periment on himself. In early youth he had often attempted pieces beyond his capacity and worked errors into his performances which later proved difficult to eradicate. One of these pieces—the Bach-Tausig "Toccata and Fugue in D minor"—was chosen for the experiment. A passage was selected which contained five "perilous points," *i.e.*, chords in each one of which a certain error was likely to occur. The writer practiced this passage, slowly and carefully, ten times daily, purposely putting in the wrong notes, for two weeks, trying meanwhile to impress himself mentally that this performance was wrong and should not be allowed in a regular rendition. On the fifteenth day the whole piece was attempted at a suitable tempo and—presto!—gotten over without an error. After several more perfect performances at intervals of a day or two the writer had the hardihood to attempt a final test by demonstrating the "perilous passage" to an advanced pupil. The result was disastrous and humiliating; every one of the carefully practiced mistakes turned up again!

Perhaps piano-playing is not exactly analogous to typewriting. Perhaps the conditions of this experiment were not correctly arranged. It may be that the laws governing ordinary habit-forming do not hold in performances which approach the upper limit of mental and manipulative dexterity. But if there is any way in which the idea of Dr. Dunlap's paper could be applied to instrumental practice the whole musical world would look up to him as a benefactor.

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## GEOMETRICAL CONSTRUCTIONS ON THE SPHERE

THE Willson hemisphere is well adapted for the use of the individual student desiring to make constructions on the sphere. For demonstrating such constructions to a class it is, however, inconveniently small. To overcome this difficulty an opal glass light shade of spherical shape and about fourteen inches in diameter may be used. Such shades are commonly employed, one at the top of each lamp post, in parks and campuses. Lines may be readily drawn on them by using the type of pencil made especially for marking on glass. In addition to the advantage of large size, these globes represent considerably more than half of the sphere. If one desires to draw a great circle, a stretched string is a convenience, one end of the string being secured to a small rubber vacuum cup which will adhere to the spherical surface.

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## SCIENTIFIC BOOKS

*The Soils of Cuba.* By HUGH H. BENNETT, soil scientist, Bureau of Soils, U. S. Department of Agriculture, and ROBERT V. ALLISON, formerly chemist and soil biologist, Tropical Plant Research Foundation. 101 illustrations. Pp. xxiv + 410. 4 maps, including large soil map of Cuba in folio with key to the principal soils of Cuba. Price, $6.25. Published by the Tropical Plant Research Foundation, Washington, D. C.

THIS book is a record of the most comprehensive study of the soils of a large tropical area that has been undertaken since the development of the more modern ideas on the investigation and classification of soils. After the introduction stating the reasons for carrying on the survey, the general characteristics of the soils are discussed, contrasts between most of the soils of this region and those of temperate climates being brought out. The basis for classifying the soils into families, series and types is considered. This is followed by descriptions of the soil series, the different related series being grouped into families.

The majority of the series, of which there are over ninety, are named for Cuban localities near which the soils were first studied and identified. Certain of the soils of western Cuba, however, are identical with and are described under the names of series occurring in the southeastern United States. Discussions and tables giving the results of chemical and physical studies of many of the soils are included. These include complete chemical analyses, studies of soil concretions (perdigon), H-ion concentration, base exchange values, mineralogical analyses and quantitative measurements of physical properties.

Following this are chapters on middle, eastern and western Cuba and the Isle of Pines. Each of the three Cuban areas is divided into a number of soil regions which are discussed separately. The profile characteristics of the important soil types of each region are described and the agricultural use of each discussed.

There is a short chapter on salt in Cuban soils and its relation to crop production. Another chapter deals with soil moisture studies. It appears that certain of the heavy clay soils through improper and infrequent cultivation have become so compact that they will hold very little water above the wilting point. There is also a chapter on the climate.

The final chapter dealing specifically with Cuban soils is given over to a discussion of the relation of soils to agriculture in Cuba. The importance of the soil type in agricultural studies is emphasized. The fact that different soil types respond to widely dif-

ferent cultural practices is brought out. It appears that this has not been considered by many of the cane growers who frequently fail to make profits because of this. The relation of soil types to each important crop of the country is discussed, special emphasis being placed on sugar cane, which is by far the most important crop of the island.

Dr. Curtis F. Marbut, of the Bureau of Chemistry and Soils, has contributed an interesting chapter on soil classification. This is followed by an appendix, tables, a glossary, a list of plant names, a rainfall map, a detailed soil map showing soil types and content of water soluble salts of an area on the south coast of Havana Province and an index. The illustrations are varied and well selected.

This volume is interesting throughout and should form a basis for future more detailed soil surveys in tropical areas.

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## SCIENTIFIC APPARATUS AND LABORATORY METHODS

### EXTRACTS OF FRUIT SKINS AS SELECTIVE NUCLEAR STAINS

THE skin of the blue grape—Concord or Worden—contains a pigment that stains nuclear chromatin very selectively. Five grams of the powdered dried skins, placed in ten cubic centimeters of water, heated to the boiling point and filtered, gives a dark purple solution. This stains the nuclei of tissues, celloidin or paraffin sections fixed in formalin or Zenker's fluid, or frozen sections either fixed in formalin or unfixed, a purplish color which becomes blue when the section is washed in tap water five minutes or longer. Eosin counterstaining can be used without altering the nuclear stain.

If one drop of a ten per cent. aqueous solution of ferric chloride is added to this aqueous solution of grape skins, the solution becomes blue and the sections are stained by it more deeply but must be decolorized with one per cent. hydrochloric acid alcohol (70 per cent.). If the sections are then washed with tap water the nuclei appear blue, resembling sections stained with methylene blue. However, the staining is sufficiently strong and selective with the simple aqueous extract followed by washing with tap water, so that the use of ferric chloride or other oxidizing or mordanting agents is not necessary or recommended.

The stain is taken up by the chromatin very selectively, and the differentiation is excellent. There is no tendency to overstain. The nuclei of rapidly growing cells, as in carcinoma, stain deeply, and mitotic figures are intensely blue. The stain is as effective when made from the fresh fruit skins, and a section of kidney stained in this way and exposed to diffuse light is now as blue as when prepared eight months ago. Even daily exposure to direct light in a south window for five months did not lead to any appreciable fading of the sections so stained. Evidently then this dye is of satisfactory permanence.

Blackberries, black raspberries, blueberries, huckleberries, the skins of black figs, large purple plums, small purple plums, dark red plums and blue plums, and black sweet cherries, have all been found to contain pigment which may be extracted in usable condition by merely boiling with water. The coloring matter thus obtained has a marked and selective affinity for the chromatin of tissue cell nuclei. If the fruit skins contain much acid, as in the case of the plums, the staining is red, but when washed in tap water the nuclei become blue, and unless the section has been stained for a long time, ten or twelve hours, for instance, only the nuclei retain the stain. The juice expressed from the black raspberries and blackberries before heating also stains nuclear chromatin readily. Blueberries have a tougher skin and have to be boiled to obtain results that are satisfactory, and the extract thus secured is apparently the most active of any of these fruits.

For large-scale production, grape skins offer an economical source. Grape juice, as on the market for beverage purposes, does not contain enough of the coloring matter to be used for staining. An extract made by boiling ten grams of the dried grape skins for one hour in one hundred cubic centimeters of 50 per cent. alcohol was very satisfactory. It stained no better than an aqueous extract of the same strength, but it has keeping properties that make it preferable.

Such a simple, inexpensive and universally available staining material would seem to have possibilities. It demands no complex method of preparation and mordanting. No aging is required, as with hematoxylin, and the stain can be used at once. It seems to be fully as selective as hematoxylin, is much less expensive and apparently is very permanent as far as yet determined.

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### A MICRO-GUILLOTINE

THE instrument described here was designed primarily to effect at any desired place and with a high degree of precision the breaking of the tip of a micropipette made by the method described at various times by Chambers.[1] It has been found in practice that

[1] Chambers, Robert, *Anat. Rec.*, Vol. 24, No. 1, 1922.