

**Digest of researches and criticisms bearing on the revision of the British pharmacopoeia, 1898 : 1899 to 1902 inclusive / prepared for the Pharmacopoeia Committee of the General Council of Medical Education and Registration of the United Kingdom by W. Chattaway.**

**Contributors**

Royal College of Physicians of Edinburgh

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DIGEST  
OF  
RESEARCHES AND CRITICISMS

BEARING ON THE REVISION OF THE  
BRITISH PHARMACOPOEIA, 1898,

PREPARED BY DIRECTION OF THE  
PHARMACOPOEIA COMMITTEE OF THE GENERAL COUNCIL  
OF MEDICAL EDUCATION AND REGISTRATION  
OF THE UNITED KINGDOM.

BY  
W. CHATTAWAY, F.R.C.

1899 TO 1902

INCLUSIVE.



Printed for the Council  
BY  
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GENERAL COUNCIL OF MEDICAL  
EDUCATION AND REGISTRATION OF THE  
UNITED KINGDOM.

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Presented to

*the Royal College of Physicians*

ON BEHALF OF THE

PHARMACOPŒIA COMMITTEE

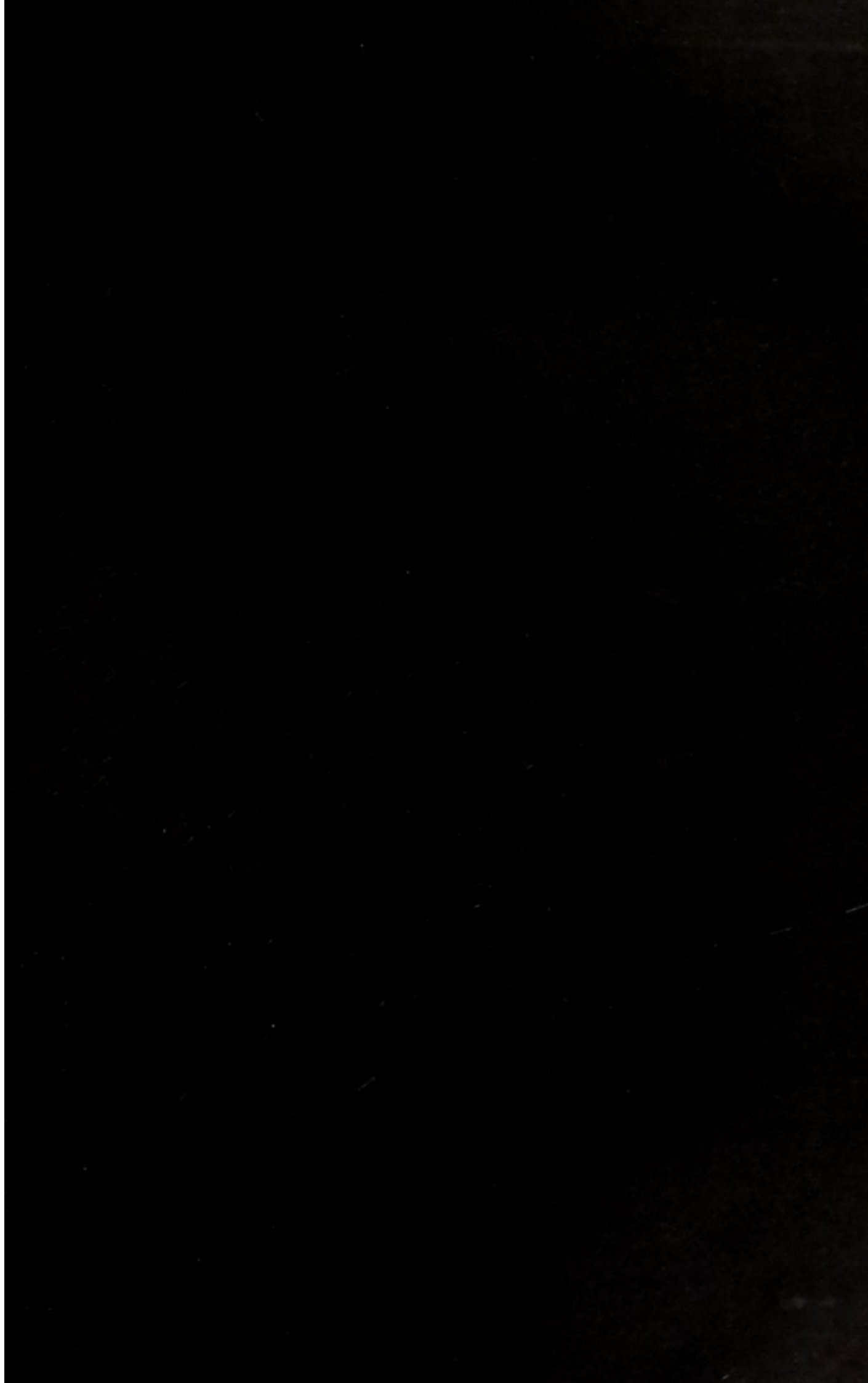
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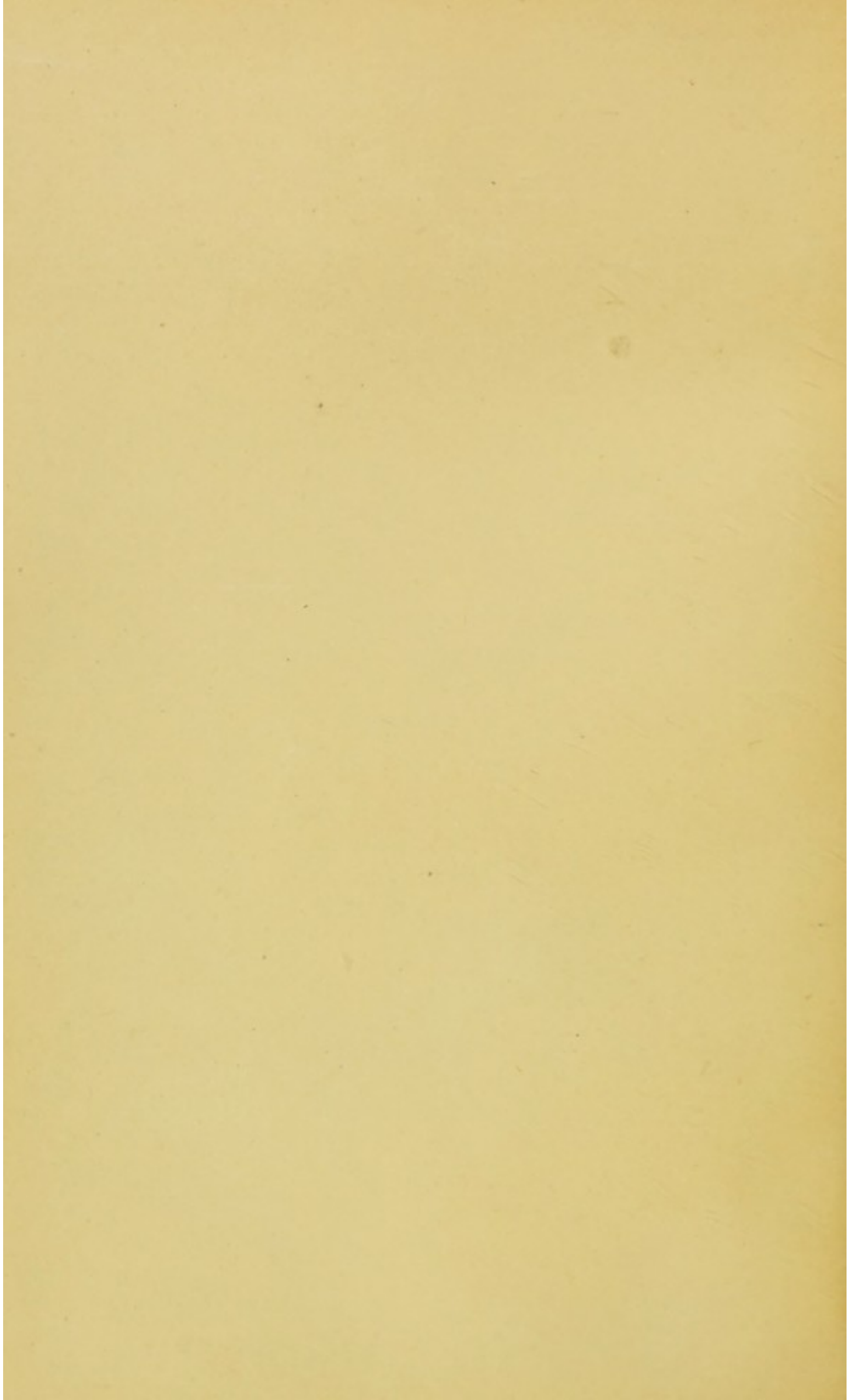
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ANALYTICAL DIGEST  
OF  
RESEARCHES AND CRITICISMS



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## PREFACE

### TO THE PHARMACEUTICAL SOCIETY OF THE GENERAL MEDICAL COUNCIL

MR. CHAIRMAN AND MEMBERS,

I have the pleasure to inform you that I have received and observed the published abstracts, questions, and answers which appear in the *Journal* of the Society of the General Pharmacopoeia of 1881.

The larger portion of these questions were published from the beginning of the year 1881 to the end of 1881. In answer to them, I have to a large extent complied with the suggestions published in the *Journal* of 1881, which I received — and as far as I have been able to do so, in order to show that I have been able to do so.

The answers to the questions published in the *Journal* of 1881, and many of the questions and answers, are published in the *Journal* of 1882, which I have the pleasure to send you, and which I have the pleasure to send you.

In preparing this paper, I have to a large extent complied with the suggestions for the publication of the *Journal* of 1881, and the publication of the *Journal* of 1882.

I think it is to be noted that the larger portion of the questions published in the *Journal* of 1881, and the larger portion of the questions published in the *Journal* of 1882, are published in the *Journal* of 1881, and the larger portion of the questions published in the *Journal* of 1882.



## PREFACE.

TO THE PHARMACOPŒIA-COMMITTEE OF THE  
GENERAL MEDICAL COUNCIL.

MR. CHAIRMAN AND GENTLEMEN,—

In accordance with your instructions, I have collected and abstracted the published criticisms, researches, and suggestions which appear to me likely to be useful for the revision of the *British Pharmacopœia* of 1898.

The larger portion of these criticisms were published from the beginning of the year 1899 to the end of 1902. In addition however, I have in a few instances alluded to suggestions published prior to 1899, where it occurred to me as desirable to include the same in order to throw useful light on the subject matter in hand.

The criticisms during this period bear mainly upon the composition and assay of Drugs and Galenicals. It is interesting to notice that criticisms dealing with the botanical features of Drugs are remarkably few.

In preparing this Digest I have made special search for suggestions for the improvement in the manufacture and preservation of official preparations.

I think it is clear that of the large number of researches published many new facts may be taken as fairly well established, and available for use in a new edition of the *British Pharmacopœia*. On the other hand, it is equally clear that there



are many cases where revision and confirmation are desirable before new processes can be regarded as sufficiently well established to warrant their official recognition.

I have made certain quotations from the valuable investigations recently carried out in the Research Laboratories of the Pharmaceutical Society of Great Britain, but as they were conducted at your instigation, and have already been reported *in extenso*, I have not deemed it my duty to reproduce them in detail.

I have the honour to be,

Mr. Chairman and Gentlemen,

Your obedient servant,

WM. CHATTAWAY.

APOTHECARIES' HALL,

BLACKFRIARS, E.C. :

*September 1903.*

# DIGEST OF RESEARCHES AND CRITICISMS BEARING ON THE REVISION OF THE "BRITISH PHARMACOPOEIA," 1908.

REPORT PREPARED FOR THE EDITOR OF THE B. P. 1908, BY THE EDITOR OF THE "BRITISH PHARMACOPOEIA," 1908, AND THE EDITOR OF THE "BRITISH PHARMACOPOEIA," 1908.

RECOMMENDATIONS OF THE EDITOR OF THE B. P. 1908, AND THE EDITOR OF THE "BRITISH PHARMACOPOEIA," 1908, AND THE EDITOR OF THE "BRITISH PHARMACOPOEIA," 1908.

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# DIGEST OF RESEARCHES AND CRITICISMS BEARING ON THE REVISION OF THE "BRITISH PHARMACOPŒIA," 1898.

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*Acaciæ Gummi.*—F. H. ALCOCK (P.J. 759, ii, 1900) suggests the inclusion in the B.P. monograph of the words, "Acacia should not contain more than 2 per cent. insoluble in water."

*Acetanilidum.*—T. TYRER and A. LEVY (C.D. 219, ii, 1899) state that the official melting-point has been placed a little higher than can be attained by commercial samples.

Dr. POWER (Pharm. Conference, 1900) criticises the official statement that, on boiling with test solution of ferric chloride, the liquid becomes reddish-brown, as test solution of ferric chloride itself becomes reddish-brown on boiling. He also draws attention to the improbability of the presence of a highly volatile liquid like acetone in crystallised acetanilide.

*Acidum Aceticum Glaciale.*—J. C. UMNEY (P.J. 242, ii, 1898) draws attention to the melting-point, and again (P.J. 8, i, 1900) shows that the melting-point given in the *Pharmacopœia* does not correspond precisely with the strength as estimated by titration. By titration, an acid of 98.9 per cent. acid is permitted, while the melting-point corresponds to a strength of over 99.0 per cent. This discrepancy would be avoided by making the titration figure the official limit, and allowing a range for the melting-point. These observations are dealt with by Dr. ATTFIELD in his *Report* for 1898, but as they are followed by other remarks by different observers, are inserted for convenience.

F. H. ALCOCK (P.J. 201, ii, 1899) suggests that, as turpentine is required to be soluble in an equal volume of glacial acetic acid, the test might be employed conversely.

SQUIRE and CAINES (P.J. 512, i, 1902) show that Glacial Acetic Acid of 99.5 per cent. strength formed a clear solution with turpentine, but that acid of a lower strength than this cannot be expected to form a clear solution; and, therefore, unless the titration requirement is raised to 99.5 per cent., this proposed supplementary test would not be of value.

Observations on the solubility of turpentine in glacial acetic acid by WM. DUNCAN, T. DUNLOP, W. LYON, W. P. SQUIRE, F. MACDIARMID, and J. RUTHERFORD HILL are to be found in the same volume (14, 4th Series, of the *Pharm. Journal*).

ALFRED H. ALLEN (Commercial Organic Analysis) pointed out in 1885 that a glacial acetic acid of 99.5 per cent. strength was miscible with turpentine in all proportions.



*Acidum Arseniosum*.—Dr. F. B. POWER (Y.B.P. 320, 1900) recommends the alteration of the name "Acidum Arseniosum" to "Acidum Arsenosum."

*Acidum Benzoicum*.—Dr. F. B. POWER (Y.B.P. 320, 1900) states that benzoic acid is probably obtained more by the wet process from benzoin than by sublimation.

*Acidum Boricum*.—T. S. BARRIE (P.J. 345, i, 1902) suggests the estimation of the actual boric acid by titration with soda in the presence of glycerin, according to R. T. THOMSON'S method, and proposes the following amended monograph:—"One gramme of the acid dissolved in 50 c.c. of warm distilled water should require, after the addition of 50 grams of glycerin, and a few drops of phenol-phthaleïn solution, 16.25 c.c. of volumetric solution of sodium hydroxide for neutralisation." He points out that it is important that the soda solution should be quite free from carbonates, and suggests means for ensuring this. It is also necessary to standardise the alkali by means of pure boric acid. (See also *Borax*.)

*Acidum Carbolicum Liquidum*.—J. C. UMNEY (P.J. 473, ii, 1900) suggests increasing the water from 10 parts to 15 parts per 100 parts of phenol in order to prevent solidification.

E. W. LUCAS (C.D. 889, ii, 1900), with the same object, suggests a mixture containing 5 parts of phenol in every 6 parts of liquid acid. This would contain 50 grains in every fluid drachm.

*Acid Chromicum*.—L. F. KEBLER (A.J.P. 395, 1901) gives a process for the estimation of chromic acid and chromates by treating one gramme with potassium iodide acidified with sulphuric acid.

*Acidum Citricum*.—DAVID HOWARD (C.D. 675, i, 1898) draws attention to the unsatisfactory test given for lead, which, if carried out as prescribed in a neutral solution, caused traces of iron to appear as lead. This has now been altered, and the test for lead is directed to be performed in a solution "nearly neutralised" with ammonia.

J. C. UMNEY (P.J. 493, ii, 1902) suggests that the following test should be applied to exclude more than a trace of lead:—"If to 1 gramme, dissolved in 5 c.c. of 10 per cent. ammonia solution 5 c.c. of saturated  $H_2S$ , water be added, this mixture shall not acquire more than a slight yellowish colouration."

*Acidum Gallicum*.—Dr. SILLAR (P.J. 684, ii, 1898) states that the B.P. is in error in stating that gallic acid is not precipitated by tartarated antimony. This has been pointed out also by D. B. DOTT (P.J. 58, i, 1899).

*Acidum Hydrobromicum Dilutum*.—Dr. SCOTT (Journal Chem. Soc., 648, 1900) gives a new method of preparation which is highly spoken of by Dr. POWER (Y.B.P. 321, 1900).

*Acidum Tannicum*.—Dr. POWER (Y.B.P. 322, 1900) questions whether any special fermentation is employed before tannin is extracted from galls,







and he also questions the accuracy of the formula, *i.e.*, as to whether the statement as to two molecules of water is correct.

*Acidum Tartaricum*.—J. C. UMNEY (P.J. 493, ii, 1902) suggests the same test for lead as in the case of *Acidum Citricum*, and states that it is capable of detecting 1 in 100,000.

*Aconitina*.—Dr. POWER (Y.B.P. 323, 1900) states that commercial specimens do not correspond to the physical description given in the *British Pharmacopæia*—"hexagonal prisms."

*Adeps*.—E. W. LUCAS (Practical Pharmacy, 189) says: "Prepared lard, containing either three minims of oil of cloves or two minims of oil of *qualtheria* to each ounce, is perfectly bland, keeps almost indefinitely, and being prepared in the cold is whiter and altogether more desirable as an ointment basis than benzoated lard."

*Adeps Lanæ*.—W. ELBORNE (P.J. 26, ii, 1899) states that the sulphuric acid test is more striking if performed by placing a chloroform solution in a test-tube and slowly adding sulphuric acid. In two or three minutes the lower (acid) layer assumes a green fluorescence by reflected light, and the chloroformic layer a blood-red by transmitted light.

*Ammoniacum*.—C. G. MOOR (Standards) suggests that the limit of ash should be 5 per cent., and the matter insoluble in alcohol should not exceed 40 per cent.

J. C. UMNEY (P.J. 495, ii, 1902) suggests that 50 per cent. shall be required to be soluble in spirit, and would allow 7.5 per cent. of ash.

*Ammonii Carbonas*.—E. WHITE (P.J. 145, i, 1900) states that the B.P. titration test is rather too stringent; this view is confirmed by GREENISH and SMITH (P.J. 775, i, 1901), who would alter the B.P. requirement from 18.7 to 18.0 c.c. of  $H_2SO_4$ , neutralised by 1 gramme of salt.

*Antimonii Oxidum*.—J. R. ALLEN (P.J. 233, ii, 1899) states that the official test is best performed in the cold instead of in a hot solution, as the formation of a precipitate is thereby avoided. He also considers the quantity operated on is too large.

F. H. ALCOCK (P.J. 362, i, 1900) suggests the addition of Rochelle salt in the official test, which entirely obviates the formation of a precipitate.

*Antimonium Nigrum Purificatum*.—J. C. UMNEY (P. J. 493, ii, 1902), says:—"the U. S. P. limit of 0.1 per cent. of arsenic appears to be reasonable."

*Antimonium Tartaratum*.—F. H. ALCOCK's modification, referred to under *Antimonii Oxidum* (P.J. 362, i, 1900), is also available here.

*Aqua Cinnamomi*.—M. DUYK (Abst. Y.B.P. 199, 1900) gives the following process of assay. The cinnamon water is treated at ordinary temperatures with an excess of a 1 per cent. aqueous solution of phenylhydrazine



hydrochloride containing 15 per cent. of potassium acetate. The mixture is thoroughly shaken, and filtered off from the precipitated hydrazone which is washed, dried and weighed. From 100 c.c. of cinnamon water the author obtained 175 grammes of hydrazone, corresponding to about 1 per cent. of cinnamic aldehyde.

*Aqua Sambuci*.—A. C. ABRAHAM (C.D. 840, ii, 1900) considers that salted elder flowers produce a better flavoured product than the fresh flowers.

*Araroba*.—E. DOWZARD (P.J. 107, ii, 1899) considers that the standard of Chrysarobin in Araroba should be raised to 65 per cent., and he is also of opinion that a water limit should be set.

J. C. UMNEY (P.C. 494, ii, 1902) suggests a limit of 7.5 per cent. of ash.

*Arnica Rhizoma*.—C. G. MOOR (Standards) suggests 10 per cent. of ash as a limit, which is confirmed by J. C. UMNEY (P.J. 434, ii, 1902).

*Asafetida*.—C. G. MOOR (C.D. 953, ii, 1899) records finding a number of samples yielding a very large quantity of mineral matter.

MOOR and PRIEST (Y.B.P. 405, 1900) say: "For the present we suggest an ash limit of 20 per cent."

J. C. UMNEY (C.D. 983, ii, 1899) pointed out that it was practically impossible to obtain any considerable quantity which would satisfy the B.P. tests at that time.

E. M. HOLMES (C.D. 1037, ii, 1899) stated that a sufficient supply could readily be obtained of B.P. quality if a fair price were paid.

W. LYON (P.J. 409, ii, 1901) draws attention to the fact that the drying and powdering of *Asafetida* (to prepare pills, &c.) deprives it of much volatile oil.

DIETERICH (C.D. 131, ii, 1898) stated that "the ash limit (10 per cent.) is right, and should be maintained."

*Atropina Sulphas*.—J. C. UMNEY (P.J. 8, i, 1900) records the difficulty of obtaining atropine sulphate melting at 183° C., owing to the expense of removing all the hyoscyamine sulphate. Practically all the commercial samples of atropine sulphate melt between 186° and 187° C., but otherwise correspond to the official requirements, and yield a base melting at 115° C.

*Balsamum Peruvianum*.—K. DIETERICH (P.J. 321, i, 1899) suggests that 65 per cent. of cinnamein should be required.

J. C. UMNEY (P.J. 495, ii, 1902) suggests that 60 per cent. should be required.

J. HUMPHREY (P.J. 29, i, 1901) says: "Attention does not appear to have been directed to the ambiguous wording of that part of the monograph on balsam of Peru, in which a modification of Dieterich's test is described. In the original it is directed that the balsam should be exhausted with ether, and the ethereal solution, after filtration, shaken with sodium







hydroxide solution to remove the resin; the ethereal solution must then be separated, and leaves on evaporation a residue of cinnamein and other aromatic bodies. In the official monograph, however, we are directed to shake the balsam with sodium hydroxide solution first, then to wash with ether, and, the ether having been removed, weigh the residue (?) after cautious drying. The residue to be weighed is, of course, that left on evaporating the ethereal solution, though that is not stated. The wording of the text makes it appear that the residual balsam is referred to."

*Balsamum Tolutanum*.—J. SPILSBURY and T. G. JOYCE (P.J. 93, i, 1900) show that while the B.P. tests are adequate in detecting admixtures of foreign resins, they do not satisfactorily provide against exhaustion. This is borne out by the figures given in their paper. While they consider the data at their disposal are not sufficient to justify them in suggesting a definite standard for cinnamic acid, their results point to 18 per cent., being the lowest requirement for a balsam of satisfactory quality.

*Belladonnæ Folia*.—F. C. J. BIRD (P.J. 169, ii, 1900) gives a method for assaying the leaves. He rubs the powdered leaves with a strong solution of potassium carbonate in a mortar, and then places the moist powder so obtained in a percolator and macerates with a special solvent (a mixture of amyl alcohol, chloroform and ether) for half an hour. The liquid is then forced out by air pressure, and the powder again treated with successive quantities of solvent till no more alkaloids are extracted. The mixed percolates are then shaken first with a half saturated solution of sodium chloride, and, after separation, the alkaloids are extracted from the ethereal liquid with dilute sulphuric acid; the acid solution is rendered alkaline with ammonia and the alkaloids extracted with chloroform, weighed and titrated as usual.

*Belladonnæ Radix*.—E. WHITE (P.J. 196, i, 1901) refers to the suggestion of CRIPPS that official belladonna root ought to contain from 0.4 to 0.6 per cent., and states that the minimum figure should be adhered to, so that a due proportion between alkaloid and extractive may be attained in the liquid extract.

F. C. J. BIRD (P.J. 533, i, 1900) gives a rapid and accurate method for the assay of belladonna root by a similar process to that which he employs for the leaves (this process has been described under *Belladonnæ Folia*).

*Benzoinum*.—C. G. MOOR (Standards, 1902) has recorded a number of analyses of benzoin, and suggests that not more than 10 per cent. should be insoluble in alcohol. This suggestion is confirmed by J. C. UMNEY (P.J. 495, ii, 1902).

*Bismuthi Carbonas*.—Dr. POWER (C.D. 147, ii, 1900) criticises the requirements of the *Pharmacopæia* as too strict, owing to the inconstant composition of the oxy-salts of bismuth. It was previously pointed out by HOWARD and by MERCK that the estimation of bismuth as oxide by ignition is preferable to its precipitation as sulphide.



*Bismuthi Salicylas.*—D. L. HOWARD (Y.B.P. 472, 1898) states that the requirement that no salicylic acid should be yielded to alcohol when shaken with this salt is too severe, owing to the facility with which it decomposes.

MERCK (C.D. Aug. 1898) states that the amount of bismuth oxide yielded on ignition should be, not 0.7, but from 0.68 to 0.7, on treating 1 gramme.

*Bismuthi Subnitras.*—UPSHER SMITH (P.J. 696, ii, 1900) suggests, after an exhaustive research, that the determination of bismuth should be made as oxide; 1 gramme of original salt yielding from 0.79 to 0.81 gramme of oxide. He also gave a method for estimation of the nitric acid, which should be present to the extent of from 17.5 to 19.5 per cent.

*Borax.*—T. S. BARRIE (P.J. 345, i, 1902) draws attention to the advisability of applying R. T. THOMSON'S method of titrating boric acid in the presence of glycerin, in addition to the present process in which the soda alone is titrated. The writer points out that this is highly advisable on account of the fact that borax may contain an excess of sodium carbonate. He considers that the most accurate results are obtained on standardising the alkali against pure boric acid direct.

*Buchu Folia.*—E. M. HOLMES (P.J. 70, i, 1900) describes the various buchus of commerce.

*Caffeina.*—Dr. POWER (Y.B.P. 327, 1900) repeats the observation of D. HOWARD (C.D. 675, i, 1898) as to the loss of water at 100° C. not being so much as 8.49 per cent., as officially stated, but about 7.1 per cent., which is in agreement with ALLEN'S observations.

*Caffeinae Citras.*—Dr. POWER (Y.B.P. 328, 1900) states that with 3 parts of water caffeine citrate does not form a clear syrupy solution, but a pasty mass; if more water is added the alkaloid separates as a mass of acicular crystals.

*Caffeinae Citras Effervescens.*—A. DAVIDSON and G. LUNAN (P.J. 142, i, 1899) record figures showing the great variability of the available carbonic acid in this article. They are of opinion that a minimum yield of CO<sub>2</sub> should be stated.

*Calcii Hypophosphis.*—TYPKE and KING (P.J. 182, i, 1899) throw doubt on the permanganate test of the B. P.; their criticism is answered by Dr. JOWETT (P.J. 226, i, 1899), who states that the right quantity of permanganate is given in the test, but Dr. JOWETT further states that the permanganate test has been shown to be unsatisfactory by himself, LUNAN, TYRER, and others.

*Calcii Phosphas.*—COWLEY and CATFORD (P.J. 86, i, 1902) record finding 9.5 per cent. of calcium sulphate in a sample of calcium phosphate.

They draw attention to the fact that the formula for calcium phosphate which was given in the 1885 Pharmacopœia is now omitted.







The writers state that commentators on *The Pharmacopœia* (including WHITE and HUMPHREY) have assumed that the sodium phosphate mentioned is the di-sodium-hydrogen phosphate, and that, therefore, two calcium phosphates are official, *i.e.*, the tricalcic phosphate and a dicalcic phosphate. The latter, however, would not correspond to the characters and tests specified.

*Calumbæ Radix*.—F. H. ALCOCK (P.J. 501, ii, 1901) mentions finding an adulterant in calumba, which he noticed owing to its high ash.

*Cambogia*.—J. C. UMNEY (P.J. 495, ii, 1902) suggests the requirement that 75 per cent. shall be soluble in 90 per cent. alcohol. (This accords with the experience of HOLTHOUSE and HARVEY, who found in four samples 78.3, 79.8, 82.7, and 81.9 per cent.)

*Cannabis Indica*.—F. BASCOMBE (P.J. 631, 2, 1902) suggests that this drug should yield to 90 per cent. alcohol not less than 10 per cent. of resin extract dried at 100° C. C. G. MOOR (Standards, 1902) suggests a standard of not less than 9 per cent. of resin and 16 per cent. of ash.

J. HUMPHREY (P. J. 363, 392, i, 1902) contributes an essay on the chemistry of *Cannabis Indica*, and summarises his remarks as follows:—“Indian hemp appears to contain a peculiar alkaloid, but the drug may yield a certain proportion of choline (bilineurine) or some decomposition product of that base, such as trimethylamine, formed during the process of extraction. The drug also contains a little volatile oil, which consists chiefly of a sesquiterpene (cannabene) and paraffin, but the chief constituent of Indian hemp is apparently the resin (cannabin), of which “charas” mainly consists, and of which cannabinal is the active principle. Finally, since cannabinal, on exposure to air, becomes oxidised and loses its potency, the loss of activity of Indian hemp and its preparations would also appear to be due to that cause. Hence it seems desirable that Indian hemp used in medicine should be obtained as fresh as possible, and that, as suggested by Dr. Marshall, the drug and its preparations should be preserved in hermetically sealed packages if they are to be kept for any considerable length of time before use.”

*Cantharis*.—C. G. MOOR (Standards, 1902) suggests 0.5 per cent. as a minimum of cantharidin in the beetle.

GREENISH and WILSON (Y.B.P., 169, 1898) suggest the employment of the extracted cantharidin for galenical preparations, as more uniform products would be thus obtained. They also give processes for the estimation of the free and the total cantharidin in flies.

*Capsici Fructus*.—J. C. UMNEY (P.J. 496, ii, 1902) suggests 15 per cent. of oleo-resin as a standard. D. B. DOTT (P.J. 618, 2, 1902) considers this too high.

*Carbo Ligni*.—The B.P. limit for ash is 7.5 per cent. C. G. MOOR (Standards, 1902) states that charcoal made from certain woods would leave less ash than this, and the standard would, therefore, allow the



presence of dirt. He suggests that not more than 1 per cent. should be insoluble in HCl, to exclude sand and earth.

*Carbonis Bisulphidum*.—W. ELBORNE (P.J. 111, ii, 1899) suggests the addition to the British Pharmacopœia monograph of a recommendation to preserve in stoppered bottles protected from light.

*Cardamomi Semina*.—MOOR and PRIEST (Y.B.P. 407, 1900) show that the official limit of ash—4 per cent.—(intended to ensure the absence of pericarps in the powdered seed) is too low, as seeds shelled in the laboratory gave an ash over 4 per cent.

H. G. GREENISH (C.D. 274, i, 1901) confirms the above observation as to the ash being sometimes over 4 per cent., and gives a description of the microscopic characters of the powdered drug.

*Caryophyllum*.—The official ash limit is confirmed by the work of SQUIRE, MOOR and PRIEST, and others.

MOOR (Standards, 1902) suggests 20 per cent. of ether extract as a proof of non-exhaustion.

*Cera Alba, and Cera Flava*.—H. V. ARNY (P.J. 591, i, 1900—Abst. from A.J.P. 72, 1900) points out that filtration of the strongly alkaline hot solution, in the test for resin, should be performed through asbestos or glass wool rather than through paper, as some cellulose might dissolve, which, on adding hydrochloric acid, would yield a precipitate.

*Cerii Oxalas*.—Dr. POWER and F. SHEDDEN (C.D. 992, i, 1900) show that the cerium oxalates of commerce satisfying the British Pharmacopœia tests might (and do in some cases) consist largely of the oxalates of lanthanum and didymium. They give the formula as 10 molecules of water, not 9, and they state that pure cerium salt, free from didymium, yields a pure yellow residue on ignition, not a brownish-red.

*Chloral Hydras*.—F. H. ALCOCK and T. H. THOMAS (P.J. 236, ii, 1899) state that the official test, involving the treatment of 4 grammes of chloral with 30 c.c. of normal soda, should be performed in the cold, not heated as officially described.

W. DUNCAN (P.J. 387, i, 1901) again draws attention to the fact that heating in the above test produces erroneous results.

HILL (P.J. 387, i, 1901) confirms the observation that heating is objectionable, and that shaking without heat for fifteen minutes is satisfactory.

*Cimicifugæ Rhizoma*.—L. OUGH (C.D. 299, ii, 1899) gives a method for the preparation of cimicifugin, which he states exists to the extent of 18 per cent. The root is first percolated with alcohol (·828 gravity), and the alcohol recovered by distillation. The liquid is evaporated to a syrupy consistency, and then poured into about twenty times its volume of water, which precipitates the resin.

*Cocæ Folia*.—J. C. UMNEY (P.J., 495, ii, 1902) suggests 0·5 per cent. of cocaine as a standard.







V. R. LAMARE (Abst. Y.B.P. 56, 1901) gives a modification of SQUIBB'S process, in which he employs kerosene as the solvent; the details are as follows: Twenty-five grammes of the finely powdered leaves are put into a wide-mouth stoppered flask of 450 c.c. capacity, and evenly moistened with 25 c.c. of 2 per cent. solution of ammonia. This is left, with occasional agitation, for half-an-hour. Kerosene oil, 75 c.c., is then gradually added, and the whole allowed to stand for an hour or more, with agitation every ten minutes. The whole is then packed in a percolator and extracted with kerosene oil. When exhausted the percolate is shaken with 25 c.c.  $\frac{N}{10}$  hydrochloric acid for about ten minutes. After allowing to stand for about twenty minutes, the watery layer and emulsion zone are separated from the oily layer, and the treatment with the acid is repeated. The bulked acid solution is now shaken out with 20 c.c. ether, the watery layer run off and again treated with ether, 15 c.c., to take out the last traces of oil and colouring matter. The aqueous solution is then very carefully separated and the ether washed out twice with water, 5 c.c., adding the washings to the acid solution. This is then made slightly alkaline with 8 to 9 c.c. of solution of ammonia (2.5 per cent.), and the pure alkaloid is extracted by three times shaking out with ether in successive quantities of 40, 30, and 30 c.c. The amount of alkaloid in the ethereal extract is then either determined by titration or the solvent is evaporated off, and the residue weighed after drying for three hours at 60° C.

*Cocaina.*—C. BOEHRINGER and SOHNE (C.D. 59, ii, 1899) give confirmatory evidence as to the value of MACLAGAN'S test.

G. L. SCHAFER (C.D. 591, i, 1899) proposes a new test for cocaine and its salts, depending on the formation of the chromates of other alkaloids of coca, if these are present, their chromates being less soluble than cocaine chromate, cause the formation of a turbidity.

P. W. SQUIRE (C.D. 641, i, 1899) criticises the above test.

E. MERCK (C.D. 897, i, 1899) also criticises it, and confirms MacLagan's test.

G. L. SCHAFER (C.D. 124, ii, 1899) repeats his confidence in his test, provided the temperature of 15° C. is adhered to.

Dr. POWER (C.D. 155, ii, 1900) considers that the official melting-point is too low, and allows too much latitude, and states that the permanganate test is useless as described, but is correct in the United States and other Pharmacopœias.

*Codeina.*—Dr. POWER (Y.B.P. 330, 1900) states that the test with ferric chloride, &c., is best performed in slightly acid solution, and therefore a comma should be placed after the word "water."

*Colchici Cormus.*—L. SCHULTZE (Abst. Y.B.P. 171, 1902) questions the advisability of retaining the corms, as they contain only two-thirds the alkaloid of the seeds.



*Colocynthis Pulpa*.—MOOR and PRIEST (Y.B.P. 410, 1900) record having found genuine samples yielding less than 9 per cent. of ash, the limit fixed by the British Pharmacopœia to ensure exclusion of the seeds.

GREENISH (P.J. 398, i, 1900) gives a number of ash estimations, and states that it does not appear desirable to fix an ash limit, but to depend rather on a microscopical examination.

*Copaiba*.—WIGHTMAN BELL (C.D. 167, ii, 1900) repeats an observation of DIETERICH'S (abst. Y.B.P. 166, 1899) that a precise method for estimating the oil would be usefully included, and in addition, acid and ester numbers.

UMNEY and BENNETT (P.J. 324, i, 1901) give a suggested monograph, and propose that the oil and resin should be dealt with separately. They suggest that the following characters should be made official for copaiba resin: "The residue obtained from copaiba after the removal of the volatile oil. A hard, brittle, amorphous substance, having a yellowish, yellowish-brown, or reddish-brown colour, and an acrid taste. Soluble in alcohol, ether, and carbon disulphide, the solution having an acid reaction. One gramme dissolved in 50 c.c. of absolute alcohol should require for neutralisation at least 4.3 c.c. of  $\frac{N}{2}$  alcoholic potash, using phenolphthalein as an indicator." (See also under *Oleum Copaibæ*.)

*Coriandri Fructus*.—An ash limit of 6 per cent. is suggested by MOOR (Standards, 1902), which is confirmed by J. C. UMNEY (P.J. 494, ii, 1902).

*Creosotum*.—L. F. KEBLER (P.J. 453, ii, 1899) considers that the Pharmacopœial requirements should be based on physical appearance; reaction, solubility; specific gravity (not below 1.080 at 15.5° C.); boiling point (200–220° C.); reaction with a 20 per cent. absolute alcoholic potassium hydrate solution, and a test to exclude neutral oils.

J. C. UMNEY (P.J. 8, i, 1900) states that the rotatory power, so far as beechwood creosote is concerned, differs from the official requirements. The beechwood creosote of commerce is either slightly dextro-rotatory or optically inactive.

Dr. POWER (Y.B.P. 332, 1900) states that the specific gravity should not be below 1.080, and that it is optically inactive. He also states that the ammonia test does not appear to be of much value, but the test for propyl-guaiacol in the United States, German, and Swiss Pharmacopœias seems to be useful.

*Crocus*.—W. N. BRAZIER (C.D. 815, i, 1899) suggests that the following addition might be made to the official requirements: "... or coloured powder, nor does this infusion, acidulated with nitric acid, yield any precipitate with solution of barium nitrate or silver nitrate."

C. G. MOOR (Standards) says: "Every fragment should, on contact with strong sulphuric acid, afford a deep, transient blue colour."

*Cubebæ Fructus*.—J. C. UMNEY (496, ii, 1902) suggests as a standard 22 per cent. of oleo-resin, ether being used as the solvent.







C. C. SHERRARD (C.D. April 9, 1892) found an average of 21·5 per cent. of oleo-resin in nine samples of cubebs, the highest figure obtained being 24·8 per cent., the lowest 16·1 per cent.

*Emplastrum Ammoniaci cum Hydrargyro*.—F. H. ALCOCK and JOHN KENDRICK (P.J. 278, i, 1899). In preparing this plaster, the authors have found the necessity of securing samples of ammoniacum of greater purity than are frequently found in commerce, and show the need of an ash-limit for ammoniacum.

*Emplastrum Belladonnae*.—C. E. PARKER (C.D. 331, ii, 1899) gives a process for the assay of plasters, in which he first digests the piece of cloth on which the plaster is spread with rubber basis, chloroform at a heat not exceeding blood-heat, and stirs to disintegrate the mass. The chloroform which contains the alkaloid and rubber (if rubber basis is present) is placed in a beaker and the process repeated. The mixed solutions are treated with alcohol to precipitate the rubber, and the cloth when free from plaster is washed with a little more chloroform faintly alkaline with five drops of ten per cent. ammonia, dried and weighed. By subtraction the weight of the plaster mass is obtained.

The chloroform-alcohol solution is made alkaline, and water is added in sufficient amount to cause the chloroform to separate. It is then drawn off and the alkaloids removed by successive shakings with dilute HCl, and eventually set free by ammonia and shaken out with chloroform.

The author also gives the titration method which he prefers to employ, and in addition he weighs the alkaloidal residue.

A satisfactory process for the official plaster is that published by F. C. J. BIRD (P.J. 147, ii, 1899), in which the formation of troublesome emulsions is avoided, and the alkaloids extracted in a very pure condition.

*Ergota*.—J. S. MEULENHOF (Abst. P.J. 523, i, 1900) has summarised, and examined into, the various statements of KELLER, TANRET, KOBERT, DRAGENDORFF and others, as regards the active principle of ergot, and has come to the conclusion that the ergotinine of KELLER is the only alkaloid naturally present in ergot. MEULENHOF holds that sphacelinic acid must be considered the active ingredient, probably this is the same substance as that described by JACOBI (Abst. P.J. 84, ii, 1897) as sphacelotoxin, who gave a method for its preparation.

*Extractum Belladonnae Alcoholicum*.—E. WHITE (P.J. 196, i, 1901), dealing with the preparation of the alcoholic extract, states that either a dry powder or a pasty product may result, according to the interpretation of the official directions. The samples met with in trade were pasty, whereas a powder was chiefly required for dispensing purposes.

*Extractum Belladonnae Liquidum*.—F. H. ALCOCK (P.J. 550, ii, 1899) proposes the removal of colouring matters, &c., by shaking first with sulphuric acid and ether.



F. C. J. BIRD (P.J. 432, i, 1899) gives some useful hints on the official mode of assay, and, in order to avoid the very troublesome emulsions which are apt to form, suggests that the fatty and oily bodies which mainly cause emulsions should first be removed by shaking the sample (acidified with sulphuric acid) with chloroform, according to DRAGENDORFF'S method. He also gives some valuable hints on the titration of the extracted alkaloids.

DEWHIRST (C.D. 586, i, 1900) speaks favourably of ALCOCK'S and BIRD'S methods.

E. DOWZARD (C.D. 401, i, 1899) proposes a method to avoid the troublesome emulsions which are apt to occur in carrying out the official process. His method depends on the evaporation of the liquid with sand, and an extraction with ammoniated chloroform.

E. W. LUCAS (C.D. 552, i, 1899) gives a new method of assay in which he uses granulated zinc, which appears to have the property of obviating the formation of emulsions.

R. GLODE GUYER (P.J. 121, i, 1900) says: "Few would care to have to prepare such a comparatively costly preparation on a large scale on strictly B.P. lines" . . . "very poor root must not be used, for a root with a low percentage of alkaloid cannot yield an extract of the desired alkaloidal strength without adjustment by evaporation."

F. C. J. BIRD (P.J. 534, i, 1900) gives an alternative process of assay, wherein, by the use of a special mixture of solvents, emulsions are avoided and the process is rapidly performed.

*Extractum Belladonnæ Viride.*—This preparation is not directed to be assayed officially, but from the experiments of FARR and WRIGHT (P.J. (4), V, 517), J. BARCLAY (P.J. March 4, 1893) and NAYLOR and BRYANT (Y.B.P. 361, 1898) a standard of 1 per cent. would appear to be satisfactory.

*Extractum Cannabis Indicæ.*—G. F. MERSON (P.J. 234, i, 1902) made an investigation into the composition of the B.P. extracts, and found a varying amount of brownish matter soluble in water, but insoluble in ether.

His conclusions are as follows:—

(i) The B.P. extract of commerce is physically a very variable article. It contains to a greater or less extent an extract which is insoluble in 90 per cent. alcohol, is soluble in water, and has all the characters of an aqueous extract of Cannabis Indica made after the drug has been exhausted with rectified spirit.

(ii) It varies in consistency from a syrup to a stiff paste, owing to variations in the amount of water it contains.

(iii) An improvement on the official process would be to exhaust the drug with absolute alcohol, and prepare the tincture by dissolving the extract in Spiritus Ætheris.

MERSON agrees with MABEN'S observation that a normal percentage of resin may not guarantee adequate therapeutic activity, but considers that uniformity in the physical characters of the extract would be a step in advance of the present varying commercial product.







The occurrence of the brownish matter above mentioned has been previously noted by SQUIRE (Companion), who says:—"By prolonged heating, even on a water-bath, the extract becomes brown, insoluble in alcohol (90 %) and soluble in water."

*Extractum Cascariæ Sagradæ Liquidum*.—J. C. UMNEY (P.J. 8, i, 1900) suggests the addition of 25 per cent. more alcohol in order to keep the preparation.

G. F. MERSON (C.D. 20, i, 1901) considers that genuine samples should yield from 23.5 to 25 grammes of extractive per 100 c.c., and contain about 19 per cent. of alcohol by volume.

C. G. MOOR (Standards, 1902) gives figures on the extractive matter on genuine samples from 17.5 to 24.9 grammes per 100 c.c.

*Extractum Cinchonæ Liquidum*.—STENHOUSE (P.J. 10, i, 1900) suggests the use of chloroform as preferable to amylic alcohol in the assay process.

DEWHIRST (C.D. 586, i, 1900) considers that the concentration of the acid liquid obtained on shaking the benzol-amyl-alcohol solution with water, neutralising and concentrating to 16 c.c., is liable to produce a deposit of insoluble matter which mixes with the tartrates. He considers that the liquid should not be more concentrated than 24 c.c.

NAYLOR and HUXTABLE (P.J. 134, ii, 1902), on examining samples which had been made for nine months, found that no appreciable loss in strength had occurred.

F. H. ALCOCK (P.J. 90, ii, 1901) gives an assay process for this preparation, modified from the official process, by which he obtained the extracted alkaloids nearly free from colour and well crystallised. He employed 5 grammes of liquid extract (he preferred weighing to measuring on account of the dark colour and thickness of the liquid) which were placed in a 4-oz. bottle fitted with a good cork, 15 c.c. of benzolated amyl alcohol and 10 c.c. of normal alcoholic potash; the mixture was shaken and put in a warm place for a short time, the clear liquid poured off into a separator, a further 15 c.c. of solvent added, shaken and poured off, and a further 10 c.c. added and poured off in like manner. The liquid in the separator was then washed with two or more separate quantities of 5 c.c. of water; the aqueous liquid was then drawn off; it contained the glycerin and a trace of alkaloid. The alkaloids were then extracted from the benzolated amyl alcohol by three washings with acidulated water in the usual manner, giving three washings at least. These acidulated washings containing the alkaloids were then mixed, and the process completed according to the official directions.

*Extractum Cocæ Liquidum*.—W. GARSEED (P.J. 214, i, 1902) records assays of seven samples of extract prepared according to the official process, and seven "miscible" extracts. In both classes of extract the alkaloid was very variable. In the official extracts the highest was 0.81, and the lowest 0.20 per cent., while the average was 0.38. The "miscible"



extracts were very deficient in alkaloid, the highest yielding 0.29, the lowest 0.014 per cent., and the average being 0.091 per cent.

C. G. MOOR (Standards) says: "The total alkaloids should amount to at least .5 per cent. . . . and the liquid extract should be standardised."

*Extractum Gentianæ*.—GREENISH and LENTON (P.J. 275, i, 1902) have shown that a double extraction with cold water is preferable to the official method in which hot water is employed.

*Extractum Glycyrrhizæ*.—D. B. DOTT (C.D. 456, i, 1902) states that a standard for glycyrrhizin is advisable.

*Extractum Glycyrrhizæ Liquidum*.—D. B. DOTT (C.D. 456, i, 1902) states that a standard for glycyrrhizin is advisable.

*Extractum Hyoscyami Viride*.—W. A. H. NAYLOR and JOHN J. BRYANT (Y.B.P. 359, 1898) examined nine representative samples of green extract of henbane, the average yield of alkaloid by weight being 0.33 and by titration 0.24 per cent. The variations in strength were very considerable.

FARR and WRIGHT (P.J. iv, v, 517) examined six samples, and found the average strength to be 0.15 per cent. of alkaloid.

*Extractum Ipecacuanhæ Liquidum*.—H. J. HENDERSON (P.J. 602, ii, 1899) states that, although the official process for the assay of this preparation requires the aid of a filter pump, and needs great care and considerable time, the process works cleanly and yields a pure alkaloid.

The same view has always been held by F. C. J. BIRD (P.J. 176, 1, 1900), who states that with the aid of a filter-pump the process is perfectly satisfactory. He draws attention to the fact that the substance weighed as alkaloid is generally a mixture of alkaloids which are light in colour together with a varying amount of a dark-coloured non-titratable substance, which is soluble in chloroform, and, therefore, accompanies the alkaloids.

J. C. UMNEY (P.J. 8, i, 1900) reports cases in which it was found that a sample of extract lost strength on keeping. This experience is the same as that of R. G. GUYER (P.J. 4, ix, 622). Other observers, however—THOMSON (P.J. 54, i, 1900), NAYLOR, and HUXTABLE (P.J. 134, ii, 1902), and F. C. J. BIRD (P.J. 414, i, 1900)—found that the greatest loss did not exceed 5 per cent. after nine months.

NAYLOR and BRYANT (P.J. 87, ii, 1899), in view of the varying amounts of impurities found, are in favour of insisting on titration.

*Extractum Jaborandi Liquidum*.—FARR and WRIGHT (P.J. 90, ii, 1899) record results on twelve samples of liquid extract which showed an average of only 0.15 per cent. of alkaloids. They detail the process employed for the estimation of the total alkaloids. Their results show a considerable falling-off in alkaloid compared with the results obtained eight years previously. This is possibly due, in their opinion, to the withdrawal from the market of the jaborandi leaves rich in alkaloid for the preparation of pilocarpine.







Dr. JOWETT (Y.B.P. 435, 1899) gives details as to the estimation of alkaloid in jaborandi preparations, for process see under *Tinct. Jaborandi*.

*Extractum Jalapæ*.—HOSEASON (P.J. November 18, 1898) draws attention to the absence of any definite requirement of resin in this extract.

*Extractum Nucis Vomice Liquidum*.—FARR and WRIGHT (P.J. 83, ii, 1900) have made an exhaustive research on the official process of assay of this article (which is founded on the method devised by DUNSTAN and SHORT). The principal conclusion arrived at by their researches is that the official process gives results sufficiently accurate for all practical purposes, provided certain details which they suggest are adhered to. These are (i) not more than 5 c.c. of liquid extract, nor more than 30 c.c. of tincture should be employed; (ii) the wash-water should be used in definite quantity—viz. 200 c.c.—and at a definite temperature—100° F.; and a correction should be made for the strychnine dissolved. (iii) In carrying out the process the Pharmacopœial instructions are to be strictly adhered to, both as regards simple agitation (not stirring) and as to all other parts of the process, as success depends altogether upon the conditions under which the process is carried out.

GREENISH and UPSHER SMITH (P.J. 667, ii, 1901) have investigated the cause of the precipitate that occurs in the liquid extract and tincture. This deposit is of an oily or fatty nature, and was mentioned by ALCOCK (C.D. Diary, 507, 1899) and by J. C. UMNEY (C.D. 459, ii, 1898).

GREENISH and SMITH investigated the matter with a view to determining the cause of turbidity, and to suggest a remedy. They found that the turbidity was due to fatty matter which is present to the extent of about 2.6 to 4.7 per cent. in the bean. They also conclude from their experiments that, of various processes suggested for making the liquid extract, the official one is the best, and recommend that the removal of the fat be effected by filtering the concentrated weak percolate before adding it to the reserve percolate. They found also that a No. 20 powder was more suitable for percolating nux vomica seeds than a 40 or 50 powder. Finally, they found that the dry extract obtained from the liquid extract prepared according to their proposed modification was easily reduced to powder. They suggest the following addition to the text of the B.P. page 118, line 11, bottom. "Delete the words 'remove the alcohol by distillation, evaporate the residue . . .,' and insert 'Distil until the alcohol has been removed and the liquid is reduced to one-third of its original volume; filter when cold; evaporate the filtrate. . . .'"

F. C. J. BIRD (P.J. 574, ii, 1900) gives an alternative process for the assay of the liquid and solid extracts, tincture, and beans. His process is founded on FARR and WRIGHT's researches, but he economises time by the use of a pressure-ball to hasten separation by forcing the liquids through a plug of cotton-wool.

NAYLOR and HUXTABLE (P.J. 134, ii, 1902) published the results obtained on the analysis of samples which had been assayed and then kept for nine months. The loss in alkaloidal strength was very small, being under two per cent.



*Extractum Pareiræ Liquidum*.—E. W. LUCAS (P.J. 525, i, 1899) proposes a modified method for preparing the liquid extract. He percolates with 20 per cent. alcohol, presses, filters, and adjusts the mixed liquids to a specific gravity of 1.020. He states that an extract so prepared is bright and keeps well.

*Extractum Sarsæ Liquidum*.—R. G. GUYER (P.J. 144, i, 1899) criticises the mode of preparation and says: "This is a case where re-percolation is a very doubtful advantage."

*Extractum Strophanthi*.—J. BARCLAY (C.D. 789, 1896) has described a process for the assay of tincture of strophanthus by conversion of the strophanthin into strophanthidin.

FROMME (Abst. P.J. LX, 504d) publishes a process for the estimation of strophanthin in the seeds, which is as follows:—The seeds are first ground, the oily matters removed by petroleum spirit, and the traces of solvent allowed to evaporate. The powder is then macerated with 80 grammes of absolute alcohol for six to twelve hours. An aliquot part is then filtered off, the alcohol removed and the residue taken up with 6 to 8 c.c. of water. Three drops of solution of basic acetate of lead are added, the precipitate filtered off and the filtrate treated with  $H_2S$  water to remove lead. After this the filtrate is evaporated and weighed as strophanthin.

E. DOWZARD (P.J. LXI, 199) publishes an optical method for the assay of the tincture and the extract.

*Ext. Taraxaci Liq.*—Dr. M'WALTER (C.D. 840, ii, 1899) questions whether ext. taraxaci liq. ought to give a reaction for glucose.

A. J. DEY (C.D. 308, lii) recorded the results of analysis of seven commercial samples which showed great variations in their percentages of alcohol and of extractive matters.

*Ferri Arsenas*.—THOS. S. BARRIE (C.D. 884, i, 1900) criticises the official statement that the salt "contains 10 per cent. of anhydrous ferrous arsenate" as misleading, on account of there being five to eight times as much arsenic oxide in combination with ferric as there is with ferrous oxide.

BARRIE has determined the arsenic in four samples of ferri arsenas by a modification of JOULIE'S process (described in SUTTON'S Volumetric Analysis). His results were as follows:

1. 34.2
2. 42.7
3. 45.0
4. 39.3

The amount of ferrous iron present was also variable, but not in any direct proportion to the arsenic. Hence he concludes that (1) commercial samples are variable in composition and (2) that the amount of ferrous iron present is no indication of the amount of arsenic present.

Dr. POWER (Y.B.P. 334, 1900) points out that the reaction which takes place cannot be considered as completely understood, and that in his opinion an estimation of the arsenic present is highly desirable.

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*Ferri et Ammon. Citras.*—Dr. POWER (Y.B.P. 337, 1900) gave results on three samples by the official (ignition) process and by an iodometric method; this latter gives rather lower results, but he regards it as somewhat the more accurate.

*Ferri et Quinine Citras.*—Dr. POWER (Y.B.P. 335, 1900) stated that the extraction of the alkaloid is better effected by chloroform than by ether.

*Ferri Sulphas Exsiccatus.*—COWLEY and CATFORD (C.D. 475, ii, 1900) suggest that a reason for commercial samples not showing as high a percentage of ferrous salt as might be desired is often due to the water not having been fully expelled, which takes a long time at 100° C. They show that the operation can better be performed at a higher temperature on a sand-bath. As the expulsion of the water is completed in less time at a higher temperature, there is less chance of the formation of the ferric salt.

*Ferrum Redactum.*—E. S. PECK (P.J. 109, ii, 1899) preferred the estimation of the iron by the mercuric chloride method to the official process. Both he and several other observers have found that commercial samples in this country and abroad are often much lower in metallic iron than they should be. PECK (C.D. 242, ii, 1901) suggests a limit of .05 per cent. for arsenic and gives a process for its estimation.

E. F. HARRISON (P.J. 371, i, 1901) recorded finding as much as .1 per cent. of copper in reduced iron.

*Ferrum Tartaratum.*—Dr. POWER (Y.B.P. 336, 1900) prefers the iodometric process as used in the United States and German Pharmacopœias for determining the amount of iron. He states that, though it may appear simple to determine the  $\text{Fe}_2\text{O}_3$  formed on ignition, in practice it is not easy completely to wash out the potassium carbonate from the light carbonaceous mass or to completely burn off the carbon. He records analyses of three samples, all of which gave results slightly below the official requirements.

*Feniculi Fructus.*—J. C. UMNEY (P.J. 494, ii, 1902) suggested 10 per cent. of ash as a standard on the whole drug, and stated that good fennel fruits contain not less than 3 per cent. of oil.

*Galbanum.*—J. C. UMNEY (P.J. 495, ii, 1902) suggested that 60 per cent. should be soluble in 90 per cent. alcohol, and that the ash should not exceed 8 per cent.

W. LYON (P.J. 409, ii, 1901) drew attention to the fact that drying and powdering this drug (as in the preparation of pills) might considerably diminish its value.



*Galla*.—An ash limit of 3 per cent. is suggested by J. C. UMNEY (P.J. 494, ii, 1902).

MOOR and PRIEST (Y.B.P. 412, 1900) found 1.3 and 2.3 per cent. on two samples.

CHATTAWAY and MOOR (Analyst, 206, July, 1903) examined two samples yielding 4.0 and 4.2 per cent. of ash.

*Gelsemii Radix*.—MOOR and PRIEST (Y.B.P. 412, 1900) found 2.1, 2.3, and 2.1 per cent. of ash in three samples.

J. C. UMNEY (P.J. 494, ii, 1902) suggested 3 per cent. as a limit of ash for the whole drug.

*Gentianæ Radix*.—MOOR and PRIEST (Y.B.P. 412, 1900) found the ash, in four samples, to vary from 2.2 to 4.0 per cent.

J. C. UMNEY (P.J. 494, ii, 1902) suggested 5 per cent. of ash as a limit for the unground drug.

*Glycerinum Acidi Borici*.—A. C. ABRAHAM (P.J. 576, ii, 1900) complains that the process is troublesome, and that the preparation is practically never used.

*Glycerinum Boracis*.—D. GILMOUR (P.J. 54, i, 1901) complains that the process is tedious and the resulting product is too viscous, and therefore its application is difficult.

*Glycerinum Pepsini*.—SIR CHARLES A. CAMERON (P.J. 570, i, 1900), "Of 21 samples only 4 were correct, 9 were wholly useless, and 8 had lost from 25 to more than 90 per cent. of their digestive power. . . . It is to be regretted that the *Pharmacopæia* does not give a good method for the preparation of pepsin, as I have no doubt imperfectness in preparing pepsin is the cause of so many bad specimens being met with."

*Glycyrrhizæ Radix*.—MOOR and PRIEST (Y.B.P. 412, 1900) record two figures of 3.3 and 3.6 per cent. of ash.

*Gossypium*.—Dr. POWER (C.D. 156, ii, 1900) showed that the official statement that cotton is dissolved by concentrated solution of ammonio-copper-sulphate requires revision; it is not soluble in the above-named solution, but dissolves readily in an ammoniacal solution of copper oxide.

*Granati Cortex*.—The ash of the root-bark is about 15 per cent. CHATTAWAY and MOOR (Analyst, 206, July, 1903) and J. C. UMNEY (P.J. 494, ii, 1902).

*Guaiaci Resina*.—J. C. UMNEY (P.J. 495, ii, 1902) suggested that not less than 90 per cent. should be soluble in 90 per cent. of alcohol, and that the ash should not exceed 3 per cent.



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*Hamamelidis Cortex*.—MOOR and PRIEST (Y.B.P. 413, 1900) recorded figures on three samples varying from 4.7 to 5.1 per cent.

J. C. UMNEY (P.J. 494, ii, 1902) suggested 5 per cent. as a limit of ash on the unground drug.

*Hamamelidis Folia*.—MOOR and PRIEST (Y.B.P. 413, 1900) found ashes varying from 4.6 to 8.5 per cent.

J. C. UMNEY (P.J. 494, ii, 1902) suggested 8 per cent. of ash as a limit in the unground drug.

*Hemidesmi Radix*.—J. C. UMNEY (P.J. 494, ii, 1902) suggested 4 per cent. as a limit of ash for the unground drug, which corresponds well with a figure recorded by MOOR and PRIEST (Y.B.P. 413, 1900).

*Hydrargyrum Ammoniatum*.—C. T. BENNETT (P.J. 576, ii, 1900) considers that the B.P. requirements as to the amount of metallic mercury yielded by this article are somewhat too high to be readily attainable.

*Hydrastis Rhizoma*.—T. MABEN (C.D. 234, ii, 1901) recorded figures showing the composition of this drug.

*Hyoscine Hydrobromidum*.—Dr. JOWETT (Y.B.P. 431, 1898), "The characters and tests given in the *Pharmacopœia* are very unsatisfactory. The solubility in water (1 in 1) is incorrect. The U.S.P. gives 1 in 1.9 and HESSE gives 1 in 4, which is more correct. The hydrated salt, when heated in a capillary tube to 100° C., forms a clear liquid, and no alteration can be observed on further heating to 181° C. (the melting-point of the hydrated salt). The statement in the *Pharmacopœia*, therefore, is somewhat misleading.

"The melting-point of the dehydrated salt as there given (193°–194° C.) requires modification. . . . The tests and characters of the official salt should be given for the pure product as it appears in commerce, which is a mixture of the stereo-isomers, melting at 181°. . . . With auric chloride the salt is stated to give a crystalline salt melting at 198° C., which is not correct."

*Hyoscyami Folia*.—J. C. UMNEY (P.J. 49, ii, 1902) suggested .08 per cent. of alkaloids as a standard. This is in accord with BARCLAY'S suggested standard for .008 per cent. of alkaloids in the tincture (which is 1 in 10).

*Hyoscyamine Sulphate*.—Dr. JOWETT (Y.B.P. 430, 1898), "The melting-point of the sulphate as it occurs in commerce is about 200° C., whilst I have found the pure salt to melt at 204° C. and not, as stated in the B.P., at 206°. I would suggest a melting-point of *not lower* than 200° C."

*Infusa*.—F. BASCOMBE (P.J. 228, i, 1899) has published figures showing the total extractive matter of the infusions of the 1898 B.P. and compared his figures with those of other observers on the infusions of the



1885 *Pharmacopœia*. His figures on the present preparations are as follows :

Infusum Aurantii	...	...	...	...	1.16
" " Co.	...	...	...	...	1.14
" Buchu	...	...	...	...	.95
" Calumbæ	...	...	...	...	.59
" Caryophylli	...	...	...	...	.88
" Cascarillæ	...	...	...	...	.38
" Chiratae	...	...	...	...	.34
" Cinchonæ Acidum	...	...	...	...	1.14
" Cuspariæ	...	...	...	...	1.16
" Digitalis	...	...	...	...	.24
" Ergotæ	...	...	...	...	.60
" Gentianæ Co.	...	...	...	...	1.08
" Krameriæ	...	...	...	...	.67
" Lupuli	...	...	...	...	1.37
" Quassiæ	...	...	...	...	.047
" Rhei	...	...	...	...	1.82
" Rosæ Acidum	...	...	...	...	2.00
" Scoparii	...	...	...	...	.52
" Senegæ	...	...	...	...	1.56
" Sennæ	...	...	...	...	{ 3.28 3.49
" Serpentariæ	...	...	...	...	.56
" Uvæ Ursi	...	...	...	...	1.68

*Ipecacuanhæ Radix*.—MOOR and PRIEST (Y.B.P. 413, 1900) suggested 5 per cent. of ash as a limit, and this is confirmed by J. C. UMNEY (P.J. 494, ii, 1902) and by W. J. LENTON (P.J. 558, i, 1902).

F. C. J. BIRD (P.J. 414, i, 1900) is in favour of an official method of assay, and he gives (*loc. cit.*) two suggested methods for its examination. In both of these methods he uses the drug in fine powder and avoids the use of heat.

In the first process he employs 10 grammes of the root in fine powder, 2 grammes of sodium bicarbonate and 5 c.c. of water, and mixes these so as to form a moistened powder, which is placed in a separator with a plug of cotton-wool at the bottom and macerated with about 10 c.c. of a mixture of 1 volume of amyl alcohol, 1 volume of chloroform, and 3 of ether. The mixture is agitated vigorously, allowed to stand for 15 minutes, and the liquid forced out by air pressure. This is repeated at intervals of a quarter of an hour, till ten or twelve quantities of menstruum have been used or the powder is exhausted. The solvent is now extracted with 4 c.c. of  $\frac{N}{Y}$  sulphuric acid mixed with 6 c.c. of water, and then with three successive quantities of 5 c.c. of water. These solutions are mixed and neutralised with ammonium bicarbonate. The alkaloids are now shaken out with successive additions of chloroform containing one-sixth of its volume of ether; with the last addition of chloroform a drop of strong ammonia is added.

The following may give an insight into the character of the material and the manner of its use.

The first section is devoted to a general description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The second section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The third section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The fourth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The fifth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The sixth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The seventh section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The eighth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The ninth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The tenth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The eleventh section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The twelfth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.

The thirteenth section is devoted to a description of the material and its use. It is divided into two parts, the first of which is devoted to a description of the material and the second to a description of its use.





The alkaloids may now be obtained on evaporating the chloroform, and estimated by titration.

The second process alluded to above is intended where accuracy is not so much desired as a rapid and fairly exact *comparison* of two or more samples. It is practically a modification of the first, employing the "aliquot part" principle.

*Jaborandi Folia*.—J. C. UMNEY (P.J. 8, i, 1900) states: "At the present time the leaves of *Pilocarpus jaborandi*, HOLMES, are not obtainable in commerce, the principal supplies consisting of the leaves of *P. selloanus* or *P. microphyllus*."

WHITE and HUMPHREY (Pharmacopodia) state: Jaborandi leaflets contain from 0.5 to 1 per cent. of amorphous alkaloids, consisting chiefly of pilocarpine,  $C_{11}H_{16}O_2N_2$ , together with small quantities of an isomeric base named isopilocarpine, and of a third alkaloid named pilocarpidine,  $C_{10}H_{14}O_2N_2$ ."

*Jalap*.—J. C. UMNEY (Y.B.P. 332, 1901) discussed the B.P. requirements for jalap, and showed by a number of analyses that it was difficult to obtain jalap of the proper resin-content. Comparing results of recent years with records of earlier analyses, it was plain that jalap was now being imported of a lower resin value than formerly.

It appeared that owing to the low price no great care was bestowed on its cultivation or collection.

*Kino*.—MOOR (Standards), commenting on an editorial in the C.D. 460, i, 1896, and an article by WATSON WILL and BRANCH (C.D. 57, ii, 1898), states, "It appears that the British Pharmacopoeia 'tests'—partially soluble in cold water, and almost entirely in 90 per cent. alcohol—require amendment."

J. C. UMNEY (P.J. 495, ii, 1902) suggested that 75 per cent. should be required to be soluble in cold water, and 80 per cent. in 90 per cent. alcohol.

*Lamellæ Homatropinæ*.—E. W. LUCAS (C.D. 959, ii, 1899) states that these discs do not contain sufficient colloid base to prevent the alkaloid from crystallising out.

*Linimentum Aconiti*.—J. BARCLAY (Laboratory Reports) has suggested a standard of .25 per cent. of ether-soluble alkaloids.

*Linimentum Ammoniac*.—J. CLOWER (P.J. 689, i, 1900) suggests slightly increasing the water, whereby the preparation is easier to pour out, and becomes whiter on keeping.

His suggested formula is as follows:—

Almond oil	...	...	...	...	...	...	4 ozs.
Olive oil	...	...	...	...	...	...	8 "
Sol. of ammonia	...	...	...	...	...	...	4 "
Distilled water	...	...	...	...	...	...	1 oz.

Mix the oils, add  $3\frac{1}{2}$  ozs. of sol. of ammonia, shake well, mix the remaining  $\frac{1}{2}$  oz. liquid ammonia solution with the water, add and shake.



*Linimentum Belladonnæ*.—F. C. J. BIRD (P.J. 692, i, 1900) says, "the modified B.P. acid extraction process answers well for the assay of the liniment, the camphor being easily removed from the acidified liquid by the preliminary washing with chloroform. Take 10 c.c. of liniment, dilute with 40 c.c. of water, and proceed as for the liquid extract."

*Linimentum Camphoræ*.—J. CLOWER (P.J. 689, i, 1900) suggested weighing the oil as well as the camphor.

ABRAHAM (C.D. 501, i, 1902) says "it would be more convenient if the camphor were present in a fixed proportion by weight."

J. F. LIVERSEEGE (C.D. 167, i, 1901) gives tables showing that *Linimentum Camphoræ* when correctly prepared should contain at least 21 per cent. of camphor, and explains his optical process for its estimation.

J. CLOWER (P.J. 590, ii, 1900) has recorded experiments which go to show that properly prepared samples do not lose camphor appreciably on storage and distribution in the ordinary way.

*Lin. Terebinthinæ*.—F. H. ALCOCK and E. WITHERS (P.J. 255, i, 1899), "This liniment has always been a great trouble to pharmacists . . . the preparation of the present official liniment is still a matter of difficulty. . . . If the following *modus operandi* be adopted there will be no difficulty in producing it in much less time, and with not so much labour, with a more satisfactory result, no separation taking place even after some days. Dissolve the camphor, previously cut into small pieces, in the oil of turpentine contained in a bottle sufficiently large to allow of its being shaken, add the soap, and shake vigorously until uniformity is obtained, that is, until the soap is thoroughly diffused throughout the liquid and no lumps are visible, this occupying five minutes; then add the whole of the water, shake vigorously, and repeat this treatment occasionally at intervals."

*Liquor Ammoniae Fortis*.—E. WHITE (P.J. [4] x, 144) points out that the official statement that *Liquor Ammoniae Fortis* has a specific gravity of .891 does not precisely correspond with the statement that it contains 32.51 per cent. of  $\text{NH}_3$ .

*Liquor Ammonii Acetatis*.—J. RUTHERFORD HILL (P.J. 59, i, 1899) proposes that the strength of the ammonium carbonate and the acetic acid should both be ascertained before mixing.

J. CLOWER (P.J. 689, i, 1900) considers that it would be better to start with a given weight of acetic acid, or to work to a given specific gravity. He recommends reinsertion in the *Pharmacopæia* of the *Liquor Ammonii B.P. 1885 Acetatis Fortior*, which he finds keeps better than the dilute preparation.

*Liquor Ammonii Citratis*.—J. RUTHERFORD HILL (P.J. 59, i, 1899) proposes adding the citric acid to the ammonium carbonate after dissolving both salts first in water; in this way, he finds there is less loss of carbonic







acid gas, and the resulting preparation has, therefore, a more pleasant flavour.

*Liq. Bismuthi et Ammonii Citratis*.—J. C. UMNEY (C.D. lii, 955) says: "It will be found that operating precisely in accordance with the *British Pharmacopœia* a considerable difficulty arises in taking into solution the whole of the precipitated citrate of bismuth. . . . By the addition of 175 grains of citric acid per pint, and an increased quantity of ammonia, there is no difficulty in obtaining a quantity of bismuth in solution equal to .6 of a gramme of sulphide from 10 c.c."

F. R. DUDDERIDGE (C.D. 211, ii, 1899) suggests certain modifications of the official process whereby the difficulties could be readily overcome. The differences between his method and the official process are:—

(1) The solution of bismuth oxynitrate in equal volumes of nitric acid and distilled water is *not* diluted to opalescence; it is not diluted at all.

(2) The order of mixing is reversed, the potash solution not being added to the bismuth, but the bismuth poured carefully into the potash solution, which is kept well stirred all the time.

(3) The potash salts are dissolved in a definite quantity of water—2 oz. for an imperial pint of product, or 100 c.c. for a litre. This forms a thick magma, to which another 2 oz. (or 100 c.c.) of water is added, the mixture heated to the boiling point, thrown on a filter, and washed with hot water until free from nitrate contamination, the washed precipitate is then easily soluble in solution of ammonia.

COWLEY and CATFORD (P.J. 604, ii, 1899) in an exhaustive paper show that the imperfection in the official formula is that it orders less potassium citrate than is necessary for converting the bismuth into citrate. They give the following proportions for the preparation of 1 litre of *Liquor Bismuthi*:

Bismuth oxynitrate, 70 grammes.

Nitric acid (sp. gr. 1.42).

Distilled water at 60° C.

Citric acid, 50 grammes.

Bicarbonate of potash, 103 grammes, or

86 grammes of bicarbonate of soda.

The bicarbonates may be weighed as pure. The bismuth is dissolved in the diluted nitric acid by gently warming, and the citric acid added, dissolved in a little water (and if a carbonate is used two-thirds of it may be mixed with citric acid); the alkali solution is added gradually with stirring, diluted with hot water to about 1 litre, cooled, filtered, and the precipitate washed free from nitrate. 60 c.c. of liquor ammoniæ (10 per cent.) diluted to 200 c.c. with water is then poured on to the precipitated citrate, and the ammoniacal filtrate returned till all the bismuth citrate is taken up, after which it is diluted to a litre, or to the required specific gravity of 1.07.

*Liquor Calcis*.—E. J. EVANS (Y.B.P. 462, 1898) states: "Lime-water can be made in a few minutes, if a fairly pure caustic lime be recently slaked



before using. . . . When intended to be kept, the lime-water should be in contact with the excess of lime used."

*Liquor Calumbæ Conc.*—A. C. ABRAHAM (C.D. 840, ii, 1900) gave records of experiments showing the variation in quality of this preparation according to the pressure employed.

F. H. ALCOCK (C.D. 879, ii, 1900) confirms by experimental data the variable character of this preparation, and BASCOMBE (C.D. 20, i, 1901) shows that the deposition on keeping is so considerable that a liquor originally yielding 5.8 grammes of solids per 100 c.c. may only yield 3.0.

F. C. J. BIRD (P.J. 128, ii, 1901), after a careful study of the official process, recommends the following modifications:—

(1) The substitution of chloroform water for distilled water to prevent incipient fermentation or souring.

(2) The use of a quantity of chloroform water for the second maceration equal to the difference between the volume of the first pressings and 16 fluid ozs., so that the expressed liquids may measure 16 ozs.

(3) The removal of suspended matters by sedimentation for 12 hours.

(4) The raising of the temperature from 180° F. (as ordered officially) to 212° F., the liquid after heating being quickly cooled and made up to 16 fluid ozs. before the addition of the spirit.

J. C. UMNEY (P.J. 497, ii, 1902) recorded as average results from well-made preparations 3.5 grammes of extractive matter per 100 c.c., and alcoholic strength 20 per cent.

*Liquor Chiratae Conc.*—F. BASCOMBE (C.D. 20, i, 1901) shows that this preparation may deposit to such an extent that a sample originally containing 4.56 grammes of extractive per 100 c.c. may after keeping a year contain 3.86.

J. C. UMNEY (P.J. 497, ii, 1902) gives 4.5 grammes per 100 c.c. as an average extractive from this preparation.

*Liquor Cuspariæ Conc.*—F. BASCOMBE (C.D. 20, i, 1901) has recorded a small loss of extractive on keeping for a year. His figure for extractives 9.6 agrees well with the 10 per cent. given as an average by J. C. UMNEY (P.J. 497, ii, 1902).

*Liquor Ferri Perchloridi Fortis.*—F. J. ALLEN (P.J. 44, ii, 1899) showed that 1.6 grammes of  $\text{Fe}_2\text{O}_3$  could not be obtained from 5 c.c. of a liquid having a gravity of 1.42, but a slight modification of the Pharmacopœial quantities as suggested by F. C. J. BIRD (Y.B.P. 362, 1899) will result in a liquor yielding the requisite amount of  $\text{Fe}_2\text{O}_3$  and having a gravity of about 1.49. These observations are confirmed by T. TYRER and A. LEVY in an exhaustive paper, who state that manufacturers do not employ the official method in the preparation of ferric chloride solutions. Regarding the possible presence of arsenic in this preparation, J. C. UMNEY (P.J. 493, ii, 1902) states, "arsenic can be without difficulty eliminated, and this condition should be insisted on."







*Liquor Hydrargyri Perchloridi.*—GREENISH and UPSHER SMITH (P.J. 217, i, 1902) have investigated the keeping powers of this solution, and recommend that it should be preserved in amber bottles. In no case should tap-water be employed in making up the solution, as a deposit is likely to form, the nature of which appears to be not yet fully understood.

*Liquor Hydrogenii Peroxidi.*—C. T. TYRER (P.J. 100, ii, 1899) considers that the official tests should include one to guard against the presence of fluorine compounds. He regards phosphoric acid as the best preservative.

NAYLOR and DYER (C.D. 222, ii, 1901) have investigated the official test, and have shown that owing to the action of the permanganate and acid on the brine solution a liberation of chlorine takes place which produces a result in excess of the truth. This difficulty may be overcome by the employment of a saturated solution of magnesium sulphate.

*Liquor Krameriae Conc.*—F. BASCOMBE (C.D. 20, i, 1901) has shown that a fall from 7.1 to 5.1 grammes per 100 c.c. in extractive may take place on a year's keeping.

F. C. J. BIRD (Y.B.P. 461, 1902), who has carefully investigated this preparation, states, "Precipitation and loss of extractive characterise Liq. Krameriae Conc. when prepared by the British Pharmacopœia method at the usual temperature of the laboratory and stored under ordinary conditions. . . . If the introduction of any other solvent but alcohol be open to objection, then considerable improvement results from the incorporation of about 5 per cent. extra alcohol in the British Pharmacopœia product, care being taken to avoid loss during manufacture." He states that if the presence of 10 per cent. of glycerin in the finished product be considered admissible, the best results are obtained by this addition, the product of which possesses all the good qualities that the present preparation has been found lacking in.

*Liquor Pancreatis.*—J. C. UMNEY (P.J. 8, i, 1900) has found that an addition of glycerin is advantageous in preserving this preparation.

F. C. J. BIRD (Y.B.P. 429, i, 1900) suggests a slight modification of the official test, which he claims to render more sensitive and definite by using ether with the nitric acid. He suggests the following alteration in the wording: after the words "for one hour" . . . "5 c.c. of the liquid to be shaken with an equal volume of .717 ether should form a clear solution, in which no coagulation should be produced on the addition of 5 minims of nitric acid."

*Liquor Picis Carbonis.*—MOOR (Standards) says: "The specific gravity of this preparation varies considerably . . . a variation of 2.1 to 3.7 grammes of solid residue per 100 c.c. has been found in samples properly prepared by the British Pharmacopœia process."

*Liquor Plumbi Subacetatis Fortis.*—Dr. POWER (Y.B.P. 342, 1900) that when freshly prepared this solution has a specific gravity of



1.277, and requires 19 c.c. of  $\frac{N}{10}$  sulphuric acid. The official directions, therefore, allow some margin for decomposition.

*Liquor Quassiae Conc.*—F. H. ALCOCK (P.J. 639, ii, 1900) found an average extractive of .35 gramme per 100 c.c. in five specimens examined by him.

F. BASCOMBE (C.D. 20, i, 1901) did not find any loss on keeping a sample of this preparation for a year.

*Liquor Rhei Conc.*—F. BASCOMBE (C.D. 20, i, 1901) found a freshly made sample yielding 13.6 per cent. of extractive to yield 12.6 after a year.

*Liquor Sarsae Co. Conc.*—F. BASCOMBE (C.D. 20, i, 1901) found a freshly made sample yielding 11.9 per cent. of extractive to yield 10.3 after a year.

*Liquor Senegae Conc.*—F. BASCOMBE (C.D., 20 i, 1901) found a fall from 20.1 per cent. to 16.4 in extractive on keeping for a year.

F. C. J. BIRD (P.J. 129, ii, 1901) has investigated this loss, which he found due at least in part to the presence of free acid. By partly neutralising the liquid it keeps well without deposition.

*Liquor Sennae Conc.*—F. BASCOMBE (C.D. 20, i, 1901) found a freshly made sample to yield 10.2 per cent. of extractive, and, after a year, only 8.6 per cent.

*Liquor Serpentariae Conc.*—F. BASCOMBE (C.D. 20, i, 1901) found a freshly made sample to yield 5.25 per cent. of extractive, and, after a year, 4.97 per cent.

*Liquor Thyroidei.*—J. C. UMNEY (Y.B.P. 468, 1898) pointed out that the preparation made strictly on the official lines does not keep satisfactorily.

EDMUND WHITE (P.J. 139, ii, 1902) has found that the liquor keeps well if the amount of glycerin is increased. His suggestion is as follows:—“To 20 grammes of fresh glands add 15 c.c. of glycerin, macerate for 24 hours, press and make up to required volume with equal parts of glycerin and water.”

*Lithii Carbonas.*—WHITE and HUMPHREY (Pharmacopedia) draw attention to the fact that the weight (1.479 gramme) of sulphate produced when 1 gramme is treated with sulphuric acid and ignited indicates not 98.5 per cent. of carbonate of lithium, but 99.5 per cent.

*Lithii Citras*—Dr. POWER (Y.B.P. 337, 1900) states: “A constant weight cannot be obtained at 100° C., and all the water is not expelled at 115.5° C. A temperature of 140° C. seems to be necessary.”

*Lithii Citras Effervescens.*—A. DAVIDSON and G. LUNAN (P.J. 142, i, 1899) show that the percentage of CO<sub>2</sub> in the finished article is very variable.







*Lupulinum*.—The ash limit appears to be a little stringent. SQUIRE ("Companion") records the fact that of 8 samples examined 7 yielded over 20 per cent. of ash; a sample examined by MOOR and PRIEST gave 15.6 per cent. and J. C. UMNEY (P.J. 494, ii, 1902) is in favour of raising the official limit of 12 per cent. to 14 per cent.

*Magnesia Ponderosa*.—F. H. ALCOCK (P.J. 461, i, 1901) recorded the loss on ignition on six different samples, the percentage loss being 5.5, 6.5, 4.7, 5.3, 7.4, and 6.1 per cent.

*Magnesiæ Carbonas Levis*.—Dr. POWER (Y.B.P. 338, 1900) says: "It is of somewhat variable composition, and therefore cannot be represented by a definite formula such as is given by the British Pharmacopœia."

*Magnesiæ Sulphas Effervescens*.—C. S. DYER (Y.B.P. 464, 1898) recorded the results obtained on assaying the ingredients of this preparation both before and after mixing. He used a nitrometer for the estimation of the available carbonic acid, and concluded from his experiments that the loss of CO<sub>2</sub> in mixing and granulating was very considerable.

He suggested that "the Pharmacopœia ought, among the characters and tests of these preparations, to state the least amount of CO<sub>2</sub> which each should yield. . . . Any sample which does not show, say, 50 per cent. of its bicarbonate available for producing effervescence should not find its place in modern pharmacy."

A. DAVIDSON and G. LUNAN (P.J. 142, i, 1899) recorded the results of their examination of a number of commercial samples of the official effervescing preparations, and suggest certain modifications in the procedure with a view of retaining as much of the carbonic acid as possible. They recommend "the use of a temperature not exceeding 70° C. for granulating, and the sifting of the plastic mass when in proper condition, without waiting for it to assume a granular form, and then separating into various sized granules, as required by the Pharmacopœia. This ensures a much shorter application of strong heat, and consequently less loss of carbonic acid."

The authors also lay stress on the great advisability of securing a uniform-sized granule, so that a given volume may more or less accurately correspond to a known weight.

*Mel Depuratum*.—C. G. MOOR (Standards) states: "The ash of honey seems to be very variable."

*Menthol*.—Dr. POWER (Y.B.P. 338, 1900) quotes SCHIMMEL'S observation (October, 1898) on the official description of menthol, which is described as "in crystals usually more or less moist from adhering oil," as apparently giving sanction to an impure article.

*Mucilago Tragacanthæ*.—W. LYON (P.J. 600, ii, 1901) states: "At various times this preparation has come under the ban of the critics on account of its proneness to become rancid." The writer then describes an experiment



in which he tried the preservative powers of a small addition of (1) Chlore-tone and (2) Chloroform. The latter acted satisfactorily; but he remarks that there are cases in which even a small quantity of chloroform is undesirable in a mixture, and that "it will be admitted that the Revision Committee acted wisely in retaining the formula as it stood."

*Myrrha.*—K. DIETERICH (P.J. 321, 1899) states: "Not more than 70 per cent. should be insoluble in alcohol, and the ash should not exceed 10 per cent."

G. F. MERSON (P.J. 42, i, 1900), after a careful examination of many commercial specimens as regards ash, solubility, &c., summarises his conclusions as follows:—

"(1) Myrrh is easily obtainable of good quality, and is not adulterated to any extent, except by the inclusion of earthy matter, which can be readily removed by sifting.

"(2) The normal ash in good 'sorts' does not exceed 5 per cent., which should be almost entirely soluble in dilute hydrochloric acid.

"(3) One gramme exhausted by 90 per cent. alcohol should leave a residue which, when dried at 100° C., should not weigh more than .6 of a gramme."

GREENISH (P.J. 666, ii, 1901), after studying the colour-test for myrrh, prefers the following modification as an improvement on the present official test: "Half a gramme of coarsely powdered myrrh, shaken occasionally for 10 minutes with 10 c.c. of ether, should yield a filtrate, 2 c.c. of which should yield on evaporation a residue that is slowly coloured violet by contact with the vapour of nitric acid."

*Nux Vomica.*—The presence of fat in the beans and its effect on the liquid extract and tincture have been dealt with under "Ext. Nucis Vomicae Liquidum."

W. LYON (P.J. 409, ii, 1901) suggests that an alkaloidal standard should be fixed for nux vomica, as there is a dose, and it is sometimes prescribed in powder.

F. C. J. BIRD (P.J. 574, ii, 1900) gives the following process for the determination of strychnine in nux vomica beans:—

The beans need not be in very fine powder, a No. 10 powder being fine enough for all practical purposes. Five grammes are taken and moistened with 2 c.c. of a 10 per cent. solution of caustic potash. The moistened powder is then placed in a separator, with a small plug of cotton-wool above the tap, and treated with successive quantities of 20 c.c. each of a solvent composed of

Amyl alcohol	...	...	...	...	...	1 volume
Chloroform	...	...	...	...	...	3 volumes
Ether	...	...	...	...	...	4 "

Usually five or six extractions will be found to be sufficient. The pressure-ball, previously described, is employed to force out the solvent after each addition.







The mixed extracts are then placed in a separator and shaken with a dilute solution of sulphuric acid, composed of 6 c.c. diluted acid and 25 c.c. of water. This mixture is used in three separate portions. The united acid liquids are transferred to a separator capable of holding 200 c.c., and having a plug of cotton-wool above the stop-cock, and half filled with water at 70° C. A freshly prepared solution of potassium ferrocyanide—1.25 gramme of the salt in 25 c.c. water—is added, the liquid in the separator is made up to 200 c.c. with water at 70° F., and the stopper replaced by a cork carrying a thermometer and the temperature maintained at 70° F. The contents of the separator are maintained for 1½ hours at 70° F. by occasional warming.

The liquid is then forced out by the pressure-ball. 200 c.c. of acidulated water are prepared by adding 5 c.c. of diluted sulphuric acid to 195 c.c. of water at 100° F., and the precipitate is well washed with successive quantities with the aid of the pressure-ball.

The precipitate is then decomposed by ammonia and dissolved in chloroform. The chloroformic solution is then evaporated in the ordinary way and the residue weighed. BIRD also makes the useful suggestion that the decrepitation of the strychnine residue may be entirely obviated by the addition of 2 c.c. of amyl alcohol before evaporating to dryness.

The correction used for the strychnine dissolved in the wash-water is given by the author as 8 milligrammes, which is to be added to the weight obtained before multiplying by 20. (FARR and WRIGHT.)

The percentage of strychnine found by BIRD in *nux vomica* beans varied from .7 to 1.5 per cent.

*Oleum Amygdalæ*.—J. C. UMNEY and R. S. SWINTON (Y.B.P. 444, 1899), for the detection of cotton-seed oil (a likely adulterant), find that HALPHEN'S modified test under pressure is very useful.

The nitric-acid test of the Pharmacopœia is adequate for the detection of apricot-kernel oil, but not for the detection of peach-kernel oil.

In the case of peach-kernel oil the colour produced is almost white, with the slightest trace of darkening, but no brown colour, separating on standing from four to six hours to a very pale yellow solid mass and nearly colourless liquid. The apricot-kernel oil, however, darkens considerably, and separates into a brownish solid mass, in almost the same time, and a yellowish brown liquid.

W. C. ALLEN and E. T. BREWIS (Y.B.P. 359, 1900) described in detail the various sources of the "almond" oils of commerce, and gave in addition a tabular statement showing the results of the nitric-acid test, BIEBER'S test, and certain analytical constants on 21 samples of almond oils and its substitutes. The figures appear to show that the specific gravity, iodine absorption, HEHNER'S bromine process, and the colour tests ought all to be applied when endeavouring to distinguish between genuine almond oil and its substitutes, but that the close analytical resemblances which exist render the detection of substitution, especially in small quantities, very difficult.



*Oleum Anethi*.—J. C. UMNEY (P.J. 496, ii, 1902) suggests that 45 per cent. of carvol should be adopted as a standard, the process of estimation being the same as described under "*Oleum Carui*."

*Oleum Anisi*.—E. DOWZARD (C.D. 814, i, 1899) states: "Oils of fair quality do not melt below  $17.5^{\circ}$  C., while oils of first-class quality melt at temperatures below  $19^{\circ}$ – $21.5^{\circ}$  C."

DOWZARD is also of opinion (C.D. 961, i, 1902) that genuine anise oil may be dextro-rotatory, though he states that all the authorities state that the oil is lævo-rotatory. He gives the solubility in 90 per cent. alcohol as being 1 vol. of oil in about 2 to 3 of alcohol.

E. J. PARRY (Essential Oils) says that it is never dextro-rotatory, and when so may be adulterated with fennel oil.

J. C. UMNEY (P.J. 496, ii, 1902) suggests as a standard 80 per cent. of anethol, the process for its estimation being fractionation between the temperatures of  $225^{\circ}$  and  $235^{\circ}$  C.

*Oleum Cajuputi*.—J. C. UMNEY (P.J. 496, ii, 1902) suggests that a standard of 55 per cent. of cineol should be required, the estimation to be made by the phosphoric-acid process.

*Oleum Carui*.—MOOR (Standards) suggests that an optical rotation should be officially specified, which should be about  $+75$  (this he bases on a number of observations made by THEO. BREWIS on oils of known genuineness). As the carvol is sometimes intentionally removed, it is important that the specific gravity as officially laid down should be adhered to (removal of carvol lowers the gravity), but a preferable plan would be to require a definite amount of carvol, as suggested by J. C. UMNEY (P.J. 496, ii, 1902), who would place it at 55 per cent., to be determined by fractionation between  $220^{\circ}$  and  $230^{\circ}$  C. and formation of the phenyl-hydrazine compound.

*Oleum Caryophylli*.—Dr. POWER (Y.B.P. 339, 1900) says: "A useful criterion for the purity of this oil which might be considered by the *Pharmacopœia* is its property of forming a clear solution with twice its volume of 70 per cent. alcohol."

E. DOWZARD (C.D. 961, i, 1902) compares the specific gravities given by PARRY and by SCHIMMEL with the official requirements, and records the results of examination of eleven samples of clove oil, all of which were known to be genuine. He says:—"These results show that the minimum specific gravity should be about 1.047." He also determined the eugenol (by the potassium-hydrate method), and found it to vary from 84 to 91 per cent. The optical rotation was slightly to the left.

J. C. UMNEY (P.J. 496, ii, 1902) suggests as a standard 75 per cent. of eugenol, to be determined by THOM'S method.

*Oleum Cinnamomi*.—Dr. POWER (Y.B.P. 340, 1900) states: "These (the official) directions are quite inadequate, and in many cases would lead to very incorrect results, if not to complete failure. In the first place, it







would obviously be a very difficult matter to shake the oil with a *boiling* solution of sodium hydrogen sulphite, and it is furthermore not desirable to add the entire amount of the latter solution at once, but in small portions, the flask being heated on a water-bath after each successive addition of the solution, until the solid bisulphite compound has become completely liquefied. A proper description of the method of conducting this determination is given by GILDEMEISTER and HOFFMANN in *Die ätherischen Oele*, Berlin, 1899, p. 505."

A test for the purity of this oil which is also of some value is its property of forming a clear solution with three times its volume of 70 per cent. alcohol.

E. DOWZARD (C.D. 961, i, 1902) found that in eleven samples examined the cinnamic aldehyde varied from 68 to 84 per cent.

The *Pharmacopæia* includes no requirement as regards the optical activity of this oil. DOWZARD found the greater number of his samples to be slightly dextro-rotatory, which is contrary to PARRY's experience.

J. C. UMNEY (P.J. 496, ii, 1902) suggests 50 per cent. of cinnamic aldehyde (by sodium hydrogen sulphite) as a standard.

*Oleum Copaibæ*.—F. W. SHORT (P.J. 54, i, 1900) says "these figures" (the official requirement as to optical rotation) "appear to have been taken from a paper on African Copaiba by J. C. UMNEY (P.J. [3] 24, 215), in which he gives  $-28^{\circ} 55'$  and  $34^{\circ} 18'$  as the rotatory powers of two samples, Para and Maracaibo respectively . . . moreover, the figures refer to a 20-centimetre tube . . . and should be halved. . . . Even then they will probably be too narrow; the figures given by GILDEMEISTER and HOFFMANN range from  $-7^{\circ}$  to  $-35^{\circ}$ ."

The above quotation refers to an official statement in the monograph on "Copaiba," in which the optical rotation is required to be  $28^{\circ}$  to  $34^{\circ}$  to the left; under "*Oleum Copaibæ*" it is officially specified that the rotation shall be to the left, but no actual figures are laid down.

Dr. POWER (Y.B.P. 340, 1900) says, "As Mr. SHORT has pointed out, they are misleading, for the limits of rotation should be much broader. A specific test for *gurjun oil* might be adopted (see A.J.P. 1897, p. 579), although this would also be indicated by a higher specific gravity and a higher optical rotation."

J. C. UMNEY and C. T. BENNETT (P.J. 324, i, 1901) give the results of their examination of a number of samples, and say:

"The oils distilled from the different commercial varieties examined all answer the requirements of the *British Pharmacopæia*, 1898, with the exception of the optical rotation. The limits recorded for optical rotation of the oil in the official monograph of copaiba itself are a mistake. . . . The following characters might be officialised:

" Specific gravity at $15^{\circ}$ C.	...	...	·903—·908
Rotation in a 100-mm. tube	...	...	$-7^{\circ}$ to $-21^{\circ}$
Boiling-point	...	...	$245^{\circ}$ C.— $275^{\circ}$ C.
Solubility in absolute alcohol	...	...	1 in 1."



L. F. KEBLER (P.J. 535, i, 1902) recommends the colour test with nitric and acetic acids for the detection of oil of gurjun in oil of copaiba.

He performs the test as follows:—"Into the bottom of a test-tube place 1 c.c. of glacial acetic acid (99.5 per cent.), add four drops of pure concentrated nitric acid, and mix well; then add four drops of oil to this mixture, allowing the oil to float on top. If oil of gurjun balsam is present a reddish or purple zone will be developed between the layer of oil and the acid mixture in a few minutes. No reaction occurs if the oil is pure."

*Oleum Coriandri*.—The optical rotation might form a useful feature for judging of the genuineness of this oil. Messrs. SCHIMMEL (Report, April 1897) give the optical rotation as +8 to +13. An oil of known purity, examined by THEO. BREWIS (MOOR'S Standards), had an optical rotation of +9.

E. J. PARRY (C.D. 54, ii, 1898) suggests as a requirement to exclude terpenes that the optical rotation should be from +5 to +15. In his work on Essential Oils (1899) he gives the optical rotation as between +7 to +13.

*Oleum Cubebeæ*.—Messrs. SCHIMMEL (Report, April 1897) gave the optical rotation as  $-30^{\circ}$  to  $-40^{\circ}$  C. An oil of known purity examined by THEO. BREWIS (MOOR'S Standards) had a rotation of  $-34^{\circ}$ .

*Oleum Eucalypti*.—D. B. DOTT (P.J. 57, i, 1899) records the result of experiments on the estimation of eucalyptol in eucalyptus oil by the phosphoric acid method. He found that too large an excess of acid must not be employed, and advises the titration with standard soda as being preferable to weighing the pressed cake.

W. H. ALLEN (C.D. 641, i, 1899) investigated SCAMMELL'S (the phosphoric acid) process for the estimation of eucalyptol in eucalyptus oils. He first prepared eucalyptol by treating a globulus oil rich in eucalyptol with phosphoric acid and purifying the eucalyptol obtained; he then mixed this in varying proportions with the non-eucalyptol constituents of globulus oil, and applied SCAMMELL'S process. When quantities not less than 20 per cent. were present it appeared that the amount added was accurately shown by the process; where less than 20 per cent. was present it was impossible to obtain satisfactory results. As the author remarks, an oil containing less than this amount would not satisfy the official requirements, and therefore the inability to estimate small quantities should not detract from the utility of the process. These experiments were undertaken with a view of proving the value of SCAMMELL'S process, as the experiments of D. B. DOTT had appeared to show that the process was hedged with difficulties and somewhat untrustworthy.

R. T. BAKER and H. G. SMITH (C.D. 864, i, 1899), officers of the Technological Museum, Sydney, record some results obtained on the







distillation of New South Wales eucalyptus. In order to thoroughly study the characters of the oils from the various species they established an experimental plant at the Museum, and have from time to time published their experiences. They are in favour of correcting the official standards for eucalyptus oil as follows :

"Specific gravity from .900 to .925 at 15.5° C. . . . and not less than 48 per cent. by weight of eucalyptol (cineol)."

E. OCKENDEN (C.D. 898, i, 1899) writes as follows:—"Messrs. BAKER and SMITH having distilled oils from some new species of eucalyptus, which oils have a lower gravity than .910, suggest that the B.P. limit should be lowered. . . . This would not be advisable unless a definite percentage of eucalyptol were also demanded, because of the great facility it would give for increased adulteration. During the past few months I have purchased several samples of eucalyptus oil from chemists, which have evidently been carefully prepared to pass the B.P. characters and tests." The writer proceeds to illustrate this statement by an example, and says: ". . . The oils produced by BAKER and SMITH are probably not produced on a commercial scale, but have a scientific interest only. The oils offered on the London market fall into two classes :

"(1) Those which contain 50-60 per cent. of eucalyptol, and easily pass the B.P. tests, including the specific gravity;

"(2) Those commonly called 'amygdalina,' which fail in all the official requirements, and contain little or no eucalyptol.

". . . . I think any alteration would be a mistake, unless at the same time the presence of, say, 55 per cent. of eucalyptol were required."

E. DOWZARD (C.D. 814, i, 1899): "The phosphoric acid test will admit an oil containing 20 per cent. of eucalyptol; while oils containing 50 to 60 per cent. are easily obtainable the test should be made quantitative."

E. J. PARRY (C.D. 227, i, 1900) comments on BAKER and SMITH's observations (*ante*) and on the requirements of the Pharmacopœia as follows :

"Taken as a whole the standard (the B.P. requirements) is perfectly satisfactory, with the exception of the specific gravity. . . . There are plenty of oils containing no phellandrene (or not sufficient to answer the B.P. test) which are optically active to the extent of +8° to -8°, and contain from 45 to 50 per cent. of cineol, but which are excluded on account of their specific gravity, which is from .905 to .910. . . . The only desirable alteration, in my opinion, is that the specific gravity should be made .905 to .930."

BAKER and SMITH (C.D. 712, i, 1900), after reviewing E. J. PARRY's criticisms, say: "If eucalyptus oil is compelled to contain not less than 48 per cent. of eucalyptol, which is the minimum standard we recommended, then excess of phellandrene cannot be present, and we consider that if an oil is compelled to reach that standard, then for all practical purposes all other tests may be abolished.



*Oleum Juniperi*.—E. J. PARRY (C.D. 690, i, 1899) has inquired into the constitution of the so-called "Juniper-wood oil" of commerce. The result of his investigations is that it consists of either

- (1) Turpentine that has been distilled over juniper berries or twigs; or
- (2) A small quantity of juniper oil is mixed with turpentine; or
- (3) The waste terpenes from the manufacture of "concentrated" oil of juniper.

He goes on to say, "These facts are surely sufficient to condemn the use of such a term as 'Ol. juniper exot.' to this product. In examining this oil it should be noted that the specific gravity is easily made to fall within pharmacopœial limits, and the optical rotation can also be adjusted by the use of French and American turpentine. The oil is characterised by the absence of any appreciable fraction distilling at 256° C.–280° C. Pure juniper oil yields from 12 to 16 per cent. at this temperature, which is chiefly the sesquiterpene cadinene."

PARRY (in his work on "Essential Oils") quotes SCHIMMEL'S Report, p. 30, October 1898, in which it is stated that no large quantity of oil is now distilled from the unripe berries, and that it is inferior in all essential qualities to the normal oil from ripe berries. The oil is lævo-rotatory from –4° to –10°. The relative proportions of pinene and cadinene should be ascertained by fractionation. Pinene boils at 156°, cadinene at 274°; from 25 to 35 per cent. is obtained between 155° and 160° of pinene, and from 10 to 20 per cent. of cadinene between 270° and 280°.

*Oleum Lavandulæ*.—E. J. PARRY (C.D. 169, ii, 1902) records the specific gravity, optical rotation, and ester-content of French lavender oils. He states that English oil of lavender appears to contain about 7 to 8 per cent. of esters, while the French contains from 25 to 40 per cent.

J. C. UMNEY (P.J. 496, ii, 1902) suggests as a standard that English oil should be required to contain not more than 11 and French oil not less than 36 per cent. of esters of linalool, determined by saponification.

Messrs. SCHIMMEL (Report, April 1902) report an ingenious adulteration of lavender oil by the addition of benzoic acid. In their Report for April 1897 Messrs. SCHIMMEL give the following figures as representative of English and French oils:

				Specific Gravity.		Rotation.
English...	...	...	...	·885–·900	...	–7 to –10
French ...	...	...	...	·885–·895	...	–3 to –9

*Oleum Limonis*.—In an editorial (C.D. 495, i, 1899) attention was drawn to the fact that the presence of a given percentage of citral in lemon oil was not a certain or satisfactory proof of purity, and that enormous quantities of citrine (the worthless material left in the preparation of terpeneless oil of lemons) are sold to Italy, and very probably are returned to this country after being manipulated.







E. J. PARRY (C.D. 545, i, 1899) writes confirming the editorial remarks quoted above, and states that many of the oils sold under a guarantee of a given amount of citral do not pass the Pharmacopœia requirements.

F. A. CORIO (C.D. 651, i, 1899), writing from Messina, says: "Citral is a product by itself, which is sold to the different essential oil manufacturers for sophistication, and just to deceive the consumer, by imparting to the oil an apparent strength."

BURGESS and CHILD (C.D. 913, ii, 1901) dealt with the lemon oil industry, saying that in some of our own colonies, especially the West Indies, they believed the industry would be a success.

As regards the analytical examination of lemon oil, the authors would alter the official requirements for specific gravity from  $\cdot 857 - \cdot 860$  to  $\cdot 856 - \cdot 859$ . The optical rotation they find to vary from  $+58^\circ$  to  $+62^\circ$  for a temperature of  $15^\circ - 20^\circ$  C. in a 100 mm. tube. They also consider the refractive index, using the Abbé refractometer, to be of value.

With regard to the rotation of the first 10 per cent. of the distillate, which according to the *Pharmacopœia* should not vary more than  $2^\circ$  from that produced by the original oil, the authors state that genuine oils may show a greater difference. They then discussed the methods for the determination of citral, and give preference to the sulphite method, the details of which are given as follows: 50 c.c. of lemon oil are added to 75 c.c. of 40 per cent. solution of meta-bisulphite of soda and 25 c.c. of sodium sulphite (made by exactly neutralising the bisulphite of soda solution with a 10 per cent. solution of sodium hydrate) in a suitable flask. The temperature is then raised to about  $70^\circ$  C. and the solution thoroughly shaken for one hour. The oil is then raised into the measuring burette, and the diminution in volume gives the amount of total aldehydes. A correction must be made for the solubility of the terpenes. The authors subtract  $\cdot 35$  for 25 c.c., but recommend each worker to determine this correction.

The authors state that lemon oil does not contain 7 to 8 per cent. of citral, but nearer 4 per cent.

They conduct the fractional distillation from a flask having three bulbs blown in the neck and connected to an apparatus for producing a fairly perfect vacuum.

E. J. PARRY, speaking in the discussion which followed this paper, said that he thought the authors would find great difficulty in extracting the whole of the citral by the method they adopted, and that might account for the low percentage they gave. He considered 5 or 6 per cent. to be the average quantity, and quoted Messrs. SCHIMMEL as having found the specific gravities of genuine oils to vary from  $\cdot 857 - \cdot 863$ . He did not regard the refractive index as an adequate test of the purity of lemon oil.

*Oleum Lini*.—E. DOWZARD (C.D. 814, i, 1899), in commenting on the requirement as to solubility in alcohol, says: "I have never yet seen a sample which answered this test, the solubility is about 1 in 40 of absolute alcohol."

C. R. C. TICHBORNE (P.J. 573, ii, 1900) has independently found that



the alcohol solubility requirement is impossible to carry out. He experimented on oils which he obtained personally from the seeds. He considers that genuine oil should have a specific gravity of from .930 to .935. It is practically insoluble in 90 per cent. alcohol at ordinary temperatures, and miscible in all proportions with turpentine.

The rise of temperature when MAUMENÉ'S test is applied should be not less than 114° C.

He gives figures comparing linseed oil with cotton, castor, and olive oils.

*Oleum Menthae Piperitæ*.—E. J. PARRY (C.D. 54, ii, 1898) remarks that an actual estimation of menthol might have been included with advantage together with a determination of the optical activity. In his work on "Essential Oils," speaking of the Pharmacopœial requirements, he says: "An unsatisfactory qualitative test for menthol is also added; . . . this should be replaced by a quantitative determination of the menthol."

J. C. UMNEY (P.J. 496, ii, 1902) suggests as a standard for *Ol. Menthae Piperitæ* that it should contain not less than 55 per cent. of menthol, as determined by acetylation.

*Oleum Morrhuae*.—E. DOWZARD (P.J. 268, i, 1902), who had several years previously pointed out the usefulness of the refractometer in connection with this oil, reiterated his opinion of its high value, and showed that it appeared that genuine Newfoundland oils usually gave figures varying from +42 to +44.5 and that genuine Norwegian oils varied from +44 to +48.

*Oleum Myristicæ*.—M. W. ALLEN and E. T. BREWIS (P.J. 328, i, 1901) draw attention to the need for modification of the Pharmacopœial description in the case of oil of nutmegs, in which it is required that "a little evaporated on a water bath should not yield a residue that crystallises on cooling." They go on to say: "This being so, either the description 'the oil distilled from nutmeg' requires some qualifying phrase, such as 'by fractionation,' or else the tests given would seem to require modification. As to which of these two adjustments would be the better it is difficult to say, it having been stated that the presence of the small amount of fatty matter which undoubtedly comes over towards the end of the distillation should be carefully avoided."

The reason for the objection to the crystallisable portion is given (P.J. [3] xxiv, 935) that the presence of this body appears to cause an unpleasant preponderance of the nutmeg over the lemon flavour in sal-volatile, and hence should be carefully avoided.

ALLEN and BREWIS go on to suggest, "Assuming that the heavier fractions of the distillate contain an essential part of the flavour of the nutmeg, and this is our experience, would it not be more reasonable to reduce the quantity of the oil in the preparation of, say, sal-volatile, rather than eliminate portions of the flavouring matter from the oil itself, thus altering its character?"







*Oleum Olivæ*.—E. DOWZARD (C.D. 814, i, 1899) is of opinion that the best test for this oil is the iodine-absorption, and that BAUDOUIN'S test for sesamé oil should also be included.

The same writer (Y.B.P. 514, 1900) records the specific gravities and the figures for the optical rotation of fifty-two different specimens of olive oil. From his observations he concludes that the limits of specific gravity could profitably be drawn closer. The greater number of his samples had a gravity falling within the limits of .9155 and .9165. He says a specific gravity of .919 is too high, "as it allows the use of inferior oils pressed at high temperatures. We must suppose that the Pharmacopœial authorities intend that the purest oils shall be used."

J. C. UMNEY and C. T. BENNETT (Y.B.P. 393, 1902) have compared the results yielded by olive oil and its principal adulterants (sesamé and cotton seed oils).

They are of the same opinion as DOWZARD regarding the advisability of narrowing the specific gravity limits—and suggest that .915–.918 is a range sufficient to include all oils suitable for medicinal use. They agree with other observers that olive oil should be fairly free from free acid, and suggest a limit of 1 per cent., reckoned as oleic acid. The iodine absorption they describe as "a very valuable test for the purity of olive oil, which alone will serve to practically exclude almost all adulterated oils." They note that the silver test (BECCHI'S) is apt to show slight darkening with oils that are undoubtedly genuine, and prefer HALPHEN'S modified test instead.

For the detection of sesamé oil they recommend TOCHER'S test, and for earthenut oil RENARD'S process.

In the discussion following this paper Dr. PAUL mentioned that his experience of the official silver test agreed with that of the authors, namely, that it occasionally happened that perfectly genuine samples failed to pass it.

*Oleum Pimentæ*.—E. J. PARRY (C.D. 54, ii, 1898) states that the percentage of eugenol and the optical rotation might with advantage have been officially specified.

J. C. UMNEY (P.J. 496, ii, 1902) suggests that 65 per cent. of eugenol should be required to be present, by THOM'S process.

*Oleum Ricini*.—J. F. THURSFIELD (P.J. 73, i, 1899) points out that genuine castor oils give a brown coloration when 3 c.c. are shaken with an equal volume of carbon disulphide and 1 c.c. of sulphuric acid added.

E. W. LUCAS (P.J. 93, i, 1899) refers to the wording of the same test in the United States Pharmacopœia, in which the colour is more correctly defined, "the mixture shall not acquire a blackish-brown colour" after shaking for a few minutes.

LUCAS states that castor oil is soluble in less than twice its volume of 90 per cent. alcohol; and he also shows the need of more precise definition of the solubility test with petroleum spirit, the official wording being, 'Equal volumes of castor oil and petroleum spirit do not yield a clear



mixture if kept at  $15.5^{\circ}\text{C}.$ ; but they yield a perfectly clear solution if other fixed oils be present." LUCAS says: "The petroleum spirit test is really a good one, as equal volumes of genuine oil and spirit form a cloudy mixture if the temperature is kept below  $15.5^{\circ}\text{C}.$ , but become perfectly transparent if more than a trace of other fixed oil is present or if the temperature is raised very slightly."

E. DOWZARD (C.D. 814, i, 1899): "The sulphuric acid test is of no value and might well have been omitted. The saponification test is very useful and should have been made official."

J. C. UMNEY (P.J. 8, i, 1900) suggests the inclusion of the percentage of potash required for saponification, which he would place at 17.6 to 18.5 per cent.

E. DOWZARD (C.D. 325, i, 1901) contributes an exhaustive paper on the examination of castor oil.

Regarding the specific gravity he says: "A medicinal oil having a specific gravity below .958 is almost sure to be adulterated; oils of good quality are never below .960." He records gravities of sixteen samples including English, East Indian, Italian, and French oils. The optical activity in a 200 mm. tube, as examined in a HOFFMANN-LAURENT polarimeter, he found to vary from  $+8.1$  to  $+9.0$ . These figures are in fair agreement with the observations of DEERING and REDWOOD, who found the optical rotation of twenty-three samples of Indian oil to vary from  $+7.6$  to  $+9.7^{\circ}$  in a 200 mm. tube.

As regards the solubility in alcohol, he is of opinion that the "five volumes of 90 per cent. alcohol" officially specified should be reduced to four volumes. He confirms LUCAS's observations on the petroleum ether test, and says, "This is one of the best tests for castor oil, as the presence of a very small proportion of any other fixed oil is indicated by a clear solution."

He records oleo-refractometer observations (AMAGAT and JEAN's instrument) on seven oils, and says that it affords useful information. The saponification equivalent he regards as giving valuable information. The variations observed on fifteen samples were from 176.4 to 180.6.

He says: "The foregoing tests are quite sufficient to detect any sophistication, but, if additional confirmation is wanted, the viscosity and acetyl-value may be determined."

*Oleum Rosæ*—E. DOWZARD (C.D. 814, i, 1899) says: "The specific gravity limit is too high; .850 to .858 would be better. The optical rotation should also be included,  $-2^{\circ}$  to  $-3^{\circ}$  per 100 mm at  $20^{\circ}\text{C}.$  The estimation of the esters would also be of value."

E. J. PARRY (C.D. 861, i, 1899) records finding otto of rose adulterated with what he believed to be guaiacum-wood oil. He detected the presence of the adulterant by separating and examining the stearoptene, which melted at  $33^{\circ}$ – $34^{\circ}\text{C}.$ , and gave an acetyl number, indicating the presence of a solid alcohol.

HENRY GARNETT (C.D. 961, i, 1900) says "I have found the specific gravity of the finest ottos to fall within .8525 to .8575. . . . I consider

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the B.P. figures .856-.860 to be too high. My figures are based on Bulgarian ottos over a number of years, including all the best brands. PARRY'S statement ('Chemistry of Essential Oils') that '.855-.865 may be taken as including most good commercial otto,' must be received with some caution, as it would exclude some of the finest otto and admit much that is doubtful. . . . The optical rotation varies between  $-2^{\circ} 15'$  and  $-3^{\circ} 15'$ ." The writer goes on to state that though the freezing-point is almost the only standard employed by the Bulgarian merchants, their method of determining the "setting-point" leads to uncertain and varying results.

He regards the ester percentage as capable of affording useful information, as the ester in true otto is very low, about 3.0 per cent., while in Palma-rosa oil it averages about 10 per cent.

E. M. HOLMES (P.J. 664, ii, 1901) discusses the constitution of rose oil, and points out that there is no satisfactory means of detecting an addition of geranium oil. He mentions a synthetic oil of rose, which was a close imitation of the genuine and contained a crystalline matter simulating the true stearoptene. He suggests that it is not impossible for roses capable of yielding oil commercially to be grown in this country, and mentions one or two varieties that would be suitable for the purpose.

E. J. PARRY (C.D. 390, i, 1902) discusses the various statements regarding the general purity or otherwise of otto of rose. He speaks of Turkish geranium oil as being "the only practical adulterant in common use." He goes on to state that the addition of geranium oil would so materially affect the specific gravity and ester figures that one cannot conceive it possible that the higher grades of otto (the analytical characters of which he gives) can be adulterated with this, or indeed any known adulterant.

He gives the specific gravity, optical rotation, congealing point, saponification value, amount of stearoptene, its melting point, and the specific gravity of the oil after the stearoptene has been removed, for twenty representative samples, all of which were typical oils of known history, and says, "The whole question of adulteration of otto of rose must necessarily resolve itself largely into one of price, and an examination of nearly any supplier's price list will show that the English dealer is fully alive to this point, as in this case, as with many other essential oils, one can usually find listed such qualities as 'finest virgin,' 'good super,' and 'commercial.'"

"... The opinion I have previously expressed—that the limits given by the British Pharmacopœia are totally inadequate—I still adhere to, and I should be glad to know the opinions of others."

*Oleum Rosmarini*.—E. DOWZARD (C.D. 814, i, 1899) says: "The addition of French oil of turpentine does not cause an increase in rotation, but a decrease. A better method than the official one for detecting this turpentine would be to proceed on the lines laid down for lemon oil. The first fraction of 10 per cent. obtained by distillation should be dextrogyrate."

*Oleum Santali*.—E. J. PARRY (C.D. 55, ii, 1898) remarks that the



santalol value might well have been given. This test, which was originated by him, will be found in the *Pharmaceutical Journal*, lv., p. 118.

He states that DULIÈRE, SCHIMMEL, and UMNEY are all in agreement with him as regards the advisability of prescribing a santalol-estimation, and says, "The common adulterants—cedar, West Indian santal, copaiba and gurjun oils—are thoroughly guarded against by this test."

W. DULIÈRE (Abst. Y.B.P. 172, 1899) states: "Pure santal wood oil, when fresh, is soluble in five times its volume of 70 per cent. alcohol; after prolonged keeping its solubility is much diminished. Its specific gravity at 15°C. should be .973–.976; its iodine number should be from 157.6–159.2, and its saponification number should not exceed 12.6. The average percentage of santalol is 94. The addition of strong sulphuric acid should cause solidification to a dry and friable mass. The oil should give no appreciable coloration with a solution of zinc chloride in hydrochloric acid, or with CONRADY'S reagent (glacial acetic acid mixed with 10 per cent. of hydrochloric acid)."

*Ol. Sinapis Volatile.*—J. C. UMNEY (P.J. 496, ii, 1902) suggests as a standard 98 per cent. of allyl sulpho-cyanide, by the process given in the United States Pharmacopœia.

*Oleum Terebinthinæ.*—E. J. PARRY (C.D. 55, ii, 1898) remarks that good oil of turpentine usually boils at 155°–156° C. unless the corrected temperature is given, and that 160° C. is too high. "Rosin spirit, a common adulterant of turpentine, would not be excluded by the British Pharmacopœia figures even when present in large quantities. Boiling at about 155° C., and at least 80 per cent. distilling below 165° C., would have been better."

C. TYER and A. WERTHEIMER (P.J. 103, ii, 1900) made a series of experiments on both oleum-terebinthinæ and terebene. They found that "the directions officially given for making 'terebene'—that is, by acting on turpentine oil with sulphuric acid till optically inactive—are not feasible if American oil be used; with the French oil, however, these conditions are possible, and much confusion would have been saved if definite instructions had been given as to which oil to use."

P. W. SQUIRE and C. M. CAINES (P. J. 512, i, 1902) investigated the cause of the occasional failure of samples of glacial acetic acid and turpentine to form clear solutions, which has previously been noted by ALCOCK (P.J. 201, ii, 1899) and subsequently discussed by W. DUNCAN and by T. DUNLOP.

They found that a clear solution was formed when the acid was a little stronger than the official titration requirement—that is, while the titration test requires 16.6 c.c. of normal soda, indicating 98.9 per cent. of acid, in order to form a clear solution the acid should be 99.5 per cent. (See also under Acidum Aceticum Glaciale.)

*Opium.*—E. DOWZARD (Y.B.P. 513, 1900) quotes the statement of M. CONROY to the effect that the 10 per cent. standard is too low, and that a







higher class of opium should be aimed at, which ought to be 2 per cent. higher than the present official one. DOWZARD here records the morphine content of twenty-five samples, the lowest of which gave 12.3 and the highest 14.9 per cent. of morphine; the general average was about 13.5 per cent.

*Oxymel Scillæ*.—J. F. BROWN (P.J. 81, i, 1901) suggests that it would be a simplification to take four parts by weight of honey to one part by measure of the acetum.

*Paraffinum Liquidum*.—E. W. LUCAS (C.D. 959, ii, 1899) states: "The *Pharmacopœia* requires a specific gravity of .885 to .890. As other writers have pointed out, this is much too high. The process of refining reduces the density, so that it is difficult to obtain it of higher gravity than .880. The author has examined products from several large refineries, and finds the specific gravity varies from .865 to .879. From a medical point of view, .865 to .870 is quite viscous enough for use in a spray apparatus. As a matter of fact the proprietary article which enjoys the greatest reputation rarely exceeds .866."

*Pareiræ Radix*.—The *Pharmaceutical Journal*, 75, i, 1900, says: "It has long been known that the pareira root usually supplied by wholesale houses is not the B.P. drug, which should be the dried root of *Chondrodendron tomentosum*, but a menispermaceous root of unknown botanical origin."

This article evoked a response (P.J. 101, i, 1900) from a well-known wholesale firm to the effect that the official article could be obtained readily at a fair price.

E. M. HOLMES (P.J. 278, i, 1900), "The stems and roots of plants of this family resemble each other so closely as to deceive the uneducated eye, and consequently spurious drugs often find their way into the market."

*Pepsinum*.—F. C. J. BIRD (Y.B.P. 432, 1900) showed that the official description of pepsin, "soluble in about 100 parts of alcohol 90 per cent.," requires modification. He quotes the United States Pharmacopœia, in which it is said to be insoluble in alcohol. Of three samples examined by him, when one part of pepsin was treated with 100 fluid parts of alcohol (90 per cent.) for four days, the pepsin which dissolved was only 37, 17, and 29 per cent. of the quantity employed.

SIR CHARLES A. CAMERON (P.J. 570, i, 1900), who had examined several commercial samples of pepsin, said, "Of five specimens of pepsin, three had less than one-tenth the proper albumen-dissolving power, two were deficient to the extent of 25 per cent. . . . It is to be regretted that the *Pharmacopœia* does not give a good process for preparing pepsin, for I have no doubt imperfectness in the preparation of this article is the cause of so many bad specimens being met with."

*Phenacetinum*.—F. H. ALCOCK and H. W. GREEN (P.J. 317, i, 1900): The B.P. test for phenacetin in which .1 of a gramme is boiled with



hydrochloric acid, &c., is not always a success, owing to the formation of a green colour."

The writers advise boiling for five minutes, diluting and cooling before adding the oxidising agent.

T. TYRER and A. LEVY (Y.B.P. 429, 1899) have made a careful study of the standard methods for estimating melting-points, and also tabulated the melting-points given by various Pharmacopœias and observers. Their results tend to show "that the British Pharmacopœial factors are too high for commercial phenacetin (and other allied bodies) . . . the official factors being apparently based upon the chemically-pure or water-free products, which it would be exceedingly expensive, if not difficult, to supply. It is especially to be noticed that commercial phenazone meets the Dutch and Japanese standards, but not the French and German—a fact which is probably the result of sound technical and commercial experience, and therefore to be taken into account by the Pharmacopœial authorities."

*Phenazonum*.—The researches on the melting-point of this substance by TYRER and LEVY are referred to under Phenacetinum

*Physostigmatis Semina*.—J. C. UMNEY (P.J. 49, ii, 1902) suggests .125 per cent. as a suitable standard; he has found the variations of alkaloidal yield to be from .103 to .160, and the average .14.

Messrs. PARKE, DAVIS & Co. (P.J. 529, ii, 1902) state that the range of alkaloidal strength is from .16 to .3, and the standard that they adopt is .2 per cent.

*Physostigminæ Sulphas*.—Dr. POWER (Y.B.P. 341, 1900) says: "This salt might, with advantage, be replaced by the salicylate, which is much more stable, and, therefore, more largely used. The *Pharmacopœia* indicates the sulphate to contain an indefinite amount of water of crystallisation, expressed as ' $xH_2O$ ,' but it is probable that, like the salicylate, the salt is really anhydrous, and that any water it may contain is simply hygroscopic moisture, due to its deliquescent character. GUARESCHI (*Die Alkaloide*, p. 495) regards it as anhydrous."

*Pilocarpinæ Nitrates*.—Dr. JOWETT (Y.B.P. 435, 1899) says: "The nitrate and hydrochloride are somewhat largely used in medicine; but the official characters of these salts as given in the various Pharmacopœias are very unsatisfactory, and hardly serve to identify the alkaloid, much less determine its purity." The writer goes on to criticise the official requirements regarding the solubility of the nitrate in water, and points out that the tests prescribed, while precluding inorganic impurity, do not exclude the other alkaloids of jaborandi. The author quotes the tests given in other Pharmacopœias, and gives the details of his own investigations on the melting-point of purified pilocarpine nitrate, and concludes by suggesting the following monograph for pilocarpine nitrate:

"White distinct crystals, permanent in the air, soluble in six to seven parts of water at ordinary temperatures, and in 146 parts of cold alcohol







(95 per cent.), and fairly soluble in boiling alcohol, almost insoluble in ether or chloroform.

"When heated in a capillary tube the salt melts at  $176^{\circ}$  to  $178^{\circ}$  C. The specific rotatory power in aqueous solution should be  $+81^{\circ}$  to  $+83^{\circ}$ .

"On ignition the salt yields no residue (absence of inorganic impurity). A concentrated aqueous solution gives no precipitate on the addition of ammonia water, or aqueous solutions of sodium or potassium hydrate (distinction from most other alkaloids). Affords the characteristic tests for nitrate."

*Pilula Colocynthis et Hyoscyami*.—W. LYON (P.J. 409, i, 1901): "Owing to the resinous nature of compound pill of colocynth mass, it is a difficult matter to mix it with a soft extract like that of hyoscyamus. Unless the colocynth pill mass is pretty firm, the addition of the extract makes the resulting mass much too soft, and the firmer the pill mass the greater the difficulty of admixture with extract. It is not for a moment supposed that any pharmacist makes this pill according to the British Pharmacopœia routine. He ascertains how much water a certain quantity of pill mass will contain, and, having mixed the powdered ingredients of colocynth pill mass, he adds the extract of hyoscyamus, and, after trituration, a sufficiency of water. Thus treated, a capital pill mass is obtained without the slightest difficulty."

*Pilula Ferri*.—W. LYON (P.J. 600, ii, 1901) says: "When, after the necessary reaction, the gums are added, the mass has to be set aside for about half an hour before it is firm enough to be rolled out. . . . If, instead of using 150 grains of syrup and 20 grains of distilled water, as directed in the *Pharmacopœia*, 130 grains of powdered sugar and 40 grains of distilled water are used, a mass is obtained which can be rolled out immediately after the gums are mixed with it. The above alteration is equal to a water-reduction of 30 grains."

*Pilula Hydrargyri Subchloridi Co*.—C. R. TICHBORNE (Y.B.P. 441, 1901) states that "castor oil is nearly always left out of the pil. calomel co. Such a pill, from which you have removed the shell, if placed in water will disintegrate in a few hours and fall as powder to the bottom of the vessel. The real pill mass will not do so after any lapse of time."

*Pilula Rhei Co*.—A. W. HUDSON (P.J. 80, i, 1901) considers the pill of the 1885 *Pharmacopœia* preferable to the 1898 formula, as the latter becomes very hard and is liable to crumble.

*Plumbi Acetas*.—HOSEASON (P.J. lxi, 531) has suggested that this estimation might be conveniently made by precipitation from neutral oxalate solution of known strength and estimation of the excess of oxalate left by permanganate.

GREENISH and UPSHER SMITH (P.J. 811, i, 1901) recommend that acetate of lead should be estimated by titration with standard oxalic acid in place of sulphuric acid.



*Podophylli Resina*.—S. TAYLOR (P.J. 368, ii, 1902) reviews the recorded work on podophyllum resin, and gives results on thirteen samples examined by him. Of these he regards four as unsuitable for medicinal use, on account of their high ash and insolubility in alcohol.

His experiments are embodied in a table too extensive to be quoted here, but the conclusions he arrives at are as follows:

- (1) That the Pharmacopœial standard of ash is justifiable.
- (2) That the solubility in solution of ammonia is not of much value.
- (3) That the matter insoluble in 90 per cent. alcohol should not exceed 5 per cent.
- (4) That SQUIRE's limit of 50 per cent. soluble in chloroform is a good criterion.
- (5) That at least 40 per cent. of the original resin should be precipitated from the chloroformic solution by petroleum ether.
- (6) That 60 per cent. should be soluble in pure ether, and that the residue should consist principally of a resinous and sticky body.

H. MACKENZIE and M. DIXON (abst. Y.B.P. 162, 1899) describe physiological experiments made by them on the relative effects of the resin of *Podophyllum peltatum* (the official variety) and *Podophyllum emodi* (the Indian drug). Their conclusions were as follows:

- (i) Indian podophyllum is an active purgative and a useful therapeutic agent. It may be substituted for *P. peltatum*, but the variety given must be known, owing to the greater activity of the former.
- (ii) The crude resin contains crystalline podophyllotoxin and podophylloresin, both excellent laxatives, causing no subsequent constipation or other objectionable symptoms.

Podophylloresin alone has a cholagogue action, the amount of solids in the bile being increased.

Both exert their therapeutic action when given hypodermically, but the irritation produced precludes this form of administration.

E. J. MILLARD (P.J. 4, vi, 304) examined a number of commercial samples of podophyllum resin obtained from American, German, and English manufacturers, and found that the latter are sometimes in the habit of supplying the product of *P. emodi* under the title of podophyllum resin B.P. He finds that the colour of the resin and its behaviour to solvents do not afford trustworthy indications of its source. The Indian resin gives an orange to red colour with strong sulphuric acid when a minute quantity is sprinkled on a few drops of the acid placed on a white surface. The official resin, similarly treated, gives a yellowish or brownish coloration.

He finds also that the two resins can be distinguished by the property of gelatinising with caustic potash solution which is possessed by the Indian resin, and concludes by giving his opinion that the Indian resin ought not to be supplied in place of the official article.

*Podophylli Rhizoma*.—J. C. UMNEY (P.J. 496, ii, 1902) suggests that good podophyllum rhizome ought not to contain less than 5 per cent. of resin, as determined by precipitation.







D. B. DORT (P.J. 618, ii, 1902) has found from 3.5 to 5 per cent. of resin in podophyllum rhizome.

*Potassii Acetas.*—GREENISH and UPSHER SMITH (P.J. 808, i, 1901) propose a limit of water, which they would fix at 10 per cent., determined by drying at 110° C.

*Potassii Bromidum.*—UPSHER SMITH (P.J. 460, i, 1901) suggests the following modification of the thiocyanate test: “.5 of a gramme of the salt dissolved in 10 c.c. of water should give a yellow and not a red or reddish-brown coloration on the addition of two drops of test solution of ferric chloride (absence of more than .01 per cent. of ammonium thiocyanate).

His reason for specifying the quantity of potassium bromide is that he found that the colour produced on adding ferric chloride was masked by an excess of potassium bromide.

*Potassii Citras.*—GREENISH and UPSHER SMITH (P.J. 809, i, 1901) suggest altering the present official formula to  $C_3H_4-OH-(COOK)_3, H_2O$ .

*Potassii Iodidum.*—F. R. DUDDERIDGE (P.J. 152, i, 1900) recommends COOK's process—liberation of iodine by peroxide of hydrogen in presence of acetic acid. He also points out that the B.P. method of titration might permit a salt which contained chlorides to pass the titration test if it also contained some moisture.

T. S. BARRIE (P.J. 58, ii, 1900) describes a process for the estimation of iodide of potassium. The principle of the process is as follows:

When a mixture of potassium chloride, bromide, and iodide is dissolved in water and treated with a 5 per cent. solution of potassium bichromate and a 10 per cent. solution of sulphuric acid, iodide only, is liberated. The iodine is extracted by an immiscible solvent, carbon disulphide or toluol, which is titrated with decinormal thio-sulphate solution, and from the iodine found the potassium iodide is calculated.

The process is as follows:

Weigh out .5 gramme of potassium iodide; dissolve in 20 c.c. of water in a separator, and add 10 c.c. of a 5 per cent. bichromate solution and 10 c.c. of a 10 per cent. solution of sulphuric acid; allow to stand a few minutes; add 60 c.c. of toluol, and shake vigorously.

When the mixture has separated, run off the lower yellow acid stratum, and wash the toluol by agitation with various small quantities of water, adding washings to the first portion separated.

The mixed washings are treated with more toluol in another separator, and, if the toluol be coloured violet, it is, after washing, added to the toluol already separated.

The coloured toluol is then shaken with 35 c.c. of standard sodium thio-sulphate, the thio-sulphate solution run off and the toluol washed. The thio and washings are now titrated with standard iodine solution to determine the amount of thio-sulphate neutralised by the iodine liberated from the potassium iodide.



*Potassii Tartras.*—Dr. POWER (Y.B.P. 341, 1900) says: "The formula given in the *Pharmacopœia* is incorrect. It should be  $(K_2C_4H_4O_6)_2H_2O$ , and the official requirements of the volumetric test are based upon the latter formula.

If the salt had the formula  $K_2C_4H_4O_6 \cdot H_2O$ , one gramme of it, after ignition, would require about 8.2 c.c. of normal sulphuric acid for neutralisation, instead of 8.4 c.c., or, more correctly, 8.5 c.c. The error has probably arisen through the attempt to express the composition of the salt by a constitutional formula.

The discrepancy between the number of c.c. (8.25) required by the formula and 8.4 prescribed in the *Pharmacopœia* was also pointed out in *Explanatory Notes on the British Pharmacopœia*, 1898 (P.J. 284, ii, 1899), where the writer, after giving the formula of the salt, as stated in the *Pharmacopœia*, and calculating the amount of normal sulphuric acid which would be required to neutralise a gramme after incineration, says, "Neutral potassium tartrate crystallises with only half the water stated in the *Pharmacopœia*, i.e. the formula should be  $(K_2C_4H_4O_6)_2H_2O$ . The molecular equivalent then becomes 233.52, and one gramme of this salt, if absolutely pure, will, after incineration, neutralise 8.56 c.c. of normal sulphuric acid.'

GREENISH and UPSHER SMITH (P.J. 810, i, 1901) state that carbonates are a likely impurity and should be specially excluded.

*Potassii Tartras Acidus.*—J. C. UMNEY (P.J. 494, ii, 1902) suggests a test for lead, which he considers will detect 1 part in 200,000.

For details, see under *Acidum Citricum*.

*Pulvis Rhei Co.*—T. F. HARVEY (C.D. 475, ii, 1900) has published some figures showing the rate of absorption of carbonic acid and water by this preparation. He found (i) that Pulv. Rhei Co. absorbs water and carbonic acid more rapidly than calcined magnesia; (ii) that water is absorbed at first more rapidly than carbon dioxide; (iii) that the rate of absorption, which is surprisingly rapid on free exposure, slows down considerably on reaching a certain stage.

This liability of Pulv. Rhei Co. to absorb moisture and carbonic acid has already been investigated by PAUL and COWNLEY (P.J. Oct. 8, 1898), by J. C. UMNEY (C.D. 515, liii), and by others.

*Quininæ Hydrochloridum Acidum.*—E. MERCK (C.D. 349, ii, 1898) states that it is practically impossible to titrate this salt with normal alkali when litmus is used; the results are below the truth, and with phenolphthaleïn and methyl-orange they are considerably too high.

*Resina.*—K. DIETERICH (P.J. 321, i, 1899) suggests further tests of purity, and states that the freedom from an appreciable amount of ash required by the *Pharmacopœia* is a condition impossible to comply with.

*Rhei Raaw.*—The ash of rhubarb root has been investigated by several observers; it is normally from about 7 to 12 per cent. Some samples,

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however, give an ash of nearly 30 per cent., as recorded by CHATTAWAY and MOOR (*Analyst*, p. 207, June 1903).

*Saccharum Purificatum*.—A writer in the C. & D. Diary for 1899, 518, remarks that a test to exclude "blue-facing" would be an advantage and says a mixture of the syrup with an equal volume of dilute sulphuric acid should not give a sulphuretted hydrogen odour after standing in a closed bottle over night.

*Sambuci Flores*—See under *Aquæ Sambuci*.

*Santonin*.—PERCY PAIN (C.D. 246, i, 1901) would modify the official test as follows: "A few crystals with 2 or 3 c.c. of solution of ethyl nitrite give a rose-red on addition of potash solution."

J. KATZ (abst. C.D. 346, ii, 1900) gives a process for the estimation of santonin in the seeds of *Artemisia maritima*. The seeds are exhausted with ether in a Soxhlet apparatus, and the ether distilled off. If 10 grammes of seeds have been employed, the residue will be about 1.7 gramme. To this is added .5 of a gramme of barium hydrate suspended in 100 c.c. of water. The whole is boiled for twenty minutes under a reflux condenser, and on cooling the liquid is saturated with carbonic acid gas. The barium carbonate is filtered off and washed, the filtrate is evaporated to about 20 c.c., 10 c.c. of 12.5 per cent. hydrochloric acid is then added and the mixture warmed for two minutes on the water-bath.

The liquid is then transferred into a decanting flask and the crystals of santonin are dissolved in 20 c.c. of chloroform, which is poured into the flask, and the whole well shaken.

The separated chloroform layer is evaporated, and the residue boiled for ten minutes with 50 c.c. of 15 per cent. alcohol under a reflux condenser. The liquid is then filtered hot and on evaporation yields the santonin. The yield is given as from 1.2 to 3.2 per cent.

*Sapo Animalis*.—E. WHITE (P.J. 29, i, 1901) writes: "The amount of water is perhaps unnecessarily high, since the best commercial varieties will be found to contain always less than this proportion." The writer also remarks that no tests are given in the official monograph to identify the substance (fat) from which the soap is made, and points out that the melting point of the fatty acids is of value. In their work, *Pharmacopædia*, WHITE and HUMPHREY give the melting point of the fatty acids from *Sapo Animalis* as about 45° C–50° C. They also state that there is no difficulty in obtaining soaps containing about 20 per cent. of water.

*Sapo Durus*.—WHITE and HUMPHREY (*Pharmacopædia*) state that the melting point of the fatty acids from this soap is about 25° C.

*Scammoniae Radix*.—J. C. UMNEY (P.J. 496, ii, 1902) suggests 6.5 per cent. of resin, free from sugar, as a reasonable standard for this drug, the solvent being 90 per cent. alcohol.

As an ash limit he suggests 12 per cent.

*Scammoniae Resina*.—P. GUIGUES (abst. P.J. 687, i, 1900) finds "that the solubility of scammony resin in ether is not, as is generally supposed,



a simple and reliable test of its purity, since the same sample of resin varies greatly in solubility with ethers of different sources."

He finds that the chief source of these discrepancies is the presence of alcohol and of water in the ether.

Thus, scammony resin that was soluble in ether, sp. gr. .755, containing 15.5 per cent. of 98 per cent. alcohol, was much less soluble in absolute ether; while in a sample of pure ether, containing only .6 per cent. of water, 23.8 per cent. of the same resin was undissolved. Marked discrepancies were also noted in the solvent power of different specimens of ether having the same specific gravity (.720) and free from either impurity, but of different origin. Not only does the quality of the ether affect the solubility of the resin, but also the quantity employed.

Thus, after a clear saturated solution of scammony resin in ether is obtained, it precipitates, in most cases, on the further addition of the solvent.

*Scammonium*.—J. C. UMNEY (P.J. 8, i, 1900) states that "The majority of samples of scammonium met with in the London market yield slightly more than 3 per cent. of ash on incineration, but that is a matter of very little importance so long as the correct proportion of ether-soluble resin is present, a requirement which is easily met, as the official standard is decidedly low."

P. L. ASLANOGLU (abst. *Chem. News*, lxxxiii, 146) suggests the examination of scammony by treatment with ether to extract everything soluble in ether. To the ethereal extract turpentine is added, and the mixture allowed to stand. This causes the precipitation of scammony resin, while any admixtures of other gum-resin will be kept in solution in the ether-turpentine. The precipitated scammony is washed with fresh turpentine and weighed.

E. M. HOLMES (P.J. 278, i, 1900) said that the cause of the inferior quality of scammony is in reality the demand in certain markets for an inferior article, and that true scammony containing only 3 per cent. of ash was never found without vastly more than 70 per cent. of resin. The amount was generally 80 to 85 per cent. according to J. S. WARD, who spoke in the discussion following on HOLMES' paper. CHARLES UMNEY said he believed a standard of 75 per cent. of resin would be better.

*Senna*.—MOOR and PRIEST (Y.B.P. 417, 1900) recorded the ash yield of seven samples of senna leaves, their highest and lowest figures being 10.5 and 5.6.

GREENISH (P.J. 397, i, 1901) made an exhaustive examination into the ash yield and microscopic characters of senna, and has embodied his results in the following suggested monograph:

"The powder exhibits fragments of epidermal tissue consisting of polygonal cells and bearing stomata and hairs or the scars of fallen hairs. Each stoma is enclosed between or bordered by two cells, arranged parallel to it; the hairs are one-celled, thick-walled and warty. It also exhibits



and the other two, which were the same as the first, were  
the same as the first, and the same as the first, and the same as the first.

The first of these was the same as the first, and the same as the first, and the same as the first.

The second of these was the same as the first, and the same as the first, and the same as the first.

The third of these was the same as the first, and the same as the first, and the same as the first.

The fourth of these was the same as the first, and the same as the first, and the same as the first.

The fifth of these was the same as the first, and the same as the first, and the same as the first.

The sixth of these was the same as the first, and the same as the first, and the same as the first.

The seventh of these was the same as the first, and the same as the first, and the same as the first.

The eighth of these was the same as the first, and the same as the first, and the same as the first.

The ninth of these was the same as the first, and the same as the first, and the same as the first.

The tenth of these was the same as the first, and the same as the first, and the same as the first.

The eleventh of these was the same as the first, and the same as the first, and the same as the first.



groups of sclerenchymatous fibres, which, however, should not be present in excessive quantity. Powdered senna should yield not more than 14 per cent. of ash, which should be almost entirely soluble in hydrochloric acid."

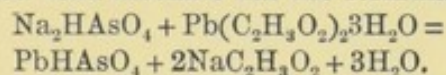
*Serpentariae Rhizoma*.—MOOR and PRIEST (Y.B.P. 417, 1900) found that this drug frequently carries large quantities of adherent earth. They suggested 9 per cent. of ash as a reasonable limit.

C. G. MOOR (Standards) suggests that the words "cleaned from adhering dirt" should be added to the official monograph.

J. C. UMNEY (P.J. 494, ii, 1902) suggests 10 per cent. of ash as a limit.

*Sodii Arsenas*.—In the Students' Columns (P.J. 324, ii, 1899) it was pointed out that the figure for the lead acetate (2.03 grammes) required for the official test would require the salt to be only 66 per cent. pure, and is probably a misprint for 3.03.

T. S. BARRIE (C.D. 884, i, 1900) says: "The monograph on sodium arsenate should be rewritten, because, in the first place, sodium arsenate, as defined on page 291 of the B.P., is the anhydrous salt. What 'arsenate of sodium (hydrous) Brit. Phar. 1885.' means as a sub-title I will not attempt to say, or what it is there for I cannot imagine, seeing that it is not stated to be a synonym. Secondly, the anhydrous salt is directed to be prepared from the hydrous by 'exposing' the latter 'to a temperature of 300° F.' without indicating percentage of weight lost. Thirdly, '1 gramme of sodium arsenate, B.P. 1898, requires 2.03 lead acetate for complete precipitation.' This calculation is based on the conception that the precipitated lead arsenate has the formula  $PbHAsO_4$ , thus:—



This conception is wrong, the reaction being the formation of lead arsenate  $Pb_3(AsO_4)_2$ , sodium acetate and acetic acid, on this account 1 gramme anhydrous sodium arsenate requires 3.05 grammes lead acetate for complete precipitation."

WHITE and HUMPHREY (Pharmacopœia, p. 436) say: "It has been stated that 1 gramme of anhydrous sodium arsenate requires 3.05 grammes of crystallised lead acetate for complete precipitation, but that statement is based on the incorrect assumption that the precipitate consists of normal lead arsenate,  $Pb_3(AsO_4)_2$ , and that acetic acid is also liberated by the reaction."

F. R. DUDDERIDGE and J. S. HILL (Y.B.P. 504, 1902) describe experiments made to ascertain whether sodium phosphate and sodium arsenate could be conveniently assayed by titration with sulphuric acid using methyl orange as an indicator. They find that accurate results are obtained in this way if fairly large quantities of the salts are taken. On account of the high molecular weight of the salts, they advise using not less than 3 grammes for the estimation.

*Sodinn Benzoate*.—F. H. ALCOCK (P.J. 274, i, 1902) describes a novel



method for assaying this substance. He mixes .5 gramme of sodium benzoate with .5 gramme of ammonium chloride, dissolved in 10 c.c. of water, and evaporates to dryness. In this evaporation there is so little loss that it may be neglected. He then gently ignites and receives the sublimed benzoic acid on a piece of glass placed over the dish. This may be weighed, and the residue in the dish (which should consist of sodium chloride) may also be weighed or titrated.

*Sodium Bicarbonate*.—GREENISH and UPSHER SMITH (P.J. 775, i, 1901) consider it advisable that a test should be introduced to admit the use of a salt containing 1 per cent. of monocarbonate, but exclude a salt containing over 2 per cent., and suggest the following test:

"A solution of 1 gramme of the salt, prepared with very gentle stirring in 20 c.c. of cold water, to which 2 cubic c.c. of  $\frac{N}{10}$  sulphuric acid have been added, should remain colourless on the addition of two drops of solution of phenolphthaleïn."

*Sodii Bromidum*.—GREENISH and UPSHER SMITH (P.J. 811, i, 1901) suggest that this salt be required to be "completely" soluble in water, and that the thiocyanate test should be as under *Potassii Bromidum*.

*Sodii Citro-Tartras Effervescens*.—A. DAVIDSON and G. LUNAN (P.J. 142, i, 1899) have found great variations in the amount of carbonic acid gas yielded by different samples.

*Sodii Hypophosphis*.—Messrs. TYPKE and KING (P.J. 182, I, i, 1899) wrote stating that the amount of potassium permanganate required is incorrect.

Dr. JOWETT (P.J. 226, i, 1899) states that the official amount of permanganate ordered is correct. In the previous year (Y.B.P. 409, 1898) he had investigated the best methods for the assay of hypophosphites, and after trying various methods gives preference to the following:

"About .3 of a gramme of the dried salt is dissolved in 10 c.c. of water, 3 c.c. of a 10 per cent. solution of lead acetate added, and the mixture allowed to stand twelve hours. It is then filtered, the precipitate thoroughly washed, and the washing added to the filtrate, which is acidified with hydrochloric acid, and then saturated with hydrogen sulphide, boiled, filtered, and the sulphide thoroughly washed. The mixed washings and filtrate are then evaporated to a low bulk and 5 c.c. of hydrochloric acid and 1 gramme potassium chlorate added and gently heated for half an hour, then concentrated to about 20 c.c., and the phosphate finally determined either gravimetrically or volumetrically by the usual method."

The author gives the results obtained on five commercial samples, from which it appears that there is need to fix a limit for moisture, one sample containing no less than 14.4 per cent.

*Sodii Iodidum*.—The researches of F. R. DUDDERIDGE and of T. S. BARRIE dealt with under *Potassii Iodidum* would apply also to *Sodii Iodidum*.







*Sodii Nitris*.—GREENISH and UPSHER SMITH (P.J. 807, i, 1901) suggest that the gasometric method of assaying this salt be replaced by the titration with permanganate of potassium. They found the best mode of procedure was to run in nearly all the permanganate required (determined by a previous experiment), then acidify and continue the addition of the permanganate until the pink colour was permanent for one minute.

*Sodii Phosphas*.—F. R. DUDDERIDGE and J. S. HILL (P.J. 138, ii, 1902) propose to assay sodium phosphate by titration with normal sulphuric acid, employing methyl-orange as the indicator. They find that a fairly large quantity of the salt (on account of the high molecular weight) should be employed. They checked the results by the loss of weight on heating and also by precipitation with magnesia mixture.

F. C. J. BIRD (C.D. 1073, i, 1900) proposed a modification of GUTZEIT's test for arsenic in sodium phosphate, an impurity which had probably existed in small quantities in this drug for years, but had escaped notice. No test for arsenic is specified in the *Pharmacopæia*, and this is probably why attention had not been drawn to it before. The test proposed by BIRD is practically the same as GUTZEIT's, which was applied by SIEBOLD in the examination of glycerin for arsenic.

*Sodii Sulphis*.—D. B. DOTT (P.J. 58, i, 1899) pointed out that oxidation occurs so rapidly during the carrying out of the titration process that special precautions are essential. After various experiments, which illustrate most clearly the error that may occur in dissolving and titrating in the ordinary way, he found the best results were obtained by dropping the weighed powder into a known slight excess of iodine solution, and titrating back.

*Spiritus Ætheris Nitrosi*.—T. F. HARVEY (C.D. 834, i, 1901) published an exhaustive study of the causes of the deterioration of sweet spirit of nitre. He made experiments to determine the relative action of evaporation, light, heat, and decomposition on this substance. His researches show that light has a powerfully injurious effect, and that this can be obviated by keeping in amber bottles. He noted what has been previously found by other observers—namely, that a small quantity placed in a bottle which would hold a considerably larger amount and shaken loses three-fourths of its strength very rapidly.

FARR and WRIGHT (Y.B.P. 447, 1901) have repeated much of the above work and entirely confirm HARVEY's observations *re* the effect of amber-coloured bottles and of the effect when a small quantity of liquid is placed in the bottom of a large bottle.

DAVID GILMOUR (P.J. 54, i, 1901), who has also studied the causes of decomposition of the article, reiterates the warning of the *Pharmacopæia* to "preserve the spirit of nitrous ether in well-closed vessels, preferably in a cool, dark place, and in small bottles."

C. G. MOOR (Standards) examined the last ounce left in several pound and half-pound bottles which had been opened in the ordinary course of business, and nearly all showed much lower yields of gas than the official



minimum. He says, "The only way in which this drug can be dispensed at proper strength by retailers is for them to obtain it at the full strength (7 volumes) and dispense it from 4-ounce bottles only."

*Spiritus Ammoniae Aromaticus*.—E. WHITE (P.J. 144, i, 1900) communicated the results of a study of this preparation (part of this has been referred to under *Ammonium Carbonate*). He showed that the official test does not allow a sufficient margin for the unavoidable loss occurring in making and storing. To allow for this he recommends the addition of a few c.c. per litre of strong solution of ammonia, and he lays stress on the fact that it is in no case necessary to add any more ammonium carbonate. His experiments go to prove that the precipitation test for ensuring the presence of an adequate amount of carbonate gives unreliable results.

F. C. J. BIRD (Y.B.P. 430, 1900) has shown that the precipitation test proved by E. WHITE to be untrustworthy may be made satisfactory by making an addition of ammonium chloride to the solution, by which means the precipitate lost its gelatinous character entirely and settled down as a granular powder. The exact manner in which he conducts the operation is as follows: "To 20 c.c. of the aromatic spirit of ammonia add 5 grams of ammonium chloride, agitate vigorously, and add 16 c.c. of solution of barium chloride. Warm to 160° F., cool to normal temperature, and filter. The filtrate, on the addition of more barium chloride and warming, gives no further precipitate. Should a slight opalescence be produced by the barium chloride it should disappear completely on heating, but any precipitate of barium carbonate would remain permanent." The amount of ammonium carbonate in 20 c.c. is sufficient to precipitate the whole of the barium chloride. The wording of the test should be altered to the effect that 21 c.c. of the aromatic spirits of ammonia should, after the removal of the first precipitate, afford a further precipitate on addition of more barium chloride.

*Spiritus Camphoræ*.—J. F. LIVERSEEDGE (C.D. 154, i, 1899) gives details of a method of estimating the camphor. He mentions that the specific gravity of the preparation is about .846.

O. SCHMATOLLA (abst. Y.B.P. 47, 1901) gives the following method for estimating camphor in the preparation in the following manner: 10 c.c. of spirit of camphor is placed in a burette, graduated in tenths of a c.c., and is shaken with 30 to 35 c.c. of saturated solution of sodium chloride. After the camphor has, as much as possible, collected on the surface, exactly 1 c.c. of petroleum benzene is dropped on to the layer of camphor. The camphor is then dissolved in this benzene by careful agitation. After several minutes the volume of the benzene solution can be read off. After subtracting the volume of the added benzene, 1.02 c.c. corresponds to 1 gramme of camphor (specific gravity .98). He states that very exact results are obtainable.

*Staphisagriæ Semina*.—E. M. HOLMES (Y.B.P. 390, 1899) has shown that the plant ordinarily grown in botanical gardens is not identical with the stavesacre of commerce.







The ash of stavesacre seeds has been shown by MOOR and PRIEST (Y.B.P. 417, 1900) and by J. C. UMNEY (P.J. 494, i, 1902) to be about 14 per cent.

*Stramonii Folia*.—J. SLINGER WARD (P.J. 326, i, 1901) describes some adulterants of stramonium.

J. C. UMNEY (P.J. 495, ii, 1902) gives .4 per cent. as a suggested standard for alkaloid in stramonium leaves.

He also suggested 15 per cent. as a standard for ash. MOOR and PRIEST (Y.B.P. 417, 1900) found 18 and 20 per cent.

Messrs. PARKE, DAVIS, and Co. (P.J. 529, ii, 1902) have adopted .3 per cent. as a standard for alkaloid in the leaves.

*Stramonii Semina*.—J. C. UMNEY (P.J. 495, ii, 1902) suggests .4 per cent. as a standard for alkaloid in stramonium seeds, and 3 per cent. as a standard for ash.

*Strophanthi Semina*.—FROMME's method of assay has been detailed under *Extractum Strophanthi*.

T. MABEN (P.J. 267, i, 1901) says: "The reason why this drug has fallen into disrepute is because a very large proportion of the seeds of commerce are practically inert. When FRASER introduced the drug twenty years ago there was a fairly ample supply of good seeds, but things have changed, and whether it be, as is the opinion of some, that the seeds are now being gathered before they are ripe, and before the season when their physiological activity is most pronounced, it is incontestable that medical men more often than not fail to get the desired effect, with the result that they have ceased to prescribe a drug so uncertain."

E. M. HOLMES (P.J. 487, i, 1901) described several of the varieties of strophanthus seeds met with in commerce, and in commenting on the difficulty of distinguishing between varieties which resemble each other much in appearance but differ in activity says, "Unless, therefore, it be possible to obtain in commerce a regular supply of kombé seeds giving the green reaction, it will be necessary to give due consideration to Dr. FEIST's suggestion that pure strophanthin or pseudo-strophanthin should be employed instead of a tincture made of a mixed seed, which, if it gives a red reaction, may owe that reaction to pseudo-strophanthin, ouabain, or even a sugar alone, and thus may vary exceedingly in strength."

HOLMES has also shown (P.J. 254, i, 1902) that the strength of the acid used for the official sulphuric acid test is of importance. He has discovered that to obtain the test satisfactorily a freshly prepared mixture of 8 volumes of B.P. acid and 2 volumes of water should be made, and that if the bottle is frequently opened the absorption of moisture soon makes the acid weaker and less effectual for the purposes of the test.

P. E. F. PERRÉDÉS (Y.B.P., 366, 1900) contributes an interesting and exhaustive essay on the Pharmacognosy of official strophanthus seed.

*Strychninæ Hydrochloridum*.—D. B. DOTT (P.J. 58, i, 1899) states that this salt cannot be dried at 100° C. and at even 110° C. loses weight very slowly. He suggests that the official directions should specify a temperature of 135° C.



W. H. MARTINDALE (P.J. 120, i, 1899) has confirmed the above observation as to the temperature necessary for dehydration, and has made a further series of observations on commercial specimens, which he summarises as follows:

- (1) No commercial sample was obtained yielding 8.8 per cent. of water.
- (2) Sublimation does not interfere with the estimation of water of crystallisation.
- (3) The salt does not appear to effloresce in air.
- (4) The salt should be dried at above 130° C., and it is not apparently decomposed even at 150° C.

*Styrax Preparatus*.—G. F. MERSON (P.J. 209, i, 1901) says "there are about half a dozen grades of storax in the market," and considered that deficiencies observed in tincture of benzoin might be as much due to the storax as to the benzoin.

C. AHRENS and P. HETT (Y.B.P. 116, 1901, abst. from *Pharm. Zeit.*), state that the resin of storax is not entirely soluble in cold petroleum ether, but common resin, used as an adulterant, is completely dissolved.

A weighed portion of storax is mixed with coarse sand and triturated with successive portions of petroleum ether, the solution being filtered into a tared flask. When the storax is exhausted the solvent is distilled off and the residue will have an aromatic odour. If adulterated it will be terebinthinous. The free acid number of this residue should be between 40 and 55 and the saponification number 180–197. Adulterated specimens give residues having the acid number as high as 116–121, while the total saponification number is as low as 172–178.

*Sulphur Sublimatum*.—E. MERCK (C.D. 349, ii, 1898) points out that sublimed sulphur does not satisfy the official requirements as to freedom from acidity unless it is washed.

*Syrupus Aromaticus*.—G. F. MERSON (P.J. 209, i, 1901) found the specific gravity of this preparation to be 1.160, and remarks as follows:

"Filtering through talc is an unnecessary refinement. Its appearance without filtration of the tincture and water is no worse than that of syrup of ginger. It is evidently the intention that the finished volume of the British Pharmacopœia quantity should be one pint. It is about  $\frac{1}{2}$  oz. short, owing to the absorption by the paper and talc. It might read 'syrup to make one pint.' If the cloudiness is objected to, the aqua cinnamoni might be replaced by two or three minims of spiritus cinnamoni, when the syrup would have an appearance much as syrup of orange—an elegant preparation. It would, in this case, necessarily be more dense, but would that be any disadvantage?"

*Syrupus Aurantii Floris*.—A. C. ABRAHAM (C.D. 503, i, 1902) considers the official process unsatisfactory, and says that it can be made in five minutes by rubbing 1 lb. of sugar with 8 ozs. of orange flower water and adding 3 lbs. of simple syrup.



It should be noted that the following is a reproduction of the original  
manuscript. It is not a translation. The original is in English and  
is written in a cursive hand. It is a letter from a man to a woman  
and is dated 18th March 1845. The letter is written on a piece of paper  
which is now yellowed with age. The handwriting is very clear and  
easy to read. The letter is written in a cursive hand and is dated  
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W. LYON (P.J. 147, i, 1902) suggests a modification of the official process. "A much preferable plan is to put the sugar, orange flower water, and distilled water (*cold*) into a bottle fitted with a stopper or tight cork, place the bottle in a moderately warm place, and shake occasionally until the sugar is dissolved. By thus modifying the official directions the syrup is easily prepared, and there cannot be any loss of aroma."

*Syrupus Calcii Lactophosphatis*.—A. C. ABRAHAM (C.D. 503, i, 1902) has found this preparation to decompose. He suggests increasing the proportion of sugar.

*Syrupus Cascarae Aromaticus*.—G. F. MERSON (P.J. 209, i, 1901) suggests that this preparation might be filtered with advantage, as it deposits considerably when the extract is diluted.

*Syrupus Codeinae*.—W. DUNCAN (P.J. 387, i, 1901) suggests the addition of a small quantity of alcohol to this preparation. MCDIARMID states *loc. cit.* that he sometimes found fungoid growths develop in the official preparation, and D. B. DOTT was of opinion that the sterilisation of the ingredients would obviate decomposition.

*Syrupus Ferri Iodidi*.—F. B. DUDDERIDGE (P.J. 152, i, 1900) recommends COOK'S process for the estimation of iodine in this preparation (this process has been described under *Potassium Iodide*).

E. RUPP (abst. P.J. 189, ii, 1900) suggests a new method of assay, by liberating the iodine by addition of permanganate. The working details are given as follows:

Dilute 5 grammes of syrup with 10 c.c. of water, add 10 c.c. of diluted sulphuric acid, and then a 1 per cent. permanganate solution, until the liquid remains purple for two or three seconds.

The colour is best seen if the liquid is rotated and the thin layers of liquid rising on the sides of the vessel observed. It is then set aside for three hours, shaken occasionally, and then from 1 to 2 grammes of potassium iodide added, and titrated with hyposulphite of soda.

LUCAS (Practical Pharmacy) recommends the use of glucose and a special method of filtering. He claims that these two conditions produce a syrup which keeps its colour for a very long time.

When the syrup has changed colour it may be restored by placing in strong sunlight; but a loss in iron results, hydriodic acid being formed.

*Syrupus Ferri Phosphatis cum Quinina et Strychnina*.—H. J. HENDERSON (Y.B.P. 434, 1900) recorded the results of his examination of ten samples of liquor intended for making this syrup. Of the ten samples three contained the right amount of alkaloids, the rest were deficient, two of them remarkably so. He remarks that "All these results tend to confirm my previous impression that a liquor, one volume of which, when diluted with three volumes of simple syrup, shall form a syrup which shall represent the official syrup, cannot be prepared."



W. LYON (P.J. 29, i, 1901) writes: "For the colder portion of the year this preparation is as satisfactory as can be expected, but my experience of it is that during the summer season the percentage of phosphoric acid requires to be increased to 7.25 or 8.25, according to the prevailing temperature, to prevent it depositing. It would be interesting to have the views of those in a warmer district, say the south of England, on this point. The suggestion to increase the percentage of acid may seem in direct contradiction to those advocated several years ago (P.J. [3] 23, 795), but it must be borne in mind that the experiments then recorded were carried out in the winter months. The directions for making might likewise be made more definite. 'Heat gently' with some people means putting the flask in a water-bath, a plan much to be deprecated, for, although it accelerates the making of the syrup, it likewise accelerates its deterioration. Summer heat is all that is required. Another point, the B.P. says, 'In the resulting solution dissolve the strychnine and the quinine sulphate.'" This should read, "Put the quinine sulphate and strychnine in a mortar and mix them with 30 c.c. of distilled water, then add the solution of phosphate of iron.' Solution is then rapid and easy, but if the quinine and strychnine are added dry to the acid solution, the quinine gets into hard lumps, which are only slowly dissolved. Even with 6.25 per cent. of phosphoric acid this syrup is much too acid, but until a neutral and suitable solvent for ferrous phosphate is discovered it must remain so."

*Syrupus Glucosi*.—A. W. HUDSON (P.J. 81, i, 1901) writes: "As this is made from commercial glucose, characters and tests should be introduced to ensure the purity of the latter, and particularly its freedom from traces of arsenic."

*Syrupus Limonis*.—R. G. GUYER (P.J. 211, i, 1899): "The instructions to clarify the lemon juice by deposition is an impracticable instruction, for if allowed to stand till clear the juice will become mouldy, unless some preservative has been added. A simple method of overcoming this trouble is to use the juice without clarification, and add to it the tincture, subsequently percolating the sugar with this menstruum in the American fashion. By this process the use of heat is obviated, and if the percolation be conducted slowly and through flannel a nice bright syrup will be the result."

*Syrupus Pruni Virginianæ*.—F. W. HAUSSMAN (abst. P.J. 591, i, 1900) recommends a slight increase in the amount of glycerin prescribed in the *British Pharmacopæia*, and states that glycerin prevents precipitation in a marked degree. He finds it best to add the glycerin as part of the percolating medium.

*Syrupus Rhei*.—F. C. J. BIRD (Y.B.P. 445, 1898) says: "It is disappointing that the faults which have so frequently been pointed out in the process for *Syrupus Rhei* are still left uncorrected. Amongst other

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defects may be mentioned the wasteful procedure (surely unworthy of the official sanction) of evaporating an alcoholic percolate."

E. W. LUCAS (Practical Pharmacy) says: "A much better preparation could be obtained by 'pressure maceration,' as in Syr. Senna B.P., using dilute alcohol in such proportion that no recourse to evaporation need be made—the sugar to be dissolved in the resulting liquid in the cold."

G. F. MERSON (P.J. 209, i, 1901) says, "If the official directions were altered to read 'should weigh 2 lbs. 4 ozs.,' it would be a decided advantage."

*Syrupus Rhæados*.—G. F. MERSON (P.J. 29, i, 1901) says: "The dried petals might have been alternatively permitted here for obvious reasons. We cannot always pluck fresh poppy petals when we require a batch of syrup, nor can we forecast our needs twelve months in advance."

*Syrupus Scillæ*.—G. F. MERSON (P.J. 208, i, 1901) suggests that this preparation might be made by mixing a vinegar of squill (which he prepares of double strength) with a suitable proportion of syrup.

*Syrupus Tolutanus*.—FARR and WRIGHT (P.J. 107, ii, 1899) published a study of this preparation, with a view of attempting to improve the process, seeing that in the present process there is a loss of volatile constituents in the process of boiling the balsam with water, and also by the subsequent separation of crystals on cooling.

After making a number of experiments they found the best results were obtained as follows:

"Take 4 of balsam and dissolve in 12 of alcohol (90 per cent.), then add to 26 of water, previously heated to 70° C., and placed in a bottle; shake vigorously, then set aside for twenty-four hours; filter bright. Mix the filtrate with seven times its volume of simple syrup."

*Terebenum*.—L. OUGH (Y.B.P. 396, 1899) records the results of the examination of a number of samples of terebene; his work has been already referred to under *Oleum Terebinthinæ*.

*Tinctura Aconiti*.—J. C. UMNEY (P.J. 497, ii, 1902) gives 1.4 gramme per 100 c.c. as the average solids and 66 per cent. of alcohol by volume as the average alcoholic strength in properly prepared samples.

J. BARCLAY (P.J. December 17, 1898) has proposed .02 gramme per 100 c.c. of ether-soluble alkaloids as a standard.

*Tinctura Aloes*.—C. G. MOOR (Standards) says: "The solids should not be less than 7 grammes per 100 c.c."

J. C. UMNEY (P.J. 497, ii, 1902) gives 7.5 as an average for solids and 38 per cent. for alcoholic strength.

*Tinctura Arnicæ*.—C. G. MOOR (Standards) says: "If a tincture is found to yield less than .6 gramme of solids per 100 c.c. it may have been due to the use of arnica containing an excess of mineral matter."



*Tinctura Asafetidae*.—BARCLAY, MOOR, and UMNEY agree that this tincture ought to yield 10 grammes of solids per 100 c.c.

MOOR and PRIEST (C.D. 14, ii, 1900), "Ten grammes per 100 c.c. was the residue in the case of tinctures specially made by us. The majority of commercial tinctures are made from asafetida containing stones, and have solids varying from 3 to 8 per cent."

*Tinctura Aurantii*.—BARCLAY (P.J. December 17, 1898) gives 2 grammes, UMNEY (P.J. 497, ii, 1902) 1·8 gramme of solids per 100 c.c.; the latter considers 74 per cent. of alcohol to be a good average.

*Tinctura Belladonnæ*.—J. C. UMNEY gives ·6 gramme of solids per 100 c.c. as an average extractive and 59 per cent. of alcohol by volume as a good average.

*Tinctura Benzoini Co*.—MOOR and PRIEST (C.D. 14, ii, 1900), "Total solids 18 grammes per 100 c.c., alcohol 74 per cent. Low solids may be due to the use of benzoin containing much woody matter."

J. C. UMNEY (P.J. 497, ii, 1902) gives very closely agreeing figures: solids 17·5, alcohol 75 per cent.

BARCLAY and MANN have proposed a standard based on an estimation of the benzoic and cinnamic acids (see P.J. December 17, 1898, and C.D. March 15, 1902).

*Tinctura Buchu*.—MOOR and PRIEST (C.D. 14, ii, 1900) found 3·9 grammes per 100 c.c. of solid matter.

J. C. UMNEY (P.J. 497, ii, 1902) gives 4 grammes per 100 c.c. of solids as an average and alcohol 57 per cent.

*Tinctura Calumbæ*.—MOOR and PRIEST (C.D. 15, ii, 1900) found the solids in this tincture to be 1·1 and the alcohol 59 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1·0 gramme per 100 c.c. as an average for total solids and 57 per cent. as an average for alcohol.

*Tinctura Camphoræ Co*.—MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to vary from ·2 to ·3 gramme and the alcohol to be 58 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gave ·3 gramme per 100 c.c. as an average and alcohol 58 per cent.

*Tinctura Cannabis Indicæ*.—J. BARCLAY (P.J. December 17, 1898) suggested as a standard 4 grammes per 100 c.c.

MOOR and PRIEST (C.D. 15, ii, 1900) found 4·0 grammes per 100 c.c. of solids and 86 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gave 3·5 grammes of solids per 100 c.c. as an average and 87 per cent. of alcohol.

G. F. MERSON (P.J. 234, i, 1902) gives several figures obtained on examining this tincture as obtained in commerce.

*Tinctura Cantharidis*.—MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to vary from ·15–·25 gramme per 100 c.c., and the average alcoholic strength to be 89 per cent.







J. C. UMNEY (P.J. 497, ii, 1902) gives .22 gramme per 100 c.c. as an average for solids and 88 per cent. as an average for alcohol.

MOOR (Standards) found two tinctures specially prepared by him, in consequence of the great variations he had observed in the figures he had collected, gave .19 and .20 grammes of solids per 100 c.c.

*Tinctura Capsici*.—J. C. UMNEY (P.J. 497, ii, 1902) gives 1.25 gramme per 100 c.c. as an average for the solids, and 69 per cent. for the alcoholic strength.

MOOR (Standards) records a number of figures showing the variability of this tincture in solids, and says: "The solids vary from .7 to 1.5 gramme per 100 c.c. These large variations in solids are—at least, in part—due to the fact that the fat deposits in cold weather, though the other extractive matters probably vary in genuine capsicums . . . it might conduce to uniformity if, instead of making the tincture from the fruits as at present, it were made by dissolving 10 grammes of oleo-resina capsici (U.S.P.) in a litre of spirit."

J. BARCLAY (P.J. December 17, 1898) proposed as a standard 1.5 gramme of solids per 100 c.c., but the figures quoted above go to show that genuine samples may give less than this amount.

*Tinctura Cardamomi Co.*—MOOR and PRIEST (C.D. 15, ii, 1900) found the average solid residue to be 6.5 grammes per 100 c.c. and the alcoholic strength 56 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 6 grammes of solids per 100 c.c. and 56 per cent. of alcohol as an average.

*Tinctura Cascarillæ*.—J. BARCLAY (P.J. December 17, 1898) suggests 1.6 gramme per 100 c.c. as a standard.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.5 as a good average for the solids and 67 per cent. for the alcohol.

*Tinctura Catechu*.—J. BARCLAY (P.J. December 17, 1898) suggested 14.5 grammes per 100 c.c. as a standard for solids.

MOOR and PRIEST (C.D. 15, ii, 1900) found the average solids to be 15.0 grammes per 100 c.c. and the alcohol 52 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) confirms these figures as fair averages.

*Tinctura Chloroformi et Morphine Co.*—MOOR and PRIEST (C.J. 15, ii, 1900) found the solids to average 28 grammes per 100 c.c. and the alcohol 52 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 30 grammes of solids and 52 per cent. of alcohol as average figures.

*Tinctura Cimicifugæ*.—J. BARCLAY (December 17, 1898) suggested 2 grammes of solids per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to vary from 1.5 to 2.5 grammes per 100 c.c. and the alcohol to be 58 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) finds also 2 per cent. of solids as an average and 58 per cent. of alcohol.



*Tinctura Cinchonæ*.—MOOR and PRIEST (C.D. 15, ii, 1900) found the solids vary from 4 to 7 grammes per 100 c.c., and the alcohol to be 64 per cent.

MOOR (Standards) has collected a large number of figures showing the large variations which are natural in the total solids of this tincture.

J. C. UMNEY (P.J. 497, ii, 1902) gives 6.5 grammes per 100 c.c. as the average in this tincture and the alcohol as 63 per cent.

NAYLOR and HUXTABLE (P.J. 134, ii, 1902) record the results on examining some tincture of cinchona which had been made and preserved for some months. They found that little or no loss of alkaloids had occurred.

J. STENHOUSE (P.J. 10, i, 1900) says, "The analytical process given in the B.P. for standardising Ext. Cinchonæ Liq., as also Tinct. Cinchonæ, is far from being an ideal one. The benzolated amylic alcohol at once forms an emulsion when shaken with the alkaline liquid extract, and the various methods adopted to overcome this emulsification not only lead to loss of time, but, what is more important, to loss of alkaloid." The writer then suggests the employment of ether chloroform in place of benzolated amyl alcohol.

*Tinctura Cinchonæ Co.*—MOOR and PRIEST (C.D. 15, ii, 1900) gave the solids as varying from 4.0 to 6.0 grammes per 100 c.c. and the alcohol as 65 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 4.5 grammes per 100 c.c. as an average and 65 per cent. of alcohol.

NAYLOR and HUXTABLE (P.J. 134, ii, 1902) have examined samples of the compound tincture which had been stored for some months and found little or no loss of alkaloids to occur.

F. H. ALCOCK (P.J. 415, ii, 1900) suggests that this preparation could be conveniently made up by mixing the requisite quantities of tincture of orange, serpentary, cochineal, saffron, and cinchona.

*Tinctura Cinnamomi*.—J. BARCLAY (P.J. December 17, 1898) suggested 2.4 grammes per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 2.5 grammes per 100 c.c. of solids and 68 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gave 2.25 grammes per 100 c.c. as an average of solids and 68 per cent. of alcohol.

*Tinctura Cocci*.—J. BARCLAY (P.J. December 17, 1898) suggested 2.5 grammes per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) give the solids as 2.0 to 3.0 grammes per 100 c.c. and 45 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.25 of solids as an average and 44 per cent. of alcohol.

*Tinctura Colchici Seminum*.—J. BARCLAY (P.J. December 17, 1898) proposed .075 per cent. of colchicine as a standard.



House and Senate (H.R. 10, 1900) passed the following amendments to the act of 1900:

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21. The House (H.R. 10, 1900) passed the following amendments to the act of 1900:



MOOR and PRIEST (C.D. 15, ii, 1900) found the alcoholic strength to be 43 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gave 2.0 grammes of solids per 100 c.c. as an average and 43 per cent. of alcohol.

*Tinctura Conii*.—J. BARCLAY (P.J. December 17, 1898) suggested .09 gramme per 100 c.c. of alkaloid.

MOOR and PRIEST (C.D. 15, ii, 1900) found 69 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1.4 gramme per 100 c.c. of solids as an average and alcohol 68 per cent.

*Tinctura Croci*.—J. BARCLAY (P.J. December 17, 1898) proposed 3.0 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 2.5 grammes per 100 c.c. of solids.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.75 as an average figure for solids and 57 per cent. of alcohol.

*Tinctura Cubebæ*.—J. BARCLAY (P.J. December 17, 1898) suggests 2.0 grammes of oleo-resin per 100 c.c. as a standard.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1.5 of solids and 85 per cent. of alcohol as averages.

*Tinctura Digitalis*.—MOOR and PRIEST (C.D. 15, ii, 1900) found 3.5 grammes per 100 c.c. of solids and 57 per cent. of alcohol.

J. BARCLAY (P.J. December 17, 1898) suggested 3.6 grammes per 100 c.c., and J. C. UMNEY (P.J. 497, ii, 1902) 3.5 grammes per 100 c.c. as fair averages; the latter gives 55 per cent. of alcohol as an average.

*Tinctura Ergotæ Ammoniata*.—J. BARCLAY (P.J. December 17, 1898) proposed 4.0 grammes per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 4.0 grammes of solids per 100 c.c. and 51 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 4.25 grammes per 100 c.c. as an average for solids and 52 per cent. of alcohol.

*Tinctura Ferri Perchloridi*.—MOOR and PRIEST (C.D. 15, ii, 1902) found the solids of this tincture very variable, namely, from 10 to 15 grammes per 100 c.c., and 22 per cent. of alcohol.

LUCAS (Practical Pharmacy) says: "When exposed to sunlight it gradually becomes lighter in colour owing to reduction of some of the iron to the ferrous state."

MOOR (Standards) says: "The *British Pharmacopæia* gives no test for this preparation, but 20 c.c. treated with an excess of ammonia should yield 1.6 gramme of ferric oxide."

J. C. UMNEY (P.J. 497, ii, 1902) gives 12 grammes per 100 c.c. as an average, and 22 per cent. of alcohol.

*Tinctura Gelsemii*.—J. BARCLAY (P.J. December 17, 1898) proposed .025 gramme per 100 c.c. of gelsemine as a standard.



MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to vary from .9 to 2.0 grammes per 100 c.c., and the alcohol to be 58 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1.25 gramme per 100 c.c. of solids and 58 per cent. of alcohol as an average.

*Tinctura Gentianæ Co.*—J. BARCLAY (P.J. December 17, 1898) suggested 5 grammes per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 5.2 of solids and 44 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 5.5 grammes of solids as an average, and 43 per cent. of alcohol.

*Tinctura Guaiaci Ammoniata.*—J. BARCLAY (P.J. December 17, 1898) suggested 15 per cent. of resin as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 16 grammes per 100 c.c. of solids and 72 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 15 grammes per 100 c.c. as an average, and 72 per cent. of alcohol.

*Tinctura Hamamelidis.*—J. BARCLAY (P.J. December 17, 1898) suggested 2 grammes per 100 c.c. as a standard for solids.

MOOR and PRIEST (C.D. 15, ii, 1900) found 2 grammes per 100 c.c. of solids and 43 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.0 grammes per 100 c.c. as an average for solids and 44 per cent. of alcohol.

*Tinctura Hydrastis.*—J. BARCLAY (P.J. December 17, 1898) suggested 2.5 per cent. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 2.3 grammes of solids per 100 c.c. and 58 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.25 grammes per 100 c.c. as a good average for solids and 58 per cent. of alcohol.

*Tinctura Hyoscyami.*—J. BARCLAY (P.J. December 17, 1898) suggested .008 gramme per 100 c.c. of alkaloids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to be 2.8 gramme per 100 c.c., and the alcohol 48 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives 3 grammes per 100 c.c. as an average of solids and 45 per cent. of alcohol.

*Tinctura Jaborandi.*—J. BARCLAY (P.J. December 17, 1898) proposed .048 gramme per 100 c.c. of alkaloids as a standard.

FARR and WRIGHT (P.J. 90, ii, 1899) record their results on assaying a number of commercial tinctures, in which they found an average of .036 per cent. of alkaloids.

MOOR and PRIEST (C.D. 15, ii, 1900) found 3 grammes per 100 c.c. of solids, and 43 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) confirms the above figures.







*Tinctura Jalapæ*.—MOOR and PRIEST (C.D. 15, i, 1900) found the alcohol in this tincture to be 68 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) found the solids to average 3.5 grammes per 100 c.c. and the alcohol to be 68 per cent.

MOOR (Standards) has found the solids to vary from 2.9 to 5.8 grammes per 100 c.c. As the tincture is officially standardised, the solids are of no importance.

*Tinctura Kino*.—J. BARCLAY (P.J. December 17, 1898) proposed as a standard 5 per cent. of kino-tannic acid.

MOOR and PRIEST (C.D. 15, ii, 1900) found 50 per cent. of alcohol.

J. C. UMNEY (P.J. 947, ii, 1902) gave 22 grammes of solids per 100 c.c. as an average and 50 per cent. of alcohol.

*Tinctura Kramerie*.—J. BARCLAY (P.J. December 17, 1898) proposed 5 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to be 4.5 gramme per 100 c.c. and the alcohol 56 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gave 5 grammes per 100 c.c. as an average for solids and 56 per cent. of alcohol.

*Tinctura Lavandulæ Co*.—J. BARCLAY (P.J. December 17, 1898) proposed .6 of a gramme per 100 c.c. as a standard for solids.

MOOR and PRIEST (C.D. 15, ii, 1900) record variations in the solids from .4 to .7 gramme per 100 c.c. and 88 per cent. of alcohol.

J. C. UMNEY (P.J. 947, ii, 1902) gives .5 as an average for solids and 88 per cent. of alcohol.

*Tinctura Limonis*.—J. BARCLAY (P.J. December 17, 1898) proposed 2 grammes of solids per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 1.5 gramme per 100 c.c. and 75 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1.8 as an average for solids and 77 per cent. of alcohol.

*Tinctura Lobeliæ Aetherea*.—J. BARCLAY (December 17, 1898) proposed .07 gramme per 100 c.c. of alkaloid as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) record variations in the solids from 1.1 to 2.0 and 64 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1.5 grammes of solids per 100 c.c. as an average, and 64 per cent. of alcohol.

*Tinctura Lupuli*.—J. RUTHERFORD HILL (P.J. 60, i, 1899) examined five samples of tincture of hops, three being prepared according to the 1885 *Pharmacopæia* and two according to the 1898 *Pharmacopæia*. He found an average of a little under 3 per cent. of extractive.

J. BARCLAY (December 17, 1898) suggested 4 per cent. as a standard for the solids.

J. C. UMNEY (P.J. 497, ii, 1902) gives 4 grammes per 100 c.c. as a standard and 57 per cent. of alcohol.



*Tinctura Myrrhae*.—J. BARCLAY (P.J. December 17, 1898) proposed 5.6 grammes per 100 c.c. of resin as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 6 grammes of solids per 100 c.c. and 85 per cent. of alcohol in properly prepared tinctures.

MOOR (Standards) says, "If myrrh contains 30 per cent. soluble in alcohol, of which only about 5 per cent. is volatile, the tincture should contain about 5.5 grammes of solids per 100 c.c."

J. C. UMNEY (P.J. 497, ii, 1902) gives 5 grammes per 100 c.c. as an average for solids and 65 per cent. of alcohol.

*Tinctura Nucis Vomicae*.—FARR and WRIGHT (P.J. 82, ii, 1900) have investigated the accuracy of the official process for the determination of strychnine in this tincture (their work has also been dealt with under *Ext. Nucis Vomicae Liquidum*), and their conclusions are as follows:

i. The assay process of the *Pharmacopœia* gives results which, though not absolutely accurate, are sufficiently so for all practical purposes.

ii. The volume of the tincture taken should not exceed 30 c.c.

iii. 200 c.c. of wash-water, at 100° F., should be employed, and a correction made for the dissolved strychnine.

iv. In carrying out the process the other official details are to be strictly adhered to.

The investigations of GREENISH and UPSHER SMITH, who have devised a method for preventing the turbidity due to fat, which is frequently noticeable in this tincture, have been dealt with under *Extractum Nucis Vomicae Liquidum*.

*Tinctura Opii*.—J. A. DEWHIRST (P.J. 359, i, 1900) gives a process of assay in which a smaller quantity of tincture is required than in the official process. His directions are as follows:

"Take 10 c.c. of tincture, add .5 gramme of lime. Warm to cause aggregation. Filter and wash. The morphine is quickly all washed through. Shake the liquid twice with benzene, washing the latter with a few c.c. of water. This benzene on evaporation gives a considerable residue of alkaloid, from which lime water extracts the merest trace of morphine. Then add ammonium chloride and a little ammonia to the aqueous solution, and shake out with hot amyl alcohol. If this is not done quickly the morphine crystallises out and is soluble with great difficulty in the amyl alcohol. The latter is easily evaporated with gentle heat and a stream of air through the containing flask. The residue is rather dark-coloured, but can be titrated with ease in the B.P. manner, using litmus paper."

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to vary from 3.2 to 5.8 grammes per 100 c.c., and MOOR (Standards) says, "The range of alcohol in this tincture should fall between 43 and 48 per cent."

*Tinctura Opii Ammoniata*.—MOOR (Standards) says this preparation should contain about .113 gramme of morphine per 100 c.c.

J. C. UMNEY (P.J. 497, ii, 1902) gives 2.75 grammes per 100 c.c. as an average for the solids and 63 per cent. of alcohol.

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*Tinctura Podophylli*.—This tincture is simply a solution of podophyllin resin in 90 per cent. alcohol, hence it should yield nearly 3·65 grammes of solids per 100 c.c., and the alcohol should be about 86 per cent.

*Tinctura Pruni Virginianæ*.—J. BARCLAY (P.J. December 17, 1898) suggested 3 grammes per 100 c.c. as a standard for solids.

MOOR and PRIEST (C.D. 15, ii, 1900) found 3·3 grammes of solids per 100 c.c. and 87 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 3 grammes per 100 c.c. as an average and 87 per cent. of alcohol.

*Tinctura Pyrethri*.—J. BARCLAY (December 17, 1898) suggested 1·6 gramme per 100 c.c. as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 68 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 1·75 gramme per 100 c.c. of solids and 68 per cent. of alcohol.

*Tinctura Quassiae*.—J. BARCLAY (December 17, 1898) suggested ·016 gramme per 100 c.c. of quassin as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids vary from ·26 to ·54 gramme per 100 c.c. and the alcohol to be 45 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) gives ·5 gramme per 100 c.c. of solids as an average and 45 per cent. of alcohol.

*Tinctura Quillaiae*.—J. BARCLAY (P.J. December 17, 1898) suggested 1·25 gramme per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to be 1·2 gramme per 100 c.c. and the alcohol 58 per cent.

J. C. UMNEY (P.J. 497, ii, 1902) confirms these figures.

*Tinctura Quinine*.—MOOR and PRIEST (C.D. 15, ii, 1900) found 74 per cent. of alcohol in this tincture.

MOOR (Standards) found from 3·1 to 3·9 grammes per 100 c.c. of solids.

J. C. UMNEY (P.J. 497, ii, 1902) gives 3·5 as an average for solids and 74 per cent. of alcohol.

*Tinctura Quinine Ammoniata*.—MOOR and PRIEST (C.D. 15, ii, 1900) found 1·8 gramme of solids per 100 c.c., and 53 per cent. of alcohol. J. C. UMNEY (P.J. 497, ii, 1902) confirms these figures.

*Tinctura Rhei Co.*—E. W. LUCAS (C.D. 959, ii, 1899) writes: "This tincture is more conveniently prepared by the maceration process. The following formula yields a clear tincture of slightly higher density than that prepared by the official process:

Rhubarb root, whole	...	...	2 ozs.
Cardamom seeds, bruised	...	...	$\frac{1}{4}$ oz.
Coriander-fruits, bruised	...	...	$\frac{1}{4}$ oz.
Glycerin	...	...	2 fluid ozs.
90 per cent. alcohol	...	...	12 fluid ozs.
Distilled water	...	...	6 fluid ozs.

Soak the rhubarb in the water for twenty-four hours, bruise in a stone



mortar, and add to the cardamoms and coriander in the strong alcohol. Macerate seven days, press and add the glycerin."

MOOR and PRIEST (C.D. 15, ii, 1900) found 16 per cent. of solids and 52 per cent. of alcohol in this tincture.

*Tinctura Scillæ*.—J. BARCLAY (P.J. December 17, 1898) proposed 10 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 11 grammes per 100 c.c. of solids and 53 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gave as an average 12 grammes of solids per 100 c.c. and 54 per cent. of alcohol.

*Tinctura Senegæ*.—J. BARCLAY (P.J. December 17, 1898) proposed 4.8 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 4.5 grammes per 100 c.c. of solids and 57 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 6 grammes per 100 c.c. as an average of solids and 56 per cent. of alcohol.

*Tinctura Sennæ Co.*—J. BARCLAY (P.J. December 17, 1898) proposed 10 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 10 grammes of solids per 100 c.c., and 38.5 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gives 11 grammes of solids per 100 c.c. and 40 per cent. of alcohol.

*Tinctura Serpentariæ*.—J. BARCLAY (P.J. December 17, 1898) proposed 2 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found 68 per cent. of alcohol.

J. C. UMNEY (P.J. 497, ii, 1902) gave 2 grammes of solids as an average and 68 per cent. of alcohol.

*Tinctura Stramonii*.—J. BARCLAY (P.J. December 17, 1898) suggested .04 gramme per 100 c.c. of alkaloid as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids 3.8 grammes per 100 c.c. and the alcohol 43 per cent.; these figures are confirmed by J. C. UMNEY.

*Tinctura Strophanthi*.—J. BARCLAY (P.J. 497, ii, 1898) proposed .3 gramme per 100 c.c. of strophanthin as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids vary from .35 to .75 gramme per 100 c.c. and the alcohol 69 per cent. In the Analyst, xxvi, 33, they published results of the examination of a number of commercial tinctures.

MOOR (Standards) writes: "If 2 c.c. are evaporated on a water-bath and the residue tested with 80 per cent. sulphuric acid, the colour will be partly reddish, but streaks of green should be distinctly visible; *the green colour is, however, transient.*"

J. C. UMNEY (P.J. 498, ii, 1902) gives .55 gramme per 100 c.c. as an average for solids and 69 per cent. of alcohol.







*Tinctura Sumbul.*—J. BARCLAY (P.J. December 17, 1898) proposed 2.5 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to be 2.4 grammes per 100 c.c. and the alcohol 68 per cent.

J. C. UMNEY (P.J. 498, ii, 1902) confirms the above figures, giving 2.5 grammes per 100 c.c. as an average and 69 per cent. of alcohol.

*Tinctura Tolutana.*—J. BARCLAY (P.J. December 17, 1898) suggested 2 grammes per 100 c.c. of benzoic and cinnamic acids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1902) found 8.5 grammes of solids per 100 c.c. and 81 per cent. of alcohol.

J. C. UMNEY (P.J. 498, ii, 1902) confirms these figures, as being average results.

*Tinctura Valerianæ Ammoniata.*—J. BARCLAY (Dec. 17, 1898) suggested 3 grammes per 100 c.c. of solids as a standard.

MOOR and PRIEST (C.D. 15, ii, 1900) found the solids to be 3.5 grammes per 100 c.c. and the alcohol 53 per cent.

J. C. UMNEY (P.J. 498, ii, 1902) confirms these figures.

W. LYON (P.J. 600, ii, 1901) is in favour of preparing this tincture by percolation rather than by maceration, as a tincture so obtained is stronger in extractive and in valerian flavour than one made by the official process.

*Tinctura Zingiberis.*—J. BARCLAY (P.J. Dec. 17, 1898) suggested .4 gramme per 100 c.c. of solids as a standard.

J. C. UMNEY (P.J. 498, ii, 1902) gave .5 gramme per 100 c.c. as an average of solids and 89 per cent. of alcohol.

*Trochiscus Acidi Carbolici.*—E. W. LUCAS (C.D. 959, ii. 1899): "The tolu basis is apparently not suitable for these lozenges, black spots frequently appearing after keeping for a short time. The same basis without the tolu undergoes no change."

*Unguentum Acidi Borici.*—A. S. SWADLING (P.J. 391, i, 1901) says: "The boric ointment of the *Pharmacopœia* is much too hard; more soft paraffin is required. A mixture of about 1 part of hard paraffin and 9 parts of soft yields an ointment of good consistence."

*Unguentum Acidi Carbolici.*—C. F. HENRY states that in his opinion carbolic acid is not soluble in soft paraffin to the extent of 1 in 20, but that its solubility is more like 1 in 32. He states that the carbolic crystallises out when the ointment is made according to the present formula and suggests an alteration.

W. LYONS (P.J. 175, i, 1902): "Though of satisfactory appearance when freshly prepared, it gradually assumes a semi-granular appearance caused by the separation of the glycerin. . . . Equal parts by weight of almond oil, white wax, and benzoated lard give an ointment which is of medium consistence, and gives no indication of change after being kept for several months. The *modus operandi* is as follows:

"Melt the lard, wax, and half of the almond oil together on a water-



bath. In a stoppered or corked bottle place the phenol and the remainder of the oil. Dissolve by immersion in hot water. Remove the melted basis from the water-bath, stir constantly until it begins to thicken, then add the phenol and oil (warm). Continue stirring until the ointment is cold. Set aside for twenty-four hours and again rub it up thoroughly."

*Unguentum Belladonnæ*.—F. C. J. BIRD (P.J. 692, i, 1900, and 195, ii, 1900) gives a method for the estimation of the alkaloids.

*Unguentum Conii*.—F. C. J. BIRD (Y.B.P. 446, 1898) said, "The boric acid is omitted; the ointment now becomes mouldy on keeping."

J. C. UMNEY (P.J. 8, i, 1900) wrote, "It seems desirable to continue to use boric acid in this preparation as required by the B.P. Addendum, 1890."

WHITE and HUMPHREY (Pharmacopædia) also draw attention to the liability of this ointment to become mouldy.

*Unguentum Hamamelidis*.—E. W. LUCAS (C.D. 959, ii, 1899) writes: "This ointment is unsatisfactory when prepared entirely with wool-fat basis. By substituting soft paraffin for a portion of the wool-fat, and substituting anhydrous for hydrous wool-fat, the ointment can be preserved apparently almost indefinitely:

Liquid Extract of Hamamelis	...	...	...	...	$\frac{1}{4}$ fluid oz.
Anhydrous wool-fat	...	...	...	...	$1\frac{1}{2}$ ozs.
Soft paraffin	...	...	...	...	$\frac{3}{4}$ oz.

Mix."

*Unguentum Hydrargyri Nitratis*.—W. LYON (P.J. 29, i, 1901) writes: "The *British Pharmacopæia* formula gives a very good ointment if care be taken. The olive oil and nitric acid are the usual sources of trouble and should always be carefully examined. The only point open to criticism is the method of making. It may be safely laid down as a general rule that a complicated process should never be authorised if a simpler one gives an equally good result. Now the *British Pharmacopæia* method is a complicated one. We are told to 'heat the lard and olive oil together on a sand-bath so that the mixture when transferred to a heated earthenware jar shall be at a temperature of about 290° F.' This means that either the earthenware jar must be heated on another sand-bath to 290° F. and the oil and lard heated to a similar degree, or the oil and lard must be of a temperature sufficiently above 290° F., so that when poured into a colder jar the heat thereby lost shall not cause the temperature of the oil and lard to fall below 290° F. The question thus arises—Is all this necessary? I do not think it is. A much simpler method (*i.e.* B.P. 1885) will give an equally good result. The complaints made against it were unfounded. The cause of all the trouble was not the method, but the use of impure materials and imperfect manipulation."

E. W. LUCAS (Practical Pharmacy): "The present process is a great improvement over that in the last *Pharmacopæia*, the ointment keeping

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better, besides being of a more typical colour. The great secret in making this ointment lies in the strict observation of the temperatures."

*Unguentum Hydragryri Oxidum Rubrum*.—A. C. ABRAHAM (P.J. 577, ii, 1900) writes: "I believe a great mistake has been made by altering this ointment and making it with a paraffin base. The consumption, since that change, has been reduced to about one-fourth. Can this be wondered at? Can we reasonably expect that red oxide of mercury will be able to exert its activity as well when it is coated with paraffin, the very name of which one would suppose was sufficient to condemn it? I quite expect to see this ointment gradually drop entirely out of use."

*Unguentum Zinci Oleatis*.—G. F. MERSON (P.J. 140, i, 1899) criticises the description of the mode of making, namely, "collect the *precipitated* zinc oleate." When the solutions of zinc sulphate and hard soap are mixed the zinc oleate *rises* in a liquefied condition and floats on the surface. He considers the best way of washing the oleate is to allow the liquid to cool, and, when a cake has formed, to pierce two holes and let the liquid run out, then add water warm and melt, and, after stirring up, cool again and repeat the operation. The second washing usually removes all sulphates, and the oleate is then broken up into a granular powder and dried at 60° C. in an air oven.

W. LYON (P.J. 175, i, 1902) writes: "Samples of this ointment obtained from different makers are darker in colour than is desirable. This condition appears to be attributable to the method of drying the oleate previous to its incorporation with the soft paraffin. Drying on a water-bath has never given a satisfactory result in my hands. The oleate gradually loses its nascent snowy whiteness, and the longer it is left on the water-bath the more difficult it is to melt with the paraffin. To obviate this difficulty removal of the water by pressure was tried. The oleate when removed from its calico covering was white, apparently quite dry, and the resulting ointment of much better appearance. This modification would be a decided improvement. Lard being whiter than soft paraffin, it was thought the use of it as a diluent would give an ointment free from any yellowish tint, but on trial it was found that lard had little, if anything, in its favour, except that chemically it is more closely allied to oleate of zinc than soft paraffin."

LUCAS (Practical Pharmacy) thinks it is not to be compared with the 1885 formula. He recommends for lumpy ointments straining in the cold—viz. pressing through unwashed muslin tied over a wide-mouthed jar.

*Valeriane Rhizoma*.—MOOR and PRIEST (Y.B.P. 418, 1900) found specimens of this drug when cleaned from adhering dirt to give an ash of about 9 per cent.

J. C. UMNEY (P.J. 494, ii, 1902) suggests 10 per cent. of ash as a standard.



*Veratrina*.—G. B. FRANKFORTER and L. B. PEASE (abst. A.J.P., p. 130, No. 71) have examined four samples of commercial veratrine. They considered the ether-soluble constituent to be the cevadine of WRIGHT and AHBENS, having the formula  $C_{32}H_{49}NO_9$ . The melting-point was  $147^{\circ}$ — $148^{\circ}$  C.

Dr. POWER (Y.B.P. 344, 1900) questions why a detailed process should be retained for this alkaloid or mixture of alkaloids when processes for all the other organic principles of this class have been deleted.

The same view was expressed by STÆDER (B. & C. D. xxxiv, 517). ATTFIELD has explained (Digest, p. 121, 1900) that owing to the composition of the medically useful substance known as veratrine being indefinite, the only method of showing what was required was to give the process.

*Vinum Aurantii*.—MOOR (Standards) writes: "The *British Pharmacopæia* omits to give any direction as to the quantity of peel that should be employed, and no indication is given as to the total solids that should be present. These vary in good samples from 16 to 20 per cent. In wines in which a fair quantity of peel was used tannin will be found present in quantity sufficient to give a precipitate with quinine, and possibly other alkaloids. Tannin may also be derived from the barrel in which the wine is received from the original maker. Inferior samples may contain little or no tannin, and possibly consist of an admixture of sugar, potato spirit, and essence of orange. A genuine wine (unless detannated) will give a distinct reaction for tannin."

*Vinum Ferri*.—SQUIRE (Companion) says: "The quantity of iron dissolved seems to depend almost wholly on the acidity of the wine." He has found the iron in commercial samples to vary from .2 to .3 per cent., but states that occasionally they are much weaker.

MOOR (Standards) quotes J. A. FORRET's work (P.J. [3] xxi, 640), who examined ten samples and found them very variable.

MOOR suggests that the preparation should be required to contain a definite amount of iron, or omitted from the *Pharmacopæia*, since none of the Continental Pharmacopœias include it.

WHITE and HUMPHREY (Pharmacopedia) state that good samples appear to contain about .22 per cent. of iron.

*Vinum Ipecacuanhæ*.—R. G. GUYER (P.J. [4] ix, 622) drew attention to an apparent loss of alkaloid in this preparation on keeping, and his experience is confirmed by that of J. C. UMNEY (P.J. [4] x, 8).

NAYLOR and BRYANT (Y.B.P. 343, 1899) published assays of three samples of wine, in all of which the alkaloids obtained were sensibly below .1 gramme per 100 c.c., although the process employed was one which on the liquid extract gave results in most cases higher than the official process.

FARR and WRIGHT (Y.B.P. 337, 1899) also published analyses of six samples of wine, the average alkaloids being only half the amount that ought to have been present.







These observers and the last-mentioned agree that not less than 50 c.c. should be taken for assay.

FARR and WRIGHT (Y.B.P. 380, 1902) examined ten samples of ipecacuanha wine which gave much better results than those examined by them previously, and F. C. J. BIRD, in the discussion that followed this paper, explained that the loss of alkaloid in some samples might be accounted for by alkalinity from the lime used in preparing the liquid extract. J. C. UMNEY mentioned finding loss of alkaloids which he also attributed to excessive alkalinity. RUTHERFORD HILL referred to a case where, on examining a wine which had been standardised two years previously, it appeared to have lost 23 per cent. of its original alkaloids.

MOOR (Standards) had examined a few samples of wine which had been standardised and kept, and did not find any loss. He says, however, 'It is very probable that different batches may vary considerably in their keeping qualities.' He also draws attention to the fact that "the *Pharmacopæia* does not specify the use of a detannated sherry, and some samples produce a considerable precipitate on mixing with the liquid extract. This precipitate contains alkaloid, so that a *detannated wine should always be used.*"

Various methods have been published for the estimation of the alkaloids. That of BIRD (P.J. 1900, 414) is simple and accurate, and is described by him as follows:—Take 100 c.c. of wine; add 2 c.c. of solution of sub-acetate of lead and a few grains of washed asbestos powder. Heat for a minute or two on the water-bath until a distinct separation of the precipitate is observed, then transfer to a BUCHNER'S filter and continue the process as described by him for the liquid extract.

*Vinum Quininae*.—F. H. ALCOCK (P.J. lxi, 479) pointed out that some samples of orange wine precipitated very considerably when mixed with quinine hydrochloride.

MOOR (Standards) writes: "Orange wines contain tannin, some samples containing enough to throw down 10 per cent. of the quinine in seven days, so that either a detannated wine should be used or enough quinine to allow for what is precipitated."

*Zinci Sulphocarbolas*.—Dr. POWER (Y.B.P. 345, 1900) says that the formula given for this salt is incorrect, as it contains 8 molecules of water.

WHITE and HUMPHREY (*Pharmacopæia*) say that the re-action mixture containing the para-phenol-sulphonic acid must contain excess of sulphuric acid. Hence direct neutralisation with zinc oxide will give a solution containing both zinc sulphate and zinc sulpho-carbolate, two salts difficult to separate by re-crystallisation. If the barium salt be first formed the two acids are easily separated.

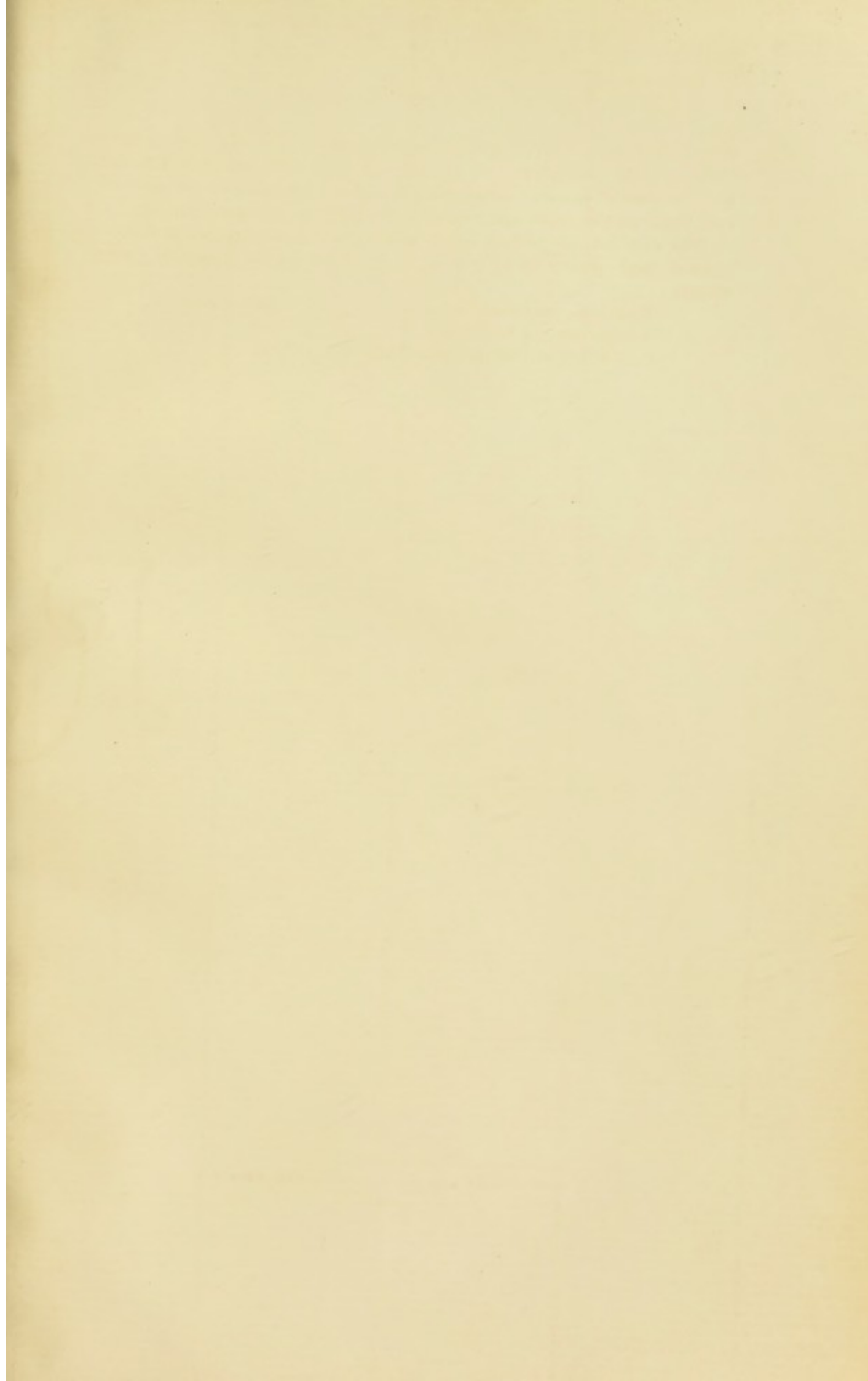
*Zingiber*.—A. R. BENNETT (P.J. 522, i, 1901) published a series of figures on the composition of the gingers of commerce and made certain

recommendations with a view of securing purity, namely, that ginger "should yield not less than 5 per cent. of resin to 90 per cent. alcohol, not less than 1·5 per cent. of soluble ash, and not less than 8·5 per cent. of cold water extract (indicating absence of 'spent' or exhausted ginger)."

The two last suggestions agree well with figures proposed as indications of good quality in ginger by C. G. MOOR (Food Analysis, 1899), namely :

Total ash, not exceeding ...	...	...	5·0 per cent.
Soluble ash, not less than ...	...	...	1·5 „
Cold water extract, not less than ...	...	...	10·0 „

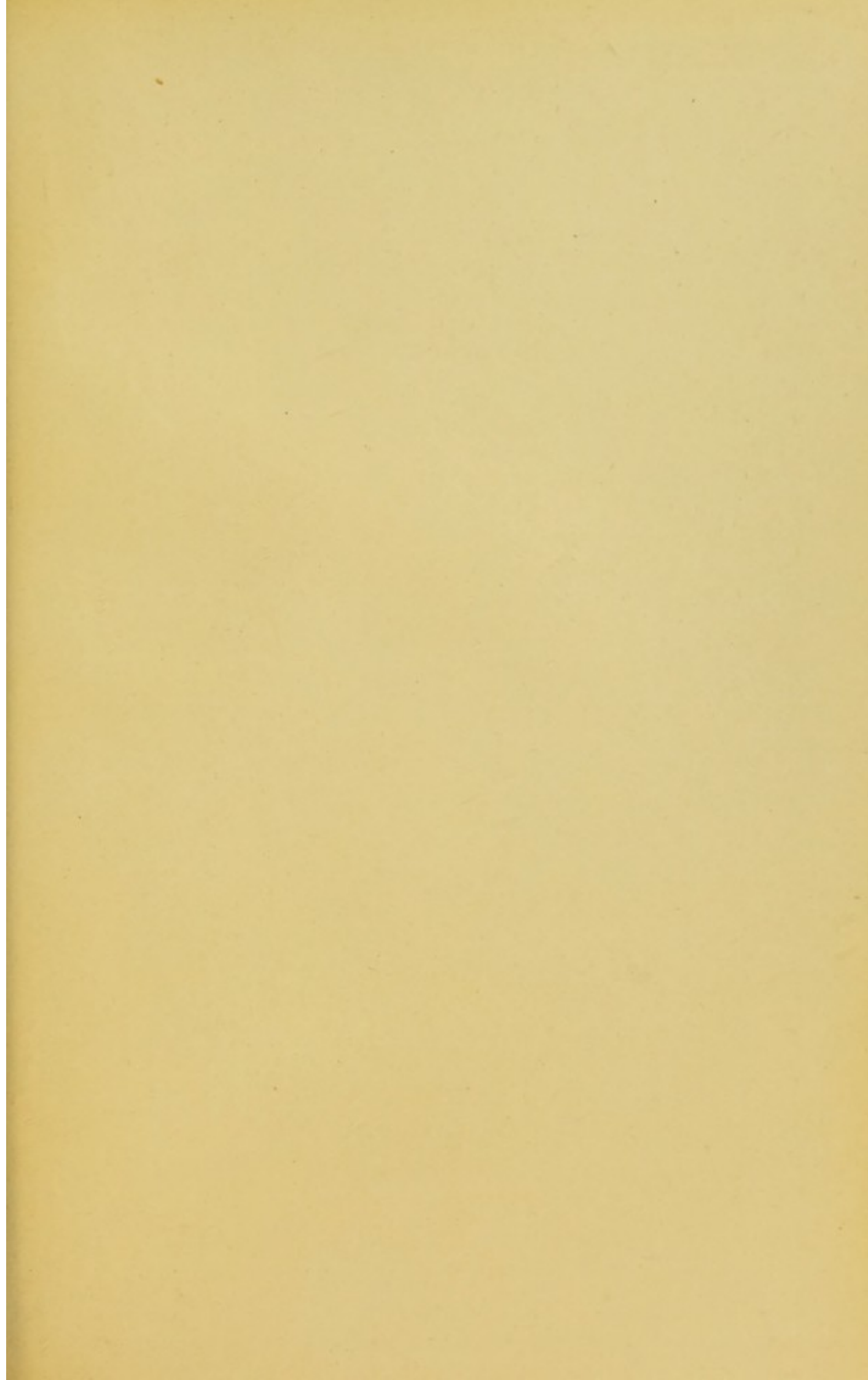




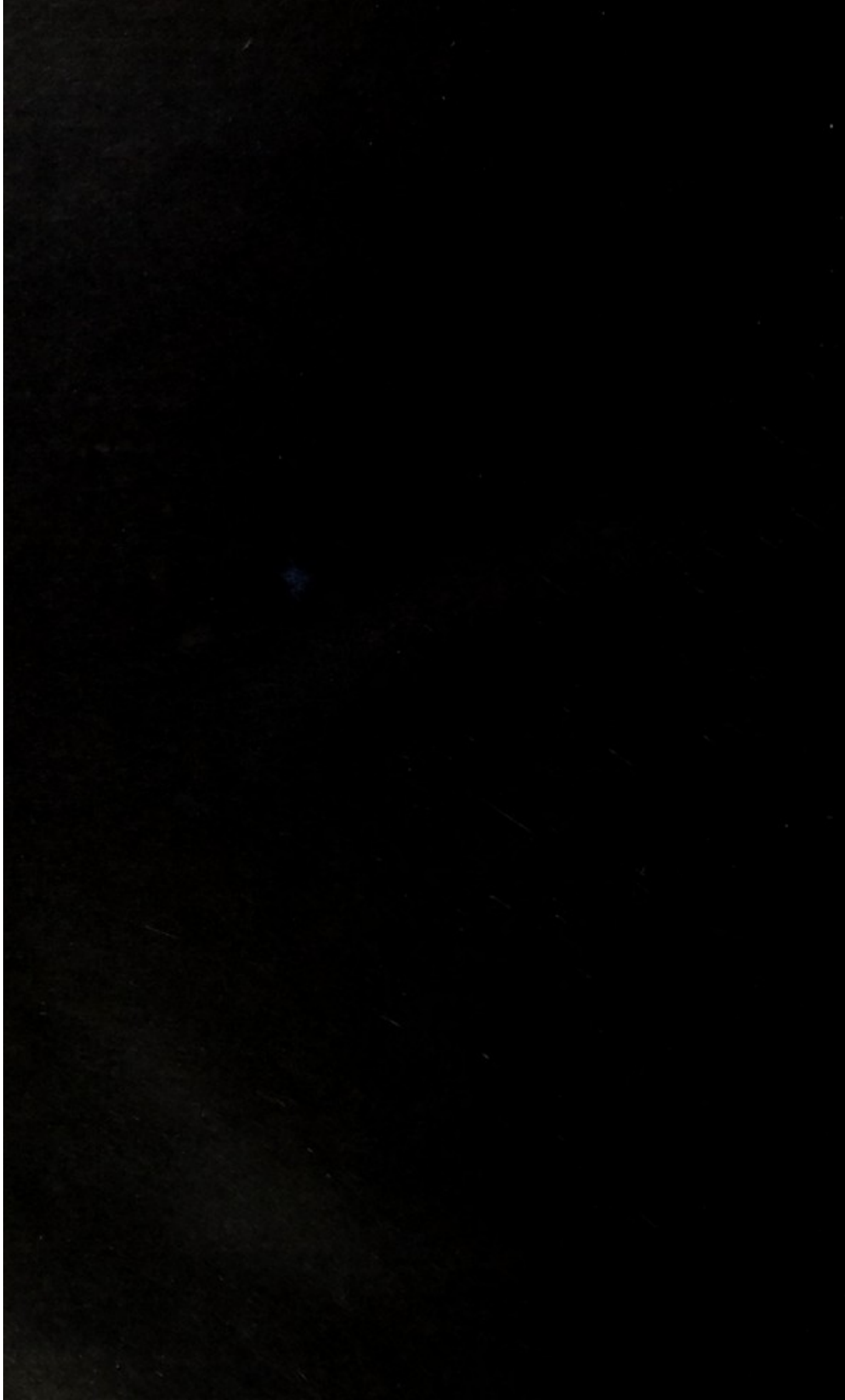
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