceedings. After his paper, over the years there followed those of Capt. Abney, Mr. Shea, Mr. Leaf, Dr. Thurstan Holland, Prof. Collie and many others, all producing superb mountain pictures in monochrome. In this style, at least, the men of old were often better than men now.

It is no less than forty years since the first paper on colour photography was read by Dr. Inglis Clark. It would be interesting to know if any member present on that occasion is also here to-night. In those days the colours were obtained on Autochrome plates which carried a silver image over a screen of dyed starch grains. The resultant positives were very dense. To-day clear dye images, projected by efficient optical systems, combine to give reasonable accuracy of colour with brilliance of image.

I should not care to speak so confidently of the quality of colour prints on paper, though much is claimed for the new Agfa process just placed on the market. There have been others in the past. Only rarely do prints turn out well, for the distortions (additional to those which arise in all colour images) which are inevitable in the transfer to paper too often make the prints unacceptable to a critical eye. Even the best colour picture can be no more than a passable imitation of natural beauty, greatly inferior to representational painting of the kind at which such men as E. T. Compton excelled, and inferior even to those storm-haunted hills that are the backgrounds to many a Victorian stag at bay.

However, my duty to-night is to speak of methods by which we can seek the best possible results, without any attempt to claim them to be in any sense an art.

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There are over 400 different processes of colour photography on record and, as Dr. Spencer has said, 'new methods are continually being hailed as putting colour photography on the map . . . the fact that this map is too often concealing a soup tureen is very rarely realised until it is too late.' Fortunately we can disregard all but the few processes which are both suitable to our purpose as mountaineers, and are available in this country.

Let us first set down the conditions we need to see fulfilled:

1. The apparatus must be light and simple.
2. The material must be capable of yielding a high average of satisfactory results, for we can rarely return to our alpine ridges merely to retake failures.
3. The material must be reasonably cheap, and obtainable in adequate quantity, so as to ensure a steady series of pictures on any one holiday.

I mention this last point particularly as ' batches ' of colour film of the same make vary in their speed and even in their renderings. A slight ' off-balance ' cast of colour is unnoticed in a series of pictures, yet is disturbing in small groups. Worse still is the variation in dodging from one make of material to another, each of which, taken separately, gives good colour. I shall not try to avoid this trouble in the early slides for their purpose is to stress such differences. But I will mention the particular bias, and its cause, as each slide is shown.

[Mr. Milner then showed a short series of examples in Dufaycolour, Ektachrome, Kodachrome ' D ' and ' A,' and Ilfordcolour ' D ' and 'A.']

The two types of colour material available to-day are the mosaic screen + silver image, and the tri-pack dye image. The only survivor of the screen method (the successor to the Autochrome plate) is Dufaycolour. Because the effect is obtained by differentially obscuring the dyed lines of the screen, there is considerable loss of light. Moreover the screen itself, though amazingly fine drawn, does show as a pattern at high magnifications. These limitations really restrict the usefulness of the process to $3\frac{1}{2}'' \times 2\frac{1}{2}''$ size or larger. At its best it can give most beautiful and accurate colour rendering, the only exception being snow. Often the nearest approach to a pure white possible in the dye screen is a light pinkish grey, and for snow highlights this is inadequate.

In the tri-pack method the colour effect is obtained by superimposed images, each rendered in a pure dye, respectively cyan-blue, magenta and yellow. In this country the best known are Kodachrome and Ilfordcolour. There are several others, among which are: Ektachrome and Anscocolor (U.S.A.), Gevacolor (Belgium), Lumière (France), Agfacolor (Germany).

In 35-mm. sizes Kodachrome is the original, the most fully tested and, in my experience, the most reliable. Ilfordcolour has passed through the initial troubles of a new medium and is probably now able to give steady results.

All colour materials have two common limitations. First, a lack of latitude in exposure. Second, restricted contrast range. Whereas almost identical positive prints can be made from normal monochrome negatives when the exposure of the same subject has varied as much as 1 : 10, in colour the tolerance is unlikely to exceed 1 : 2. Contrast in

a reversal process, as they all are, except Agfacolor, is necessarily the precise inverse of the negative. In fact the problem for photographers may be briefly stated as equal to the task of producing from a group of ordinary negatives a set of prints using identical exposures and paper of the same contrast for all prints.

Even with accurate exposure and manageable contrast, not all mountain subjects are suitable for colour. In particular I agree with Mr. Smythe and Mr. Busk, both of whom, I think, have said in this Club that colour is unsuited to high-altitude work except for very short periods after sunrise and before sunset. It is also unnecessary in most rock climbing where colour is of subordinate importance. It is rarely of value in telephotography where there is mainly a technical interest in distant detail.

For all these reasons few men will wish to abandon monochrome entirely, and for them the use of colour means an extra camera. True, some machines have interchangeable loading by dark slide or roll-holder but they are usually too bulky and heavy for the present-day climber, whose pocket is likely to be too shallow to admit either the camera itself, or to provide the funds for porters as well as guides, and whose friends on the rope show a reluctance to carry equipment that is in inverse ratio to their anxiety to inspect the results. Occasionally I have tried to avoid an extra camera by loading colour film in late afternoon and using half by sundown, finishing the roll at or soon after sunrise the next day, and then continuing in monochrome during the middle hours. But although these times are the best, it is an uneasy method of doing things, applicable more to the Alps than to Britain or the Dolomites.

The best method is to use one of the little folding 35-mm. cameras of the ' Retina ' type as an extra for colour. They do not give results quite so precise as the first-rate Contax or Leica, but in colour work for projection, such as most of us intend, the utmost sharpness is not needed. This is an apparent contradiction to the enormous magnification on a screen. Yet the screen is being seen to-night, even by the front row, at a much greater relative distance than a 10-inch print in the hand. Moreover we are concerned in colour with a general effect rather than with particular detail, such as identification of a route or the location of a hut or bivouac.

This tolerance in the sharpness of small positives is not, of course, to be taken as an excuse for the poor definition often seen in 35-mm. work. Much of this arises from careless mass production rather than from the size of the negative material. In particular the use of eye-level view-finders has reduced average sharpness, which can be inferior to that secured by the quite casual use of larger, cheaper cameras, held at waist level. A steady position and short exposures are the remedies.

I have mentioned the importance of exact exposure in colour. The over-exposed picture shows blank highlights with weak colour elsewhere, the under-exposed picture shows shadows without detail, and exaggerated intensity of colour elsewhere. However, open views in

good sun can be taken safely at certain ' standard ' exposure times. 1/100th at f4·5 or 1/50th at f6·3 are about normal for Kodachrome or Ilfordcolour in summer at home, or in snowclad winter hills. Similarly for general views in the Dolomites, and in the Alps where there is only distant snow. Snow scenes in the high Alps need only half or less. It is for the pictures taken at unusual times of day and in broken or dull weather that calculation of exposure should be done with a photo-electric meter. The ' highlight ' method in which the meter is pointed at the source of light is technically the sounder, but is frequently impracticable, *e.g.* when taking a picture from a shadowed position which cannot be changed. The photographer free to move about in ordinary terrain rightly finds the sky an unreliable element of brightness if pointing the meter directly at the subject. But this ' direct ' method is simple and generally effective in the hills, where the sky tone does not markedly differ in brightness from the landscape. Care is needed when a dark landscape is seen on a grey day, and the meter should not be pointed to include any sky in its reception angle.

Calculation of exposure for colour is not made any easier by the variables of three kinds :

1. Lenses vary in effective speed according to their construction and finish (*i.e.* whether coated or not) and a marked aperture of f4·5 can be appreciably faster with one lens than with another. Changes in aperture of the same lens, however, are precise in their marked ratios.

2. Shutters can vary considerably from their marked speeds, even when of the same make. Some shutters lose speed when the mechanism is cold, as it can be in the Alps. Changes in speed of the same shutter are not necessarily of the order indicated by the markings.

3. Exposure meters vary among themselves.

The answer to all these things is to get a good camera with a reliable shutter of the ' compur ' type, and a good photo-electric meter. Stick to them and to the same type of film until you all get used to each other. Preferably adopt a constant shutter speed (1/100th is a sound choice with a wide aperture lens) and vary exposure by the precise aperture adjustment.

So much for basic technique which will ensure steady production of transparencies that are within the limits of highlight and shadow as colour knows them, and that will project as well-lit pictures. But colour work has passed the stage when to get a recognisable image was satisfactory, and it is necessary to seek results that will reveal in harmonious colour compositions those representations of the mountain scene acceptable to critics who know the subjects very well indeed.

The colour camera constantly lies and to keep its mendacity within bounds we need to use every one of the limited methods of control and correction that is available. These are : correction filters, choice of time and place for taking, and chemical after-treatment. Finally, those

results which still show bad colour should be ruthlessly discarded. Admittedly I do not include in ' bad ' colour those many pictures where the material lies gracefully, when it accentuates beauty by giving perhaps a little more orange in a sunset than was really there or a *slightly* richer blue of sky, or turns into Ruskin's ' tender violet ' that shadowed snowslope which to our gloomy and crevasse-directed eyes seemed no more than a repellant and uniformly scandalous grey.

With tri-pack materials the methods of the manufacturer who does the processing do not help us much. He generally tends to provide a ' bright ' result, by accentuating contrast. A little extra contrast is perhaps necessary to compensate for the loss of stereoscopic effect, but this strong accentuation is done, I imagine, to cater for a general public who like their colour in large lumps. From my experience with American materials of the same brand as those made in England, I conclude that the American public must like it in even larger lumps.

This exuberance of result can best be borne when the original subjects were in diffuse lighting, or were made up of those gentle greyed hues so characteristic of our own landscape, rather than of the stronger tints of the Alps.

As well as contrast exaggeration, there are periods when a definite colour bias is produced. For instance, some years ago Kodak had a ' green ' period. This year they have had a ' blue ' period, possibly reflecting current economic conditions.

In contrast control the Dufay user has some advantage. He can do his own developing and a skilful worker can keep the contrast at a level which suits his personal taste. With Kodachrome a moderate correction can be made chemically, and I will refer to this later on.

Control by filters is particularly valuable in dealing with excess blue present in the subject. Some of this blueness is certainly capable of apprehension by a trained eye, but most of the excess is due to the increased blue and violet content of high-altitude light to which the eye adjusts itself, yet which the top layer of film records too freely. In addition is the ultra-violet, which we sense only as an uncomfortable glare and eliminate by snow glasses. The colour film must also have its protective glass—a filter.

The Kodachrome ' Haze ' Filter (Wratten No. 1) is almost colourless to look through, but eliminates extreme violet and ultra-violet. For hill photography it should be regarded as an indispensable minimum. As it needs no increase in exposure it can be kept permanently on the lens.

A stronger reduction of violet and blue is given by the Wratten 2A Filter which is visually pale yellow. But it needs to be used with discretion as it easily overdoes matters and gives greenish skies or distance. For early and late lighting it is often valuable in accentuating the warmth of tone on sunlit rock or snow, and reducing excessively blue shadows. It demands an exposure of one and a half times that calculated for the film without any filter. A new filter, designed to give a correction

midway between the 1 and the 2A is, I understand, shortly to be made available by Messrs. Kodak, and this should be almost ideal for our subjects.

Also useful, or at least interesting, to those with a taste for experiment are the ' pale amber ' colour-correction filters designed primarily for use in studio lighting. The CC 13 for instance can bring a slight but welcome warmth of highlight to the cold glitter of high noon on snowfields.

The only filter available at present for Ilfordcolour is the ' Q,' which is slightly stronger than the Wratten No. 1. I have used the latter on this material quite satisfactorily. The 2A, however, seems too strong for it.

Many successful mountain pictures in colour have been taken by deliberately using the artificial light material (*i.e.* Type ' A ') with the recommended compensating filter which is light orange in the Kodachrome/Ektachrome series, or dark yellow for Ilfordcolour. In either case the filter is so deep that effective protection against *ALL* excess blue violet and ultraviolet, is obtained. For the same reason the more delicate adjustments possible with the pale filters on daylight material are not applicable.

A few points are as well borne in mind in selection of subject, so as to respect the limited range of contrast the materials can handle, and to make the most effective use of whatever colour the subjects offer. All materials give acceptable accuracy of colour only within a fairly narrow range of brightnesses, and, as the subject detail becomes darker, so do distortions of colour invade these areas. Finally the point at which all colour and detail are lost in the shadows is reached much quicker than with normal negative processes. In general, therefore, subjects which do well in colour are those of moderate tonal contrast ; suitable lightings for any subject are those when the sun is weak or lightly diffused through a damp atmosphere. In clear sun, the light should fall more or less directly upon the subject from behind the camera, and a day of bright clouds throwing light into shadows is better than one with a deep cloudless sky. The brilliant subjects *contre jour* which are so striking in monochrome rarely show to advantage in colour.

Even when some care has been taken on the points mentioned above, alpine skies are often rendered too deep and too strong. This is partly because they can fall into the ' shadow ' group of tones and are thus exposed to exaggeration, whereas an English sky is usually in the ' highlight ' group and can be rendered correctly. An avoidable danger is the ' high ' sky, *i.e.* one taken with the camera tilted up to the mountain. With a proper viewpoint, even on snow ridges where sky tone is relatively very deep, a ' low ' sky usually renders well. Failing this correct alignment of the camera, we may have to sacrifice truth of sky to good snow texture, and the only possible course is to keep the sky area as small as possible so as to be subsidiary in the picture.

Making the best of what colour is available in the subject is usually only a question of choosing a suitable foreground. The basic rule of painters is, I think, to keep ' warm ' tones in the foreground—oranges,

browns, olive-greens, and so on—to contrast with the ' cool ' tones of distance—blues, violets, etc. In this way each colour group enhances the other and both gain in beauty from this contrast.

For instance a foreground in Britain of sunlit bracken, which glows almost orange in winter and early spring, is remarkably effective. Brown alpine rock is similar in effect. But, in both cases, sunshine on the foreground is essential. Both of these colours turn into an ugly purple in shade, and should then be avoided.

If a very dark foreground must be used, let it be small in area, and of distinctive outline, for instance a tree or spiky rocks. It will not then matter if it shows as a silhouette, to give an illusion of space.

Because of the colour distortion I have mentioned, large areas of middle distance shadow are best avoided. For instance a green hillside in shadow can render too crudely metallic in its colour. With a clear sky, most other things including grey rock become far too blue. If a choice of time is possible, take the scene when such shadows are small. Alternatively, by choosing a suitable viewpoint, it may be possible to mask these middle distance shadows by sunlit foreground objects from trees to *gendarmes*.

Since inclusion of foreground is so important it should be remembered that the normal, fairly wide, angle of view of a camera lens is the most manageable. Long focus lenses are much more difficult to use effectively because they cut out this foreground.

Whatever skill is used in, or luck attends, selection of subject and choice of exposure, a series of colour pictures from any mountain holiday usually includes several which are capable of improvement by after-treatment (in addition to those incapable of improvement by any means whatever !). With Dufay material, the silver image can be altered by intensification or reduction of a normal kind. In the former case contrast is increased and colours strengthened, in the latter reduced and weakened respectively. But no control over a particular colour is possible.

Kodachrome cannot be intensified as there is no silver image left in the final positive. But the dye images can be reduced by chemical means. The formulae are neither so well known nor so widely used as they deserve. Each solution acts independently upon a particular colour layer, so that excess blue can be cut down without affecting either the red or the yellow layers, and so on. Successive applications of all solutions will enable a dense slide to be reduced without much change in the colour balance. In each case, the methods reduce contrast. The formulae, which cannot be given here, will be found in the standard work *Colour Photography in Practice* by Dr. D. A. Spencer (pp. 277–9, 3rd Edn. 1948). It may be helpful to those of you who, like myself, have no access to a laboratory to know that :—Sodium Hypochlorite is obtainable as ' Milton ' ; Methyl Alcohol is replaceable by ordinary Meths ; Potassium Metabisulphite (easily obtainable) is weight for weight usable instead of Sodium Bisulphite ; Sodium Hydrosulphite and Ethylene Glycol are obtainable from May & Baker Ltd., and Messrs. Johnsons of Hendon Ltd.

Procedure is empirical, and it is well to remember that the secondary effect of the cyan reducer is to give the picture a pinkish cast, which is removed by the magenta reducer. I have found little use for the yellow bleach.

Similar methods for Ilfordcolour (if devised at all) have not been published and it is to be hoped that something of this kind will eventually be made available.

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I have perhaps dwelt overlong on technicalities, using my slides to illustrate them. In conclusion therefore I should like to show a few isolated slides and some slide groups which may give pleasure without my needing to say anything about how they were produced. The occasional flashes of special beauty in the hills cannot be found in the course of any one holiday, they must be gathered together patiently over the years. I have brought some from my collection which I hope you will like . . . a spring day on Wastwater, a red sunset over the Langkofel, a storm on the Drei Zinnen, the first red rays of sun on Mont Blanc seen as I turned in my steps near the head of the Whymper Couloir of the Verte, and a curiously atmospheric Matterhorn seen from the Wellenkuppe. I am usually against quoting verse with a photograph as being a bad example of mixed media, but the following might be acceptable to you as you look at the Matterhorn.

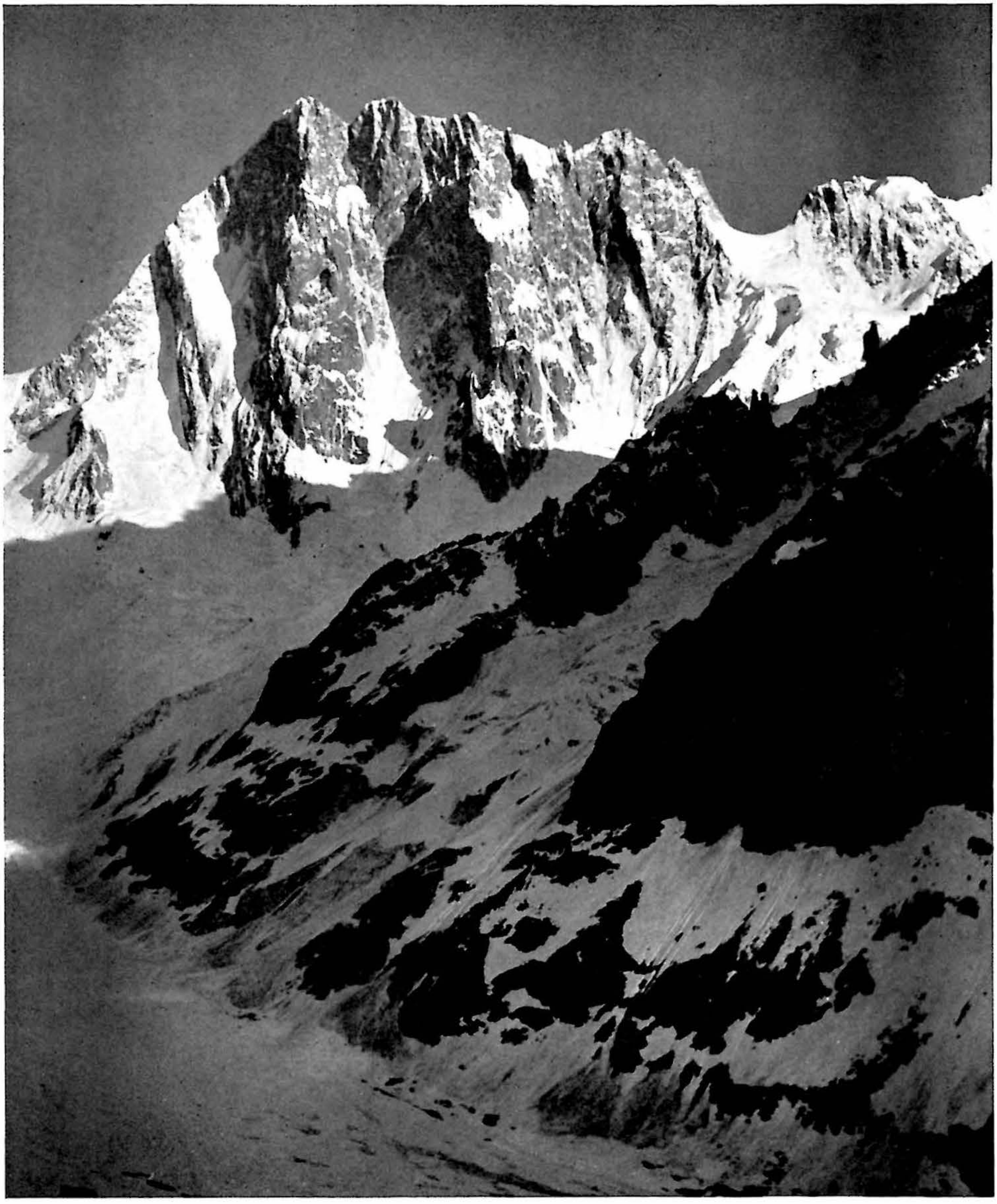
They climbed the steep ascent of Heaven
In peril toil and pain
Oh Lord ! to us may grace be given
To follow *in the train*.

The short series of slides is often an agreeable way of bridging the gap between the single photograph and the restless moving picture, in summarising contrasts or changes of lighting on a particular view.

For instance, in the course of a long weekend at Ballachulish, in variable Easter weather, I obtained a set of the loch showing everything from sweeping hailstorms, through clear skies, to the last faint light beyond the hills of Ardgour as the sun went down behind Garbh Bheinn.

Another series of this kind records an evening and a morning at the Trient Hut above Champex, and those showing the progress of the first light may, like Sheridan's clock, be said to ' beget an awful attention in the audience, save a description of the rising sun, and a great deal about gilding the eastern hemisphere.'

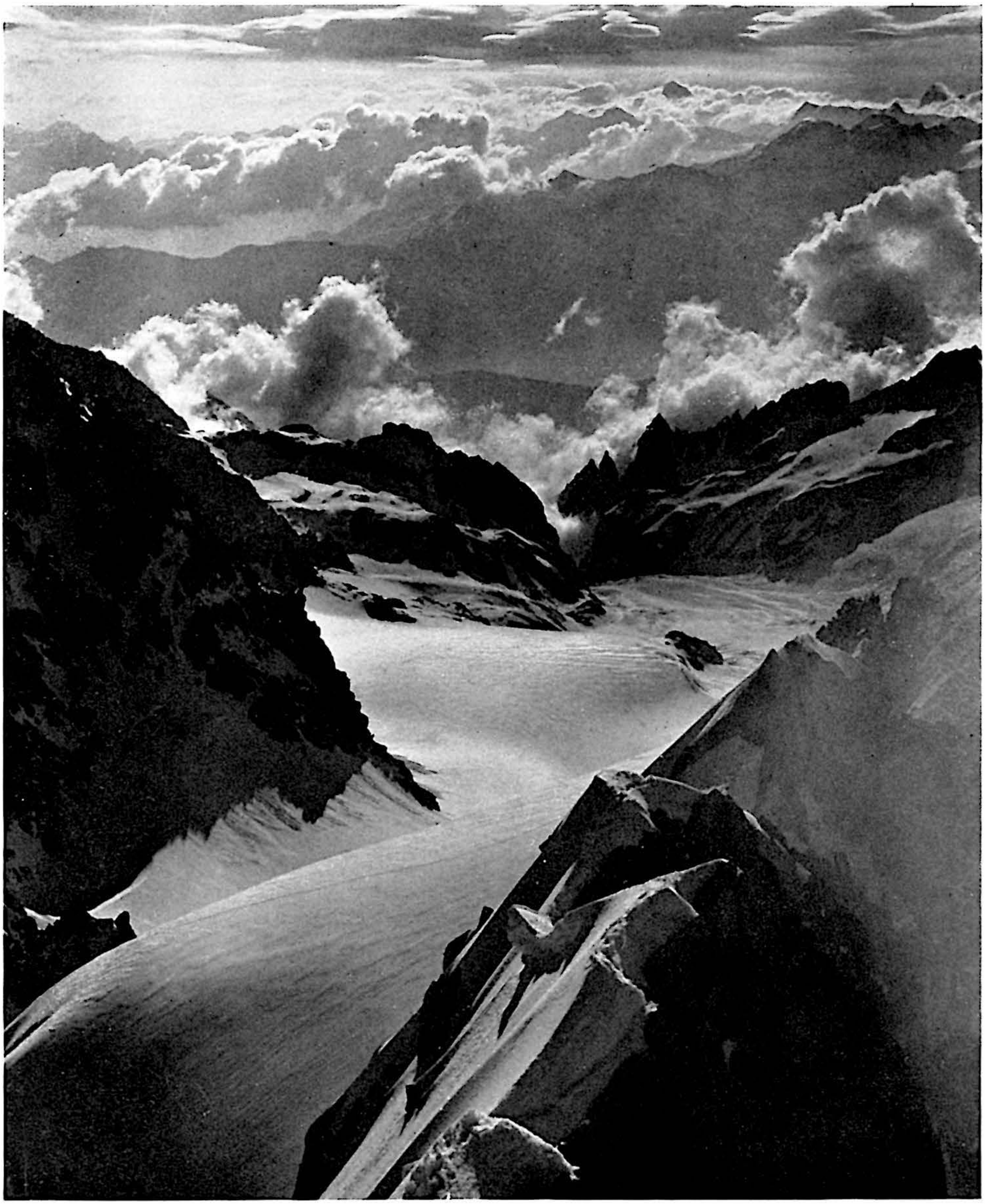
Of the sunset series, especially that of the last slide with fading sunglow on the snows and a darkening curve of sky rising high above them to the bright crescent moon, I can only hope they recall to you, as they do to me, Lord Schuster's splendid prose '. . . *to such a day succeeds the incomparable pomp of eve, and when the sun has passed down into the tangle of the French foothills, and the peaks, each a separate sun now he is gone, have burnt out in turn, one by one, through every variety of colour, night, marching slowly but visibly from a hundred miles away, hushes the streams and hangs her own jewels in the heavens. . . .*'



[*C. Douglas Milner.*

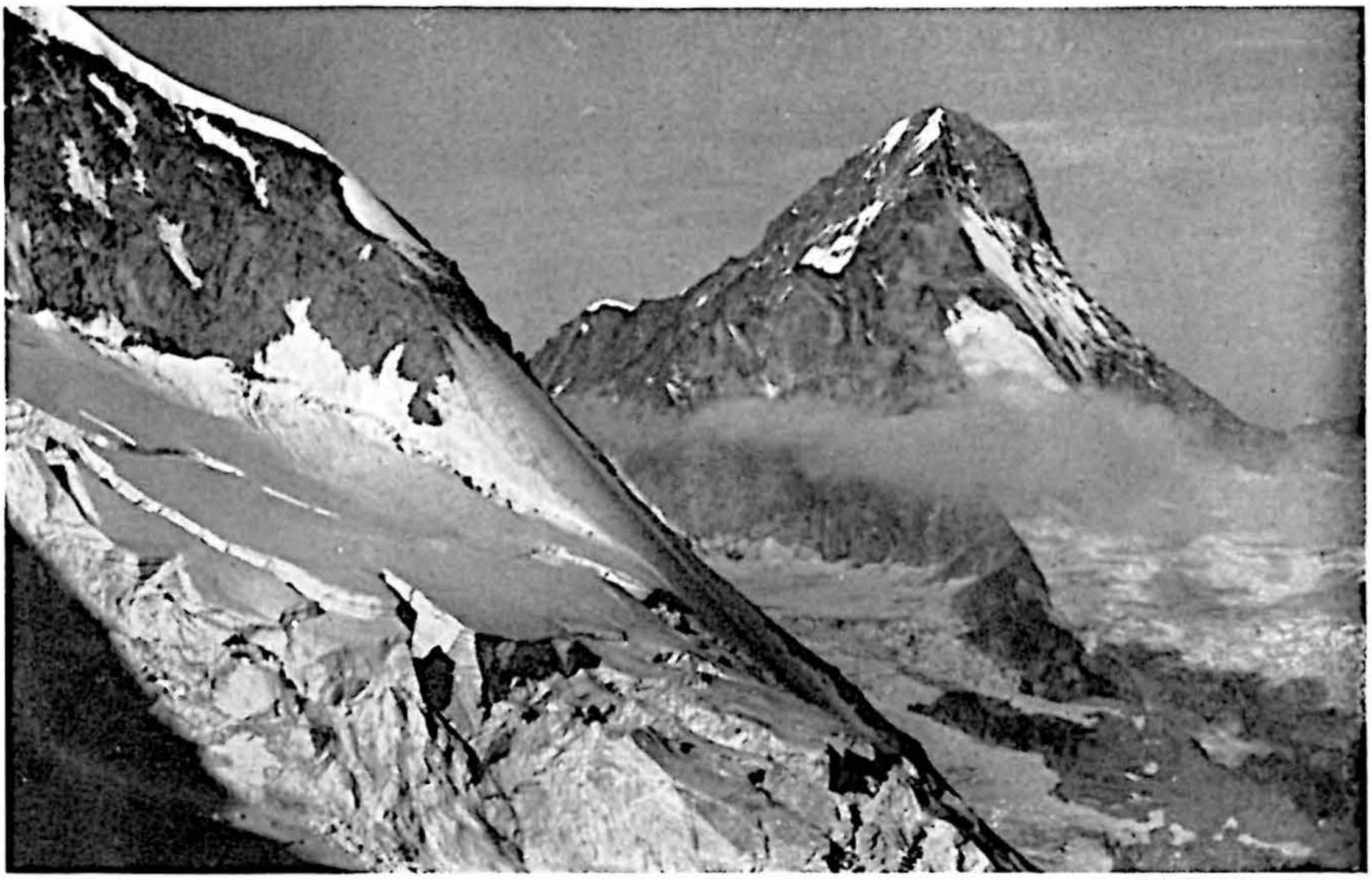
THE GRANDES JORASSES.

[*To face p.* 328.



[*C. Douglas Milner.*

THE SALEINAZ GLACIER FROM THE CHARDONNET.



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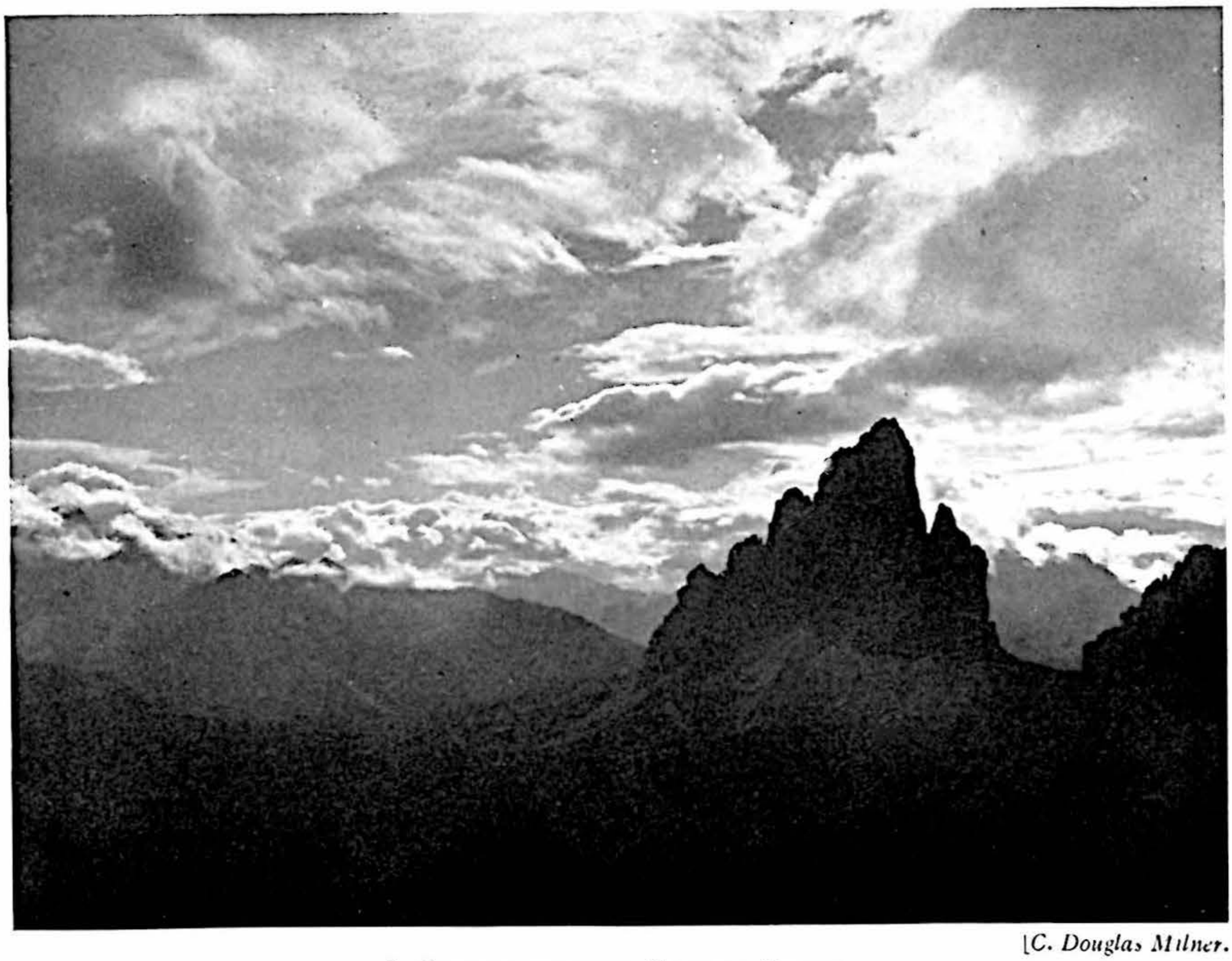
THE DENT BLANCHE FROM THE TRIFTJOCH.



[*C. Douglas Milner.*

A STORM ON THE GROSSE ZINNE.

NOTES ON THE ILLUSTRATIONS

The very high cost of colour blocks has made it impossible to illustrate this paper in colour. The black and white reproductions are of subjects which have also been taken in colour, and the following points may be useful :

Les Grandes Jorasses. Taken from the Couvercle late in the evening, when the orange-yellow sun lit the cliffs. A time of day when lighting contrast between highlight and shadow is low, and so perfectly good for colour renderings. A Wratten 2A filter will ensure that the large shadow area is not too insistently blue.

The Saleinaz Glacier from the Chardonnet. A type of subject which renders brilliantly in monochrome, yet which, in colour, is unrewarding. A series on the arête, taken with the sun behind the camera, was more successful in colour than was the duplicate picture from this viewpoint.

A Storm on the Grosse Zinne. Taken from the summit of the Zwölferkofel. An exception to the rule of backlighting for colour. The Zinne and its base plateau can be ignored, as regards detail, and shown in silhouette. The brilliant edges of clouds being broken up into small areas also do not matter if they are shown as blank areas. Thus the important parts in colour are the sky patches and the half-tones of cloud forms. The subject rendered well and to ensure success, assessment of correct exposure being a difficulty, three frames were used: at calculated exposure ; half ; and double.

The Dent Blanche from the Triftjoch. An early morning type of light, with a slightly misty sky. The glancing sun on the snows of the Obergabelhorn keeps its general illumination within the scope of the film. The lighting on the distance is almost flat, to give maximum colour differentiation. Shadows are small and such mere accents do not need detail. Such lighting is almost ideal in the high alps.