Notes on Aerial Photography

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When the Division of Forestry and Forest Products of the FAO came into existence in May, 1946, attempt was made to estimate the forest resources of the world. During the second session the following was recommended:

"All countries should be requested to supply to FAO as soon as possible their most recent statistics on forest resources annual growth, annual drain, and forest products".

The Philippines, cognizant of the importance of this movement and being a member of this world wide organization, has to comply with this recommendation. Obviously, the Bureau of Forestry is the government entity that will be charged to devise ways and means with the aim and view of producing results in compliance with the said recommendation. It is regrettable to state that we are not in a position to give an accurate estimate of our forest resources, because if ever we have conducted combined land classification and forest inventory since the liberation, it was nothing more than a mere scratch considering the size of our public forest. In the words of the Assistant Chief, Division of Forest Engineering, "We all know that war caused damage to our forest capital, how and to what extent, we only guess. Our present statistical knowledge of our forest is based on prewar data. We are at present groping in the dark and unless provision is made for more intensive forest survey."

One of the most recent methods adapted in advanced countries in forest inventory and land-use survey is aerial photography. For the past thirty years, this method has been used in vegetative mapping, although its application to forestry is very recent and limited in more progressive nations like England, Canada, United States, etc., where it has shown promising results. Its use in forest inventory may have the following advantages: (1) It provides a permanent and comprehensive record of the vegetative condition of the area; (2) maps may be prepared quickly and accurately; (3) accurate delimitation and calculation of area of different forest types within a reasonable period of time.

Our rain forest which is by nature complexed will not be a problem because aerial surveying has been continually improving ever since it has been employed in vegetative mapping. The possibilities of this method in the Philippines can not be doubted.

In Australia where the author had a preliminary study of aerial surveying, commercial aerial surveying of forest and land uses has been in progress with nominal fees. Aerial photographs are of varied sizes and types but the most common are 9" x 9" and 7" x 9", the former being more widely used. For the purpose of satisfying the mapping requirement and to have an accurate photo interpretation, the photograph when taken requires the plane to have as much as possible a minimum tilt of usually less than 3 degrees.

There are two types of aerial photographs: vertical and oblique. For taking oblique photographs the camera is located at a window or side opening of the cabin of the plane. The use of oblique photograph in forestry is of little significance, except may be for illustrative purposes only.

In the taking of vertical photograph, the ca-

mera is located at an opening through the floor of the cockpit so as to get a full view of the terrain directly below. The photographs are taken successively in strip lines following the North-South or East-West direction depending of course on the flying conditions and the requirement of the work.

Before the actual aerial survey of the area commences, a flight map of the area has to be prepared based on available old photographs of the area or upon old map of satisfactory scale. If, however, the area to be covered is large, the same may be divided into sections of sufficient size using as much as possible natural boundaries.

The flight lines are drawn on the map at regular intervals depending on the width of the side overlap, height of the flight above the ground, focal length of the camera and size of the photograph. This flight map is similar to the base map of ordinary strip survey. With the use of base map with flight lines, gaps are avoided which are costly and time consuming to fill in.

For the purpose of guiding the plane, triangulation stations have to be established in flat countries. Further use of these triangula tion points will be evident in the construction of maps from photographs.

Each of the photographs covers 60 per cent of the terrain covered by the previous exposure. This endlap is necessary to align the air photos when examined under a lenstereoscope and for photographic triangulation. Adjacent strips have a sidelap of about 30 per cent on the sides of the photos.

The scale of vertical photograph may be expressed by a ratio between the focal length of the camera in feet divided by the height also in feet of the camera above the ground at the time of exposure.

It is essential for vegetative and land use survey to have the following information: (1) Date when photograph is taken; (2) Scale of the photograph; (3) Focal length of the camera used; (4) Season of the year; (5) Time of the day and (6) Film and filter combination used.

In map making and forest typing, lens type stereoscope is used in magnifying adequately details of aerial photographs, such as, (1) tree species; (2) site quality based on physiographic factors; (3) tree heights; (4) crown diameter; (5) density of the growing stock and (6) determination and measurement of dominant or co-dominant species. In the inventory of most softwood forest abroad, volumetric estimates are made possible by the use of a combination of these information.

In view of the fact that conditions obtaining in our rain forest are different from that of the softwoods mentioned above, another scheme must have to be studied if ever aerial photography is to be adopted in our plan of nation-wide inventory of timber resources. One of the factors that will help in the identification of the species is the characteristic appearance of the picture when the area covered by the survey includes stand of trees in flowers. Physiographic features and tree association may help to reveal identities of certain species in the air photos. The possible classifications of our forest into site qualities with the aid of aerial photographs may be based on topographic location of the species.

Tree height being the most outstanding variable in volumetric computation, its measurement is possible by measuring the tree shadows on single vertical photograph with relation to the angle of the sun; by measuring the outward displacement of tree top from the base in the photograph and coverting into tree height and by calculating the difference in parallax between the top and bottom of the tree on a stereogram by the use of the parallax bar or the Harvard parallax wedge. Tree height can be estimated by multiplying the flying height above the ground by the differential parallax (between top and bottom of tree) divided by the absolute parallax of the tops of the tree.

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cultural and physiological studies of the bacterium showed that it is different from *Pseudomonas solanacearum,* a notorious vascular parasite causing wilt diseases of a great number of solanaceous plants. The name *Psuedomonas tectonae* sp. m. is suggested, at least provisionally, for the causal organism of this bacterial wilt teak seedlings. Suggested control measures for the disease are given and described in the paper.

Preliminary experiment on the impregnation of rattan pieces with chemicals to prevent fungal stains using the gravity method. By E. F. Roldan & J. R. Tadena (1951). The study deals with the prevention of stain in rattan. Stains or discolored blemishes developed on rattan are important because they cause the lowering of the grade of rattan thus radically affecting its value. The fungi found causing this discoloration are species of Ceratostomella; Melomastia; Helminthosporium; Cladosporium; Diplodia; and Curvolaria. The following chemicals were found to be effective in preventing growths of staining fungi if applied to freshly cut rattan and in proper strength: Lignasan, Dowideide G., Pentachlorophenol, Permatox 10-S, Copper sulphate and Acetic acid. Crysillic acid, Woodlife and Mercuric-bichloride, however, were found to have little effect on the suppression of the growth of the staining fungi.

Construction of an experimental dryer and artificial drying of rattan. By E. O. Mabesa (1951). The paper described the method of construction and use of an artificial dryer of rattan. The dryer costs ₱833.00 and has a capacity of 150 canes with an average diameter of one inch and 3 meters long each. It took 4 days to dry scraped rattan over 1 inch in diameter to 5.8 to 8.7 per cent moisture content.

A desirable temperature for drying to minimize collapse was found to be around 60°C at the start and gradually increased to 65°C when nearing the end of the period of drying. Scraped canes of limuran have a greater tendency to collapse whether matured or young than scraped palasan.

A study on the chemical treatment of rattan against insect attack. By A. D. Diasanta (1951). This investigation was conducted to determine the efficacy of some chemicals in protecting rattan from insect attack. The chemical used were pentachlorophenol (PCP), gamma benzene hexachloride (BHC) and dichlorodiphenyl-Trichloroethane (DDT) with kerosene as solvent. Two concentrations, 2 and 5 per cent by weight, of each chemical in kerosene was prepared.

The results showed that all the chemicals used in the tests were decidedly repellent to *Dinoderus* sp. with varying duration of effectivity depending upon the chemical, the concentrations used, and the treatment. Under adverse conditions where rattan canes are exposed to severe infestation of borers, it is highly probable that a 5 per cent solution of kerosene sprayed on the piles of rattan will prevent infestation by *Dinoderus* for a considerable length of time.

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The measurement of the width of the crown can be accomplished by the use of any known micrometer wedge or any other instrument known for measuring horizontal distance. The determination of the density of growing stock can be made by actual count of the crowns of trees visible in the air photo. Because our forests have second and third story trees, use of density scale will facilitate density determination. The different gradations of the density scale which correspond to density classes will aid the interpreter to represent stocking of the particular forest covered in the survey.

It would be of advantage to the interpreter to have previous knowledge of the conditions of the forest before attempting to interpret the photograph. Therefore in order to be proficient, he must be well versed in the types existing in our rain forest.

Research in the correlation of variables for the determination of volume of stands must have forward stride so that we may have sufficient results for volumetric interpretation of photos. For the present time, I do believe that aerial photography will find its most important use in preliminary reconnaissance of the public forest. Hence, a combination of aerial photography and ordinary timber cruising may yield a highly desirable result from the standpoint of accuracy and economy.

REFERENCES:

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2. Spurr, Stephen H. "Aerial Photography". pp. 183-194; Unasylva, Vol. II, No. 4.
3. Lecture notes taken in the class.