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ORIGINAL AND SELECTED PAPERS.

ON FLUID EXTRACTS AND THEIR MENSTRUA.*

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Concluded.

The menstrua for fluid extracts need much revision and much research, for upon the menstruum a large part of the therapeutical as well as pharmaceutical success depends. The writer has only very imperfectly studied this branch of the subject, and yet too much time and space would be required to give an abstract of the observations made. He must therefore be content with offering his judgment as based on his experience.

The officinal "alcohol," defined as "spirit of the specific gravity 0.835," seems to be no longer needed in the Pharmacopœia, its place having been well taken by the common so-called "95 per cent. alcohol," or "alcohol fortius" of the Pharmacopœia. This might now be called in the Pharmacopœia, as it is in the market, simply alcohol. Since the last revision of the Pharmacopœia the Government has taken charge of the spirit market, and one result of legislation upon it, has been to reduce the strength of the market grades. Ten years ago it was easy to get the so-called "95 per cent. alcohol" and "cologne spirit" from any good maker, containing 92 per cent., or of the officinal specific gravity 0.817. But of late years, in the writer's experience, this is always difficult and generally impossible. In a review of some fifty barrels or more from several good makers, including "Atwood's Alcohol," at various times within the past year, and all bought to special order, and not in the general market, the specific gravity has only once reached .817, all the others varying between .818 and .824 with an average of about .820. A ten-gallon keg bought in the common market, of a first-rate house, and with the brand of a good maker on it, stamped by the United States Revenue Officer as containing "10 wine gallons," "Proof 188," contained 8 gallons and seven pints, yet gave no evidence of leakage, and had a specific gravity of .82058. This probability fairly represents the market at the present day, and if so, 91 rather than 92 per cent. should be aimed at by the Pharmacopœia.

Some reform in the mercantile management of alcohol is much needed and the influence of this Association might be used to bring this about at an earlier day than it would naturally come through popular demand. When the so-called "95 per cent. alcohol" sold for 40 to 45 cents per gallon, the "shortage" of half a gallon or a gallon on each barrel was of less moment than it is now with a price of $2, or thereabouts; and the difference of temperature between summer and winter,—or between 10° C.=50° F., and 30° C.=86° F. of a fraction over 2 per cent. in the measuring, was also of less moment. Either through erroneous gauging, or through some skill in making barrels, or through both together, it is very rare to find a barrel of alcohol that holds out measure even in summer temperatures, and the rule is that they fall short from half a gallon to one and a half gallons on the barrel, while of late years the writer never knew a barrel to overrun the gauge. And as the United States Inspector's certificate always certifies the gauge, the alcohol-maker throws himself upon this, and there is no redress. Besides this there can be nothing more clumsy, nor more difficult to comprehend in common usage, than the plan of defining the strength by degrees above and below proof, and the quantity by proof gallons. If it was desirable to keep the consumers or users of alcohol so befogged that they could not detect deficiences in strength or measure, hardly a better plan could be adopted, and the advisers or experts of the General Government, who are responsible for the present method, could not have better sub-served the interests of the Whiskey Ring, or damaged the interests of the consumer had they been paid for it.

The strength should always be indicated by a percentage of absolute alcohol *by weight* and not by volume, and this should be determined by apparent specific gravity.

It should always be bought and sold by weight, the barrels being tared, just as castor oil, linseed oil, cotton seed oil, &c., are of late years.

Five gallons alcohol, specific gravity .8202 at 15.6° C.=60° F., measured at 21° C.=69.8° F., weighs 34 lbs. avoirdupois, or nearly 6 lbs. 13 oz. to the gallon. This alcohol contains about 91 per cent. by weight of absolute alcohol.

The officinal alcohol fortius, specific gravity .817, containing about 92 per cent. of alcohol by weight, if measured at 15.6° C.=60° F., weighs just about the same. So that about 5.4° C.=9.8° F. of temperature, is equal to 1 per cent. in strength.

If bought and sold by weight, or by weight gallons, which would be the first step, temperature would not have to be taken into consideration.

Alcohol of specific gravity .81674 at 15.6° C.=60° F. when weighed at 25° C.=77° F., has an *apparent* specific gravity of .808767, and at 30.6° C.=87 F., .80400, or about .00085 for each Centigrade degree of temperature. By apparent specific gravity is meant that although the alcohol is weighed at the higher temperature given, it is compared with the same volume of water at the lower temperature of 15.6° C.=60° F.

One pint of this alcohol, officinal "alcohol fortius,"

at 10.6° C=51° F. weighs	387.72 gram.	=5983 grs.
at 30.6° C=87° F.	379.87 "	=5862 "
20° C=36° F.	7.85 "	= 121 "

Alcohol of specific gravity .82154 at 15.6° C.=60° F. when weighed at 25° C.=77° F., has an *apparent* specific gravity of .81342, and at 30.6°=87° F., .80889, or 000843 for each Centigrade degree of temperature. One pint of this alcohol, which is about the common commercial strength,

at 15.6° C.=60° F. weighs	388.05 gram.	=5988 grs.
at 25.6° C.=78° F.	384.15 "	=5938 "
10° C.=18° F.	3.90 "	= 60 "

The next alcoholic menstruum which the writer has found necessary thus far, is a mixture of equal parts, by weight, of stronger alcohol and water. This mixture rejects much more of the troublesome mucilaginous portions of such drugs as dandelion than the diluted alcohol does.

Equal weights of alcohol specific gravity .81953 at 15.6° C.=60° F. and water, give a mixture having a specific gravity

at 15.6° C.=60° F. .92858
at 25° =77° F. .92003. Difference, .000S9 for ea. 1° C.

One pint of this mixture

at 10.6° C.=51° F. weighs	439.93 gram.	=6789 grs.
at 30.6° C.=87° F. "	433 03 "	=6682 "
20° C.=36° F.	6.9 "	= 107 "

Diluted alcohol, as at present officinal, consists of equal measures, at 60° F., of alcohol of specific gravity .835 and distilled water, and has a specific gravity

at 15.6° C.=60° F. .94118.
at 25.2° C.=77° F. .93438.

This, when made from alcohol s.g. .81674 at 15.6°C. requires 100 measures of the alcohol at 15.6°C. to
112 54 " " dist. water at 15.6°C., or
100 " " " " 15.6°C.
require 88.85 " " the alcohol at 15.6°C.

Made by weight

100 parts of the alcohol require 126 80 distilled water,
or 100 " distilled water " 73 03 alcohol.
100 " alcohol s.g. 835 " 119,84 distilled water,
or 100 " distilled water " 83.44 alcohol, .835.

One pint of this diluted alcohol

at 10.6° C.=51° F. weighs	446.30 gram.	=6887 grs.
at 30.6° C.=87° F. "	439.69 "	=6785 "
20° C.=36° F.	6.61 "	= 102 "

Made with alcohol, s.g. .8208 at 15.6° C=60° F., 100 parts alcohol require 135 parts distilled water, and the s. g. of the mixture
at 15.6° C.=60° F. is 941849.
at 25° C.=77° F. is ·935422 or .000684 for each 1° C.

One pint of this mixture

at 10 6° C.=51° F. weighs	446.50 gram.	=6890 grs.
at 30.6° C =87° F. "	439.75 "	=6786 "
20° C.=36 F.	6.75 "	= 104 "

A mixture of three parts, by weight, of stronger alcohol, and one part of glycerin, proves to be a very good menstruum for cinchona and rhubarb, and may be found applicable to other drugs.

Made with alcohol of s. g. .81674 at 15.6° C.
and glycerin " 1.2523 at 15.6° C.
the mixture has a specific gravity
at 15.6° C.=60° F. .90050.
at 25° C.=77° F. .89296, or 000802 for each 1° C.

One pint of this mixture

at 10.6° C.=51° F. weighs	427.50 gram.	=6594 grs.
at 30.6° C.=87° F. "	419.82 "	=6479 "
20 C.=36° F.	7.48 "	= 115 "

* From the proceedings of the American Pharmaceutical Association, 1870.