

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 preparations¹ 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 ovoidlecithin 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.

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 PHARMACEUTICAL CHEMISTRY AS APPLIED TO FOOD AND
FOOD ACCESSORIES.*

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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

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that I would like to see pharmacy divided, even as medicine is divided, into its rational special fields of practice such as surgery, obstetrics and gynecology, internal medicine, treatment of eye, ear, throat and nose ailments. Nor is this a fanciful presumption. Such division is already being made; the college-educated pharmaceutical chemist is almost waylaid as he emerges from his trained laboratory experience and made a specialist in certain lines of work whether he wills it or not, by those who need him for the finely diversified services he can give which the purely "chemical" chemist—the mere master of chemical facts—cannot render. To the pharmacist, chemistry is not only a science, but has to him, by his application of it, become a fine art as well. The late Robert Kennedy Duncan, not by nature lavish in praise, confided to a mutual friend a "Sir Hubert" tribute, that "he was surprised at the quality of the chemical work those pharmacy students did." He meant that they mastered facts and saw the applications beyond them.

So, to some extent we really have distinct and separate divisions of pharmacy to-day. That there really are such divisions has been recently impressed on me by my having been called to render some services in connection with the administration of the Food and Drugs Law in which I have been obliged to construct methods of estimation of food accessories and certain food products. Recently, too, the writer has been asked to investigate and report on coffee substitutes, having before reported on the subject of volatile principles of coffee, which report has already been published. Another item—that of the investigation of what may be termed pie fillings—has been asked for.

It should be stated in this connection that the work on these subjects has not been sufficiently completed to make more than a preliminary report.

In the report on the Volatile Principles of Coffee, the principles investigated were those not pre-existing in the bean, such as caffeine, but those which were brought into being by the roasting process—empyreumatic and possibly, if taken in quantity, toxic.

The cereal substitutes for coffee, containing proteins, carbohydrates etc., on being roasted may also bring into existence certain obscure decomposition products which may cause more unpleasant disturbances than coffee itself.

Work on the investigation of the empyreumatic principles produced in the manufacture of these cereal beverages has been performed and a preliminary report prepared of the findings. The articles investigated were: No. 1, a pharmaceutical-laboratory-made extract of roasted coffee of known purity in scale form; and Nos. 2, 3 and 4, three cereal substitutes for coffee of trade origin. Ash determinations were made. Also examinations of the various extractions afforded by successive treatment with petroleum ether, ethyl ether, chloroform and alcohol.

The petroleum ether yielded extractive matter: No. 1, .85%; No. 2, .17%; No. 3, .15%; No. 4, .10%. The succeeding treatment with ether in the same numerical order gave .17, .13, .23, .12 percent. Chloroform: .14, .04, .11, .06 percent. Alcohol: 2.65, 3.95, 4.93, 7.16 percent.

Crudely stated, the first three solvents extracted the fats and empyreumatic bodies. The alcohol extractive represented practically the undecomposed or slightly changed cereal bodies, or slightly modified carbohydrates, sugars, and some modified intermediate bodies, dextrine-like, of starch origin.

As mentioned, this examination was merely preliminary. The alcoholic, least altered nutritive extractive bodies, would probably interest the substitute user the most. He would select the article that promised the greatest nourishment and the least of possible toxic synthesized principles. Our own deduction would have to be cautiously made in view of the fact that deductions should be arrived at after more ample and thorough investigation leading to unmistakable proof. This will serve as one example of specialized applied pharmaceutical chemistry, the commencement only of an investigation of interest to the public, but which the public hardly conceives is of pharmaceutical origin, or nature.

Applying the purity rubric to the matter of pies—couching it that way sounds pharmaceutical at least—and to the ever-willing bearer of burdens—the pharmacist—is that task allotted. The manufacturers of pies in the U. S.—especially fruit pies—have been desirous of having a standard arrived at and imposed upon all manufacturers as a part of the Food and Drugs Act. Representative manufacturers claim that at least 51% of the whole fruit should form the pie mass between the upper and lower crusts. Pie fillers are sold on the market which are condemned by the Federal Committee which administers the food and drug laws.

The problem has been to find a workable method that would be serviceable in regulating or standardizing what might be called pure pie masses or fillings. Several attempts were made to separate the pie masses (or fillings) by centrifuge after proper dilution, analyzing the solution as well as the solid centrifugate and finally to ascertain the total moisture in the upper and lower crusts including the filling, but all efforts to secure satisfactory uniform results have not been, thus far, fully successful on any workable basis.

Since fruit pies are made from the fruit pulp which is thickened by starches of different kinds—thickened by bringing the mixture simply to the boiling point under steam heat—it has been assumed that if the percentage of starch contained in a pie filling were determined that would be a valuable, if not a satisfactory datum, as a means of comparison; therefore the present method has been used with some fairly good results, *viz.*: by using 80% alcohol to separate sucrose and fruit sugars from the analytical portions and the residue from this after inversion with hydrochloric acid, quantitatively tested to determine the inverted or converted starch by the Fehling solution method. Thus far we have been able to obtain measurable concordant results. We can only report this much of the work at present.

I might apologize for bringing before this body such an apparently unfinished work, but since the chairman of this section desired a paper from me I could think of no better way to bring before this body of pharmacists the importance of looking toward pharmacy as a calling which should require of them a degree of attainment worthy of the name "drug chemist," and that they by this means are preparing themselves for a wider sphere of influence than the so-called drug business alone, as valuable as that part of the vocation is.

I hope that some day the various interests of pharmacy may be gathered together as a unit; when the commercial lines as well as all the other of the various branches of pharmacy will take their place beside other professions which have been differentiated, and thus made more highly useful to mankind.