

Field Photography and the Forester

— A Personal Approach

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MANY of us avoid camera-work and, even more so, colour photography, because of what we think is the formidable nature of the technicalities involved, because of the imagined exorbitant cost, or because we "haven't the time" (i.e. patience) for it.

The writer has been dabbling in this and many other means of recording field-work for some years past. Disappointed quite often by poorish results in black and white where photographs of growing vegetation and young trees were taken, he has by degrees awakened to the radical differences between black and white, and colour; and to the absolute superiority of the latter for many practical purposes associated with forest research. In the widest sense, all forestry is forest research, so this discovery has relevance to every forester and to his daily round.

The outstanding advantage of colour photography is not the obvious one, the presence of colour, it is the stereoscopic or three-dimensional effect that colour gives. This advantage is most marked in the case of transparencies, or colour slides as we say, where to a remarkable extent colour gives the appearance of solidity to objects seen on a flat screen, or through a simple viewer held up to the light. Here is a case where it is quite literally true to say that the effects have to be seen to be believed. Yet, a reasonably good quality lens, a little skill in camera technique, and a reliable colour film (plus the necessary light, coming from a suitable direction, of course) are all that we

require for first-class results. It is true that the better the equipment and accessories the less room is left for the operation of chance but still, in all field-photography, variables of the subject are so many and the human element so vitally important that it has real claims to be called an art as well as a science. This should encourage those of us for whom a camera with everything built-in (including a three-figure price tag!) is out of the question.

Light.

Within the camera, the amount of light admitted to, and absorbed by a sensitive plate or film is regulated in two ways. By the size of the aperture through which it comes— $f22$ is often the smallest, $f4.5$ often the largest opening possible— or by the time during which the light in question is admitted, e.g. $1/300$, $1/200$ or $1/100$ of a second up to a half second and from there on to time-exposures of longer duration. Obviously, variable shutter-timings and lens-openings like these give plenty of latitude to meet widely varying light conditions. For instance, $f22/1/300$ second for the very brightest subjects and conditions, using high speed film; $f4.5$ with a half second or longer time-exposure for the worst possible cases of dull subject and poor lighting, using normal film.

Photography, as the roots of the word make clear, means "light-writing". We may, as artist-photographers, sketch in our effects by way of snapshots, or spend some time and care on more detailed "paintings". It is with the latter almost entirely that the forester will be and should be concerned, although of course, the snapshot has its part to play where time is genuinely not available for anything better.

Correctly judging or estimating the light-values, and setting the most appropriate combination of "stop" and timing on one's camera, together make up the key to successful photography. The beginner gets there at first by a combination of pure guess work and, let us hope, a study of the brief but extremely useful exposure tables enclosed with all films nowadays. His errors when using black and white film, unless he is very inaccurate in his judgments, make little difference for all ordinary purposes to the prints he eventually receives. This is because at processing, much compensation can be made for over or under exposure. When using colour film, however, the position is quite different. There is little or no room for error and so, if insufficient exposure (or too much) has been given, no skill at processing can make good the results.

Light values are affected by time of year, time of day, atmospheric clarity or occlusion, angle of shot and nature of subject. Only the last two factors call for a word of explanation. Angle of shot for the forester will relate to those times when he needs to "shoot" an object on or near the ground, with camera pointed downward. Compensation

must be made for this deflection even in bright light e.g. a camera setting of f5.6 becomes f4.5, or a speed of 1/50 second becomes 1/25 second. (Note the "or". If he does both, he will have achieved double the correct exposure). Nature of subject can affect light values quite significantly. Thus a smaller "stop" can be used in photographing peeled pitwood than in taking pictures of unpeeled produce. Under the same light the dark foliage of Austrian pine calls for an exposure increased over the amount required for the lighter green of birch foliage or larch needles. This kind of hair-splitting is not going to appeal to the beginner, but the fact is, he must experiment, if his pictures are ever to rise beyond the mediocre.

Focus-Depth.

Why have these puzzling series of aperture/exposure-time combinations? Not only to give room for manoeuvre under widely differing light conditions but also to provide alternatives in the amount of detail within the picture that will come into clear focus, and further, as we shall see later, to give us a better chance of "stopping" movement in the subject.

Everyone has noticed how when looking through a window or a windscreen one may concentrate or focus on some object *on* the glass or on something a long way off seen *through* the glass. When this is done, objects further away in the first case and on the glass in the second case are blurred i.e. out-of-focus. In exactly the same way the camera eye can be focused on a particular spot to its front, the term zone would be more correct, and the width of this zone or band in clear focus is called the "depth of the field" for each particular setting.

Depth of field decreases, that is, the band in clear focus becomes more narrow with increasing size of aperture and with decreasing camera/object distance.

Thus, to give a real instance, the minimum depth of field obtainable with a particular camera (2 ft. 10 ins. to 3 ft. 2 ins. = 4 ins. depth of field) is got by setting it at the minimum distance (3 ft.) and maximum aperture (f3.5) available. This would be the ideal setting for, say, the detail of leader growth on a two year old Sitka spruce. Everything nearer to the camera than 2 ft. 10 ins. and further than 3 ft. 2 ins. will then be blurred: the detail of the object required will stand out sharply and clearly, provided always, of course, that the distance camera/object has been measured accurately and that the correct exposure time has been given. It is probably not necessary to add that the factor exposure-time has no relevance to the factor depth of field, which latter derives, as we have seen, from aperture and from distance camera/object. Also from a third variable into which, happily, we need not enter here,—the focal length of the lens we use.

Continuing with our actual instance of the attributes of a particular

35 mm. camera then, using the same aperture throughout (f3.5) the depth of field, which at 3 ft. distance setting was 4 inches;

at 5 ft. distance setting becomes 4 ft. 7 ins. to 5 ft. 6 ins.
= 11 ins. depth of field.

at 10 ft., ,, becomes 8 ft. 8 ins. to 12 ft. 2 ins.
= 3 ft. 6 ins. depth of field.

at 25 ft., ,, becomes 17 ft. 2 ins. to 45 ft. 4 ins.
= 28 ft. 2 ins. depth of field.

Thus the depth of field becomes greater with increasing distance-setting, and *vice versa*.

Again using the same camera, and this time keeping the distance-setting uniform at, say, 10 ft. we get the following, using different apertures;

at f3.5 the band in clear focus is from 8 ft. 8 ins. to 12 ft. 2 ins.
= 3 ft. 6 ins. depth of field.

at f6.3 ,, is from 7 ft. 7 ins. to 14 ft. 9 ins.
= 7 ft. 2 ins. depth of field.

at f18 ,, is from 5 ft. 3 ins. to 114 ft.
= 108 ft. 9 ins. depth of field.

Thus the depth of field becomes greater with decreasing aperture (f18 is only one-thirty-second the size of f3.5).

We have seen how the detail of the subject (leader growth on our two year old Sitka spruce), among many other similar objects round about it, was brought out by using maximum aperture and minimum distance, thus separating the tree from the wood. If a general view of the same wood or plantation had been the object however, the reverse course should have been taken viz. smallest possible lens-opening for the light available, and maximum time.

And in those last three little words there lurks a snag, for a little too much breeze can easily upset our nice, and hitherto simple, calculations when we are dealing, as foresters must, with natural objects only too liable to wind movement.

Wind.

Suppose the light is good, fitful sunshine on a March morning, with a gusty wind blowing. Our object is to photograph the south-west edge of a plantation or trial plot, on the windy bog or hill-side. We may judge or measure that a camera setting of f8/1/50 second would be ideal. One-fiftieth of a second, however, is unlikely to "stop" moderately strong wind movement near the camera, and there may not be room to move back even if we wanted to. So it would be better to use f5.6/1/100 second; better still f4.5/1/200 second. But in widening the aperture, we cut down the depth of field and this is just what we may wish to avoid. In which case there is really no way

out. We must either recharge with a faster film enabling perhaps f16/1/200 second to capture the subject—or await a calmer time. Using a really high speed film as routine is not a good solution either. If we try this, occasions can arise, especially in summer, when minimum aperture and exposure-time combined can still over-expose.

So that in field photography as in fishing, patience is the important thing and persistence a necessity. We must always be prepared to come back another day.

Accessories.

Camera accessories *ad lib* are on sale. All share one characteristic—they are best done without, (if one can so manage). The beginner, bearing in mind that correct exposure is much more critical with colour film than with black and white, will feel he needs a light exposure meter. But a better plan, provided the original enthusiasm can be made to last out, is to go without and to embark instead upon a course of self-set experiments, in other words a course in trial and error. Indeed, no meter can replace such a course because, after all, it is the photographer who decides the setting, meter or no meter. (We are not concerned here, needless to say, with automatic cameras that are all guaranteed—to take the fun out of photography). Undoubtedly the fewer artificial aids to our personal judgment, the greater the aesthetic pleasure from our better pictures. And what great gains in humility, from those of the other kind.

At this point, as it happens, the aesthetic and financial aspects become nicely blended. Standard 35 mm. colour film can be had in cassettes at prices that work out at around 1/- per transparency, inclusive of processing. But the full price having been paid before any photographs are taken, 50% failures in the field will mean a doubling of the cost per good slide eventually, and so on, *pro rata*. It follows from this that as with the poor fowler "every shot must tell", leading, in both cases let us hope, to better markmanship and a keener study of the game.

The unsteadiness of the human hand is one of many things that can deceive the camera-eye. It is generally laid down that if an exposure-time greater than 1/25 second is used, a tripod becomes a necessity. A ranging rod, stuck in soft ground, can be quite effective as a base-plate or "unipod". Some authorities hold that even with 1/25 second a tripod is essential, but personal experience suggests that at 1/20 second or, softly be it claimed, even at 1/10 second, perfect definition can be obtained with a hand held camera, *provided there is good breathing control*. The rule is supposed to be that you take a deep breath, then "press trigger". For one amateur however, the moment of truth is that immediately following the exhalation of a deep breath. It would be interesting to hear whether this trick works for others.

Filters in great variety are on offer. In our kind of field photography the only one that will be required with black and white film is the light yellow correction filter which gives character to sky and cloud effects, and may improve the detail of foliage. The filter factor for this may be 1.5 or 2, which means (if the factor is 2) that every time it is used we must remember to double the normal time *or* the normal aperture.

For studies in colour beside "the wine-dark sea" and at high elevations, an ultra-violet filter is recommended. The filter factor here is, fortunately, 1.0, which means your forgetting it will make no difference.

Colour Photography and Forest Records.

The most widespread use of colour pictures in forest record work will be that of showing the progress of growth in plantations; and vegetation changes over a period of time, perhaps over many years. Whenever a photograph is taken for such a purpose, it is absolutely essential that a post be driven in or some other *exact* record made of the precise viewpoint and height of camera above ground. If this is not done, retakes in later years will be worse than useless.

The compilation of exact data, like this, is only a special instance of what should become for every forester and research photographer, an inflexible rule, namely—that every single photograph taken will be recorded at once in one's notebook under the headings of camera-setting, time and date, apparent light conditions and interest of subject. It is amazing how much useful information, direct and incidental, can build up over a period when this is done.

For instance, colour photographs were taken, every kind of subject, with a new camera from August to December, in sunshine only. Notebook data show clearly that the best pictures were obtained by increasing apertures steadily, by one stop, month by month over that period. Theoretically, it should be necessary only to decrease them again, from January to July in like measure, to get equally good results. It would be unsafe, of course, to apply a scale like this to any other camera. Every one must work out his own salvation, likewise calibration.

It is doubtful if there is a more useful tool available to the forest research officer, to the forestry lecturer or to the plant-ecologist than the modern camera loaded with colour film. By this means, given sunshine, or the photo flash attachments for both indoor and outdoor use available to-day, he can assemble, re-sort at his leisure and present systematically, records that are self-explanatory or nearly so. In particular, colour transparencies each of which can be as good as a thousand words of explanation, demonstration or technical reporting. Slides of text-figures, of graphs, of colour drawings are easily prepared and much more readily conveyed to class-room or lecture hall than the originals.

Further, they become the focus of attention in every sense, flashed on a screen in a darkened room.

By means of transparencies the forest officer can illustrate and record indelibly, forest history, nursery seedbed and transplant line development and trials, diseases in nursery and plantation, response to treatment, progress and effects of thinning and all other forest operations.

Every forester can assist with the compilation of such records. Obviously the man on the spot is the one most likely to be the first to notice significant happenings; and to be there when the light is right and from the proper quarter.

Then, with camera and notebook at the ready, it remains only for him to compose his picture artfully and carefully, so that it may prove not only technically informative but, so far as possible,

*"A thing of beauty
And a joy forever".*
