tivity and in response to stimuli, while the thick, more muscular uteri are practically all active and sensitive. This knowledge enables the operator to save considerable amounts of time, as it renders it possible for him to distinguish between active and inactive uteri before connecting them with the apparatus.

PHARMACODYNAMIC LABORATORY,
H. K. MULFORD COMPANY,
AUGUST 1, 1917.

WATER DROPS AND WATER DROPLETS.

BY A. B. LYONS.

There has been much discussion regarding a standard dropper for accurate measuring of small quantities of fluid. It has been shown that the size of the drop depends—other things being equal—on the diameter of the delivery tube at its orifice, and that when that diameter is 3 millimeters the dropper will deliver at standard temperature 20 drops of distilled water to the mil.

Obviously the usefulness of such a dropper would be very limited, since for different liquids, including aqueous solutions of different substances, the count of the drops per mil varies greatly. We have indeed occasion often in the laboratory to measure small quantities of a liquid by drops, but for such purpose we use an ordinary pipette, ascertaining by experiment how many drops per mil it will deliver of the particular liquid we propose to measure with it. Even so, we make our measurement only from the middle third of the pipette, or from the enlarged portion of the same.

In the use of such extemporized standard droppers we have been accustomed to keep in mind the effect of temperature on the size of the drops, using them only at temperatures not more than 5 degrees centigrade above or below that at which the dropper was standardized. Inasmuch, however, as the quantities measured in this way are never large, the effect of temperature, even in cases where the coefficient of expansion is large, is almost negligible as long as measurements are made at room temperature.

There is, on the other hand, an important possible cause of variation in the size of drops delivered from a pipette or dropper which has been very generally overlooked. This is *the character of the atmosphere in which the drop is formed.* The important factors governing the size (*i. e.*, the weight) of the drop are the surface tension of the fluid and the attraction between the fluid and the surface with which it is in contact. The first of these factors may be influenced enormously by the presence in the atmosphere of certain gases or vapors.

A few simple experiments will illustrate. Deliver into an empty flask from a pipette a certain volume of water, measured by the interval between two fixed lines on the pipette, counting the drops. Now put into the flask a little ether and repeat the count. The number of drops will be more than twice as great as in the first experiment. If the flask contains some strong alcohol the number of drops will be 25 or 30 percent greater than when it is empty, or contains only water. You are no longer getting standard drops, although the pipette is delivering the same fluid as before—contaminated at most with no more than a trace of foreign substance. You may call them droplets if you choose, but as units of measure they have ceased to have value.

It is not necessary to go into detail, showing precisely how much variation is occasioned by this or that particular vapor. Little or no practical use could be made of such data. The important thing is to keep in mind the possibility of such disturbing influences in any use made of the dropper for exact measurements.

HYDROGENATED OILS AS FUTURE OINTMENT VEHICLES.*

BY ERNEST R. JONES.

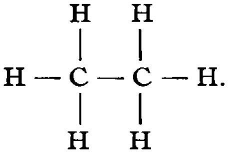
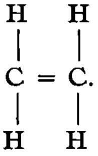
INTRODUCTION.

For many years oil chemists had been searching for a simple means of changing oleic acid into stearic acid in order to convert relatively cheap raw material into more valuable fats.

While the matter would seem very simple because of the closeness of their empirical formulae, *i. e.*, $C_{18}H_{34}O_2$ or oleic acid and $C_{18}H_{36}O_2$ or stearic acid, a difference of only two hydrogen atoms, it was not until a suitable hydrogen carrier or catalyzer was found at the very close of the nineteenth century that the changing of oleic acid into the harder stearic acid was commercially accomplished. A German patent in 1901 is probably the first one recorded having to do with the reduction of organic bodies by hydrogen in the presence of nickel catalyzers. Since that time many improvements and patents have followed rapidly.

It is not the intention of this paper to go into the technique and processes used for the hydrogenation of oils and fats, but briefly, the process consists of converting a soft fat or oil into a harder one by causing the unsaturated acids or glycerides to take on more hydrogen. To do this the fat is heated in a suitable container to about 160° C. (temperature varies in different processes) a suitable catalyzer is added, usually a salt of nickel or palladium, or the finely divided metals themselves, and hydrogen is run in under pressure, the process being continued for several hours or until the desired degree of hardness is obtained. The catalyzer is then filtered out, the product cooled and is ready for use unless further bleaching or deodorizing is desirable.[1]

CHEMISTRY OF PROCESS.

Although the hydrogenation process is essentially one of reduction it will be easier understood if we consider the new product as obtained by "addition." To explain—the graphic formula for ethane is written  $H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - H$. The graphic formula for ethylene is written  $\underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} = \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}}$. It will be noticed that in the latter

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* Read before Detroit Branch A. Ph. A., April meeting, 1918.

[1] For a more extended discourse on these processes see "Hydrogenation of Oils," by Ellis.