

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 mi-

totic 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.