

People often ask me how I decide to photograph the subjects I do - what determines my choice. I suppose I could glibly improvise some rationalization based on what I have heard said about aesthetics, but to do so would be misleading and I must truthfully answer that I do not know. To understand the multitude of ~~xxxxx~~ influences that have been at work on a person since his birth, conditioning his emotional responses to the immensely complex exterior world - exclusive of his genetic endowment - would require a deeper self-analysis than I believe is humanly possible. The human brain, by far the most complex of computers, is yet unable to coordinate the vast amount of information necessary for a meaningful simple answer to such a fundamental question. Our scientific indoctrination has conditioned us to believe that analysis if pushed deeply enough will reveal the causes and predict the direction of human responses. There is much justification for this confidence in the scientific process when the responses to be expected are basic to our psychic make-up, but esthetic judgements are not in this category. So all I can say, obviously, is that the subject ^{appealed} to me. The why, however, is buried in the vast complexity of ~~the~~ ^{cells} brain, from which miraculously arise the mysterious phenomena of mind - self-consciousness and individuality - the seat of these judgements.

However, it is still possible to say a great deal about the what of the appeal if not the why, and that in its broadest sense is what I propose to discuss. Plato discussing art said that a work to be successful must be appealing and must be convincing. The first criterion is not one that appears full-blown in the individual. It develops, I believe, from an inherent capability, from a seed within each person, in some in a more viable form than in others. And

it may develop in different directions. To attain its full blooming however requires the utmost of tender loving care. No upper limit to the potential of esthetic appreciation exists; with encouragement it will continue to expand throughout the life of the individual. Actually the appeal of a subject translated into a photograph and the conviction that the photograph relates to

reality - subjectively or objectively - are part of the same thing - the appeal

The process goes as follows:

preceding the conviction./ First, one is attracted by something he sees - it could be a landscape or a small detail of nature - and second, he wishes to transcribe this fragment by graphic means to paper so that others may vicariously experience pleasure, or at least some emotion on seeing his copy. The success of his effort is proportional to the degree that he has been able to arouse in his audience a feeling allied to that which the real subject aroused in him. The two emotions though they share a common origin need not, in fact they cannot, be identical for they are produced in separate individuals and dissimilarity is the criterion of individuality.

In addition to esthetic appeal, and inseparably joined to it as a necessary adjunct, is the requirement that the representation of nature carry with it convincing evidence of its validity. This does not mean that the photograph should depict an object conventionally with all its customary attributes, or even portray a recognizable object, but it does mean that whatever inevitable or intentional distortion is incorporated the presentation ^{UNLESS OR} ~~unless the authors intention was to shock.~~ must not be offensive to the viewer. There will be, of course, disagreement on this point in many cases. But it cannot be denied that to those who find the interpretation unconvincing the photograph fails to communicate. If all who look upon it are unconvinced then it is a total failure. To others with whom the photograph carries a meaning it will be a success. The point is not that

there can be a difference of opinion but that the success of a picture in any one person's judgement requires that it appeals to him and convinces him of its validity.

As an example of the kind of interpretations or distortions I have in mind, on which a difference of opinion exists, consider a photograph of green trees made with infra-red light. The scene will have something of the quality of ^amoonlight landscape with a jet black sky and the leaves of the trees will be white as though covered with snow. To some people this departure from accepted reality is objectionable and for them the photograph is not convincing and not a success; to others with a different sensibility or imagination this divergence from perceivable reality is exciting.

Whereas in black and white photography distortions are almost exclusively a matter of tonal emphasis (perspective distortions are also possible in any photographic medium since they are optical; the extreme case being photographsmade through a fish-eye lens, an example of which I have yet to see which appealed to me more than as a curiosity) in color photography the added dimension of color provides the photographer with a further means of emphasis and personal interpretation. When I speak of distortions I refer to the departure from some physically measurable quantity such as relative brightness related to the spectral sensitivity of the human eye. But distortion is inevitable in the photographic process whatever its nature when the ultimate product is a print. A less pejorative term than distortion would be emphasis because it implies a human factor. The distortions of a process are amenable to wide control by manipulation of the various photographic variables by means of which all the possible interpretations in tonal and color values arise and which make up the esthetic contribution of the photographer. In discussing this matter of

the interpretation of reality one can get into serious trouble if he allows himself to become bogged down in considerations of what is meant by reality. Let us say for simplicity that by reality we refer to the world outside^{of} us which we see through our eyes and about the nature of which most of us agree. Of course this definition leave out a great deal, leaves out of consideration the vast world of subjective experience - the inner workings of the mind - but this is not the world which concerns optical photography, nor is it one in which I can visualize photographic possibilities.

Perhaps we can agree now that photography - the recording of optical images on photosensitive materials - consists in the subjective interpretation of the real or natural world by means of emphasizing some and playing down other features of a selected part of it. Therefore, being an interpretation, photography is not a literal representation of nature, and to the degree that it manifest the perceptions and sensitivities of the photographer it becomes art. It has been said by some practitioners of black and white photography that because it portrays nature more literally the creative potential of color photography is of a lower order than that of black and white photography. In general it seems to me it can be accepted that the more literal the interpretation of nature the less creative it is, but that nevertheless subject choice still remains a factor to be reckoned with. Literal photographs whether in color or black and white are often boring because they leave little to the imagination. The viewer is presented with an explicit statement which he can make nothing out of and so he quickly loses interest. Usually, though, the explicit photographs of nature are too all-inclusive encompassing too much. Their fault lies more in the vastness of the subject than in the literalness of the portrayal.

That there is such strong opposition to color photography among

the higher sophisticated echelons of the photographic fraternity I find difficult to explain. It is a phenomenon I believe analogous to the low esteem in which photography as a whole was held by artists and critics generally during the early decades of this century until Alfred Stieglitz brought about its recognition as a valid creative medium in the arts. The opposition to color photography is the same order of conservative reaction to a new process. Part of the explanation at least is to be found in the complexity and laboriousness of the printing techniques in color photography. To those who photograph in color but do not produce their own prints by ~~the~~ methods which offer the greatest degree of control the process will never attain its full creative potential just as black and white photography will always be an incomplete creative experience for those who farm out their printing. Neither can ever experience the emotional satisfaction derived from assembling a beautiful three color or producing a fine black and white print.

At this point it behoves me to try to explain ~~how~~ I got into color photography and why I spend so much more time in color than in black and white photography. If I only made 35mm slides ^{is popular to do with} as ~~so~~ many amateurs ^{Today} ~~do~~, it might with some justice be said that I was too lazy to make prints and therefore took the easy way out by using a medium that does not give itself readily to print making. But this criticism ~~is~~ invalid since I do make color prints from hundreds of transparencies each year by the dye-transfer process which requires meticulous precision. I became interested in color many years ago when on presenting a collection of black and white bird prints to a publisher I was told they were not publishable because the birds could not be identified in black and white, that they would have to be in color. This episode occurred shortly after Eastman Kodak began the production of Kodachrome. So being younger and more energetic than I now am I set about photographing birds in color and after

several years returned to the publisher with a new set of prints in color. This time I was told by the same editor that he could not possibly publish them because of the cost. I didn't believe him and so I wasn't too discouraged and kept on photographing in color. At the same time I began to point my camera at other subjects such as flowers, fungi, details of the forest floor. My wife seeing them said they reminded her of Thoreau and that I ought to illustrate a book ^{on} Thoreau. This idea rapidly germinated while I read all of Thoreau I could lay my hands on and eventually resulted in the publication of "In Wildness is the Preservation of the World". The bird book is yet to come. With this commitment to color and its ultimate reward it is not surprising that I kept on making color photographs, and that as I continued my ideas on what constitutes good color photography began to take form and to crystalize.

The first objects of nature that attracted me, as might be expected, were the most colorful ones. Of the birds were those with the brightest plumage, while among other subjects it was the flowers, lichens, and autumn leaves. Gradually the more subtle hues began to draw my attention - the colors of earth, of decaying wood, of bark, and then the strange colored reflections one sees when they are looked for. To be aware of these relationships of light and color requires an education of perception, of training oneself to see; not that in my case the process was a conscious one which I worked at, for if it had been, and in fact almost always ^{was} when I made the conscious effort, the results ~~were~~ ^{would have} stiff and contrived, lacking in the quality of spontaneity. The things and situations I began to see attracted my attention as the result of continuously observing the fine structure of nature. Increased perception will be the reward to any one who focuses his attention as I was doing in this direction. And this has been the experience of many young photographers with whose work I have

become familiar in recent years. I began to see the effect of available light either from a clear blue or from an overcast sky on my subjects, and I began to recognize that sunlight was often a disadvantage producing spotty and distracting patterns. The only natural sources of light available for photography are direct sunlight and skylight, and the way these two sources interact with the environment by reflection and absorption produces all sorts of wonderful effects. To those who are not used to observing them they often seem on reproduction unreal or false, and these people complain about the distorted and artificial colors in my photographs. But they are there although I sometimes emphasise or depress them in the printing process. To do this is no more than what the black and white photographer does with neutral tonal values during the steps of negative development and printing.

One of the most interesting and compelling subjects for me is water in its numerous forms and manifestations. As is well known it reflects the sky thus giving us the blue sea on a clear day. In rills and puddles it also reflects the sky giving some marvelous effects in surroundings of quite different color. These small bodies of water reflect light which has already been reflected from some other source in which partial absorption has taken place. Thus the green vegetation beside a pool is reflected by a ruffled surface giving an emerald cast to the water or autumn leaves may turn it to gold. If the water is moving the ripples as they face in various directions reflect the light from different sources producing patterns of color. But not only water reflects light: leaves and rocks reflect the sky too. The upper surfaces of the former ^{in shaded location} ~~becoming~~ at times as blue as the sky/ itself ~~and~~ leaving the undersides still a yellow green. The black oxides that form on sandstone in the West called desert varnish reflect the sky too almost perfectly in shaded alcoves when they

shine like windows in the cliff.

Fresh snow is a nearly perfect diffuse reflector as we all have experienced in the glare from a sunlit winter landscape and in the blueness of shadows illuminated only by the sky. On sunlit snow the blue from the sky is swamped out by the intensity of the direct sunlight. Some physiologists insist that snow shadows appear blue owing to a mechanism of visual perception by which one sees the complementary color following stimulation by a strong colored light. Since sunlight is slightly yellow shadows on snow would by this mechanism appear blue by contrast. No doubt this does happen, but it is also a fact that shadows on snow are illuminated by blue sky light and should appear blue as do all shaded areas in summer landscapes on a bright day. On an overcast day snow may appear slightly bluish, but is also perceived as neutral white. The blueness of ice and the interior of clean snow banks, described by Thoreau, is an example of the same phenomenon of differential scattering that makes the sky blue.

All these effects can be recorded on color film and can be enhanced or diminished in the print as the photographer chooses. Should the emphasis of a color be carried too far an unreal effect may be produced which as in the case of infrared photography might be emotionally exciting or distasteful depending on the preference of the viewer, but is not necessarily invalid. I believe that the reaction elicited is related to the experience of the viewer, the degree of his awareness, and his prejudices. By and large those who have been in closest with the natural environment are the most receptive of these phenomena when brought to their attention. They accept and are pleased with the emphasis. Others whose contact has been more superficial complain that the colors are unreal, artificial, that they have never seen anything like them although they have been to the same places, and therefore they maintain

that what I have done is to falsify nature and reject my interpretations. For them obviously the photograph is unconvincing and displeasing - a failure. They are like a painter friend I had who after seeing my exhibition of Glen Canyon photographs asked me how I could justify representing rock in those garish colors. What color are rocks I replied. Rock color he said. He was a New Englander though he lived in the Southwest and was unable to free himself from his early life gray stones impressions - the color of antiquity as Thoreau described the lichened rocks of Concord. He could not contemplate the Utah sandstones of more recent antiquity being different in color from the ancient granites of Massachusetts. Thoreau I am sure would have been more open minded. Blue highlights elicit the same ~~EXXIXX~~ kind of reaction from others of my audience that the Navaho and Wingate formations produced in my painter friend - Unbelieving incredulity - a strange reaction indeed since blueness is such a pervasive feature of all earthly landscapes derived as it is from the scattered blue light of the atmosphere.

To invalidate color photography on grounds of excessive literalness is a contradiction of the criticism I have just considered that I exaggerate the colors of objects and create false color contrasts. The critics cannot have it both ways. ~~The question I am concerned with, which is the theme of this discussion, is what are the necessary attributes of a successful color photograph, and correlatively how they influence the scope of color photography.~~ Whether color photography is too literal or not literal enough is not a controversy which seems to me promises to throw much light on the theme of this discussion because it could equally well be applied to an evaluation of black and white photography. The question I am concerned with is what are the necessary attributes of a successful color photograph, and correlatively how they influence the scope of color photography. I have already stated ~~that~~ the

two fundamental requirements for acceptance are that the photograph must first be pleasing and second must carry conviction. The previous discussion on the chromatic properties of the environment contained the tacit implication that a relationship exists between color quality and the effect it produces on the viewer for whom, if the photograph is to be accepted, it must be a pleasant one. No requirement is included that the colors have to be exact reproductions of some ones predetermined idea of their quality as selected from the subject. They may be exaggerated and distorted to any degree the photographer desires just so long as the relationships are attractive. There will arise a difference of opinion between viewers, of course, on this matter, but the first person to ~~XXXXX~~ be pleased must be the photographer himself otherwise the photograph contradicts his own judgement and is at best insincere and at worst dishonest. After the photographer the judgement becomes a matter of consensus. Even such extreme manipulations as the reversal of colors in the printing process could be attractive, and here we come to the second criterion that the result shall be convincing.

The results I have seen, However, of switched colors in the three color printing processes have yet to convince me of ~~XXXXX~~ the validity of this distortion. To me they are gimmickish and attempts to do something different for the sake of difference. Rather than expressions of creative insight, they are in my opinion contrarily the product of creative impoverishment.

control

Less extreme color ~~XXXXXXXXXX~~ is accomplished by ~~making use of~~ the conventional techniques of the photographic process used in other fields of pictorial photography. The primary ~~XXXXX~~ ^{devices} are spectral selection and contrast control. The former in black and white photography involves the use of colored filters during negative exposure, and the latter variations in exposure and development in both the preparation of the negative and the

positive print. These manipulations offer the photographer very wide latitude for creative expression as all familiar with the teaching of Ansel Adams and Minor White know. In color photography spectral selection during the exposure of the original positive or negative material (Ektachrome and Ektacolor for example) is a much more subtle tool and must be used with more restraint than in black and white work. However, in color printing spectral control provides a tool for obtaining very great variations in the quality of the final print. Thus a predominant color resulting from selective environmental reflection can be suppressed by filters in the direct color printing techniques (Ektachrome paper), or by selective dye control in the indirect techniques. Contrast in dye-transfer printing is controlled in all four stages of the development of the final image: first, by masking the transparency, which by itself is a complicated many-faceted technique; second, by separation negative processing, a procedure similar to black and white negative development; third, by controlled development of the positive matrices from which the final print is assembled; and fourth, by controlling the amount of dye the matrices absorb for transfer to paper. So it is obvious that here too as in black and white work the ~~XXXXXXXXXX~~ technician has at his disposal a tremendous range of devices for creative interpretation. The parallel between contrast control in black and white and color photography is only approximate in that in the latter at certain stages enhanced contrast produces increased color saturation. To avoid this effect the technician may find that he must resort to a deduction of contrast at one and an increase at a subsequent stage in the printing. But on the whole color printing is amenable to a degree of control equal to if not greater than that available to the maker of black and white prints. The one control in black and white printing not available to the dye-transfer printer is dodging. The effects of ~~XXX~~ such selective manual controls ~~XXXXXX~~ can be attained

only by differential masking.

Whenever possible it is desirable to obtain the desired color or spectral qualities in the transparency by the discriminating use of filters. But they should be used conservatively since slight alterations in the composition of the light reaching the emulsion causes very noticeable changes in the color balance - overall color. The filters commonly used in color photography belong to the color correction and light balancing series available in steps from a slight tint to a deep color in the three primary colors ~~XXXX~~ red, green, and blue, and in the three respective complementary colors cyan, magenta, and yellow.

There are two general circumstances under which these filters can profitably be used. One is under conditions in which the ambient light contains a predominant wave length such as is the case with shaded subjects on a clear day when blue sky provides a large fraction of the illumination. Correction can be accomplished through the use of light yellow or red filters. The degree of filtration needed cannot be stated precisely for it varies from subject to subject and condition to condition and in the end is determined by the individual experience and judgement of the photographer and the interpretation he desires. The other condition requiring the use of filters arises from color film sensitometry. No photosensitive emulsions respond to light exactly proportionally to the exposure, in which exposure is defined as the amount of actinic energy acting on it or as the product of the intensity of the light acting on the emulsion and the duration of its action. Thus an exposure of $1/100$ sec. at $f/2$ for a ^{certain} subject illumination of cpf^2 will not be equalled ~~by~~ in its effect on the emulsion by an exposure of 4 min. at $f/40$ for the same illumination, although the total amounts of energy involved in the two exposures is equal. This lack of equivalent effect

on the emulsion is called reciprocity failure. ^{the} In/multilayered emulsions of color film in which each layer is sensitive to a different part of the spectrum the phenomenon of reciprocity failure occurs unequally in the different layers. In other words reciprocity failure is a function of wave length. The result is that with long exposure most color film - some types more than others - give a different color from that obtained with short exposures. The over-all color or color balance of the two exposures differ. With Ektachrome emulsions of recent years this shift is towards green. The longer the exposure required the greener the result. To correct this effect a magenta filter complementary to green is needed, the density of which is correlated to the length of exposure. No absolute rule can be/ formulated for the choice of filter for it depends too much on personal preference and on a multiplicity of environmental factors. One photographer may like a warmer color balance in his photographs than another; or his preference of color balance may vary with subject matter. ~~XXXXXXXX~~ Moreover opposite environmental ~~fac~~ factors may cancel out their effects. This happens with some types of film when long exposure is required for shaded subjects illuminated chiefly by the light from blue sky. ^{an old type} The hue shift under long exposures in/Ektachrome a few years back was to yellow requiring a blue filter to counteract the effect, but which was also counteracted by blue sky light. In the last analysis the decision on choice of filter, if any, and how to expose the film comes down to the photographer's expectations and his judgement as to the means to attain them. The finished product is the ultimate measure of his esthetic taste.

All photographers have their prejudices and I am no exception. Added to those who hold that color photography is too literal - to even the score - are a large number who make no black and white photographs because

for them the medium is too limited. Even though in recent years I have done little black and white work I reject both these points of view. My prejudices are more specific and relate to subject matter more than to interpretation and expression, and perhaps paradoxically are concerned with aspects of color photography. I have said quite a lot about the influence of blue sky light on color quality under certain conditions and how this influence can be reduced, altered, or accentuated. It is the blue sky itself in color photographs that I dislike, not the indirect evidence of blue sky that I find objectionable. I feel that a cloudless blue intrudes irrelevantly into the subject; it never seems to fit or belong with the rest of the picture. To me it is a false note which can be mitigated to some extent but not entirely by the presence of white clouds. A white or very pale sky does not arouse in me to the same degree this antipathy, not do black and white photographs of skies have this effect on me. My prejudice is related to the conjunction of sky and landscape and has nothing to do with photographs of clouds and atmospheric phenomena by themselves. Ah ha! the literalist will say, its because the effect is too literal that you object to it. Maybe so, but I think there is a more subtle reason which has to do with the totality of a photograph as well as with its explicitness. Blue skies almost always seem to me redundant; they add little to the information conveyed by the photograph. In fact they may detract from it by distracting ones attention from the relevant parts of the picture. A photograph should contain no more than is necessary to convey the meaning the photographer had in mind or in his subconscious. There will of course be exceptions to this dictum and photographs of mine will turn up with blue sky but they will be few; some may be exceptions that prove the rule, whereas in others the sky may actually contribute to the totality of the composition.

The total picture is in the end what counts. All the parts should combine to produce an integrated whole with greatest economy and least irrelevance. The more junk the viewer has to dig through to get the message the less the photograph will appeal to him and the less conviction it will carry. But nevertheless intricacy of detail and complexity of subject are not contradictions to harmony not to an inherent simplicity of the whole.