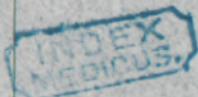


FLUID (OR) EXTRACTS x x

ON FLUID EXTRACTS

AS PROPOSED

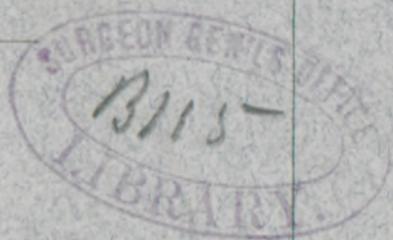


FOR THE COMING

PHARMACOPŒIA.

REPRINT FROM THERAPEUTIC GAZETTE,

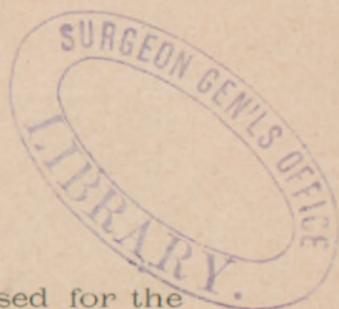
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On Fluid Extracts as Proposed for the Coming Pharmacopœia.

THE aim of this article is to call attention to some points that seem to have been overlooked by the authors of the different processes for fluid extracts, which have been presented for adoption in the next pharmacopœia, and, at the same time, to suggest a modification of the method of procedure which should, in our opinion, be applied in quite a large number of cases.

The propositions to be made, may as well be formulated in the shape of queries. First: if several liquid preparations of the more important drugs are to be made by assay, so as to present a representative of the drug of uniform strength, why should not fluid extracts be made in the same way, especially of those drugs which possess great activity and contain definite principles, such as belladonna, conium, ipecac, nux vomica, sanguinaria, veratrum, jaborandi, ergot, etc.? Second: in the case of these, as well of less active drugs, why have their hygroscopic properties been left entirely out of consideration?

In regard to the first proposition it will certainly need no argument to convince any mind familiar with pharmaceutical and chemical work, of the feasibility of the proposed plan, nor does it need any special pleading to show the advantage that would ensue in the resulting uniformity of our liquid preparations of vegetable drugs. The principle referred to has already been adopted by manufacturers in the case of ergot, opium, and a few

other active drugs, and we can see no valid reasons against this innovation, while there are many in favor of its adoption in an authoritative work claiming to embody pharmaceutical progress, and the fruits of scientific research as applied to the advancement of the art.

It will hardly be necessary to enlarge upon the fact which must become evident to every one engaged in the pursuit of pharmacy, that vegetable drugs are not always of uniform composition; that is, do not invariably contain the same percentage of active principle, whether it be an alkaloid, resin or oleo-resin, a volatile oil or merely extractive matter. The variations in strength of different lots arise from a variety of causes which it is unnecessary to dwell upon here. Familiar illustrations of the fact are found in ergot, opium, the cinchona barks and narcotic plants generally. This being the case it would seem to need but very little argument to demonstrate the desirability of making a fluid extract, say, for instance, of belladonna, contain so much per cent. of atropia; one of hyoscyamus, so much per cent. of hyoscyamia, and so on, just as has been proposed in the case of opium.

With all the well understood, concise and practical methods of assay now known, the problem presents no great difficulties, and it would certainly be an accomplishment by which the physician, who, after all, is mainly interested in the value of the medicines prepared, would be greatly assisted in his work, adding largely to the element of precision in his administrations. To this natural variability of strength is added another element of complication, which will be referred to in considering the second proposition, this element being the varying amount of moisture in the apparently dried plant. In view of these facts it really seems necessary to insist on greater exactness in the manufacture of these preparations.

One thing may be said to those disposed to cavil

and question the practical value of such a plan, having perhaps the added trouble and difficulties in mind, and that is, it is much safer to adopt as high a standard of requirement as the present state of science will permit, and have the pharmacist conform to the standard, than to lower the standard to suit the calibre of the average pharmacist. The present lack of statistics about the composition, strength and yield of vegetable drugs would be supplied by the adoption of this plan, and a new impetus given to the gathering of exact knowledge concerning them. That a method of assay is even possible for less active drugs will be illustrated further on. To sum up, the present rather indefinite and hap-hazard methods of work should give way to such as require a normal standard to be observed in the manufacture of this class of preparations.

In considering the second query, it may be as well to state, by way of preface, that a method of control attempted in Germany and dependent on the specific gravities of tinctures has been found defective, and the reason for this will at once appear when it is made evident what influence the physical condition of the drug, at time of manufacture, has on the menstruum employed. A few statistics will be necessary to illustrate the principle involved; the samples mentioned were taken at random from freshly ground drugs after having been air-dried as is customary, ten grammes being taken in each case. The amount of moisture present in the drug and lost during desiccation at 105° C. (221° F.) is given in per cents.

| | | |
|--------------------------------------|-------|-----------|
| Alexandria senna lost..... | 10.50 | per cent. |
| Henbane leaves lost..... | 10.00 | " |
| Blue Cohosh lost..... | 12.50 | " |
| White Bryony lost..... | 11.70 | " |
| Fucus vesiculosus lost..... | 17.40 | " |
| Ber. aquifolium lost..... | 9.50 | " |
| Cascara sagrada lost.... | 12.75 | " |
| Yerba santa lost..... | 11.10 | " |
| Cubebs (dried over sulphuric acid).. | 4.00 | " |

The experiments undertaken have not been completed up to the time of this writing, but a single instance will be sufficient to show how the resulting fluid extract must be affected by the varying amount of moisture in these vegetable drugs which the figures show is considerable and constantly changing from well known causes. Of 100 parts senna taken, ten and one-half parts proved to be moisture, leaving eighty-nine and one-half parts dry drug. After maceration and subsequent complete exhaustion with a sufficiently large quantity of diluted alcohol, the insoluble residue, after drying at the same temperature as before used, amounted to $60\frac{3}{4}$ parts. This gives the following composition of the drug :

| | |
|--|---------------|
| Moisture..... | 10.5 percent. |
| Extractive matter soluble in menstruum | 28.75 " |
| Insoluble residue..... | 60.75 " |

Showing the dried drug to contain in round numbers 32 per cent. of extractive matter, while the sample as found contained only $28\frac{3}{4}$ per cent.

The question is now, if this percentage of extractive matter should turn out to be the normal yield, ought the fluid extract prepared from 1,000 parts of the sample used, be made up to 1,000 parts or 895 parts? In the former case the 105 parts of water present would further dilute the menstruum to that extent, so that it would result somewhat as follows, supposing diluted alcohol to be taken for percolation, and the fluid extract made to represent weight for weight, this case allowing of a less complex result and of round numbers for the purpose of illustration. One thousand parts of finished fluid extract would contain

| |
|-------------------------------|
| 287.5 parts extractive. |
| 105 " water from drug. |
| 607.5 " diluted alcohol. |

Or again, 1,000 parts would contain (uniting the quantity of water in the drug with that in the

alcohol)

287.5 parts extractive.
236.925 " alcohol.
475.575 " water.

If in place of this result 895 parts of fluid extract were obtained from the same 1,000 parts of drug and the 105 parts of water contained in it were reckoned as a diluent of the alcohol used, so as to make the finished product consist of

287.5 parts extractive,
607.5 " diluted alcohol,

we should have the following as the composition of 1,000 parts :

321 parts extractive,
679 " diluted alcohol.

Apply this treatment to an active drug like hyoscyamus. I find the sample of henbane to lose ten per cent. of moisture and shall assume that the quantity of extractive contained in it is twenty per cent. (which is very near the exact yield). We have the following results as proceeding from the two methods of adjustment : 1,000 parts of henbane containing 100 parts moisture, made into fluid extract by the first plan yield a product composed of

200 parts extractive.
273 " alcohol.
527 " water.

or, made by the second method up to 900 parts, 1,000 parts of finished fluid extract would contain :

222.22 parts extractive matter.
303.33 " alcohol.
474.44 " water.

making a difference of over ten per cent. in the strength of the two preparations. In view of the conditions referred to it certainly seems desirable to narrow the limits of variability as much as possible, and this can best be done as pointed out, by making fluid extracts, at least of the more active drugs, by assay.

As soon as the experiments, being conducted, are completed, we shall lay the results, with the deductions therefrom, before the profession through the medium of the GAZETTE.

