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Correction — the word Pharmacopeia
should read Pharmacopoeia

"Suggestions for a Revised Pharmacopœia"

In presenting myself as a candidate before the Senatus of Glasgow University for the degree of M.D. I think it not inappropriate to choose as subject of thesis

"Suggestions for a revised Pharmacopœia"

I have been led to this choice of subject from the interest arising from some practical acquaintance with it; also the revision of the present pharmacopœia which is now being undertaken by the General Medical Council was not without a guiding influence.

In treating the subject I wish to make a few preparatory remarks of a general nature afterwards arranging drugs and their preparations as far as possible in groups making a few introductory remarks to each group, following up these remarks by observations on the individual members of the groups.

The term "pharmacopœia" originally meant the art of the drug compounder; but in its modern technical application it is applied to various works consisting for the most part of 1st a list of the articles of the Materia Medica whether simple or compound with their characters and the tests for the determination of their purity and 2nd a collection of approved receipts or prescriptions together with the processes for articles in the Materia Medica obtained by chemical operations.

The term "pharmacopœia" first appears as a distinct title in a work published by

authority at Nuremberg in the year 1542
a student named Valerius Cordus who was
staying for a short time at Nuremberg showed
a collection of medical receipts which he had
selected from the works of the most eminent
writers to the physicians of that city
who were so struck with its value that they
urged him to print it for the benefit of
the apothecaries and obtained for his
work the sanction of the senate.

Before this time the books chiefly in
use amongst apothecaries were the treatises
: on Simples by Avicenna and Serapion
the Liber Servitoris of Dalchasi ben
Aberrazin, the Antidotarium of Johannes
Damascenus arranged in classes
; and the Antidotarium of Nicolaus de
Salerno arranged alphabetically.

The term 'Pharmacopoeia' did not come
into general use till the year 1617 in that
year the apothecaries obtained a special
license to deal in drugs.

The preparation of medicines and
physician's prescriptions being thus
entrusted to the apothecaries it was only
natural that the authorities should en-
deavour to establish a standard by which
the drugs and their preparations dispensed
by the apothecaries might be tested
whence arose the 1st issue of the London
Pharmacopoeia. The medicaments in
which were chiefly selected from the works
of Mezer and Nicolaus de Salerno.

There were further editions, 1627-35-50-47
1721, ⁴⁶⁻⁵⁷ 1809. - 24. - 36, 57

The nature and number of the ingredients that entered into the composition of many of the pharmaceutical preparations would equally astonish the practitioners and the patients of the present day.

In the earlier editions we find enumerated earthworms, snails, wood-lie frogs, toads, puppy-dogs ^{the f^ol^o} ~~foxes~~ especially if it is fat and of middle age; the skull of a hanged man, cat's blood, the urine and the increments of various animals; and many electuaries were composed of from 50 to 124 different ingredients.

There were marked improvements in Sir Hans Sloane's edition 1721.

There was still further improvement in the 1788 edition. a great many deletions being made in it.

The last edition being made in 1857.

The London Pharmacopoeia was not the only Pharmacopoeia in Great Britain for the 1st Edinburgh Pharm was published in 1699 and the last in 1841 while the 1st Dublin one was published in 1807 and the last in 1850.

The preparations contained in these three Pharmacopoeias were not uniform in strength this led to inconvenience and danger to the public when potent ~~pre-~~ preparations were ordered in one country and dispensed according to the national Pharmacopoeia in another.

Hence a provision was inserted into the medical act 1858 by which it was ordered that a General Medical Council

Should cause to be published under their direction a list of medicines and their compounds and such other matters and things relating thereto as the general Council should think fit and it was to be called the "British Pharmacopoeia".

The last edition of the B.P. appeared in 1885 with supplement 1890; but with the recent and great advances in scientific knowledge it is self-evident that it is capable of great improvement; and it is with this object that I make this humble effort. Hoping to add my grain of knowledge to the great heap that has been accumulating in past ages; and inspired by the teachings of and the enthusiasm of my old master Prof. Charteris, who has made so many and admirable researches in the subjects of Therapeutics & composition of drugs.

Having thus given an historical outline of the evolution of the Pharmacopoeia, I think we have arrived at a time when the Pharmacopoeia should assume an International character and this could only be based upon the metric or decimal mode of calculations and the centigrade scale of γ . By adopting these principles we would bring ourselves into touch with earnest workers in every land, we would cease to be vicarious; and there might come in time a uniformity of extracts and tinctures representative of the several drugs."

Prof Charteris
7.9. Nov. 19th 92
20. 11. 92

Botany of pharmacopoeia

owing to our more advanced knowledge of the histology of plants suggests with changes in nomenclature the botany of pharmacopoeia needs revision. The question resolves itself into this. What extent of botanical detail should be admitted into the pharmacopoeia? So much should be given that the plant or part of plant described should be easily recognised by the pharmacist.

Macroscopic characters should occupy the first place in sufficient detail as not only to be descriptive of positive characters of drug; but also to enable any one to distinguish plant from adulteration.

The pharmacopoeial descriptions of the macroscopic characters are defective as they admit of varying interpretations and they want in precision by using phrases which are intended to cover natural variations of drug. The description of vegetable drugs may be rendered more precise by adding the description of the microscopic characters. By using micrographical descriptions we could obtain several advantages. The 1st is that the structure of plants is constant and thus providing means of recognition in every condition. 2nd The terms in anatomical and histological botany being more precise admit of less errors in interpretation where macroscopic characters not enough for identification. microscopic characters should be given. As instances of the difficulty of identification by external features only, atropine Belladonna and Digitalis purpurea may be given

Botany of pharmacopoeia contd

On making a microscopic examination the internal structure makes recognition more positive. e.g. in *Belladonna* leaves aggregations of crystals of calcium oxalate may be seen in certain cells these are characteristic. The leaves of *Digitalis* are seen to be furnished with peculiarly shaped hairs.

The leaves of *Senna* might have description of their form supplemented by adding a description of the peculiarly shaped epidermal cells & hairs.

The barks of the two species of *Rhamnus* are to be distinguished by the varying amounts of sclerenchyma in *Rhamnus frangula* there is little.

The root of *Scammony* might have greater certainty added to identification by observing form of stural grains which are peculiar.

In certain cases e.g. Umbelliferous fruits microscopic features fail as means of identification. In such cases a figure of the particular fruit described might be given. The position and shape of the ridges ~~might be given~~. The characters of the endosperm and the vittae might be accurately

The description of certain plants and parts of plants requires to be more definite. e.g. the

Hig is described as a fruit whereas it is an inflorescence, hence the description is not full enough. Concerning leaves, the fact that the margins of the young leaflets or segments of the leaves are frequently tinged with white near their points to be stated (green)

Botany of pharmacopoeia

Quassia wood is described as being both dense and narrow. These characters vary inversely; also it is said to be in chips, shavings etc. and then it is to be recognised by being in logs, billets.

It is desirable that the pharmacist should be able to identify the powder apart from the drug in the unaltered condition; therefore a microscopical description is necessary. Many constituents of vegetable tissues are distinctive, the starches being distinctive, the tissues of seeds being structurally different from those of roots, e.g. the powder of pecauanha can be recognised by the perforated tracheids and the starch grains having a peculiar appearance.

Kalap in powder shows distinctive starch grains, peculiar crystals, and numerous resin containing cells, (green)

The distinctive features of Pulv. N. hci., Pulv. Gentian., Pulv. Glycyrrhizae etc. to be introduced. Many —

Vegetable tissues respond to chemical reagents; therefore a more accurate application of these is desirable, e.g. H₂SO₄ gives a scarlet colour with eubels

The seeds of two species of sinapis are to be distinguished by moistening, the black giving off a distinctive pungent odour, the white none

The anatomical structure of closely allied plants for purposes of distinction is of limited use. In these cases a careful description of the general characters of crude drug necessary.

Botany of pharmacopoeia cont.
Such crude drugs as have been sufficiently investigated should have a micrographical description as well as an account of general characters. The principal structural features being put forward, prominence being given to those which are serviceable in distinguishing drug from other substances. Negative evidence is frequently of great value, the absence of certain elements being referred to.

Chemistry of pharmacopoeia.

owing to the great advance in modern chemistry. The chemistry of pharmacopoeia requires to be completely revised and brought up to present standards of chemical science. The manufactures of chemicals of the present day owing to improved processes can turn out superior products to those prepared by methods of pharmacopoeia; also the tests of pharmacopoeia could be replaced by others more delicate and trustworthy.

The descriptions of chemical substances are often not sufficiently adequate to afford a means of discovering nature of substance described.

The formulae for chemical substances are not consistently employed; also many of them are obsolete and meaningless.

As an example of above defects *Liquor antimonii chloridi*. In the pharmacopoeia it is described as a "liquid of a yellowish red colour" ignoring the fact that the pure substance is colourless, and neglecting to state in "tests" that red colour is due to Fe_2O_3 .

The descriptions of dialysed iron, menthol, camphor, glycerine should be replaced by other and more precise definitions.

The descriptions of the alkaloids require amendment, e.g. *aconitina*. The description would answer that of a mixture of alkaloids.

In using chemical formulae

Botany of pharmacopoeia Contd.
The formula $C_2H_5 \cdot C_2H_3O_2$ is given as an equivalent for acetate of ethyl. One might infer from this that a pure product is intended. From the characters and tests however it is evident that a pure product is not intended notwithstanding that a definite formula is assigned in the description

Amylie alcohol. a formula should be given as a substitute for the name.

Phenol is described as an acid which is not correct and is represented by the formula $H C_6H_5O$ so as to correspond with the formulae of the organic acids. but this idea is exploded. It would be better described as an alcohol

The formula of Carbonate of Ammonium to be changed from $N_3H_7 C_2O_5$ to $NH_4NCO_3, NH_4NH_2CO_2$

Sulphonal and phenacetin to have structural formulae.

In future more uniformity should be observed in introducing formulae and the method should be abandoned of using chemical formulae as the equivalents of names of substances, which are not required to be pure.

Minute accounts of obsolete methods of preparing substances to be deleted from pharmacopoeia e. g. ^{liq} Ammoniac and deomine

Descriptions of processes for preparing commercial chemicals should be omitted. It would be enough to give a full and accurate description of substance and good tests for purity

Chemistry

Revision of pharmacopoeia Contd.

tests for purity. These might be cleared and fuller. The nature of the impurities detectable by the tests should be mentioned

Metallie salts and certain other substances to be stated as free from specified impurities and tests given.

In those cases where perfect purity is not needed the limit of impurity to be fixed and the n.c. given

Purity of organic compounds can frequently be fixed by reference to a stated boiling or melting point

The boiling points of chloroform, Ether and absolute alcohol should be given

Great care should be shown in the selection of proper tests. So as to act as safeguards against impurity and adulteration. As examples of unsatisfactory characters of present tests; Ferric Oxide Cit, Liq Potass alcohol, Syrup, Aescum may be mentioned

The chemical descriptions and tests of the following need revision, Acid Hydrochlor. Citric. Tartaric. Lactic. Phosphoric. Salicylic. acetic, Hg. H Br. Hg_2Cl_2 . Bi Carb and Bi Subnit, phenol acetylilide, Borax glycerine.

Improvements might be made in the preparation and method of testing the less definite products such as tinctures, extracts etc seeing our knowledge of these has made great advances.

Psychology of pharmacopoeia

The following objections may be made to the psychology of the pharmacopoeia

- 1st doses of many substances not accurate
- 2nd inconsistency of dose.
- 3rd want of uniformity.

According to Dr Whittle the doses of the following are excessive, viz Ext: aconite, ʒij aconite, ʒij virarri virid, Ext: Colchici acet Ext Gelsemii alcohol. Ext: Belladonnae alcohol

The doses of iron preparations need revision

Inject apomorphinae hypoderm. The maximum dose too large and the minimum dose is none.

Liquor potassae. As this is a very corrosive substance directions should be given for its dilution if given in the maximum dose.

Boracic acid and Antic: feline the doses of these are too high and consequently should be reduced.

Pills might be reduced in size by omission of inert substances so as to bring dose down to 3-6 grs.

Chrysa robin. The dose not to exceed 1/8 gr.

Doses inadequate in the following (Whittle)

Ext Filicis liq. Dose to be 45-90 mins

Succus bonie. This is an almost inert preparation

Soda ʒurrate. Increase the dose.

Hydrarg. Subchlor. dose could be increased to 20 grs.

Quininae Sulph. dose " " " "

Sodii jadis. Increase dose to 20 grs.

Toxicology of pharmacopoeia Contd.
Pulv. opii Co. increase dose to 10 grs.

2nd. The dose of the various preparations should correspond as much as possible upon basis of strength of crude drug. The doses of the following are inconsistent, viz. *Truacis romi*, *Liq. arsenic. radit.*, *Pulv. antimonial.*, preparation of Ergot, *Essential oils*, preparations of *aloes*, preparations of *Digitalis*, preparation of *Daborandi*.

3rd as regards uniformity of dose. Uniformity of dose and strength are incompatible. Two courses seem open either to make all tinctures ^{etc.} of one strength; or all of such various strengths that their doses will be the same.

The following points as regards dosage are worthy of notice in the pharmacopoeia

- viz
1. *Massimum minimum doses.*
 2. *Daily dose.*
 3. *Doses for children under 1 year*
 4. *Single dose.*

Processes. Characters and Tests

The materials used in medicine are either vegetable substances which need only to be defined; or manufactured substances which require descriptions for identification and tests for purity.

Manufacturers consider that many processes of pharmacopoeia are defective and that it would be a mistake to follow them.

In applying the tests of the pharmacopoeia it is found that many of them are cumbrous and antiquated.

It seems desirable to so define articles used in medicine that the manufacturers will know standards to which they must conform and the pharmacist will have an indication of what he may expect.

Where chemicals are of a definite character, ^{process} would better be left to manufacturers.

In the description of chemicals there is much unimportant matter which should be left out; but where salts are new a description would be useful.

A process might be given for ammonio-citrate of iron, which should be of a practical character.

Spirit of nitrous ether should have a process given and the article to be made by this process only and to answer official tests. Every case should be decided on its merits & if necessary information obtained from manufacturers.

Galical formulae giving clear, precise and practicable instructions for making preparations on the small scale if necessary.

Processes, characters and tests Cont.
official formulae should be given for
Easton's "Fellows" or Parrieh's Syrup.
Personal names should be avoided as much
as possible

Pharmacopieal Synonyms to be applied
to preparations exclusively for medicinal
use and where necessary to avoid dangerous
irregularity

Pharmacopie should be an authority on
medical matters only

In adopting names care is to be taken
that they do not imply too much.

The process for preparing aconitine is
faulty and should be amended. It is not
capable of giving a pure product, instead
of being designated Aconitine it would
be better to term it "aconite precipitate"

In absence of certain reactions sufficient
to indicate purity the safest course for official
purposes is to indicate the best process known
at the time and require it to be followed.

Only those processes characters & tests
which are not established on well known
scientific bases require to be made the
subject of pharmacy law as enunciated
in the pharmacopiea.

In describing certain plants and parts of
plants it is enough to give the botanical source
and the other characters can be obtained from
botanical works or Materia Medica.

Certain chemicals do not require more than
the name for their description. The characters
and tests to be obtained from ^{chemical works} the pharmacopiea

Processes, Characters & Tests Contd.

The galenic tests and standards require attention e.g. Pepsin requires a definition of strength by a definite process giving a certain result which should indicate an activity not below a good standard

The latitude allowed on characteristics of Carbolic Acid suggests revision

Galenical preparations not standardised by estimation of alkaloids might have an approximate standardisation by estimating the dry residue of a certain quantity of the fluid in last stage of preparation and having recourse to evaporation or dilution of the bulk so that it might be brought to such a p.c. of dry residue as might be officially fixed upon.

In directions for application of heat it should be mentioned the kind of heat should be ~~mentioned~~ ~~mentioned~~ whether water bath or free flame and the time of application of the heat to be mentioned.

Tables of Solubilities & Melting.

It would be of great practical importance both to the physician and pharmacist if tables of solubilities ^{& melting points} were introduced into the Pharmacopoeia. The following are a few of the more important drugs with their solubilities

Abbreviations. s. soluble; ins. insoluble, sp. sparingly
 v. vry. alm. almost; Dec decomposed.

Name of Chemical	Waque @ 15° C 59° F	Boiling Water	Recified Sp. @ 15° C 59° F
(One part is soluble in)			
acid Arsenicum	30-80	15	Sp
" Boricum	25.6	-	15
" Carbolicum	15	-	v. s.
" Salicylicum	4.50	14	2.4
" Yarrowie	0.8	0.5	2.5
Ammon Chlorid	3	1	alm ins
Antimon Yart	17	3	ins
apomorph Hydrochlor	45	dec	45
Argent Nitrat	0.6	0.1	26
Calcii Hypophosph.	6.8	6	ins
Chloral Hydras	v. s.	v. s.	v. s.
Cocaine Hydrochlor	0.48	v. s.	3.5
Cocaine	80	17	3
Hydrarg perchlor	16.	2	3.
Magnes Sulph	1.5	0.7	ins
Morphine Hydrochlor	24	0.5	62
Potass Bicarb	3.2	dec	alm ins
" Chlorat	16.7	1.7	ins
" Jodid	0.45	0.5	18
Quinidine Sulph	440 100	30 7	65
Salicinum	28	0.7	30
Sodae Salicylas	0.9	v. s.	6
Strychnine	6400	2500	110
Thence Sulph	0.6	0.2	ins

Table of Melting Points.

	Centigrade
acid Acetic Glacial	15°
" Benzoicum	121.4
" Carbolicum	35° increase to 40°
" Salicylicum	159°
" Tartaricum.	135°
adeps	38-40°
Camphora	175°
Cera alba	65°
" Flava	63-64°
Cetaceum	50°
Chloral Hydras	58°
Iodoformum	115°
Lanoline	40°
al Theobroman's	30-33°
Paraffin Durum	62.8°
" Malle	35-40.5°
Phosphorus	44°
Salicinum	198°
Salol	42-43°
Serum	45-50°
Sulphur	115°

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Standardisation of drugs etc
When we consider the variability in strength of many potent drugs used in medicine it becomes a matter of necessity to devise means whereby uniformity in strength may be obtained. This can be accomplished by means of Standardisation.

A typical Standard preparation is one which reaches a fixed and exact standard both as regards active principle and - physiological activity.

Where activity of drug is due to the alkaloids it contains a standard of total alkaloid might be fixed based on the average yield of a number of samples of drug.

It might be found that the proportion of matter extractable from certain other drugs by alcohol of a given strength was fairly constant. An attempt at uniformity might be made by fixing a minimum standard of extract to be yielded by the fluid when evaporated and residue dried at a fixed T .

Where the chemistry of many drugs whose physiological activity is known to be due to alkaloids or other well defined active principles has not been worked out and that therefore it is not known to what principle the activity of drug is due. This may seem an argument against Standardisation. In this case it would be better to carry Standardisation up to limits of knowledge of active constituents. The Standards should be provisional.

"Standardisation" Contd.
and liable to alteration and revision with
the acquisition of more precise and definite
knowledge of the chemistry of drugs?

"These preparations only which contain
alkaloids and well defined principles
capable of isolation and identification could
be submitted to a reliable plan of standardisation.

The principle of standardisation to be
extended to other than the standardised pre-
parations of opium, cinchona, Nuc. vomica
e.g. Hemlock, Henbane, Stramonium,
Galap., Belladonna, Yucca, anha
aconite, Digitalis.

Other drugs and galenic preparations
might be investigated with view of bringing
them under principle of standardisation
e.g. Oil of Eucalyptus might be
standardised by Helbing's process
for estimating the amount of eucalyptol

It might be thought that satisfactory
standardisation of preparations might
be obtained by using standardised drugs
; but it is difficult to obtain drugs of
constant strength and even then preparations
made from them are not always un-
iform in strength.

Preparations should be made
and standardised by themselves and not
prepared from a standardised extract
liquid etc.

Weights and Measures.

For expressing relative quantity of each ingredient to be used in a preparation various systems have been employed. They may be enumerated as follows

- 1 Weights & measures of B.P.
- 2 Weights & measures of metric System
- 3 Parts, all by weight
- 4 Parts "solids by weight liquids by measure"

The first makes use of the terms grains ounces, pounds, minims, fluid drachms fluid ounces, pints, gallons. There are objections to a further continuance of this system. - it is complicated and cumbersome in application, it cannot be used in international trading and it is not suitable for scientific purposes.

The system of parts is almost universally adopted in the pharmacopoeias of other countries. An attempt was made in the 1885 edit of B.P. to express some of the formulae in parts alongside of the weights and measures, but it was partial and could have been extended. The term one part to be denominated as 2003.

Parts "Solids by weight liquids by measure" might be used where practicable; but a great many preparations cannot be conveniently treated by this method if British weights and measures are employed e.g. in making up Ungt. Hydrarg. quidi Rub. The system of parts would not be so convenient as the system of weights.

This objection would not hold if the metric system of weights and measures were

Weights and Measures Contd.
in force. The metric system of weight and
measures seems to have several advantages
over the British system of weights & measures.

Thus the metric system is more ad-
apt for use in science. It can be made
a basis for international trading, and any
calculation can be more readily made by
it. As the British weights and measures
can be adapted to some extent to the metric
system as in grains and grain measures
probably the best method would be to direct
solids to be weighed and liquids to be measured
as in U.S. Pharmacopoeia that is to use
the metric system except when dealing with
liquids. Of course there would be several
disadvantages in using metric system
viz that by a misplacement of the decimal
point a serious fault might be made
in weighing out potent drugs; also in
weighing out small quantities there
would be great inconvenience.

"Acida"

The dilute acids should be prepared by weighing the ingredients and then much time would be saved in waiting till the dilute acid attained the γ of 60° F before being made up to the volume ordered.

Iodine to be used as a test for sulphurous acid with the addition of starch if necessary.

Acid Carbolic. The melting point to be raised to 40° C. The higher melting point frees the acid from numerous impurities while in no way impairing its antiseptic properties (Chambers). The boiling point to be altered also

Acid Hydrochloric. A test for SO_2 to be given. The S.G. to be corrected and details preparation need not be stated in the pharmacopoeia

Acid Salicylic. The length of γ 's to be stated; so as to reject all but physiologically pure acid. The melting point to be raised to 156.6 (Prof Chambers)

Acid Oleic. This would be better described as an unsaturated fatty acid

Acid Phosphoric. Use the form containing 66 p.c. real acid. A much easier and simpler means of determination of this acid would be by means of caustic soda and phenol phthalein (Boull)

Acid Hypophosphor. This might be introduced into pharmacopoeia 1.0367 S.G.

Acid Lactic. Stronger solution to be retained by preference.

Acid Meconic. This might be deleted; or formula stated to show basicity

"Acida" Contd

Acid Hydrocyanic dil. The U.S.P. method preferable in estimating the acid

Acid Tartaric. The tests to be more definite & standards laid down and method of performing test so as to avoid ambiguity

Acid Nitro: Hydrochloric dil. The acids to be mixed before hand so as to develop the gas the H_2O being added afterwards

Alcohol

alcohol is a subject which will require careful consideration in forthcoming Pharmacopoeia, the definitions at present for absolute alcohol and rectified spirit not satisfactory. The adoption of a definite standard for absolute alcohol and insertion of alcohol tables needed. The B.P. method for preparation of absolute alcohol is not capable of giving a product free from water. If a standard is to be adopted on which to base the tables a definition of alcohol must be inserted. The S.G. might be given 0.938 at 60° F. (Sage), $H_2O = 1$ at 60° F. It will be necessary to adopt a more definite method of expressing different strengths of alcohol than "rectified" and "proof" spirit, *Menstrua* containing 80, 70, 60, 50, 40, p.c. would be sufficient for all purposes in pharmacopoeia (Fuss & Wright) a 90 p.c. alcohol might replace present S.V. P. This would conduce to uniformity, in preparing different strengths general directions might be inserted for all the p.c. strength to mean the amount of absolute alcohol by weight contained in 100 parts by weight of product, the weight of an equal volume of water at 60° F. being standard. A definite standard should be adopted for relative valuation of alcohol, i.e. orange wine is stated to contain 10-12 p.c. alcohol and sherry 14 p.c.; but it is not stated what is meant by alcohol and whether p.c. by weight or volume.

Character and tests: There is room for revision and the addition of $NH_3 + H_2O$ test which detects aldehyde bodies by giving a pale canary colour. Fusel oil and organic matter are limited by the nitrate of silver test.

Alcohol cont'd

traces of fusel oil detected by mixing sample with an equal quantity of water and a little glycerine and drying gently. The glycerine retains the fusel oil distinguished by odour (Sage)
Explicit definition of alcohol, tests for neutrality. methyl alcohol and dissolved matters are worthy of consideration in next pharmacopoeia.

Alkaloids & Active principles

Pharmacologists have looked forward to the time when all the galemeal preparations will be abolished and the desired medicinal effect produced by properly adjusted doses of the alkaloids and active principles. There would be advantages attending on above. e.g.

1. The action of crude drug is often due to a plurality of principles and though one of these is predominant the action is modified by the others. e.g. The action of this being different from that of caffeine. Where action of galemeal is due to one compound it would be better to employ active principle. because of the difficulty in devising a practical means of standardising the galemeal. More certainty of action is obtained by using a definite weight of alkaloid than by use of equivalent of "pure etc."

2. This is to be preferred to crude drug where there are two alkaloids of antagonistic action found together in same plant. Longitudinal alkaloids are generally harmonious in action e.g. the alkaloids of opium, Cinchona, Belladonna. The action of principal alkaloid being usefully modified by subordinate alkaloids.

In B.P. fifteen alkaloids are official
 Delisions, acousine, berberine, cinchonine
 cinchonidine.

additions, emetine, gelsemine, lobeline
 colchicine.

Process of manufacture. No process to be inserted which cannot readily be carried out in an ordinary pharmacy and which could ~~not~~ be carried out by a practical chemist, if needed.

The process for opium Sulph to be amended as suggested by D.H.

Alkaloids & active principles
In preparing alkaloids the methods are so
lavish in use of solvents and so great heat.
light petroleum might be used instead of
alcohol

Active principles. active principle is
applied to any chemical compound other than an
alkaloid to which a drug chiefly owes its
activity, e.g. chrysothrin, elaterin, salicin,
Santonin, picrotoxin, Salicin is the most
valuable of these principles. The tests might
be extended for it to include the melting point
effect on Fehling's solution, and on polarised light
Santonin. The melting ^{point} to be given & definite
statements as to solubility. It would be difficult
to suggest addition of more active principles
owing to want of purity and constancy of composition
chemistry of alkaloids, & active principles.

The pharmacopoeia require more information.
A partially structural formula and main
facts regarding composition. It might be
mentioned that morphine combines with alkalies
and acids. Cocaine and Apomorphine the
conditions under which they decompose to be
stated. Substances quite dissimilar might be
described more fully. e.g. Salicin as a
glucoside. Santonine as an anhydride

Aquae

Waters are very weak simple solutions of volatile oils in distilled water.

There are sixteen waters in B.P. Thirteen prepared by distillation, two by solution, one natural.

The waters can be prepared by several methods, (1) By distilling the herb or the essential oil with water (2) By agitating the essential oil with cold water (3) By agitating the essential oil with water at 60 to 65° C (4) By using alcohol as solvent, 5 Dividing the oil by means of talc, silica, magnesic, chalk, Hahn etc. 6th Precipitation through cotton - maintained with the oil.

The B.P. methods of preparing the waters are defective in the case of anise, dill, caraway, fennel and pimenta. 1 By not providing for previous maceration of bruised dried fruits 2 By not ordering distilled water 3 By an excess of material for a saturated solution of the oil. The best method - Maceration of the oil in hot water with occasional agitation & filtration when cold through a double fold of white well wetted filtering paper. Thus prepared the water is superior in strength & flavour to that obtained by any of the other methods. A saturated solution is obtained and any other method can give no more.

Instructions should be given for preserving the aromatic waters which should be stored in stoppered bottles kept quite full.

Except in two cases - orange flower and cherry laurel no characters and tests are given and no doses prescribed except in Camphor & chloroform.

The B.P. methods should be abandoned and a more

Aqual

uniform process adopted. Tests and doses should be given and distilled water employed. The strengths of all the waters should be uniform 1 in 500 as in U. S. P.

Aqua Destillata, under "Tests" the impurity test for fat should be stated

Aqua Chloroformi is not a water, it should be placed among the liquors

Aqua Lauracerasi. It is doubtful if this should be retained, on account of uncertain strength, liability to chemical decomposition, its tendency to lose HCN and so become inert

The introduction of Aqua Euryophylli to displace Aqua Pimentis would be an advantage.

The three waters which are prepared by distilling the flowers are generally impure. They do not keep well. They soon become turbid, produce fungoid growths & require an offensive odor.

Aqua Auranti Floris could be prepared from *Auranti*

Aqua Rosae could be prepared from Otto of Rose

Aqua Sambuci " " " " essential oil

As thus prepared the waters have a fine aroma

They keep well & are readily prepared

Aq. Camphorae. To be prepared by treating powdered Camphor with hot water

Aqua Anisei

" Carui

" Foeniculi

" Menthae Virid

" Pimentae

are not of great service and might be deleted.

"Cataplasmata"

Poultices are well known external preparations, they generally contain linseed meal as their base.

According to Prof. Charrin's - a gentleman who has made so many admirable researches in pharmacology - "cataplasmati" might all be deleted. Undoubtedly poultices might be considered as domestic preparations and by the deletion of their formulae more space might be left for important preparations; but the medical man finds that in practice poultices are unskillfully prepared & hence arises the necessity of giving an official method which method shall secure a satisfactory and efficient preparation. I think the directions to mix the linseed meal with boiling water ~~do~~ not give a sufficiently high %: It would be better if the linseed meal were boiled with the water like "Scotch porridge"

Cataplasma Carbonis, "this being used principally for the charcoal is a bad form and should be rejected"

Cataplasma Lonic. "not necessary replaced by ointment." The evaporation of hemlock juice not ~~needed~~ necessary if ~~the~~ retained.

Cataplasma Fermenti, Omit not much used

Cataplasma Lini, Directions to be given for the linseed meal to be boiled with the water

"Enemata"

Enemas are liquid preparations for injection per rectum. These preparations have been characterized by Dr. Whittle of Belfast as framed in opposition to the recognised principles of physiology and therapeutics; but I consider this too sweeping an assertion. No doubt that a not inconsiderable time is required for the operation of the enemata Magnes Sulph. and Aloe; but it is difficult to conceive how they can be retained for the period of time necessary to manifest their activity seeing the bulk of the enemata are so large. I think the enemata of Asafoetida, Opic, Turbithinal might with slight modification be retained with advantage.

Enema Asafoetidal - Use the tincture of Asafoetida instead of the gum resin in the preparation.

Enema Opic. The quantity of tincture of opium to be used should be left to the discretion of the prescriber.

Enema Turbithinal. add a less quantity of mucilage of starch.

Enema Aloe } not much used
" Magnes Sulph } delete

A formula for a nutritive enema to be given in the Pharmacopoeia.

In administering enemata directions to be given that they be administered moderately warm -

"Extracta"

Extracts are preparations obtained by evaporating either the expressed juice of fresh plants or the soluble constituents of dried drugs. These extracts may be 1 Green extracts, 2 Fresh extracts, 3 aqueous extracts, 4 alcoholic extracts, 5 Ethereal extracts 6 Acetic extract 7 Liquid extracts, 8 Dry extracts.

Standardisation of Extracts.

Extracts may be standardised, 1st By testing their alkaloidal strength whilst still liquid.
2nd By evaporating a given volume to a definite weight.

Exct Leoniti. This is rarely prescribed. If retained a standardised alcoholic extract of the root would be a better preparation.

Exct Belae Lig. This is much used in India. But improvement in process needed.

Exct: Calumbae. Not much used, delete.

Exct: Belladonnae. It would be better to standardise the alcoholic extract and remove this one altogether.

Exct Belladonnae alcohol. Spirituous menstruum all through gives a stronger and more satisfactory preparation.

Exct Rhamni frangul. Replace by Exct basearum.

Extracta Cont'd

Exst Conii. Not much used. besides strength uncertain and there is a difficulty in standardizing preparation

Exst. Cascae Sagrad Lig.

Formula and method of preparation to be altered. The present process tedious and imperfect. The following is formula suggested by Swan

Cascae Sagrad 1 lb
Spt vini Rect 1 part
aq distill 3 parts.

Moisten bark with menstruum and allow to stand for twelve hours. Percolate till exhausted. Residue first 140° and evaporate remainder by water bath to soft extract. Dissolve this in reserved portion make up to 160° with menstruum and filter

Exst. Coloe: Co. Directions to be modified so as to have it in the more convenient form of powder

Exst Ergot Lig: More satisfactory method is to use as little heat as possible in the preparation. Therefore process to be replaced by percolation or extraction by pressure

Exst. Glycyrrhizae. Prepare from decorticated roots

Exst Oenopyrni. This is liable to become a solid mass on keeping. Magnesia might be used as a substitute for Sacchar Lactis to lessen cohesiveness

Delete the following. Exst Lactucae. Exst Lijuli. Exst papaveris. Exst pereirae. Exst quassiae. Exst mezerii aetherium

Extracta liquida

19

Liquid extracts are an important class of pharmaceutical preparations. There are thirteen liquid extracts in B.P. It may be profitable to consider the position they now occupy in relation to British pharmacy.

The official formulae when compared with one another, are not consistent therefore they require to be amended in this respect, e.g. in the quantity of spirit used in preservation, the mode of preparation and the quantity of drug operated on.

The subject may be arranged under three divisions
1st extracts that should be deleted, 2^d additions
3rd alterations.

Deletions. *Ext. rhamni frangul* might be deleted. *Ext. nucis lig.* *Ext. Sassafras Lig.*

Additions. The following might be added.

Belladonna, *Calumbae*, *Chiretta*, *euonymin*,
grindelia, *haematoxylum*, *ipicacuanha*, *jaborandi*,
quassia, *rheum*, *Scoparium*, *sassa*, *trichopus*.

The reasons for their adoption are, they contain the whole medicinal properties of drug, they keep well, are in small bulk and are convenient and they are capable of taking place of concentrated infusions and decoctions.

Alterations in formulae. These alterations might be considered as follows, (1) Strength of the extract, (2) mode of extraction (3) menstruum most suitable for purpose.

As regards 1st when practicable, one part of fluid should contain the soluble matter of two represent one part by weight of drug.

(2) mode of extraction. The simple process of maceration and percolation without some means of concentration cannot very well be made use of.

Extracta liquida contd.

where menstruum is water percolation and evaporation of resulting fluid being enough together with addition of one fourth of alcohol
In some cases evaporating by heat does no injury; but where active principles are present they might be destroyed by heat. Evaporation might be conducted in vacuo

Alcoholic menstrua. In using these we have choice of several methods

- (a) In this the powdered drug is macerated for 48 hours with selected menstruum in percolator percolation is then allowed to proceed and more menstruum added till drug is exhausted. So N.C. of 1st portion is reserved the remainder evaporated to a soft extract dissolved in reserved portion and made up to quantity required.
- (b) In this the powdered drug is macerated with alcoholic menstruum for 48 hours. The liquid pressed out and set aside. The pressed mass is next mixed with water, macerated for 48 hours pressed, strained and evaporated to a bulk sufficient to make up required quantity when added to reserved alcoholic portion
- (c) Preparing a solid extract and re-dissolving in chosen menstruum.
- (d) Repeated macerations with pressure until the required quantity is obtained, evaporation of last pressing and the resulting extract added as in (a)
- (e) Repercolation. In this the powdered drug is divided up into four or five suitable percolators and the weaker portion of 1st put on 2nd and soon till contents of series are exhausted. Theoretically the last process is the most perfect but it does not

Extracta liquida

as it does not involve the application of heat. Process (4) on the whole the most ^{satisfactory} perfect.

Choice of a suitable menstruum. It must be a suitable (menstruum) solvent of active principles of drug chosen to obtain a satisfactory product. This can only be obtained by a thorough knowledge of nature of drug and experience in manufacture.

The foregoing additions together with the official fluid extracts may be divided into four sections. (a) extraction with water, by two parts S.V.P. and three parts water (c) Proof spirit & S.V.P.

Water	2 parts	3 parts	Proof Spirit	S.V.P.
Bala	Columba	Cinchona	Cincofuga	
Ergota	Cuscuta Lag.	Coca	Grindelia	
Glycerohis	Chiretta	Jaborandi		
Haematoxyl	Quonymas	Rheum		
Onium	Humamelis	Senega		
Pareira	Yucca			
Quassia	Sarsae			
Scoparium	Yuracae			
Triticum repens				

Yucca euanthea keeps best when prepared with an acetic menstruum and 10% acetic acid to be added to each pint of menstruum.

Senega, to be made according to U. S. P. by adding 5% w/v liq. Ammon. dil.

Cinchona: This should not be prepared with hydrochloric acid as it is objectionable. The proper degree of division of drug has an important bearing on process of extraction. In 1st group broken or crushed. The others to be in a finer state of division, a no 10 powder would do.

"Extracta liquida" Cont'd

the powders to be uniform

the drugs in second and third groups: in no
20 powders. those in fourth group.

in no 40 powders and all made by process 19,
Standardisation, when possible the fluid
extracts should be standardised

In Ext Yuccae Lig. the same monogram
to be used throughout

Ext Bronchone Lig. characters & tests and
S.G. to be given

"Essentiae"

Essences are solutions of volatile oils in Rectified Spirit.

There are two essences official in the pharmacopoeia viz. Aniseed and Peppermint. I consider that these preparations are too strong. They should have their strength amended to 1-8, or 1-10.

The so called "Essence of Ginger" might have its strength increased to 1603 to the pint

"Glycerina"

Glycerines are substances dissolved in glycerine. The directions and formulae might be altered in the following respects

Glycerin Acid Gallic. Do not prepare this with heat as it is apt to be decomposed.

Glycerin Acid Yarnic. This is better prepared in the cold and a little water added. - in fact all the glycerines would be improved by adding 1/10 or 1/12 volume of water

Glycerin Boracic. Prepared as by the B.P. method it is too thin; therefore less water should be used in fact the formula of U.S.P. would yield a better product.

Glycerin Tragacanth. Made according to B.P. formula it is too stiff 1/2 or 2/3 of the quantity of Tragacanth enough

"Injections Hypodermic"

Hypodermic injections are strong solutions of an active drug for administration with a hypodermic syringe.

There are three of these preparations official in B.P. These preparations are not faultless and could be improved in several particulars, as follows.

Inject Apomorphini Hypodermi.

The maximum dose in this is too large and the minimum is of no use as a means of emesis. The dose should not exceed 1/100g. I think greater convenience could be obtained by using small tablets of the compressed drug which could be dissolved in 2 S. of water when required. Two advantages would be obtained by this method, viz greater accuracy of dosage would be obtained and there would be no danger of using a preparation that had undergone decomposition.

Inject Ergotini Hypodermi.

If this were prepared in a less concentrated form less irritation would be caused and greater accuracy in dosage would be obtained.

Inject Morphi Hypodermi.

The tartrate of morphia being a more soluble salt of morphia it should be used in the preparation. The B.P. solution is too concentrated. Compressed tablets could be used in this solution. A little atropine added to this preparation would be an advantage.

Infusi

Infusions are obtained by steeping vegetable substances in water generally near the boiling point and straining.

There are twenty-eight infusions official in the B.P.

Their position in B.P. is owing to their popularity not because they have any great intrinsic value; also their use involves a good deal of waste - infusion not yielding all its expressive matter.

The infusions may be roughly divided into two groups, 1st Aromatic, 2nd Non-Aromatic.

There are certain general tests to which they must conform before a admission into Pharmacopoeia viz. 1st The purpose for which they are used by the physician, 2nd Sensibility of menstruum for extracting what is required, 3rd The frequency of demand for them.

Some think that concentrated infusions should be admitted into Pharmacopoeia; but where aroma is to be preserved the fresh infusion is to be preferred and one can imagine that volatile principles would be decomposed by the prolonged operations requisite in the preparation of them.

Aromatic Group.

Infus Antherm. It is rarely required, the use of hot water volatilizes the essential oil & so is objectionable.

Infus Aurantia. To be made fresh.

" " " Co Not needed as we have the

Infus Gent Co

Infus Buchu. To be retained, leaves to be bruised and made fresh as required.

Infus Caryophylli. No demand, the oil serves all purposes, omit

Infusi

Infusum Cascarillae. Reduce infusion to fifteen minutes. The bitter principle not being very soluble in water. The tincture on the whole best preparation.

Infusum Cuspariae - omit

" *Gentianae Co.* 15 mins infusion enough. To be prepared fresh as aroma is then better.

Infusum Lupuli. Seldom used. Hops contains a volatile oil and lupulinic acid very slightly acted on by water. Hence infusion not a good preparation. If retained 15 mins infusion enough.

Infusum Rosae Acidum, a fluid extract prepared by reprecipitation would answer better.

Infusum Serpentariae. Seldom prescribed when bruised starch is set free when unbruised it yields very little extractive. on this account and also because active principles are soluble in alcohol a fluid extract or a tincture more satisfactory preparations.

Infusum Valerianae. Seldom used, it is inferior to the two tinctures.

Non-Aromatic Group

Infusum Calumbae. This is a good preparation. It is necessary to prevent starch being taken up by menstruum. A fluid extract prepared by reprecipitation might be substituted.

Infusum Catechu, this might be left out and tincture used.

Infusum Chicoratae. As it used in same cases as gentian, and the tincture being a better preparation, the latter might be used instead.

Infusi

Non aromatic Group Cont'd.
 Infus binchonal acid. Formula to be deleted as it leads to great loss of alkaloids, besides there is an acid solution official constant in strength.

Infus Cusco. Delete.

Infus Digital, whole leaf to be used. otherwise infusion apt to be of unequal strength.

Infus Ergotae, Seldom used, delete
 "the liquid extract is a superior and more efficient preparation

Infus Jaborandi, "this may vary somewhat in strength, a standard tincture would be better.

Infus Krameriae, "the bark alone to be used. Infusion being seldom used & decomposing soon to be deleted and the tincture retained.

Infus Lini, omit, a domestic remedy.

Infus Malvae, Not much used, need not retain, if retained 15 mins infusion enough.

Infus Quassiae, an aqueous fluid extract would answer as well.

Infus Rhei, omit, "tincture better preparation, 15 mins infusion long enough.

Infusi.

Non-aromatic Group. Could
the fresh infusion ^{Infus Sennae} be ^{Senega} better? of nature & better
preparation than the fluid extract.

Infus Sennae. Not used except in the
preparation of Infus. Sennae. Co. A formula
for it might be included in the preparation
of the latter.

Infus Uvae Ursi, 15 mins infusion
enough.

"Linimenta"

Liniments are preparations suitable for application by rubbing etc. Liniments contain either camphor, oil, glycerine or soap

The formulae in the following might be altered with advantage.

Lint Saponis

It would be an advantage to use Soft Soap in this preparation; as the solution would then be perfect and it could be readily made.

Lint Yerebinthinal

The formula should order as much water as will form a thick cream with the soap.

Lint Yerebinthia acesia

This could be formed into a creamy emulsion with yolk of egg like St. John Long's liniment.

Lint Hydrarg. This liniment

is not much used and might be deleted.

"Liquores"

Solutions consist of substances other than volatile oils dissolved in water. Alterations might be made in the formulae of the following with advantage

Liquor Ammon Acetat fort.

This solution would be better made by adding equal parts Lig Ammon part and acid of glacial acid

Liquor Magnes Carb. This solution is too strong; it is apt to deposit. In determining the strength Evolucinal forms a good indicator

Lig Plumbi Subacet. In diluting to the proper strength, recently boiled distilled water to be used.

Liquor Potassal. A definite S.G. and a definite strength are given in R.P.; as it is a difficult matter to get both these with the ingredients ordered; consequently it would be better to make one or other of these the fixed quantity and the other the variable

Liquor Zinc Chlor.

This requires the addition of HCl to keep it clear

Liquor Calcis Sacchar.

It would be an advantage to dissolve sugar in the water and then to add the lime.

Lig Ammon Cit fort. et dilut.

Lig Ammon Chlorid. Lig Chlorid. Lig Ferri acetat. et fort. Lig Ferri perchlor
Lig Ferri persulph. Lig Jodi. Lig Magnes
Lig Morphinal acet. Lig Morphinal Binnee
Lig Potass Effervescent. Lig Sodae. et Efferv.
Lig Sodii arsen. Lig Sodii Ethyl.

The above liquors to be deleted

Essential oils

the official definitions, characters and tests have rendered little assistance in furnishing standards for comparison of quality or even for identification of essential oils. There is now a better knowledge of chemical constituents of essential oils. This demands recognition of facts established by independent investigation. Modern research has tended to favour the application of principle of standardisation to essential oils. From the chemist's point of view the recognition of standards of certain chemical & physical (data gained by observation on a large number of oils of good quality) is the only means by which the adulteration of these products can be guarded against.

By the adoption of standards it is not meant the mere dilution or concentration of an oil to correspond to a certain N.C. of one of its ingredients. The natural combination of volatile substances contained in mother drug, the preservation of which by suitable methods of extraction is the criterion of success in preparation of an essential oil, is an all important feature.

We understand by standards as applied to essential oils the following.

- 1st That specific limits in physical constants (gravity, optical rotation boiling point) should be recognised
- 2nd That one or more constituents be present in certain proportions
- 3rd Certain substances indicative of adulteration, deterioration, or inferiority, should be absent
odour, appearance, flavour, holding a subsidiary position

Essential oils cont'd

the physical and chemical characters being given instead

the delicate and complicated nature of some of processes by which determinations are made cause a difficulty in compiling B.P. definitions of characters and tests of essential oils; but allowing for these much can be used to benefit of pharmacy and medicine.

the determination of physical data is an important factor in the identification and valuation of essential oils and in view of difficulties of methods of chemical estimation reliance must be placed on physical data. To decide the identity of oil and to detect gross forms of adulteration these indicators would be sufficient; but in some oils where refinement in adulteration has been carried to a high pitch that would require to be associated with a chemical examination. The limits to be set up should be as narrow as possible consistent with justice

Physical data therefore should be given 1st place in Pharmacopoeia as being easy to determine and because they are good indicators of something wrong.

In defining characters of essential oils in Pharmacopoeia the following to be uniformly stated:

- 1st Specific gravity
- 2nd Optical rotation
- 3rd approximate boiling points
- 4th Melting point and solubility

Spec. gravity of essential oils may be taken generally at 15° with exception of anise oil the degree of definiteness in gravity factors depends to a large extent upon nature of oil. In essential oils which consist mainly of one.

Essential oils Cont?

Constituent or of similar constituents a difference of a few figures in third place of decimals marks limits of genuine oil, while in others containing a mixture of several constituents in fairly equal proportions a limit of two or three figures in second place of decimals must be allowed ^(Passmore) ageing has an effect upon specific gravity increasing or lessening it

Optical activity, in essential oils is an important feature in a number of instances; but this would require a knowledge of the polarimeter; but the method of operating with it need not present an insuperable difficulty

Boiling point. The nature of apparatus required and conditions to be observed in determining this might be mentioned; so as to secure uniform results; Valuable indications are afforded by noting initial boiling point, boiling point of bulk and final point of distillation.

The same remarks may also be made about the melting or congealing point

Tests. As regards the most suitable chemical tests for introduction into Pharmacopoeia many of them are both exacting and tedious. Many group reagents such as phenylhydrazine, Sulphuretted hydrogen, Caustic soda, Caustic potash, Benzoyl chloride, Sodium bisulphite, phosphoric acid, ammonia have been found as useful for essential oils as in study of other compounds. Such a group of reagents even afford an approximate idea of proportion of respective constituents from amount of precipitate formed and methods of quantitative estimation we base on them which furnish very true results

Essential oils Contd.

Besides these gravimetric quantitative estimations the volumetric determination of saponification equivalent in oils containing esters also affords a ready and easy method of determining the amount of such esters by calculation. The alcohols possessing the formulae $C_{10}H_{18}O$ while the combined acid is generally $C_2H_3O_2$ (Passmore). By conversion of the uncombined alcohols into esters prior to determining the saponification equivalent the volumetric estimation of uncombined alcohols can also be carried out.

Reagents for detection of impurities not to be overlooked. Fe_2Cl_6 for phenols. Na_2SO_3 for aldehydes. $NaHO$ for acids & phenols, & other reagents which appearance of special adulterant might suggest. Where such reagents are employed the impurity they are intended to discover should be mentioned.

Deletions from or additions to Pharmacopoeia.

Al anethi. To be replaced by *Al Carui*
" *Cajuputi* " " " " *Eucalypti*
of *Cassia*, bergamot, orange to be added
to pharmacopoeia

Oils, Fats, and Waxes.

^{the knowledge of} the chemical composition of these bodies has advanced greatly in recent years, yet there is an almost complete absence of tests for oils in B.P.

All the oils at present in B.P. required and the number could be added to with advantage e.g. cotton seed oil of good quality could be used as a substitute for olive oil and where fatty acids of low melting point are not required. Peach and apricot kernel oils might be used instead of almond oil as they resemble the latter very much.

Suitable tests should be introduced for official oils.

Specific gravities should be introduced for official oils. The limits not to exceed the following

- Oil Ricini 954 - 969
- " Lini 929 - 938
- " Amygdal 914 - 920
- " Olival 914 - 918
- " Morrhuol 922 - 932
- Cotton seed oil 922 - 929
- Peach kernel oil 917 - 923

(E. J. Parry)

Oil Theobromatis and lard the s.g. to be defined at a high γ .

Oil Myristical the product being so variable the limit cannot be fixed practically; but it should not fall below .945 @ 60 γ . Parry

The n.c. of H₂O to increase with decreased melting point

The colour reactions with H₂ S₂ are of little value; but other colour tests might be introduced with advantage. e.g.

For oil of peach and apricot kernel oils

Olea etc. Contd.

in almond oil. HNO_3 for olive oil. Turbidity reaction for sesame oil. $SuBr_4$ for rosin oil. HNO_3 test for cotton-seed oil. The reaction for cad. oil may be left out as it is only a test for linseed oils in general. The iodine absorption should be an official test for fixed oils, it yields good results under certain conditions. The process being based on scientific ~~bases~~ data the results are constant and valuable. The amount of H_2O for complete saponification should be introduced as this will determine the presence of mineral oil in seed or animal oils.

The introduction of these two quantitative methods would enable a good deal of adulteration to be detected. There are other tests such as Viscosity and the Polarimeter; but they could not be much used in B.P.

Free acid in fixed oils to be determined, it should not be more than 1.5. p.c. free acid reckoned as oleic acid. (Parry) in olive, almond, Castor when these are used medicinally.

Solubility. This is of little value with the exception of Castor oil. The solubility of which in alcohol might be retained. The solubility in glacial acetic acid might be mentioned, and the insolubility in paraffin.

The common methods of manufacture might be mentioned.

Bodies included under term wax should be better defined by physical properties.

Present limits of S.G. for yellow wax are too wide they should not be more than .956-.966 @ 60° (Parry). The melting point 62-63.5 C or 64 C (Parry). The amount of ^{H_2O} free acid ~~at~~ required to neutralise the free acids & that required to saponify

Oils. Fats and Waxes Contd.

the esters to be introduced. The presence of paraffin to be provided against white wax. The S.G. and melting point to be higher than that of a fellow wax Spermacete. The acidity to be tested; also the iodine value in sperm oil. The melting point to be between points already official.

Paraffin Wax. This is described as consisting of paraffin hydrocarbons; but it often contains oxygenated bodies and hydrocarbons of other series when purified it consists essentially of H. Carbons

the melting point often reaching 45° (Paraffin) Soft paraffin. Described loosely. H. Carbons of other series occur largely in this product A test for acidity to be introduced. As owing to imperfect refinement H₂ Sox present, alkalis do not saponify paraffin

Soaps. If made only from olive oil an examination of fatty acids of soap to be made e.g. melting point. iodine absorption, N.C. composition of water and alkali both free and combined should be limited

New organic remedies

In new organic remedies are included all organic compounds which are not contained as such in the crude material; but which undergo chemical treatment or are prepared by synthesis.

Organic remedies have an advantage in that they can be prepared synthetically and that they are of constant composition and uniform action. There are already eight of these compounds in B.P. The question of further recognition of these remedies ~~must~~ demands attention.

In introducing them, the pharmacopoeial requirements and the characters & tests to be stated. The present descriptions in B.P. inadequate. Only those remedies which have been a length of time in use and have been found successful and reliable in physiological and therapeutic action to be introduced. The following might be introduced

Acetonilide.	Antipyrin
Guaiacal	Homopropine hydrobromide
Zelthyal	Lanoline
Phenacetin	Piperazine
Resorcin	Saccharin
Salol	Sulphonal

Nomenclature. The chemical name is the most strictly correct; but this is not practicable. The name by which a remedy is described in therapeutic literature should be the principal title adopted in B.P. The chemical nomenclature and constitutional given under synonyms. The name to be that by which it is known in international literature and this name to be defined according to chemical constitution and

Organic remedies Cont'd

the structural formula of chemical Socy.

Such preparations to be defined and such characters and tests given for its composition and purity as will be a check on manufacturer

Method of manufacture, unless a complete and detailed description can be given in pharmaco. it is of course to give a skeleton outline of process.

Character & tests, preparation to be defined so exactly that description will apply to substance only identified by chemical nomenclature and constitutional formula given; or in case of other substances e.g. lanoline and ichthyal to assign as exact qualification as possible to less exact terms.

To define preparation it is not only necessary to give reactions for its identification; but to give the melting and boiling points. Fractional distillation and fractional crystallisation can alone determine these points.

Tests, these to be precise. The exact quantities and concentration in which they have to be carried out and strength of test solutions to be stated. When the directions are to heat, water bath or free flame to be specified and length of time.

Pilulae

Pills are soft easily divisible masses variously composed of extracts, powders or other active substances thoroughly mixed and made into an uniform consistent mass with some suitable excipient such as, treacle, mucilage, glycerine, Soap, confessor of roses or powdered liquorice.

There are twenty one formulae for pills in B.P. Owing to popularity of most of B.P. pills it would be a difficult matter to seriously alter many of them on the other hand to attempt to augment their number would be as difficult.

It is generally conceded that the 5gr pill is too large they should be reduced somewhat in size.

It would be an advantage if new pharmacopoeia would give directions as regards the coating of pills.

The excipient that will make the smallest pill is to be preferred, so that Confect Rosae should be deleted. As a general rule Syrup would prove the most efficient excipient both as regards bulk and keeping properties.

The following formulae to be improved
 Pil Alae et Assafoet. Syrup a more suitable excipient than Conf Rosae; but requiring smaller qty.
 Pil Alae et Ferri, a minute quantity of gingerine to be used in place of aromatic powder
 Pil Alae et Myrrh. Syrup makes a better mass. omit glycerine & Saffron.
 Pil Coloe Co. add a little gingerine to prevent griping

Pilulae cont'd

Pil Ferri Jadio. add a few grains of pulp of tragacanth. which improves mass. Keeping properties improved by rolling at once and varnishing or coating.

Pil Hydrarg Subchlor Co. Made according to present formula pills lose shape and firmness & little hard soap added to mass is an improvement.

Pil Phosphoric. The B.P. formula to be amended the phosphorus to be dissolved in bisulphide of carbon and this to be incorporated with suet to make a rot basis of this 10 grs mixed with of theobromal form a good pill basis to be divided into 30 or 50 pills.

Pil Rhei Co. Glycerine not necessary syrup makes a better mass

Pil Saponis. Formula should read.

Omission in powder 10z

Hard Soap } 2.5 to produce
Glycerine } 4oz.

This would give a definite quantity of opium in each pill.

Pil Ferri. Formula improved by omission of water

Pil Rumbi et Opio. Use Syrup as excipient

Pil Scamm Co. There is no advantage in making solution and evaporating. gingerine to be used instead of 4r ginger.

Delete. Pil Alae Sacot. Pil Conii Co. Pil Cornubagiae Co.

The following might be added to pharmacopeia viz formulas for Pil Colocyntis Hyoscyæ Hydrarg Pil podoph. Co. Pil Alois et Belladonnae.

"Pulveres"

Powders are composed of for the most part of dry insoluble substances reduced to powder and thoroughly mixed and sifted alterations in the following formulae might be made with advantage.

Pulu cretae crocatae. There is no special need of the Saffron it might therefore be deleted.

Pulu Rhei Co. Heavy calcined magnesia might be substituted for the light magnesia.

The following powder might be introduced to make *Mist cretae vi*

Pulu cretae Co.

Ry. cretae ppt. ℥iv

Sacchari albi ℥vii

Gummi acaciae ℥iv

℞ Cinnamomi ℥i/2ss

℥i of this powder to each ℥i of water forms *Mist cretae* of *BR*

Pulu Antimonial and *Pulu Opii Co* might be deleted as they are seldom used.

"Spiritus"

Spirits are solutions of oils in *S. R.*

The spirits of essential oils to be made 1 in 10 by volume except *Spt. of Rosemary* which might remain as it is.

The following spirits should be deleted. *Spt. armoraciae Co.*, *Spt. Cajuputi.*, *Spt. Lavand.*

"Suppositoria"

Suppositories are solid conical bodies made up of an active ingredient and oil of Theobroma, glycerine or starch, Soap, as a basis

"Oil of Theobroma without Soap is quite satisfactory for all suppository bases provided it is carefully washed, when melting" (Prof. Charnick)

"The following suppositories might be deleted with advantage

Supposit. acio Yannie & Sapone
" Morphinae & "
" Plumbi Co

In Supposit. Sannin, iodform and morphine the quantity of the active ingredient is deducted from the oil of Theobromae ordered, calculated thus the mass will not yield twelve 15 gr Suppositories.

"Vina"

Wines are solutions of drugs either in Sherry or orange wines

Vin Antimonial. Directions to be given for the Antimony part. to be dissolved in a little hot water previous to adding the wine

Vin Colchici. This would form a more accurate preparation by dissolving a standard preparation of the extract in wine

Vin Ipecac. This wine to be prepared by dissolving a standard extract in the wine

Vin Opie. If this preparation retained the aromatics to be deleted as they are injurious for eye preparations. Delete. Vin Ferri Cit Vin Rhei. Vin aloes. Vin Opie

"Syrupi Concl
change in a short time; also when the γ falls
crystallises out - the S.G. being too high
a more stable product having qualities and
properties of R.V. Syrup could be obtained by
mixing suitable proportions of Citric acid. γ
Limonis. Sugar and distilled water

Syr of Rhubarb, an improved product
could be obtained by using present formula; but
following directions for preparation furnished
for *Elixir Rhei* D.P.C. unofficial formulae

"There are two objections to process for
making *Syr Sennae*, 1st the prolonged in-
fusion is apt to lead to ineffectual fermentation
2nd too much time expended in carrying out
process for filtration, a better keeping product
could be obtained by following out directions
for preparation of *Elixir Sennae* D.P.C.
unofficial formulae.

Syr of Ginger. Present preparation
unsightly, a more elegant preparation to
be obtained by substituting a soluble essence
of ginger for the tincture.

"The S.G. in *Syr of Squills* is too high
2 1/4 lbs of sugar to one pint of the vinegar
of squills being sufficient, a brighter and
more stable product obtained by following
directions in U.S.P. by raising the vinegar
of squills to the boiling point and filtering
while hot on sugar

"formulae for the following might be
introduced, *Syr Ferri phosph Co*
" " " et Quin et Stryphe
" *codicinal*
" *Hydrophosph Co*
" *Pruni Virgin*

Tinctural

Tinctures are solutions of active substances in spirit either alone or combined with other solvents. They will still continue to hold the field among pharmaceutical products as they contain the active principles of the drug in the same state of combination in which they exist in the drug itself.

Tinctures have distinct advantages over other preparations as far as constancy of strength & stability are concerned - alcohol having great solvent and preservative properties. By proper treatment and suitable strength of menstruum to character operation an ideal product may be obtained.

The question is how to obtain this product containing the full activity of drug.

The difficulties are connected with 1st strength of menstruum, 2nd degree of division of drug 3rd process best adapted for securing thorough exhaustions of drug.

With regard to first there is room for improvement in B.P. the principle laid down being to use strong alcohol in preparing resinous drugs & the weaker spirit in other preparations.

To effect improvement careful experiment is required to ascertain the strength of menstruum adapted to particular drug. Results obtained by Hart and Wright (Pharm Journal) point to conclusion that requirements would be met by employment of menstrua containing 80. 70. 60. 50. 40 p.c. alcohol by volume. 50 p.c. best adapted for preparation of leaf tinctures. 40 p.c. for roots and barks and 80 p.c. for resinous substances.

Sinectural Contd.

As regards the proper state of division in which to employ drugs for sinectures. A drug, certain principles may be laid down. A drug for extraction with strong alcohol ought to be in fine powder, a fine state of division is both unnecessary & not the desired in the exhaustion of fruits etc e.g. Carium, Colchicum, Stramon. as the active principles are easily extracted and it is not desired to have the preparation loaded with extractive matter. Leaves need not be in so fine a state of division as roots & bark.

Where drugs cannot be reduced to a uniform powder maceration and expression should be followed. In the preparation of certain "yrs" as Calumia, Capsicum, etc simple maceration with whole of menstruum would be better.

Regarding strength & dosage of "yrs".

Due consideration being had to permanence of finished product. ratio of drug to menstruum should be as simple and uniform as possible viz 1-5, 1-8, 1-10.

The proportion of drug to solvent should not be more than the latter is readily capable of extracting and the principles extracted are to be diffused through such a volume of spirit as is requisite to ensure stability of resulting preparation.

As regards processes for preparation of sinectures continuous percolation is the most reliable. The advantage of this is, that there is less variability in strength of finished product seeing that perfect exhaustion of the drug can readily be effected.

The principle of standardisation of drugs to be extended to those containing certain

Yinctural Contd.

Alkaloids or other well defined principles capable of ready isolation and identification. An attempt at uniformity might be made by fixing for the corresponding tinctures a minimum standard of extract to be yielded by a given volume of the yincture when evaporated and the residue dried at a fixed γ :

In standardisation the object to be aimed at and the principles which should guide us should be clearly stated.

An ideal standard preparation is one which has an exact standard both as regards active principle and physiological activity; but it is difficult for any galenic product to attain this condition. The most that we can expect is that the γ will represent the entire drug with all its properties and shall contain the active principles in the condition & proportion in which they exist naturally. Then all that will then be needed is the fixing of a minimum standard of active constituent as will afford evidence of therapeutic power.

Where the chemistry of drugs whose physiological activity is due to alkaloids or other defined active principles has not been worked out & therefore it is not known to which of these principles their physiological activity is due may seem to be an argument against standardisation of these drugs. In these cases we must proceed to carry standardisation to limits of knowledge we have of their active constituents.

A standard of total alkaloids where activity of drug is due to such might be fixed from average yield of a number of samples of drug. Where

Tinctural Contd

Standards to vary from time to time as we obtain more precise and definite knowledge of drugs. It has been suggested that standardisation of drugs themselves be made use of; but it is difficult to obtain drugs of standard strength. The employment of drugs of standard strength does not ensure uniformity in strength of drugs prepared therefrom.

Principle of standardisation might be applied to Conium, henbane, Stramonium jalap, belladonna, ipecacuanha, lobelia and jaborandi.

Other drugs should be investigated with object of securing consistency of strength e.g.aconite digitalis, gelsemium, colchicum etc. Every preparation should be standardised by itself and not from a standard extract, liquid or solid.

Characters and tests to be applied to tinctures are

1st average S.G. of each tincture to be given as maximum limit fixed for each.

2nd An irreducible minimum of extract dried at stated %.

3rd Standards to be further developed.

The following %s might be developed:

• %s Alac. Arnicae, Conii, Cubebae, Ferri acet
• Gallae, Laccis, Pyrethri, Sabinae, Serpentaria
• Sumbul, Veratri virid.

Additions, %s Ferri. Similar to %s Ferri Mur Ed. 10th.

%s Jodi same strength as Ed. 10th.

Unguenta.

Ointments are mixtures of active substances with lard, benzoeated lard, suet, wax, oil and various soft paraffin variously combined; or with simple ointment. The ingredients are either thoroughly mixed or melted together.

There are forty fine ointments in B. P.; but only about one third of these are in use. There is an increasing demand by the public for certain of these together with a desire for a greater variety.

In constructing formulae for ointments they have to be considered from two points of view viz medical and pharmaceutical. From the medical side the appropriateness & usefulness of the base have to be considered and the strength of ointment, on the pharmaceutical side we have to consider the purity and compatibility of ingredients and the best method of preparing and preserving the ointments.

Ointments may be required to serve two distinct purposes, 1st to convey remedies into the skin 2nd to act merely on surface of skin.

The selection of base is thus governed by purpose it is required to serve. e.g. Ungt. Hydrag. is often used for its constitutional effects in this case vaseline is not as good base as lard.

Ungt. Acid Boracic being used for its action on skin is better made up with lard & soft paraffin.

In examination of ointments of B. P. it will be found that the base employed is not always the most appropriate. The useful bases are adeps Benzoeat, Wool fat, lard, hard and soft paraffins; Spermacete & simple ointments

Unguenta Contd.

are generally considered to be failures. Prepared lard is of doubtful value except when quite fresh.

It will be advantageous now to consider bases in order of their usefulness, viz, 1st ~~adeps~~ Benzocat. 2nd hydrated wool fat. 3rd hard + soft paraffins and the adoption of the following 4 hard benzocated lard 5 rose ointment.

Benzocated lard. The B.P. preparation is defective in two respects, viz, 1st it should not be prepared from prepared lard but from the fresh flare, 2nd too little benzoin is added and the time of maceration is too long. The following ointts. are best prepared with adeps Benzocat viz.

Unguenta. acic Salicylic, Belladonnae, Caluminae, Chrysoarobin, gallae, Hydrarg ammon, Hydrarg Biniodis dilute Hydrarg nitrat, Hydrarg ox rub, Hydrarg subchlor, jodi, potass iodid, Sulphur iodid, Sulphur and Zinc.

Hydrated Wool fat. This base is of use where penetrating power is required, it has the power of holding water in a fine state of division which gives it properties not possessed by any other base its drawback - stickiness - can be modified by the addition of lard or soft paraffin.

This base can be used in preparing ointments of tar and mercury. Mercurial ointment could be improved by preparing according to formula and with greater therapeutic efficiency. e.g.

Mercury 2 parts
Lanolin 1 part
Benzocated lard 1 part

M. S. A

Unguenta Cont'd

742 ointment, would be improved by making according to following formula

742 5 parts

Yellow wax 1 part

Lanolin 1 part

M. S. A

Hard and Soft paraffins. These form ideal bases in some respects. They are useful in bringing remedies into surface contact.

Soft-paraffin in general is too soft of itself, hard paraffin being added to give it consistence; but the quantity added is too great in the ointments of carbolic, Salicylic, and eucalyptus, alter formula for eucalyptus ointment as follows.

ol Eucalypti 1 1/2 part

Paraffin dur 1 " by weight

" moll 18 " M. S. A

alter formula for Carbolic ointment as follows.

Phenol 1 part

Paraffin dur 1

" moll 18 M. S. A

Ungt. Jodoformi. present preparation unsatisfactory, alter as follows.

Pulv Jodoform 1 parts

ol Eucalypti 1/6 "

Paraffin moll 8 "

" dur 1 " M. S. A

Hard Benzoyated Lard. This would be of use when a harder ointment base than benzoyated lard is needed e. g. in combining with fluids. This base is obtained by melting together one part yellow wax & nine parts lard, stirring till cold.

Unguenta Cold

Stavesacre & Sarsin ointments could be prepared with advantage with this base; but it would be useful as an extemporaneous base for other ointments.

Rose Water ointment. This to be introduced to meet demand for Galen's ointment otherwise Cold Cream. To be prepared as follows.

Benzoina lard 10 ℥

Oil of rose 5 ℥

Rose Water 4 ℥

When base to be used in preparing aconite, nuxvomine & atropine ointments.

Sulphur ointment, should be prepared with precipitated sulphur; as if ordinary sulphur used it should be washed.

Iodide of potassium ointment, would be improved by adding a little hyposulphite of soda Boracic ointment. alter formula consistence not suitable

Carbolic acid. Prepared by D.P. process it has the disadvantage of allowing the phenol to crystallise out

Atropine ointment, omit spirit & use sulphate of alkaloid & a non irritating base

Belladonna oint. This is an unclean preparation 1/2 to 3i Lint Belladon to 3i Benzoin lard would answer the purpose as well.

Gall ointment, Replace gum galls by tannic acid.

Gall ointment with opium. alter as Gall oint

Ammoniated mercury ointment, Use adeps tenguat as base

Oint of glycerine of subacetate of lead. alter to a more soothing basis - as paraffin base irritating

Unguenta contd.

Ointment of Stavesacre. Use oil of stavesacre in place of linds.

Resin ointment, Soft paraffin to be substituted for simple ointment & almond oil

In directions for preparation of oints.

It is a mistake for some of the ointments to be stirred till cold prepared thus they are more apt to become rancid & containing air they are not so soothing.

A basis of some non-fatty substance which would wash off with water without scar might be useful. e.g. Starch, dextrin etc

Prof Charrier's remarks in Pharm Journal ^{Nov. 1919} page 414 regarding the combination of hard and soft paraffin. "The ointments in which they are to be used cannot be made gracefully for when hurried they are apt to be lumpy. It would be advisable to have an official preparation of hard and soft paraffin which might be termed "Paraffinum Medicum. This is made by melting 1 of hard and 2 of soft paraffin"

The following ointments might be deleted. Ungt. antimon. tart. creosote, cantharides, elami and perubinth, also resucci and simplicis

The oleases of lead, mercury & copper might be introduced with a lanoline basis

"Deletions and additions" 38
 Brought into 'tabular' form

In making a table of these I beg to call attention to the list of additions & deletions made by Prof Charvot's Pharm journal Nov 19th 192 pp 413-4. with which I in great part agree & for similar reasons.

List I. Substances & Preparations for deletion

Decum	Cusso
Acid Lacticif	Decet Cetrariae
" Meconia	" Granati Radicis
aconit folia	" Hordei
Ammon Nit	" Papaveris
" Phosph	" Purpureae
Antimonii Oxid	" Sarsae
" nigra purif	Elemi
Aqua Anise	Emplast Plumbi Jodii
" Menthae Virid	" Saponis Fuscum
Arnicae Radix	Enema Alue
Arnicae Rhizoma	" Magnes Sulph
Aurantii Fructus	Esct aconiti
Beberniae Sulph	" Alue Sbd
Bismuthi et Ammon Cit	" " Sacat
" Oxidum	" Calumbae
Calamulae Prepar	" Colekicii
Cambogia	" Conii
Cunellae Cortex	" Gelsemiae Aleohol
Cassiae pulpa	" Tuborandae
Cataplaomata	" Krameriae
Cetraria	" Laeueae
Cinchonidinae Sulph	" Lupuli
Cinchoninae "	" Mezerei Aether
Confect Opii	" Papaveris
" Scammonii	" Purpureae
" Yerbini th	" " Lig
Cupri Nitras	" Quassiae

Delemonis etc Costa

Esct. Khamni frang	Liquor Jodi
" " liquid	" Magnes cit
" Sarsae liquid	" Morphinae acet
" Stramonii	" " Sineconat
Farina Tritici	" Potassae Efferv
Ferri arsenias	" Sodae "
" Peroxid hydrat	" Sodii Arseniatis
" Phosphas.	" Sodii Ethylatis
" Sulph granal	Lupulinum
Glycerin Acid Gallic	Manna
Granati Radic Cort	Mastiche
Hemidesmida radice	Marras alb
Hirudo	Mezerii Cort
Hydrarg Persulph	Mica Paris
Infusum Capsicu	Mist Brasoti
" Cusco	" Ferri Aromat
" Tuborandi	" Scammonii
" Krameriae	Morphinae acet
" Lini	Moschus ?
" Lupuli	Nectandrae Cort
" Matric	Oleum Anesthi?
" Valerian	" Menthae Vir
Magnala	" Phosphoret
Lac	" Rutae
Lacruca	" Suberinae
Laricis Cort. Yinet	OS Usturn
Lint. Hydrarg.	Purpurae Rad
Liquor Acid Chromici	Pil Ulaes Bbd
" Ammon Cit et fert	" " Sacat
" Antimonii Chlorid	" Cambog Co
" Chlori	" Conii Co
" Ferri acetat	" Ferri Carb
" " Fort	" " Jodi
" " perchlar	" Scammonii Co
" " persulph	Plumbi Jodi

Deletions and Additions Contd. 31

Brought into Tabular Form	
Plumbi Nitras	1/2 Pyrethri
Potassii Cyanid	" Sabinae
Pulv Antimonial	" Serpentariae
" Opii Co	" Sumbul
Pyrethri Radix	1/2 Roch Ferri Redact
Rhamni Frangulif	" Opii
Sabinae Caecumina	" Sadae Ricarb
Scammonium	" Cascarilla
Rosae caninae fruct	Ungt Antimon Tart
Sodii Arsenias	" Calamenae
" Nifras	" Conii
" Valerianae	" Creosoti
Sodium	" Elemi
Spt. Armoracis Co	" Eucalypti
" Guaiacuti	" Gallae
" Lavandulae	" Hydrargri Co
" Juniperi	" Plumbi Jovis
" Cinnamomi	" Potass Sulphuric
Sumbul Radix	" Sabinae
Suppos Acet Carbolicae & Saponis	Uvae Ursinae
" " Yarnis "	Vapor Acet Hydrocyan
" Hydrargri	" Chlori
" Morphinae "	" Coninae
Syrup Hemidesmii ?	Vin Alas
" Papaveris	" Ferri Citrat
Tabaci Folia	" Rhei
1/2 Alas	" Opii ?
" Urnicae	
" Aurantii Recent	
" Conii	
" Cubebae	
" Ergostae	
" Ferri Acetat	
" Gallae	

Appendix

List II. Substances to be transferred —
 Alcohol Amylicum
 Bromum
 Brevisiae Ferment
 Gutta Percha
 Manganesii Oxidum nigrum

List III. Proposed additions

Acid Hydrobromic S.G. 1.308	Nitroprusside
" Hypophosphorum 1.136	" Thyroid gland prepared
Ammonii iodidum	$\frac{1}{2}$ Ferris Muric. P.
Chloralamide	$\frac{1}{2}$ Convallaria majulis
Cocaine	Ext. Grindelia liquida
Cocaine phosphate	Hydroquinone virid.
Elixir Auranti Co	Papain
Emplast. Belladonnae	liquida Methyl Orange
Esset. Maltis	100% pure
" " e. of Morrhuae	
Glycerinum Pepsinae acis	
Gossypia antiseptica	
Gelatina	
Quinnia Hydrobromas	
" Salicylas	
Resorcinum	
Salol	
Syrup Cocaine	
" Ferris phosph. Quin. et Strychn.	
" " " Co	
" " Hypophosph. Co	
" " Pruni virgin.	
Yucca	
Ungt. Hydrarg. ex flav.	
Cocaine Hydrochloride. A local anesthetic	
Similar to Cocaine, but less toxic. It's pro-	
peries have been well investigated & described	
by Prof. Chatterjee & Dr. M. Lennan.	