VII. LIQUOR CRESOLIS COMPOSITUS—COMPOUND SOLUTION OF CRESOL.

The only use of soap in this preparation is for the purpose of rendering cresol miscible with water. Any soap which accomplishes this purpose can be substituted for the expensive linseed oil, potash soap. The alcohol used in the formula is not necessary and does not serve any useful purpose. I propose that Liquor Cresolis Compositus be made from equal parts by weight of Sapo Mollis and cresol.

Solution of cresol made by this formula mixes clear with water in any proportion. It gives a light colored solution and affords a method of making that should meet with the approval of pharmacists. Cresol is an excellent solvent for soaps and the soft soaps can readily be dissolved in the cresol at a low temperature.

I respectfully suggest that this paper be referred by the Section to the Committee of Revision of the U. S. Pharmacopoeia. I submit samples which may also be turned over to the committee.

LABORATORY OF THE CINCINNATI SOAP CO.,
CINCINNATI, OHIO.

USE OF HYDROGENATED OILS AND FATS IN PHARMACY.*

BY E. V. KYSER AND C. A. MAYO.

Hydrogenation is the process of applying latent hydrogen to organic compounds which are unsaturated or, in other words, having free bonds which are capable of taking up additional hydrogen, oxygen, or any of the halogens.

Hydrogenation, however, does not confine itself to oils alone, but at the present time we are interested in this special field, the hydrogenation of oils and fats, in an endeavor to procure a substance which will prove an efficacious substitute for lard as an ointment base.

There are many methods of hydrogenation proposed, as well as in practice. The early work on hydrogenation of oils and fats was (while somewhat crude and non-applicable to quantity production) sufficient to show the feasibility of converting unsaturated glycerides of higher fatty acids into saturated compounds.

Primarily, the object sought was to convert olein or oleic acid into stearin or stearic acid which is largely used in the manufacture of candles.

The difficulty in manipulation of the earlier processes was the sluggishness or inactivity of hydrogen, and it is only within the last decade that this has been overcome by the use of catalyzers which accelerate the combining power of hydrogen and unsaturated oils.

There are many proposed catalytic agents and methods of preparation. Among these are various salts of nickel, palladium, iron; zinc and copper, as well as other metals.

In quite a number of instances these catalysts are supported by carriers or vehicles in the form of porous substances such as fullers' earth, pumice stone and kieselguhr, which have a tendency to finely divide the particles of catalyzers

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.

used. Freshly reduced nickel oxide, prepared by heating nickel to a high temperature and subsequently reducing by hydrogen, is most generally employed and is calculated to produce the best results. Generally, the prepared nickel oxide is supported on fullers' earth or pumice stone.

The procedure for hydrogenation is quite simple and leads to results that are satisfactory. The oil or fat to be hydrogenated is intimately mixed with the catalyzer in an autoclave under pressure at a temperature of 160 degrees to 250 degrees C. (depending upon the process followed as well as the oil or fat used). Either hydrogen or water gas is supplied in the quantities specified, the whole being agitated so as to insure complete or partial saturation, as desired. The procedure is regulated by taking samples which are controlled by either a titer or iodine absorption test, or by both.

Hydrogenation has been resorted to in this country mostly for the production of lard substitutes, compound lard and butter compounds, and soaps. In Europe where unsaturated oils, which are unsuited for the manufacture of soaps, are cheap and abundant, the process of hydrogenation is quite popular.

There has been some work done in this country on hydrogenated oils for ointment bases. Most oils when hydrogenated to a degree whereby their iodine value is low, become too hard and are unsuited for this purpose. In an endeavor to procure a substitute, which is of very near the same consistency as lard and having a low iodine value, we have chosen coconut oil.

This oil, nominally, is easily obtained and is usually the lowest priced of all the oils. The iodine value is low and it requires very little hydrogen to saturate its glycerides. The process was carried out in the usual way and the finished oil had an iodine value of one and a slightly higher melting point than that of lard.

The hydrogenated oil is particularly suited for use in the preparation of iodine ointment. The fact that the iodine value of lard is high and consequently the amount of iodine absorbed is large has been responsible for the substitutions of petrolatum and petroleum oils in iodine compounds to overcome this quality.

Fats for use as ointment bases are much better suited than are the petroleum substitutes since they are more readily absorbed by the skin. The wax in the pharmacopoeial ointments can be replaced by a hydrogenated oil of a higher titer and, by proper admixtures, ointment bases of any consistency can be made.

We have prepared all of the ointments of the Pharmacopoeia from a base containing hydrogenated coconut oil and stearin. The ointments are good in appearance and consistency. We have not had the opportunity to observe these for any length of time and consequently can make no definite recommendation.

We will do additional work along this line and report our observation at a later date.

ABSTRACT OF DISCUSSION.

MR. MAYO: The paper on "Proposed Changes in the Soaps of the Pharmacopoeia" bears on the paper on "The Uses of Hydrogenated Oils in Pharmacy," by Mr. Kyser and myself. I would ask that the paper and its samples be referred to the Committee on U. S. Pharmacopoeia.

MR. NITARDY: My understanding of the hydrogenation of oils is, that chemically the glycerides of oleic acid or liquid oils are changed into glycerides of stearic acid and for that reason the finished product of the completely hydrogenated oils are physically similar to stearin or tallow. Is that always the case or are there physical differences in the product?

MR. MAYO: Physically there is a difference in the degree of hardness and that is shown and mentioned in the paper; chemically the reaction is apparently the same.

MR. GRIFFITH: I wonder if I am right in saying that it depends on the nature of the oil with which you start. Palmitin oils, oils containing an amount of palmitin, do not show physical changes as quickly as those containing a large amount of olein. Consequently an oil containing a certain amount of palmitin and olein is not of such hard consistency when the end reaction is reached.

MR. JONES: About five years ago I started with some investigations along these lines. I used "Crisco;" tried it out as a substitute for ordinary lard in the making of zinc oxide ointment, advocating the adoption of a petrolatum vehicle in that particular ointment, which was afterward rejected. I have a sample of that ointment on hand which is fully five years old. However, I do not advocate keeping zinc ointment five years. This sample is perfectly smooth and a fine ointment.

One of the peculiarities of hydrogenated fats, particularly with the "Crisco," is, that when melted and quickly cooled a smooth product is obtained. The stiffness of such fat is dependent on the amount of unsaturated fatty acids or glycerides which are present.

Hydrogenated cacao butter is peculiar. When it is hydrogenated a waxy substance results which resembles in appearance carnauba wax. It has a brittle structure which probably makes it useful as a base for cacao butter suppositories.

I took up the matter with the "Crisco" manufacturers and asked them why they could not put out a stiffer hydrogenated fat than "Crisco." They replied that it was used mostly for cooking and the women did not care whether it cooled smoothly, or not. By inclusion of fifteen percent of wax a very smooth product of desirable consistency is obtained.

THE CHAIRMAN: About four years ago I had occasion to examine a sample of zinc oxide ointment. I thought there was petrolatum in it, but I found that was not the case. The melting point of the fat was a little higher than it should be, and it was certainly made of a hydrogenated oil. It was put up by a large pharmaceutical manufacturing firm, labeled strictly U. S. P. If the degree of absorption is the same it makes no particular difference, or as is usually the case with zinc oxide ointment, but when it is used in cases where rapidity of penetration is essential this point should be considered.

(Samples of hydrogenated oils were supplied by courtesy of Procter & Gamble Company.—E. V. K.)

LABORATORIES OF THE CINCINNATI SOAP COMPANY
AND THE WM. S. MERRELL COMPANY.

THE FUNCTION OF GLYCERIN IN SOME U. S. P. AND N. F. PREPARATIONS.*

BY EDSEL A. RUDDIMAN.

The object of these experiments was to determine if possible the value of glycerin in some preparations; whether it adds to the permanency or in any way makes them better.

Samples were made up in August 1918, following the formulas of the U. S. P. and N. F. At the same time samples were made up in which glycerin was replaced by other fluids. Five samples of each preparation were made as follows:

No. 1. In each case the formula given was used.

No. 2. Glycerin was replaced by syrup.

No. 3. Glycerin was replaced by water.

No. 4. Glycerin was replaced by a commercial solution of invert sugar.

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.