After coming to Ottawa he organized, in co-operation with the provinces, the series of standardized forest fire protection statistics which continue to the present time. He also strongly supported the fire protection research program which, among other things, developed the Wright System of Fire Danger Measurement now used by most of the forest protection organizations in Canada.

In 1939 he organized the National Forestry Program for Youth Training, which was most successful although unfortunately terminated by the war.

In 1948 he was appointed Canadian member of the Advisory Committee to the Forestry Division of the Food and Agriculture Organization of the United Nations. Dr. Macdonald represented Canadian forestry at sessions of the Conference of FAO in Washington and Rome, and attended the Third World Forestry Congress in Finland in 1949, and the Fourth Congress in India in 1954.

Dr. Macdonald was Chairman of the Forest Insect Control Board of Canada, and in 1949 was head of the Canadian delegation to the Conference on World Pulp Problems organized by FAO and held in Montreal. For many years he served as a director of the Pulp and Paper Research Institute of Canada, and as a director of the Canadian Forestry Association.

In 1952 Dr. Macdonald was Chairman of the Sixth British Commonwealth Forestry Conference, to which Canada was the host country.

Shortly before his retirement from the Federal Public Service in October 1956, Dr. Macdonald received the Annual Forest Conservation Award from the Canadian Forestry Association.

He then became a director of Hunting Technical and Exploration Services, Limited, and was actively engaged in organizing the Forestry Division of that company until shortly before his death.

Dr. Macdonald was for many years an active member of the Canadian Institute of Forestry. His interest in and support of the Ottawa Valley Section in particular will be sorely missed.

A CHECK ON THE ACCURACY OF TREE HEIGHTS TAKEN FROM AERIAL PHOTOGRAPHS

By J. R. Collins¹

Abstract

In the Spring of 1956, some forty tree heights were measured by parallax bar from aerial photographs and checked against ground measurements.

The standard error of individual height estimates for all trees was ± 6.1 feet, and for dominant trees was ± 5.1 feet.

Estimates of maximum height for site classification can be made with excellent reliability by this method.

General

In 1955-56 an area of some 10,000 acres was cruised from aerial photographs. Photo-volume tables were set up based on detailed ground examination of five 2-acre photo plots, plus information from a standard ground cruise of an adjacent tract. The area is now being logged. A complete report and analysis of the cruise procedure will be made when figures are available for

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the volumes cut. In the meantime, however, a note on the accuracy of tree heights measured from photographs may be of interest.

Procedure

The following equipment was used to establish tree heights from the photographs:

- (1) 12-inch focal length photographs with an average scale of 1 inch to 1,200 feet.
- (2) Old-Delft Scanning Stereoscope with a magnification of $4\frac{1}{2}$ -X.
- (3) Cassella Parallax Bar.

Forty tree heights were measured from the photographs, and remeasured on the ground with tape and abney.

The average height of the measured trees was approximately 90 feet, with a range of 50 to 120 feet. Care was taken that the sample trees fell into representative sites such as flat and open ground, steep hillsides, gullies, etc.

Three effective parallax readings were taken for each tree and averaged. Two feet were added to each calculated height as allowance for leaders. The average maximum height of five dominant trees within each plot was calculated averaged for site classification.

Results

- (1) Standard error of estimate for individual tree height..... ± 6.1 feet
- (2) Maximum error - 15 feet
- (3) Estimate of average maximum height by plots (average of five dominant trees)

	Average of		
	Photo Heights	Ground Heights	Difference
Plot 1 (flat & open)	81 feet	81 feet	0
Plot 2 (steep hillside)	89 feet	90 feet	- 1 foot
Plot 3 (gully)	91 feet	89 feet	+ 2 feet
Plot 4 (flat & brushy)	78 feet	77 feet	+ 1 foot
Plot 5 (steep & brushy)	91 feet	92 feet	- 1 foot
(4) Standard error of estimate for dominant tree heights	± 5.1 feet		

Remarks

The maximum errors fell on the smaller trees, which were usually thrifty immature, and thus had long leaders with a slender crown, which was difficult to resolve under the stereoscope.

The dominant trees were old-growth Douglas fir with a flat crown, and thus were comparatively easy to resolve.

A significant difference was noted between individuals using the parallax bar. It was noted, however, that all individuals tended to improve their accuracy with practice.