

PHOTOGRAPHY IN WINTER AND SUMMER IN THE ALPS.

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(Read before the Alpine Club, April 11, 1893.)

I HAVE attended a good many meetings of the Club, and I have always listened with attention to the feats of climbing which are brought before it—climbing in New Zealand, in the Caucasus, and in the Alps—and it seems almost a sacrilege to break through the traditions which guide the mental diet prescribed, and therefore I must commence by apologising to the audience for venturing to introduce anything so frivolous as photography. The subject is one, however, which is gaining in interest to mountaineers, and if anyone wishes to put his climbing to use beyond what I may call personal exploration I venture to think that photography is the best way in which he can do it. There is, however, photography and photography, and I can only recommend one kind as practical. The modern school of art-photography, which groups almost everything into undefined masses of light and shade, and allows nothing to be seen except what is said to be artistic, is scarcely to be commended for Alpine work. Such is, or may be, very well for art purposes, but it is of no earthly use for explorers, which the Alpine Clubbists most certainly are. The only photographs I advocate are what I may call photographic maps of a country—maps of peaks, maps of ice, maps of snow, maps of trees, and so on—and if there happens to be a feeling for art in the operator he can so arrange his view that the productions shall give æsthetic pleasure as well as be useful. Once for all, what I personally aim at in a photograph is to make it as useful as possible for scientific purposes and as a record.

My photographic career began a good many years ago, and I have worked every process since then as it has been discovered, and added some few to the list myself, and for the last eighteen years have spent most of my leisure in Switzerland, so that I have a vast collection of views, by almost every process. As I look at some of the older ones I cannot help believing that in years to come they will be valuable as recording the changes which have taken place in the configuration and aspect of the country, and it is with this general object in view that I still continue the work that I began so long ago. But a man cannot be ubiquitous, and unfortunately my records are insignificant compared with those which should be taken; and I would have members of the Club take up the work and let a permanent print of

every negative, which may be of future interest, be sent to its officials. Such a collection would have a scientific—and when I say scientific I mean physical, geological, antiquarian, and meteorological—value which would be in time to come incalculable. In the old days, before the invention of platinotype and the gelatine printing-out process, to file photographic prints was almost useless, as they vanished, as a rule, in a very few years; but since the introduction of these new processes this difficulty of fading has vanished.

With these introductory remarks I will now proceed to give my ideas of what a photographic outfit should consist of. I have tried all sizes of camera from 12×10 to a small Kodak giving $1\frac{1}{4}$ -inch pictures. The former I abandon except on special occasions, as being too bulky. I know that Signor Vittorio Sella takes a larger size in his climbs, but it is a matter of expense, which must fix a limit. It must also increase risk, for one is so apt to avoid taking an extra porter, for economical reasons. The Kodak I abandoned after one season's trial. The maxim that 'you push the button and we do the rest' is all very well, but no seriously minded photographer would be content with that, and further, I would say that it is impossible to get that sharpness of detail which will bear enlarging—what I call satisfactorily—on a thin flexible film. Intermediate sizes then alone remained to be tried. The whole plate is too bulky and almost too heavy to carry oneself. The tourist size, $7\frac{1}{2} \times 5$, just comes within the limits of what one can comfortably carry, and it was that size which Mr. Donkin used so successfully, and which I myself had in use at the same time. I need scarcely call to your mind the splendid work that Donkin did; he was not only a scientific man, but he had the feelings of an artist, and the happy combination of science and art gave to the world those inimitable productions. But a later favourite with myself is the simple $\frac{1}{4}$ -plate hand camera, which weighs but one-fifth of my tourist camera when fully charged with the same number of plates, and for exploring or recording purposes I know of nothing better. I have also used a $\frac{1}{2}$ -plate hand magazine camera, holding eighteen plates. It is more weighty and bulky, but lighter than the tourist camera, and can be carried by the traveller himself. Mr. Mead has adapted one to knapsack straps, but still it is too bulky for comfort. To come back to the $\frac{1}{4}$ -plate hand camera: its essentials I take to be *strength* and *lightness*. It should possess a *rapid shutter* which will not shake the camera when it is let off, and it should also be *capable of being regulated*. It should *expose a plate equally*

throughout, and should have an *adjustable focus*. As to the lens, it should be one which gives as flat a field as possible with a nearly full aperture—that is, every part of the image should be in fair focus when the aperture of the stop is one-eighth of the focal length.

The camera should have a level attached, and, if possible, should have a means of raising the lens above the centre of the picture, so as to cut off unnecessary foreground and to include high objects which would otherwise be cut off when keeping the camera level, and if inverted should cut off unnecessary sky. I must here digress for a moment about the camera being kept level. This should always be done if the photograph is to be of any value for cartographic and surveying purposes. It may seem hopeless to be able to make any use of a photograph for such purposes, but it is not so. If you know all about your lens you can from a small photograph plot your angles with far greater accuracy than you can take them by a prismatic compass, supposing the camera to be held very nearly, even if not quite, level, and if the objects be in absolute focus it will compete well with a theodolite.

I am not sure if it might not be of use to have attached a level which can, at will, be set to an angle desired. It might easily be done, and if the angle of tilt or depression were known the photograph would then be equally available.

The camera should be capable of allowing the lens to be readily set to a fixed distance from the plate, the distance being the focus for parallel rays—that is, for a focus of an object which is more than 100 times distant the focal length of the lens—thus if the lens were 6-in. focus all objects fifty feet away and beyond would be sharp. (The definition of focus, I may say, is when the image of a point is represented by a disc not more than $\frac{1}{100}$ th in diameter.)

I think these requirements are met with in the Key camera. The new front adjustment is one which I had adapted to it by the makers. It is strong; the shutter, which is capable of being regulated, works in the centre of the lens, and so all the plate is exposed at the same time and for the same length of time. The lens itself is an excellent one, but whose make it is I am not aware. Light iron double-backs carry the plates, and any plate can be inserted in the camera at once, or they can carry films in the carriers supplied for the purpose. The speed of the shutter I can show you by a diagram. It can be varied between $\frac{1}{50}$ th and $\frac{1}{4}$ th of a second.

Personally I almost always use the diaphragm which has an aperture $\frac{1}{8}$ th of the focal length, as this gives a sharp picture when the lens is set at the fixed focus for all distances from in-

finitly to 15 ft. of the operator. The use of this small diaphragm has also the advantage of giving pictures so 'sharp' all over the plate that enlargements can be made up to 30 ins.

I have often been asked how it is that such sharp pictures can be obtained by holding the camera in the hand, and I will take credit to myself to say that, taken all round, they are the sharpest average I have examined, and I have seen a good many. After an ascent one's hands are never very steady, and one's heart beats rather more rapidly than at what I may call downstairs rate, and it is hopeless to get a steady picture, except by a fluke, when in this condition if the camera be held against the body. My plan is to use the ice-axe head or my stick as the prime support, and to keep the camera away from the body, merely steadying it with the hand. By this artifice the sharpest pictures possible can be obtained.

Now as to plates. There are several new rapid brands in the market, and none better than Cadett's snap-shot plates. With such plates as these even winter views on dull days can be taken in $\frac{1}{10}$ th of a second. As to *films*—I am not referring to the flimsy roller-shutter films, but to stout celloidin films—none are so rapid as these plates; in fact, they require about six times the exposure, and in order to use them it is well to use a stop of $\frac{1}{11}$ in order to get a fully exposed view. The films I exhibit are the celloidin films supplied by Adams & Co., and Hinton. They are, I believe, both made by the same man, and they are quick and clean, as you can see by the accompanying negatives. So far my remarks have been general, and do not apply specially to photography in the Alps, and now I would ask your permission to say a few words as to this.

There is no doubt that the views are grand, and should take well; but I must honestly say that, as a rule, Alpine views by amateurs are not as good specimens of photography as can be found. They are usually harsh—black and white and lacking in detail. The whole secret lies in the treacherous light with which the photographer has to deal, and the want of skylight, if I may call it so, in the space between the spectator and the view. What is skylight? It is simply reflected sunlight and nothing else, but it is so reflected that the blue rays are more scattered into space than the yellow or red rays, and these being again reflected the light appears to us as blue. Hence the expanse above us is blue, and the light illuminating objects in shadow is blue, though toned, of course, with the local colour. Tracing sunlight in its course to the observer, we have sufficient evidence to show that it encounters in its passage innumerable fine and almost

ultra-microscopic particles of matter. Each of these particles allows the longer red and yellow waves of light to, as it were, roll over them without disturbance, as a wave will roll over a small stone; but the smaller blue and violet waves which are comprised in white light dash against it and are reflected in all directions, principally at right angles to the direction of motion, some part passing on, however, to the observer. (This is how a ripple would behave against the same stone over which the big waves will pass.) These encounter other particles and are reflected to the observer. These particles exist not only above us, but we are surrounded with them; hence there is skylight between us and any object, and in photography the blue reflected light may finally mask the objects themselves, as we see it does in photographs of distant hills in English landscape. This is more the case with the photographic than with the visual image, for the one is formed principally by the blue rays and the other by the yellow rays.

The greater the absence of particles the less skylight there will be, and consequently the less will the shadows be lighted up; and further the stronger will the direct light be, as there is less abstracted from it.

Observations made by myself and recently published show that the number of particles above you at any altitude varies as the square of the height of the barometer. Thus, at 15 in. there are only $\frac{1}{4}$ the number above you that there are at 30 in. Here are some measurements of sunlight at various altitudes:

Barometer	Intensity of Sunlight Overhead	Intensity 30° above Horizon	Intensity 15° above Horizon
30 inches	1	1	1
28 "	1.05	1.10	1.20
26 "	1.11	1.23	1.47
24 "	1.15	1.32	1.73
22 "	1.23	1.50	2.25
20 "	1.28	1.61	2.58

In the table the intensity of the light at sea level has been taken as unity.

The natural inference from these figures would be that at the higher altitudes less exposure should be given. This would be true had we to photograph only the objects in sunlight, but we must remember the shadows as well. What is gained in sunlight is lost in skylight, and you have to reckon with this loss in choosing your exposure. I should, therefore, rather say that in photographing an object at 12,000 ft. in sunlight, with the sun at 15° above the horizon, $2\frac{1}{2}$ times more exposure should be given than at sea level.

I have often met with the necessity of this in my experience. I always gauge by the eye the depths of the shadows and expose for them, leaving the high lights to themselves. But with some plates this will not do, because there will be no detail in the dense parts. The cure for this is to use a developer which will not give too great density. I strongly recommend eikonogen cartridges as a convenient developer, and I also strongly advise that at all events a plate should be developed now and then to see how the exposures are being timed.

I use one of these cartridges dissolved in 5 oz. of water, and to it add 3 grains of bromide. If the exposure have been timed correctly this should with proper plates give exactly what you want. It is useful to take a scale of density with you. Make a trial print with it before you start, and note which square gives you as perfect a white as possible when the black through the unexposed part of the plate is deep. There will be no need to have greater density in your negative than such a square; in fact, more will be hurtful.

There are times when a long exposure is absolutely necessary—for instance, in summer, near midday, when taking dark trees or rock in the foreground and a distant mountainscape. In this case skill is required not only to time the exposure but also to develop it. With a hand camera I always time it to be as slow as possible—say, to the one-fifth of a second—and then use a very weak developer to get out a faint image, and then put a stronger developer on to get the necessary density. A transparency from a negative so developed you will see on the screen. It very often happens that such a negative looks flat, but a little intensification will make it sufficiently ‘plucky’ for printing purposes. With a snow mountain largely in shade, if the sun is well up in the heavens, my experience is that a longer exposure may be given than when the sun is lower. In the latter case the shadows are much lightened by reflections from neighbouring snowfields. An early morning picture is always more harmonious than one taken near midday for this same reason, besides which the shadows are longer and are more artistic. Photographs taken in a sky where there are white clouds about are also softer and better for the first reason, and on such a day the minimum exposure may be given at high altitudes.

In winter the exposures on a bright day in the Alps are shorter than they would be in summer, with the sun at the same height above the horizon, the reason being that the low snow around acts as a reflector for the shadows. Some of the most beautiful effects are to be found where the snow

on the foreground is broken up, and the long shadows cast by the clots of snow are depicted. Winter photography need not be confined to days when there is sunshine. Most beautiful views are often to be obtained with clouds hanging on the mountains, and even whilst snow is falling. The usual exposure between nine and three o'clock in the day when the sun was shining was about $\frac{1}{25}$ th of a second, and when dull, and up at, say, some 6,000 ft., twice that exposure sufficed to give good results.

When you have secured your negative you may do several things with it: you may print in platinum, or enlarge it direct on platinum, or enlarge it on bromide paper.

This last is a good plan if you want to study detail, but I think the best plan of all is to make a lantern slide from the negative, and throw it on the screen for this purpose. The reason why a lantern slide is so preferable to a print is that you get many more shades of gradation. The white of paper in the shade is only about thirty times brighter than the deepest platinum black, and whatever may be the illumination in which the print is viewed this ratio is always kept. On the other hand, if the lantern slide be properly prepared the darkest parts will not let any appreciable light pass, the dark parts of the screen only being illuminated by the diffused light, whilst the brightest parts of bare glass may be illuminated to any extent equal to that of sunlight. Practically speaking, the gradation of white to black may be increased to 200 to 1 or thereabouts.

The direct enlargements are very simply done, no special camera being used. A lens inserted in a door, the negative placed in a camera in front and illuminated by daylight, by the electric light, or by gas light is all that is required. When any light except daylight is employed I place a piece of glass ground on both sides, and at least twice its dimensions, in front of the negative, and some two or three inches away from it, so as to obtain an equally illuminated field. A print on 15 × 12 paper will cost about 8*d.*, and one on 22 × 17 paper about double that. I have found that the same lens may be used for enlarging as that used in taking it.

I have not touched upon orthochromatic plates, as if used without a yellow screen in front of the lens they are only valuable under exceptional circumstances. If used with such a screen, the exposure becomes so prolonged that the hand camera requires the addition of a tripod to it; for the hands, even with the supplemental ice-axe support for the camera, will not be steady for a sufficient length of time to enable a really sharp picture to be taken.