Chairman for morning session was R. C. Wilson; for afternoon, H. G. Chickering, Jr.

THE COMMITTEES

Program Committee

Charles N. Oros, Chairman
Leonard Delano
Charles W. Gowan
Bert Mason Jr.

Arrangements Committee

Wesley Ellis, chairman
H. J. Grimmonpre, exhibits
Robert W. Prentiss, exhibits
James L. Harris, publicity
Wayne E. White, publicity
Mildred Butler, registration
Kathryn Flaherty, registration
Morris J. Boyd, reservations
J. Edward Deal, social

PHOTOGRAMMETRY SOCIETY IN ANNUAL SESSION*

PROBLEMS in procuring aerial photographs, application of color photography, land classification and appraisal, timber cruising and volume estimation, were the main subjects relating to forestry, discussed at the annual meeting of the Columbia River Section, American Society of Photogrammetry, held in Portland, Oregon, Dec. 7.

In welcoming the 300 participants at the highly informative meeting, Stuart Moir, forest counsel for Western Forestry & Conservation Association, Portland, declared that the gathering together to make a science of aerial map making is real progress. Aerial photographs have contributed greatly to human knowledge broadening our horizons for natural resource development.

The principal problems connected with aerial photography are weather and time, together with the lengthy training of pilots for essential split-second timing. As outlined by K. S. Melsom, president of Pacific Aerial Surveys, Inc., Seattle, there are 30 to 35 days per year in the Pacific Northwest, in which aerial photographic conditions prevail. All operations accordingly are planned to "hit the air" during these 35 days. Due to the limited time, it necessitates maintaining several crews in order to increase the volume of man days for photographic work. Costs run from $800 to $1,500 per photographic day.

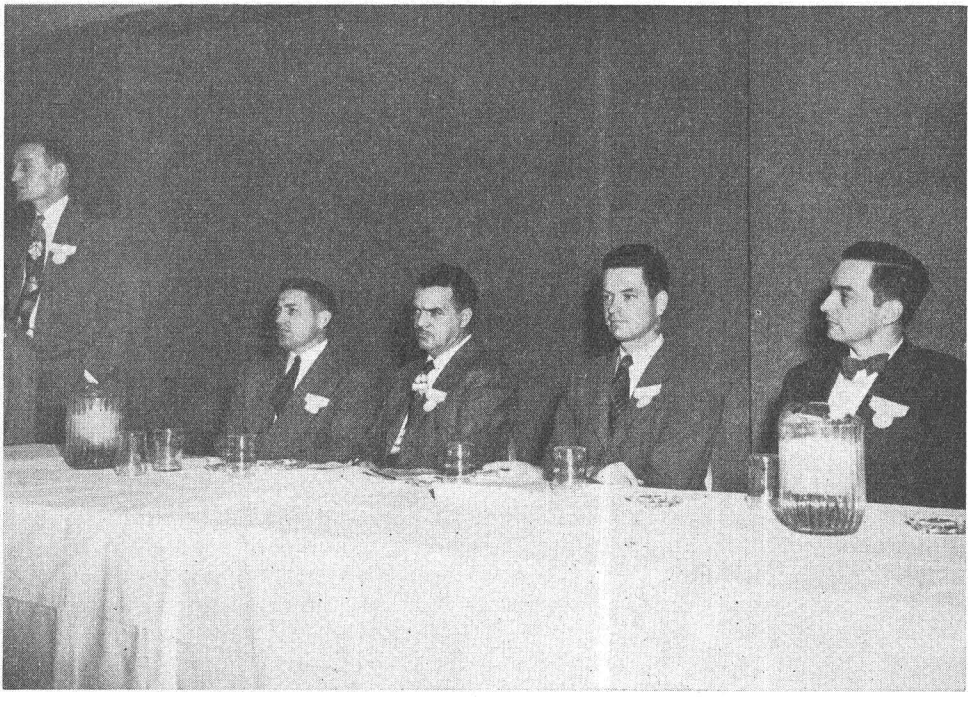
There are approximately 300 planes engaged in aerial photogrammetry in the nation today, Melsom stated. However, present planes are not constructed to obtain anything like top efficiency for aerial photographic work. Generally they are underpowered, do not contain sufficient fuel supply and have insufficient vision. Full 180 degree vision is needed with a minimum of 45 degree vision downward. Planes need to reach 25,000 feet within one hour and have six to eight hours' cruising time.

The pilot is the one important figure in the business and governs the entire efficiency of the operation. Only one out of five pilots is suitable and it require two to three seasons for proper training. Pilots should know every phase of the photographic work down to developing of the prints. Concentration on the camera, calculations, map interpretation for location as well as operating the plane is highly fatiguing. Perfect timing is the greatest problem here.

The application of color photography is yet in the experimental stage, but we have a new tool with which to work, Panel Moderator A. H. Fagergren, of Simpson Logging Co., stated. Others on the panel included C. E. Waldo, U. S.

* Reprinted from *The Timberman*, January 1950, with the permission of the publisher which also permitted use of the illustrations.

Classification and Appraisal. Paul Sanders, speaking; J. G. Clouston, Umatilla National Forest; Ian Mahood, Taxation Dept., British Columbia; R. M. Kallendar, Oregon State Board of Forestry; Dr. S. W. Cosby, Soil Conservation Service.



Color Photography Panel. Dick Wilson, speaking; A. H. Fagergren, moderator, Simpson Logging Co.; C. E. Waldo, U. S. F. S.; John Wear, Forest Insect Laboratory, U. S. D. A.; Paul Casamajor, Fairchild Aerial Surveys, Inc., Los Angeles.

Forest Service; John Wear, Forest Insects Laboratory, U. S. Department of Agriculture; and Paul Casamajor, Fairchild Aerial Surveys, Inc.

From color photography experiments in U. S. Forest Service, Region One, Waldo advised that they believed with a little good sense and by following instructions, good color pictures were obtainable. During the spot experiments in 1946 to detect beetle kill, every tree that had been attacked by the beetles could be readily detected.

Per roll cost of color is $125, plus chemicals for developing, against cost of $25 per roll of black and white. Color also requires three times as long to process and 7×9 prints are $8 as against 75 cents for black and white. However, cost of film is not a consideration in the over-all survey costs. Film costs generally run a fraction of 1% of the entire outlay. Added to this would be only the extra film and processing charges, which would still keep it a minor expenditure.

Experiments in color photography by the insect laboratory showed it to be very useful in determining any type of kill as well as in making timber typing much easier. Color sets up a false stereo effect and tends to provide its own third dimension. Use of proper filters is important and trial runs should be made in each area before photographing is started, to determine color contrasts for proper corrective measures through filters and timing.

Altitudes Determined

Flight tests showed heights from 1,000 to 5,000 feet for color, easier to interpret. Problems of best time of year, practicability on large areas, etc., compared with ground costs have yet to be determined.

Casamajor reported that Fairchild's use of color in South America for advance exploratory work was highly satisfactory. Though on open ground areas, soil types, mineral and geological conditions are determined readily through color use. Exposures are critical and much work needs to be done on the film, such as speeding it up and better contrast control. Use of a 12-inch lens is recommended to avoid dark areas on film corners.

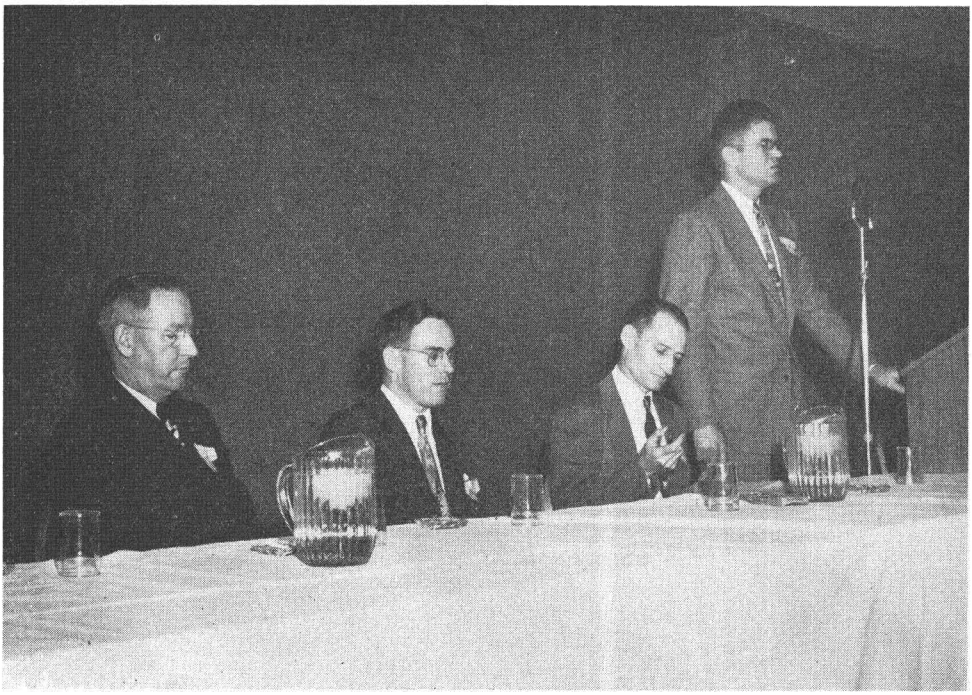
Land classifications and appraisals have proved definitely feasible by use of aerial photographs, for a wide variety of uses. Paul M. Sanders, chief forester, Willamette Valley Tree Farms, Eugene, Oregon, was moderator of the panel on land classifications and appraisals which included J. G. Clouston, range conservationist, Umatilla National Forest; Dr. S. W. Cosby, Pacific regional chief Soil Conservation Surveys Division; W. B. Eubanks, Oregon state tax commission; R. M. Kallendar, rehabilitation director, Oregon State Board of Forestry; Ian Mahood, head, timberland appraisal, taxation department, British Columbia, Canada; and G. W. Shoemaker, head, appraisal branch, Portland, Oregon, District Corps of Engineers.

The state of Oregon made replanting surveys to determine the restocking of Tillamook burn lands, down to the first year seedlings, determined the soil, cover types, exposure, slope, fuel types and snags per acre. The photos provided excellent snag count and were additionally used for the fire protection survey. Field work was cut in half, according to Kallendar. For further fire survey use, the photos showed best locations for corridors, avoiding heavily concentrated snag areas and enabled correlation of the corridors with fire access roads.

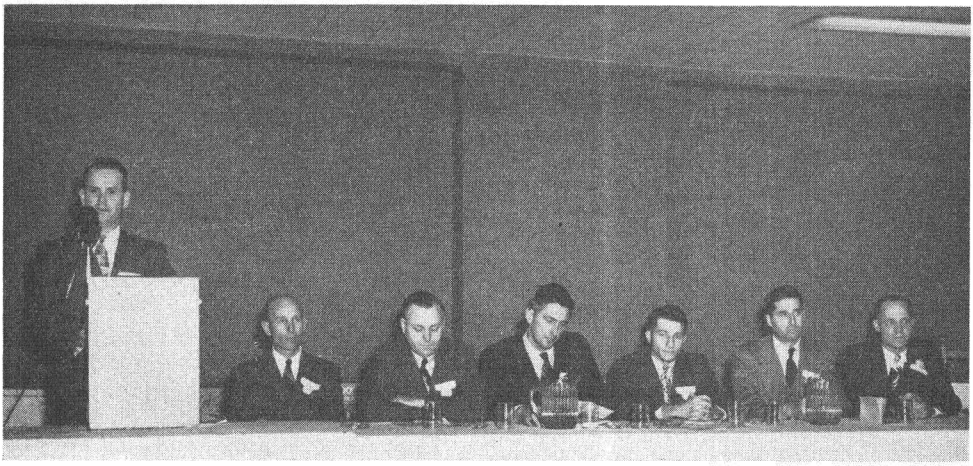
Scale found best was one foot to 12,000 feet. Good resolution was obtained for all around photo use, using a 12-inch lens.

In range use, the aerial surveys determined soil conditions, erosion, location of water, and general all around development necessary for management plans.

Tax commissions use aerial photographs in timber for determination of more



Land Classification and Appraisal Panel. G. W. Shoemaker, Corps of Engineers, Portland; W. E. Eubanks, Oregon Tax Commission; R. D. Wilson, pres. of section; P. M. Sanders, moderator, Willamette Val. Tree Farms.



Timber Cruising: J. R. Dilworth, moderator, Oregon State College; Kenneth Bradshaw, U. S. Forest Service; C. E. Reynolds, Aerial Mapping Co.; H. K. Trobitz, Simpson Logging Co.; R. B. Pope, U. S. Forest Service; Homer Hixon, U. S. Forest Service; Herbert A. Jensen, Hammon, Jensen & Wallen.

equitable taxation. Low cost and short time are necessary for such use. Where pictures were available and less than two years old they are sometimes used. Scale of one foot to 12,000 feet was used. A 12-inch lens, using pan film and filters, provided the best results.

In British Columbia, two departments successfully use aerial photographs in timber areas, the lands department and the taxation department. Under lands, classification investigations to locate potential farm lands is highly successful at a fraction of the ordinary costs. Taxation department makes appraisals for assessments chiefly on undeveloped land. Much more factual and just assessments are possible for this department, with costs one-tenth of previous methods. Photos are also used for public relations. Pictorial representation serves to convince owners of the accuracy of the department and has won much closer cooperation. Costs are low compared with land values concerned.

Problems in aerial photography were discussed by K. S. Melsom, president, Pacific Aerial Surveys, Inc., left. Right, R. D. Wilson, Pacific Northwest Forest & Range Experiment Station, president, Col. River Section.

Land Use Surveys

Soil conservation services are able to determine soils, slopes, erosion, drainage, irrigation plans, overflow hazards and other facts for better land use in plot photographs using a scale of eight inches to the mile generally, and some times four inches to the mile. Land capability is readily detected from the air photographs, with a saving of 50% in both time and money.

It takes good photographs if you are to have a good timber cruise from aerials. It is essential to make certain that the survey crew knows exactly what you want, Moderator J. R. Dilworth, assistant professor in forest management, Oregon State College, told the men. Others on the panel were H. J. Hixon, forester, U. S. Forest Service; R. B. Pope, Pacific Northwest Forest & Range Experiment Station; E. C. Reynolds, Aerial Mapping Co.; H. K. Trobitz, Simpson Logging Co.

Bringing "photo cruising" down to a practical basis, estimates of timber should be made on plots down to 40 acres, Reynolds said. You must be able to take off proper boundary lines, tree heights and type lines. Enlargements of the area should be 400 feet to the inch. Start one on each 40 acres, and lay out the strips on the photographs.

To get the volume estimate, the DBH is determined by the crown width. Use volume tables for total height and DBH and multiply by the number of trees. Work each type separately to obtain the gross volume.

Field Work Necessary

A good field man should work through sample sections of the area surveyed to obtain estimates of culls and breakage. The net volume may thus be obtained at one-tenth the ground cruise cost. Accuracy may be off a few per cent but the aerial method is highly satisfactory for cruising. By cruise running a strip you may judge the accuracy of the photograph.

It was determined that the use of aerial photographs, plus a minimum of

ground work to be most advisable. Map and photographic study is valuable before starting the field work. Aerial photographs can obtain the most results for the money expended in the shortest time.

The one-day session was presided over by R. D. Wilson, president, Columbia River Section, American Society of Photogrammetry, Portland.

LARGE SCALE HIGH PRECISION MAPPING BY PHOTOGRAMMETRIC METHODS

H. G. Dawe, Chief Photogrammetric Engineer, Hunting Aerosurveys Limited, London

ALTHOUGH the acceptance of photogrammetric methods for the production of medium and small scale maps has become almost universal, there are particular spheres of surveying where photogrammetry has been used very little, if at all. The limitations of photogrammetry, when applied to very large scales are well known, and even in the most developed countries, the scale of 1:1,000 has in the past been universally accepted as the limit to which aerial photogrammetry could apply; and only a very limited application has been made.

Difficulties that occur in large scale surveying from air photographs are attributable mainly to the fact that the subject is viewed from above, and therefore the likelihood of detail being screened is great. At smaller scales, for example, the screening of the ground lines of buildings by their roofs is not serious, as the difference in the plan positions is normally less than the plottable amount. At very large scales, however, the acceptance of the roof line will introduce intolerable errors. At the same time, an increase in the scale will almost certainly necessitate the plotting of a large number of small details which are not always easily identified. As the size of a feature is not necessarily an indication of its importance, very serious omissions can be made. It is understandable that doubts will be cast on the reliability of a plan produced entirely by a process which is handicapped by its viewpoint, and in which, in normal circumstances, the details cannot be seen clearly enough for them to be represented on the plan, in their true character and position.

Precision plotting instruments have already reached the stage where no shortcomings in the resulting plotting are attributable to them. In other words, present-day instruments are capable of extending the scope of photogrammetry, but are handicapped by other considerations, such as the photographic process and the precision with which specific details can be resolved, interpreted and plotted. The design and production of fully automatic plate cameras, with lenses of a very high resolving power, giving quite remarkable definition, have reduced the errors previously found in the photographic process. Nevertheless, the problem of resolution and interpretation of small features is still a formidable obstacle.

In the autumn of 1947, Hunting Aerosurveys Limited were asked by the Southern Railway Company to carry out an experimental survey at the engineering scale of 1:480 (40 ft. to 1″), with the object of finding out the value of aerial photogrammetry in railway engineering. The requirement was a plan, to this scale, of a section of line at Bournemouth, Hampshire, which included a busy provincial station and yards, plotted to an accuracy in keeping with nor-

NOTE: Comments on this paper are invited. To ensure consideration for publication in the September issue, receipt before July 15 is necessary.