vent evaporated. The residue was dissolved in boiling water and crystallized. The slightly yellow crystals so obtained melted at 127–128° C. uncorrected. The alcoholic solution gave a brown-black coloration with ferric chloride. A few crystals dissolved in glacial acetic acid, on the addition of a few drops of concentrated nitric acid, gave a blood-red color. These reactions prove that the crystalline substance is cotoin.

SUMMARY.

Nectandra Coto Rusby is a true coto, since it contains cotoin. The total ether extract is 24.83%, volatile oil 1.89%, and ash 1.67%. Two new alkaloids, parostemine and parosteminine, were found in the drug. Further work is in progress and will be reported later in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

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THE HISTOLOGY OF VILCA BARK.

BY FANCHON HART.

Piptadenia macrocarpa Bentham is the botanical source of Vilca bark, one of the many medicinal barks brought here from South America by Dr. H. H. Rusby. This bark was collected by him during his recent exploration in the Amazon region.

The tree is a member of the family *Mimosaceae*. It was found growing in Bolivia where the natives make an aqueous extract of the bark. This extract is added to cane juice to hasten fermentation, the process being brought to completion in much less time than is otherwise required and resulting in an increased yield.

The tree has a wide range in central South America. Dr. Rusby encountered it on the central slopes of the eastern Bolivian Andes, at an elevation of from 3000 to 5000 feet, where the trees are abundant, growing on the slopes, but not in the river bottoms. The usual height of the trees is from 40 to 80 feet, and the trunk diameter from one to two feet. The tree is instantly recognized by its conspicuously warty bark, the warts so densely placed as to be freely confluent or superposed. The leaves are bipinnate, with innumerable very small leaflets, imparting a fine and graceful appearance to the foliage. The flowers are of the usual mimosaceous type and the pods like narrow flattened bean pods, with strongly thickened margins, brown in color and of a woody texture. The wood is extremely hard and very durable, and largely used as lumber.

It is noteworthy that this is one of the several trees of tropical America to which the name "quebracho" has been applied, so that there has been some confusion of it with the quebrachos of Argentina and Paraguay. It has also been called "Zumaque," doubtless because of its large content of tannin, showing a confusion with the several plants known in different regions as "sumac."

The bark is easily collected, peeling readily from the wood, and has been used for tanning, as well as for the fermentation of cane juice.

GROSS DESCRIPTION.

Older pieces of the bark dry in the form of large curved, warty, roughly scabrous quills, 50 to 60 millimeters in width and averaging 200 millimeters in length. The middle and inner bark is from 5 to 8 millimeters in thickness, the warts from 2 to 25 millimeters in thickness. *The outer bark* which is thickly covered with warty projections is rough and scaly. These warts are built up layer upon layer and are

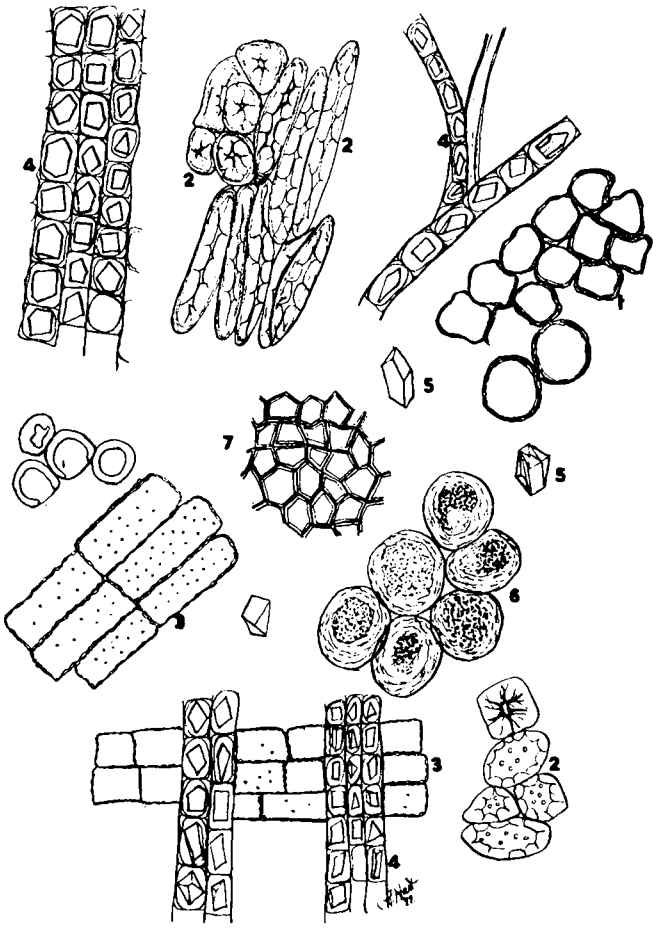

FIG. 1.—THE CELLULAR ELEMENTS AND CONTENTS OF VILCA BARK.
1—Cortical parenchyma; 2—Stone cells; 3—Medullary ray cells; 4—Crystal-bearing fibers; 5—Prismatic crystals; 6—Resin cells; 7—Bark parenchyma.

from 2 to 30 millimeters in diameter at the base. They are broadly conical or oblong in shape, deeply furrowed and concentrically striated. Externally they are gray to greenish brown in color, internally they are brownish yellow. *The middle bark* is pink to pinkish buff in color and breaks with a hard splintery fracture. After fracturing, the middle bark separates (with difficulty) into six to eight layers. *The inner bark* is red to brownish red in color, smooth to the touch and

marked with many fine longitudinal striations. Elevations which appear on the inner bark are caused by the protrusion of the tissues of the larger warts.

HISTOLOGICAL DESCRIPTION.

A cross-section of the bark (Fig. 3) through one of the warty projections shows the periderm to consist of many layers of cork tissue. Each wart is completely bounded by cork and contains bands of cork tissue together with some cortical parenchyma and many resin cells. Large lenticels and secretion cavities are apparent in the bark periderm. The cortical parenchyma of the middle bark contains many

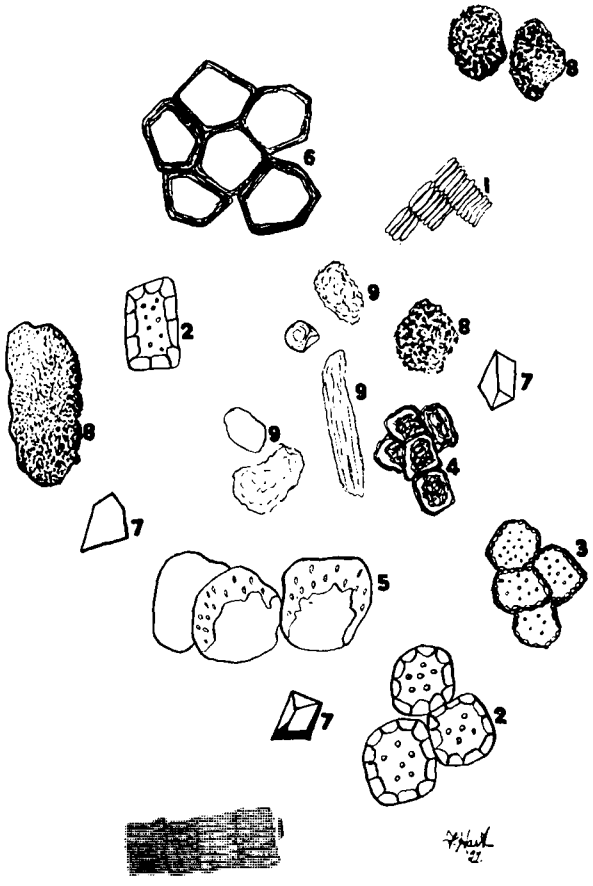

FIG. 2.—THE CELLULAR ELEMENTS AND CONTENTS OF WARTY PIECES.

1—Cork cells; 2—Stone cells; 3—Porous bark parenchyma; 4—Resin cells; 5—Stone cells; 6—Bark parenchyma; 7—Prismatic crystals; 8—Resin masses; 9—Siliceous materials.

prismatic crystals. Bast fibers and porous striated stone cells are likewise found in this region. The inner bark consists of bast fibers, bark parenchyma and medullary rays. The above elements are shown in Fig. 3, cross-section of the bark.

The powdered bark, excluding the warty material, shows many large crystal-bearing fibers, composed of crystal cells. Large prismatic crystals fill the cavities

of the crystal cells, the walls of which are thickened at the corners. Porous and striated stone cells are seen in long and cross-section view. Masses of irregular cortical parenchyma cells and five- to six-angled yellow and reddish brown cells of the bark parenchyma are easily distinguished.

Medullary rays crossed by crystal-bearing fibers are seen in the form of broken fragments. Many circular red and yellow resin masses present a spongy appearance. Prismatic crystals are found free in the field.

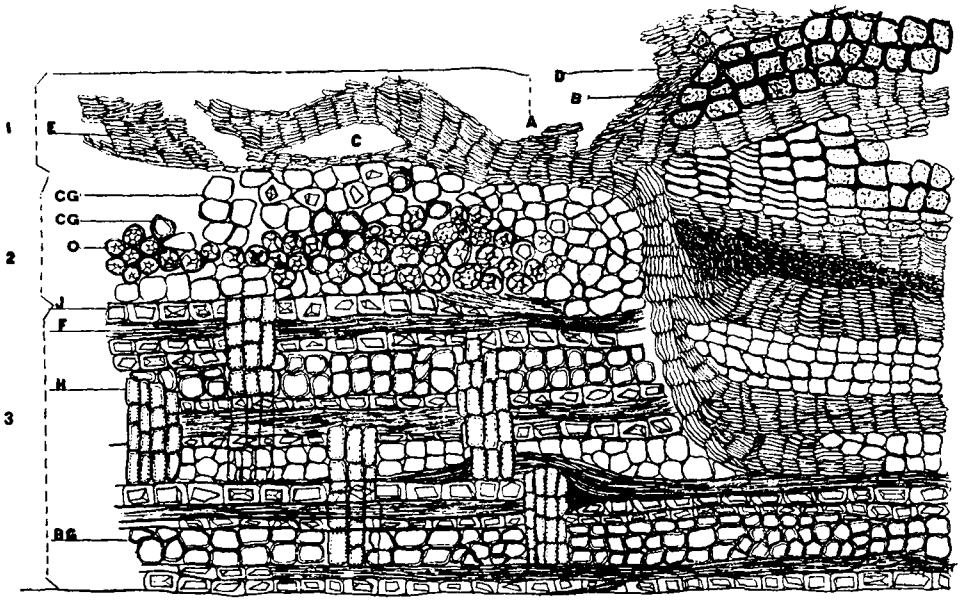

FIG. 3.—CROSS-SECTION OF VILCA BARK.

1—Outer bark: A, Lenticel; B, Thickened walled cork with tannin; C, Secretion cavity; D, Cork tissue; E, Periderm.
2—Middle bark: CG, Cortical parenchyma; F, Fibers; O, Stone cells; J, Crystal-bearing fibers.
3—Inner bark: F, Fibers; H, Medullary rays: BG, Bark parenchyma.

The powder prepared from the warty projections shows them to consist largely of cork and resin cells. Prismatic crystals, stone cells, cortical and bark parenchyma are found in smaller amounts than in the bark proper. Irregular pieces of siliceous material are present in considerable quantity.

The bark contains a large percentage of tannin, calcium oxalate and resin.

BOTANICAL DRUG RESOURCES OF NEW ENGLAND.

BY E. E. STANFORD.

The New England States furnish a considerable number of native plants which were largely collected for medicinal use in the colonial and early national periods but which now rarely enter commerce from this source. Many are no longer extensively used in commercial or prescriptive medicine, and those which are in demand can usually be more cheaply supplied by Southern Appalachian regions.

Increases in price and an influx of cheaper foreign labor into the rural districts suggest the possibility of commercializing at least some products. *Veratrum viride* and *Aspidium marginale* are examples of such materials. Drug cultivation appears scarcely to have been attempted here, though agricultural conditions suggest worth-while possibilities for a few products.