A fine group of *Atropa Belladonna* seedlings are found in plot No. 31, as well as a few flowering plants.

Plot No. 36 contains such xerophytic plants as *Aloe spec., Agave Americana, Cactus grandiflora and Euphorbia pilulifera,* the border consisting of *Echeveria spec.*

Plots Nos. 39 and 56 are filled with such cereal yielding plants as *Avena Sativa, Hordeum sativum, Triticum sativum* and *Secale cereale.*

Three varieties of Hyoscyamus are being studied, namely, *H. niger, H. albus* and *H. pictus.*

Several plots throughout the garden were assigned to drug yielding shrubs. Some fifty of these have been planted, including *Viburnum opulus* and other species, *Chionanthus Virginica, Hydrangea arborescens, Berberis vulgaris, Cornus stolonifera, Sambucus canadensis, S. nigra, S. pubens, Prunus serotina, Prunus Virginiana* and *Euonymus atropurpureus.* Between the shrubs hardy perennials have been planted, such as Monarda species, *Helenium autumnale, Iris spec.,* yielding Orris, *Phlox spec., Paeonia officinalis, Yucca filamentosa,* etc.

On five of the plots cold frames covered with sash were constructed. Many plants were started in these and they will be used again this fall for giving slight protection to certain plants during the winter.

Over one-half of the medicinal plants yielding official drugs are already under cultivation and more are being continually added. Of those which do not yield official drugs the number is much larger and it is planned to add representative specimens as rapidly as possible of all drug yielding plants, some of which necessarily must be conserved in the greenhouse.

The general plan in developing the garden has been to keep different species of plants belonging to the same family in beds of close proximity. This was followed out to a certain extent, but until soil conditions can be produced as desired in each plot the plan will not be entirely feasible. Such an association of plants greatly enhances the value of the garden in giving instruction in pharmaceutical botany.

The effect of different soils, moistures, etc., on the constituents of certain plants is being carefully observed and it is hoped that some valuable pharmacophysiologic work can soon be accomplished.

PERMANENCE OF SOME ASTRINGENT PREPARATIONS.

WILBUR L. SCOVILLE.

In March, 1908, a series of fluidextracts of drugs which contain considerable amounts of tannin was prepared for the purpose of studying the stability of the tannin in such preparations. Each was freshly made and was tested as soon as possible after finishing.

The Loewenthal method of estimating tannin was first tried. With some the results were satisfactory, so far as the operation of this process is concerned, but with others it was impossible to get any end-point and this method was abandoned. From this and subsequent experiences the writer believes that no one method

can be applied satisfactorily to all kinds of tannin containing material, because tannin, as the term is used, stands not for a definite substance but for a class of substances, ranging from chlorogenic acid to true tannic acid. For specific kinds of tannins, as for the treatment of leather, tests which are adapted to that purpose can be made very satisfactorily, but it will be readily understood that for other kinds of tannoid bodies, such a test may entirely fail.

After some study and experimentation it was decided to use two methods, found in Allen's Organic Analysis, 3rd edition, Vol. III, Part I.

The first method, devised by F. Jean, consists in matching the color produced with a weak solution of ferric chloride and a tannic acid solution of known strength, with a dilution of the fluidextract under examination. As in all colorimetic processes this will vary not only with the personal equation, but in different lights, and with colored solutions.

The fluidextracts were each diluted 1 Cc. to 99 Cc. of water for this test. When fresh, each produced a marked cloudiness with water, but after aging some mixed clear with water and all were more miscible than at first. It was not thought best to clarify these solutions any further than by simple filtration through paper, so in the earlier tests a greater degree of cloudiness was contended with than in the later tests. This will account in part at least for the higher results often obtained by this method on the preparations after they had stood for a time.

It is scarcely necessary to point out that this method will estimate not only tannins, but also gallic acid (if present) and any principle that will give a dark color with ferric chloride.

It has, however, the advantage of rapidity, and for tests in series on the same liquid it may be expected to show whether any marked changes have taken place in these principles on standing.

The second method, devised by Collin and Benoist, aims to measure the amount of weak tannin solution required to precipitate all of the gelatin from a definite gelatin solution. The end-point on this method is found in the disappearance of a blue color which is added to the gelatin solution, and is aided by the appearance of the precipitate.

In this process much depends upon close attention to certain details—more, in fact, than was realized in the earlier tests. The gelatin solution must be very hot (80° C), the tannin added very slowly and mixed quickly, and the reaction of both solutions must be alkaline, but faintly so. Since alkalies split up tannins, this last is a fatal point for very accurate work, particularly with colored solutions.

The process, however, distinguishes between tannic and gallic acids, and excludes also other principles which give a dark color with ferric chloride. It thus serves as a check upon the first process.

It may be charged that two inaccurate processes cannot make an accurate one. This is certainly true, and the most that can be claimed for the results given below, is that they may show whether marked changes have occurred in the preparations during the three years that they have been kept, with a fair degree of certainty.

The writer wishes to state that his respect for tannin estimations has not been increased any by this work, and that while, in the light of an accumulated experience more uniform results might be obtained by a repetition of the work, yet a liberal allowance would need to be made for results, by these methods.

The results in the following table are expressed in percentage as a matter of clearness and convenience, but it is highly improbable that the percentages represent actual proportions of tannin. In each series, blanks were used with a solution of pure tannic acid of known strength, and the calculations based upon the figures obtained at the time, but the results with pure tannic acid varied. Differences in the light will account for variations in the first process, and differences in the gelatin solution and in alkalinity will account for the variations in the second process.

	March, '08		June, '08		Dec., '08		June, '09		Dec., '09		Dec., '10		April, '11	
	Jean	C&B	Jean	C&B	Jean	C&B	Jean	C&B	Jean	C&B	Jean	C&B	Jean	C&B
Bayberry	8.6	19.0	8.6	12.5			8.0	11.0	9.0	18.0	9.0	17.0	7.5	13.0
Blackberry ..	8.0	11.8	8.0	5.5	8.7	5.0	8.0	5.3	7.5	6.0	8.2		7.5	2.8
Chestnut Leaves	7.05	7.7	7.05	5.5	7.7	5.5	5.7	5.4	6.2	5.1	6.4	5.0	6.0	2.2
Geranium ...	4.3	10.5	6.0	6.8	6.0	5.5	6.0	6.0	5.7	6.0	2.4	2.5	*	
Gambir, Tr...	0.92	1.3	1.0	0.6	1.0		1.0	0.64	0.91	1.2	0.85	0.75	0.96	0.90
Jambul	8.0	11.1	8.0	6.3	7.8	5.2	5.7	5.0	7.4		6.4	6.0	6.5	3.8
Kino, Tr.....	1.1	2.4	1.3	2.5	1.3	2.0	1.2	1.8	1.3	2.0	1.3	2.0	1.3	2.2
Logwood	6.6	6.3	6.6	5.0	6.6		5.7	3.2	5.5		6.3	3.0	5.0	2.2
Nutgalls, U. S. P.....	17.1	10	17.1	10	16.6	8.7	16.0	8.3	13.0		15.0		13.3	7.4
Nutgalls, aqueous ...	17.1	15	10.0		9.0	00								
Rhatany	6.0	21	6.0	6.8			5.3	5.6	4.2	5.5	4.1	5.5	2.0	1.8
Rose	12.0	19	12.0	6.5	10.5		10.6		12.0	11.2	12.3	12.0	12.0	5.0
Sumac	6.0	7.5	6.0	3.4	5.5	3.3	5.0	2.6	4.5		3.0		3.2	
Uva Ursi	7.0	9.0	7.0	5.0	7.1	3.3	8.0	2.8	8.0			00		00
White Oak...	5.0	10.5	5.0	6.4	5.0	4.7	5.0	6.0	5.0		3.7	5.0	4.0	2.8
Wh. Pond Lily	12.0	13.3	12.0		12.5	9.0	13.3	8.0	13.0		10.0	7.5	11.0	6.0
Wild Cherry.	2.7	7.9	2.0	2.2										
Witch Hazel..	6.0	9.5	6.0	3.9	5.9	2.2	5.0	3.8	4.6	1.2	4.5		4.6	

*Gelatinized.

It will be noticed that the results by the gelatin process on the first assay are usually much higher than on subsequent tests—usually about twice as high as the second test. Since the gelatin solution was prepared fresh each time, I cannot account for this except on the supposition that some change takes place in tannin solutions very quickly. And since the U. S. P. Nutgall fluidextract is the only one that is made without water in the menstruum, and the aqueous fluidextract of Nutgall corresponds in this respect to the other preparations, it would seem that a hydrolysis takes place. This is further borne out by the fact that the preparations which are weakest in alcohol (Chestnut, Uva Ursi, Wild Cherry and Witch Hazel) show the most rapid change.

Indeed, the most profitable suggestion from this study is that tannin preparations should be strongly alcoholic in order to be permanent, and conversely preparations which are undesirably astringent may be rapidly freed from tannin by using a weakly alcoholic menstruum. Thus a fresh fluidextract of Wild Cherry is strongly astringent, but after standing a few weeks it will lose most of this astringency and become more miscible with aqueous fluids.

Glycerin does not appear to hinder or prevent this change as does alcohol, the aqueous fluidextract of Nutgall being made with a menstruum of 60 per cent. glycerin by volume.

The physical conditions of the fluidextracts at the end of three years are interesting.

The fluidextracts of Bayberry, Logwood, Nutgall (U. S. P.) Sumach, Rhatany, White Oak and White Pond Lilly and Tinctures of Gambir and Kino are nearly clear or contain only a very slight precipitate. Fluidextracts of Bayberry and Rhatany show no precipitate but they seem to have thickened a little and suggest the gelatinizing process.

Fluidextracts of Blackberry, Chestnut, Jambul, Aqueous Nutgall, Rose, Uva Ursi, Wild Cherry and Witch Hazel have precipitated badly, and in most cases the precipitate has caked together. Fluidextract of Geranium gelatinized after about two years.

Of the nineteen preparations, Tinctures of Gambir and Kino, and Fluidextract of Nutgall are the only ones in which no material change is evident in three years.

Fluidextracts of Bayberry, Blackberry, Chestnut, Jambul, Logwood, Rhatany, Rose, White Oak and White Pond Lily kept well for two years, but signs of deterioration now appear in these, though positive conclusions should not be drawn from the last tests. No positive conclusions are drawn for these preparations.

Fluidextracts of Geranium, Aqueous Nutgall, Sumac, Uva Ursi, Wild Cherry and Witch Hazel show an unmistakable loss of astringency, and mostly within a year. Geranium kept about two years then gelatinized—and it will be noticed that the tests within three months of gelatinizing showed a marked and sudden reduction in tannin. Aqueous Nutgall shows evidence of the tannin rapidly changing to gallic acid.

Wild Cherry loses its astringency quite rapidly; Sumac, Uva Ursi and Witch Hazel more slowly.

Gelatinization does not take place until the tannin is all changed, and a preparation which will gelatinize finally may have lost most of its astringency without changing its physical appearance. Precipitation may occur to a considerable extent without loss of astringency. But the use of strongly alcoholic menstruum for astringent preparations is strongly suggested.

Two fluidextracts of Cinnamon were included (Cassia and Ceylon Cinnamon) in the investigation, but the estimation of tannin in the fresh preparations was so unsatisfactory that definite records could not be obtained. Evidently the tannoid bodies in Cinnamon are not true tannic acid.

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ANETHOL VS. OIL OF ANISE.

OTTO RAUBENHEIMER.

The question whether Liquor Ammonii Anisatus, a much used galenical which is to be admitted into National Formulary IV, should be prepared with anethol or with oil of anise, a question which has caused quite some arguments in our National Formulary Committee, prompts me to bring the same up before the Scientific Section for discussion.

Liquor Ammonii Anisatus, official in most of the foreign pharmacopoeias, is a solution of 1 Gm. anethol or oil of anise in 24 Gm. alcohol with addition of