

were used at a height of 31,680 feet, the desired 1:7,200 scale would be obtained with a 2.2-diameter enlargement. To get the 1:1,200 scale sometimes required would of course necessitate a 13.2-diameter enlargement. This does not seem an excessive figure to expect from the concentrated arc light since 8- and 10-diameter prints are frequently made with conventional enlargers.

Admittedly it might be extravagant to use a roll of film 9 inches wide if the area used were only 4 or  $4\frac{1}{2}$  inches square on the original negative, although the extra coverage might be convenient on some occasions. The alternative would be to use film 5 inches wide in a standard magazine masked the proper size, and with suitable adjustment in the film metering mechanism.

The two main objections to the above procedure arise from the fact that (1) the stereo effect will be reduced, and (2) high altitude photography as suggested in this paper will be more expensive than current procedures because there is no increased coverage to reduce the number of pictures or the number of strips. In numerous cases the decreased stereo effect would be of little significance, since unfortunately many engineers and planners do not know how to use a stereoscope. In regard to cost, that will undoubtedly come down as more work is done at higher altitudes and navigational devices are improved to permit more precise flying. The object of this paper is primarily to point out one distinct advantage in high altitude large-scale photography in the hopes that commercial concerns will test the merits of the scheme by flying as high as is practicable on all large-scale projects.

## USES OF AERIAL PHOTOGRAPHS IN FOREST RECREATION\*

### A DISCUSSION

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**W**E WHO work in the field of forest recreation are indebted to Robert N. Colwell for his paper, "Uses of Aerial Photographs in Forest Recreation," which appeared in the March, 1950, PHOTOGRAMMETRIC ENGINEERING. It is a valuable and precisely detailed addition to the basic literature of forest recreation.

Not only did Mr. Colwell explore coverages inherent in his descriptive title, but he sensed intangible values within forest recreation which might need clarification or defense in relation to his proposals. This he did by admitting (page 31) that "an enthusiastic attitude has purposely been assumed," and by the editors inviting comments on his paper.

Mr. Colwell's examples and illustrations are valid and commendable. Accordingly little concerning them will be included in this discussion. "Workers in the field of forest recreation," (as Mr. Colwell termed them) are today bedevilled by the task of protecting forest recreation areas against mounting numbers of outdoorsmen, despite funds curtailed by other needs of government. Hence the savings possible through reconnaissance by aerial photography prior to the establishment of recreational facilities, are certainly welcome. Aerial photographs should be used in most forest recreation projects which propose to modify forest recreation areas.

\* This paper by Robert N. Colwell was published in the March 1950 issue, Vol. XVI, No. 1.

To Mr. Colwell's list of worthwhile uses, we can add comparisons, by aerial photography, of areas considered for intensive forest recreation use, on the basis of their relative ability to withstand abuse. Forest recreation harvests and activities (beyond sight-seeing from conditioned roads by people who never leave their cars) are upon a per-acre production basis just as surely as corn, beef, or sawlogs. This being true, we can employ aerial photographs when making decisions favoring one proposed recreation-use area as compared with another which, by interpreted drainage, vegetative types, and climatic factors is less able to "take it."

One may question whether boating and swimming, as discussed in the paper, and skiing are truly forest recreation activities for which forest areas should be opened. To many they are forms of athletics most enjoyed when exhibitionism is possible. However, in organizational camps they admittedly are activities sometimes suitably interspersed with other pastimes unquestionably of the forest. Thus they can be tolerated in frequented areas.

In respect to Mr. Colwell's suggestions for the use of aerial photographs by forest recreationists, we notice that in each use he is fighting time. He implies that without maps, night may catch the forest traveler in an uncomfortable bivouac as he moves rapidly under the dictates of short vacations. Or if descending into a seemingly inaccessible canyon, without aerial photographs, he may lack time to explore all routes and still harvest the fruits of his proposed venture.

Many in these hurried days lack time in which to become skilful outdoorsmen. The frantic tourist without time to learn fly fishing for wary trout is tempted into catching hatchery-reared trout for sale from commercial trout ponds built in major resort towns. We forgive him as a hurried beginner, while we realize that the finest trout fishing conceivable is in an unmapped (not even aerially mapped), unnamed lake containing a naturally evolved, undescribed trout.

Few people can afford the time, funds, or renunciation of comfort and status possessed by Marco Polo, Lewis and Clark, or by Harry Franck when essaying their remarkable pilgrimages. So the vista-dome railroad cars are popular among hurried people, but we shall not chronicle their explorations like we have those of the great men mentioned.

Those who top the summit of Pike's Peak by cog road or auto highway may use the toils of others to save their time and pains, but we shall not honor them as we do those who lie hidden among eternal snows just short of the tip of Mount Everest. Nor shall equal honor be given to climbers who may later surmount Mount Everest, possibly with the aid of aerial photographs.

Those who, like Kipling's "Sons of Martha," serve the public, perhaps protecting forest recreation values against the abuses of the people, often will be negligent if they do not use aerial surveys to perfect their work for those who pay the taxes. But the recreationist who uses aerial photographs to gain ends complicated by Nature's obstacles, cannot rate as well with himself, or with his neighbors (unless they are beginners without standards) whenever he thus leans upon the aid of others. I can find no more eloquent definition of this truth than that which Stewart Edward White wrote in *THE FOREST*: ". . . with his naked soul he fronts the wilderness . . . As he substitutes the ready-made of civilization for the wit-made of the forest . . . to exactly that extent is the test invalidated. He has not proved a courteous antagonist, for he has not stripped to the contest."