well as public. The final, bound, International Business Machine tabulation is in book form.

A general idea of the scope of this work is obtained from the following summary of data represented:

Data collected and analyzed in Guatemala, C.A.: March 1943–July 1944.

Further analysis of variance of data in U.S.A.: October 1944–March 1945.

Number of chemical assays in data: 3,573.

Number of grafts attempted during 1937–42, inclusive: over 180,000.

Number of grafts set out in the field for same period: 27,531.

Number of trees one or more years in the field and included in the study: 31,058.

Number of trees measured from 1 through 7 years of age, inclusive: over 17,000.

Number of clones: 709.

Number of additional different pedigrees represented by individual trees: 1096.

Number of principal *fincas* where most of plant material is growing: 7.

Number of fields represented in above *fincas*: 27.

Range of elevations of fields: 3,000–6,000 feet, or 914–1,829 meters.

Total area in study: 35.2 acres, or 14.2 hectares.

A total of 709 clones, already established in Guatemala through grafting, together with the individual trees that were assayed but not grafted at 7 principal *fincas*, or estates, represents the material of the clonal performance records. On the basis of these it is possible for the first time to see what has been done with respect to each pedigree and clone and to make certain comparisons. The information given for each pedigree may be classified as follows: (1) identification and description by pedigree; (2) chemical analysis of bark with additional pertinent data on factors believed to affect the alkaloid content of a tree; (3) figures concerning the size of the trees, general appearance, abnormalities, and diseases; (4) ability of plants to survive in the field; and (5) data relating to the ease with which the various plants may be grafted.

Three measures of performance have been computed to permit direct comparisons between pedigrees. Differences due to age and certain environmental conditions are equalized in these three figures. The first is termed *quinine value*, a comparative figure adjusted for differences in age and differences due to fields and altitude. This is computed as a per cent of the average content of the three highest assaying types, namely *ledgeriana*, *ledgeriana* hybrid, and hybrid. *Size value*, the second measure, is adjusted for differences due to age and is computed as a per cent of the average of the three types mentioned above plus *succirubra* hybrid. The third figure, *survival value*, which is adjusted for age, number of years in the field, effect of original planting and replanting, is computed in terms of the average per cent survival for the same four types as were used to determine the average size of the trees.

These figures show the *quantitative amount* by which any given pedigree excels the average of all other pedigrees; *i.e.* it is a quantitative means of comparing the ability of a given pedigree to produce quinine with the average ability of all pedigrees. The figures are consequently free of all personal bias or favoritism and reflect the experience gained at 7 different estates, each directed by different individuals. On the basis of the tabulation it is now possible to select those pedigrees which are the best or the worst with respect to quinine content, size, and survival.

The reliability of the data presented is indicated by the number of individuals upon which the many figures are based. In some instances there are evidently too few observations to give any but the most preliminary indications of the true or probable performance of a given clone. Additional sampling will be necessary to determine the usefulness of certain plant material.

The results of a detailed statistical analysis of the data by the author are in the form of a manuscript entitled *Cinchona in Guatemala*. Cinchona growers in Latin America as well as in other countries would greatly benefit by its publication.

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Scientific Book Register

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