by distillation, the liquids concentrated to a volume of 156 Cc. and 94 Cc. of glycerin were added.

The product which was treated with an equal volume of alcohol has precipitated some on standing, while that to which two volumes of alcohol were added remains perfectly clear.

All of the above tend to show that cold water and ammoniated water extract a lot of gummy and albuminous matters which are of no value but on the contrary are troublesome in producing precipitation or growing bacteria and moulds. A further evidence is found in the fact that the fluidextracts which were made by percolating with boiling water and concentrating the percolate by boiling in open pans mix well with 73% alcohol, and those which were extracted with boiling water but concentrated at a low temperature mix well with 65% alcohol, while the alkaline extracted samples do not mix well with diluted alcohol.

None of the above samples contains alcohol in the finished preparation. One sample which contains 25 percent of glycerin, by volume, has precipitated considerably and shows a fungoid growth at the top. A sample containing 30 percent of glycerin has kept well for eight months. The rest all contain 37.5 percent of glycerin, by volume, which seems to be sufficient to preserve the liquid and it adds to the sweetness also.

In this respect as well as in cost and the avoidance of restrictive factors it has an advantage over alcohol.

For the solid extract the drug was extracted by boiling water, the percolate boiled down to a small volume, then filtered and the filtrate evaporated to extract consistency. None of the four samples so made shows any change on standing whereas some made by extracting with ammoniated water have moulded.

While the use of heat in extracting and concentrating licorice percolates has not proved altogether satisfactory in preventing precipitation in the fluidextracts, yet the amount is very much diminished and in none of my samples is there enough precipitation to be really troublesome. In economy of extraction and in miscibility with alcoholic fluids they are a decided improvement over the present official methods, and there is also less tendency to mould or sour.

For a fluidextract of licorice, glycerin is recommended as a preservative in preference to alcohol.

LABORATORY OF PARKE, DAVIS & CO.,
DETROIT, MICH.

## OBSERVATIONS ON MUIRA-PUAMA.*

BY HEBER W. YOUNGKEN.

Several months ago, the writer was called upon to determine the authenticity of a woody root which was labeled Muira-Puama. Being interested in the new problem, he compared this specimen both as to macroscopical and microscopical features with two samples of a root likewise marked "Muira-Puama" in the crude drug collections of the Philadelphia College of Pharmacy and Science. On the label of one of the specimen jars containing the root appeared the botanical origin

* Read before Scientific Section, A. Ph. A., New Orleans Meeting, 1921.

which was given as "*Liriosma ovata*" Miers. A comparative study proved that all three samples were identical.

Until recently, comparatively little Muira-Puama has been seen in this country for about fifteen years. At present it is being shipped from Para and Rio de Janeiro, Brazil, to various manufacturing pharmaceutical houses in the United States where it is made into a fluidextract which is then sent back to Brazil, there being no particular demand for it here. In Brazil and France it is employed in the form of fluidextract and other preparations for the treatment of nervous disorders.

### DESCRIPTION OF PLANT.

*Liriosma ovata* Miers[1] is a small tree about 14 feet in height belonging to the Olive family and found growing in Brazil. Its leaves are short-petioled, up to two and three-fourth inches in length and one and five-eighth inches in breadth, broadly ovate, attenuated at apex, obtuse at base, light green on upper surface, dark brown on lower surface, venation pinnate-reticulate, the few veins being short arched and turning back toward the mid-rib, veins scarcely visible on the lower surface, margin slightly reflexed. The inflorescences consist of short axillary racemes of 4 to 6 flowers each.

### DESCRIPTION OF ROOT.

Conical, nearly straight, tapering to a small point, from one-half to one and one-half feet in length and from one-eighth to one and one-half inches in diameter; externally light brown to grayish brown, faintly longitudinally striated and beset with short, sharp projections which occasionally unite two or more roots; fracture strongly tough and fibrous; internally light brown with thin bark and broad wood; odor faint; taste slightly saline and acrid.

### HISTOLOGY OF ROOT.

Sections of the root of Muira-Puama exhibit the following histological characteristics, passing from periphery toward the center:

1. Cork, composed of several layers of tabular cells with lignified walls and brownish contents.

2. Phellogen of clear meristematic cells.

3. Cortex, a broad zone of starch-containing cortical parenchyma, imbedded in which are cells containing a resinous substance and scattered groups of sclerenchyma fibers accompanied by crystal fibers.

4. Phloem, a narrow zone of sieve tubes and phloem cells, the latter possessing numerous starch grains. Imbedded in this region are groups of thick-walled, lignified bast fibers accompanied by crystal fibers.

5. Cambium, a prominent circular zone of meristematic cells.

6. Xylem, a very broad zone of radiately arranged wood wedges separated by starch-containing medullary-rays. Each xylem patch is composed of numerous wood fibers with lignified walls that have simple oblique pits, scattered among which are wood parenchyma cells containing starch and crystals of calcium oxalate and porous and pitted tracheae. Crystal fibers, the cells of which contain rhombohedral or cubical shaped crystals of calcium oxalate frequently adhere to the wood fibers.

POWDERED DRUG.

Light brown; simple and compound starch grains, the individual grains being spheroidal or 2- to 4-compound with circular or 2- to 3-cleft hilum and averagely 7.5 to 15 microns in diameter; numerous crystals of calcium oxalate in crystal fibers and rhombohedral or cubical crystals; numerous fragments of sclerenchyma fibers, the latter often accompanied by crystal fibers; numerous fragments of tracheae with bordered pores or simple pitted walls; stone cells with porous, lignified walls, and numerous resin cells with dense brownish contents.

PREPARATIONS.

In addition to the fluidextract, there are two preparations[1] which are used mainly by the French. One of these, "Pilula Potentin Composita," contains one grain of extract of Muira-Puama and one grain of ovolecithin to each pill. It is given in doses of 3 to 6 pills daily, before meals, as a nerve stimulant and aphrodisiac.

The other preparation, "Muiracethin," consists of the residue *in vacuo* of 100 grammes of fluidextract of Muira-Puama and 5 grammes of lecithin with a sufficient quantity of licorice powder to make 100 pills. The dose is given as 3 to 4 pills daily—one pill morning and noon and two pills in the evening.

BIBLIOGRAPHY.

[1] Miers, "Additional Observations upon the Genera Aptandra, Cathedra, Liriosma, etc.," Annals and Magazine of Natural History, Series 3, Vol. 4, p. 363, 1859.

[2] Formulaire des Medicaments Nouveaux, 23d ed., 1911.

BOTANICAL RESEARCH LABORATORY,
PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE,
JULY 1, 1921.

---

# PHARMACEUTICAL CHEMISTRY AS APPLIED TO FOOD AND FOOD ACCESSORIES.*

BY L. E. SAYRE.

One of the reasons for presenting this paper is to direct attention to the fact that pharmacy and pharmaceutical chemistry lead one into many other fields which neither the pharmacist nor the public always discerns; its value is not generally recognized. The properly trained pharmacist like the trained physician is naturally led into lines of investigation where his services are sought for and highly appreciated. It seems to the writer that we should, as a class, recognize the fact that pharmacy, like law and medicine, is progressive and that the vocation at any one time is different in its interpretation, growth in scope and inclusion as it progresses. In recent years the pharmaceutical chemist has been called upon more and more to contribute his skill and training in directions outside the consideration of drugs alone. The equipment which he has obtained in such subjects as drug and plant analyses, bacteriology, etc., make him valuable in serving, in a peculiar way, as a chemist in very many directions. The public, the physician, and all too often the pharmacists themselves fail to grasp the value of the training by which the pharmacist is able to render such services. I have frequently said

* Read before Scientific Section A. Ph. A., New Orleans Meeting, 1921.