

specific gravity of 1.310 it certainly required more sodium citrate. Then I began looking it up and sent the memoranda of the details to our Chairman for action before the National Formulary Committee.

"With the gravity of a solution of iron of the last pharmacopœia, the trouble is that we have increased the gravity or the strength of the solution of iron in the present pharmacopœia beyond that of the last and we have not changed the quantity of sodium citrate. That is the whole substance of it. So that it would seem as though it will have to be threshed out a little more; that the sodium citrate will have to be increased."

MR. F. M. APPLE:—"That was my experience in making up the preparation."

CHAIRMAN COOK:—"The next preparation is a new preparation for the National Formulary, a compound solution of phosphates. This preparation was made with the intention that it would form a stable concentrated solution for the making of a number of other preparations which call for phosphates; notably the syrup of phosphates.

"I have samples here made over a year, and one made more recently, and quite extensive criticism of this formula by Mr. Hensel of Denver, together with criticism from Dr. Englehardt of Baltimore. The criticisms will be referred to the National Formulary Committee. Has anyone anything to say about it?"

"If not, the next preparation is the syrup made from this solution, which is also here for you to see, showing quite a striking difference in the two preparations made by the two men.

"The next preparation is the tincture of cudbear of the National Formulary. This preparation has been the cause of probably more discussion in the National Formulary Committee than any other one preparation. The preparations are here before you with some notes with regard to difficulty in percolation, which has been the old story in regard to this preparation.

"The next preparation is an antiseptic solution of pepsin. This preparation received considerable comment when it was published in the Journal a number of years ago. It is a stimulating antiseptic wash for wounds, I believe."

DR. WILBERT:—"There is nothing to say except that it is a wash used for cleaning and flushing wounds. It has been used extensively in surgical practice and with satisfaction. We have made it at the hospital for a number of years and it has been used there and in other places. It is not intended at all for internal use."

MR. EDSSEL A. RUDDIMAN:—"What effect has the antiseptics on the action of pepsin? Do they interfere there with the digestive action of pepsin?"

DR. WILBERT:—"Possibly they do, but we make the preparation up fresh. It is never kept more than a couple of months. The loss in activity is not material and we have never had any complaint from it, at least not in my time."

CHAIRMAN COOK:—"The next preparation is the syrup of hydriodic acid. The formula is here rather for you to see than to comment upon specially. I might say that glycerin has been omitted in the preparation of syrup of hydriodic acid. This was originally proposed but found to be objectionable. The formula is modified to this extent. This is practically the same as the present U. S. P. excepting that the amount of hydriodic acid is slightly increased so that instead of one *per cent.* I think we will have about 1.25 *per cent.* present. It is also made up instead of by weight, by mixing volumes.

"The next preparation that I have on my list is solution of magnesia citrate. Unfortunately, the sample was broken in transportation. I have had a number of criticisms. Anyone who would like to say anything about the newly proposed formula for solution of magnesium citrate?"

"If there is no discussion, the next preparation will be elixir of phosphorus. The preparations you have before you. The old criticism that has come in, is that they prefer the old method. The formula itself is probably satisfactory.

"That concludes the preparations that I had specifically selected in filling out the program as I had planned it.

"I would now ask for the reading of the paper on zinc oxide ointment by Mr. Ernest R. Jones."

A NEEDED CHANGE IN OINTMENT ZINC OXIDE, U. S. P.

ERNEST R. JONES, PH. C.

It is a well-known fact that this ointment, after standing for a little while, becomes very granular and is anything but a sample of pharmaceutical elegance.

Most of the previous papers on this subject have ascribed the cause as due to the zinc oxide or to faulty compounding of the formula, and have suggested changes in the manipulation of the present formula which were expected to produce a permanently smooth ointment.

Some have advocated rubbing the zinc oxide until thoroughly smooth with a small quantity of a fixed oil, such as castor, olive or cottonseed oil; then incorporating the lard. Others have tried the expedient of first bolting the zinc oxide very finely. Another endeavored to accomplish the same purpose by a process of elutriating the zinc oxide.

It is very doubtful if any of these persons have kept their product under observation during a sufficient length of time, say perhaps a year, in order that it could have encountered the different changes in temperature. I have tried all of the different suggestions, but have not as yet found any that solved the difficulties. I recently had an opportunity to observe a one-pound sample of U. S. P. ointment which had been made according to one of these new schemes of manipulation and which, after setting undisturbed on the shelf for over a year, was apparently as good as when made. It seemed to have solved the difficulty, until upon digging down toward the bottom of it, we found that the lower portion was soft, granular, and almost semi-liquid, whereas the top portion was smooth and hard. This would indicate that a separation of the constituents of the lard had taken place.

The writer once had an idea that possibly enough saponification took place between the free acids of the lard and the zinc oxide to liberate enough water to cause the trouble. There is no doubt that some zinc compounds are formed with the acids, for they may be separated with ether. Careful estimation of the amount of water present in the ingredients before making them into the ointment, and estimations of the amount present in the ointment after standing six months, showed that this reaction does not take place to a degree sufficient to cause the granulation.

With a view to determining whether the granulation was caused by the zinc oxide not being in a fine enough state of division, my co-worker, Mr. French, made up a sample following the U. S. P. directions carefully, and then passed it through an ointment mill ten times. Surely the zinc oxide must have been fine enough after this treatment to eliminate any cause for trouble in this respect. However, after a short while it was just as granular as the others.

You gentlemen are all familiar with the composition of lard and know that its constituents vary considerably in physical characteristics. The glyceride of oleic acid is a liquid, while those of palmitic and stearic are solids. If you will examine good lard under a low power microscope, you will observe that it has a very "seedy" appearance, indicating that it is not entirely a homogenous mixture of the combined glycerides. As a warmer temperature is attained, my opinion is that the olein, on account of its liquid nature has a tendency to separate and that upon cooling again without stirring, the stearin and palmitin being more solid, is partly separated in such a manner as to cause the granular appearance.

I have here for your inspection, a sample of benzoinated lard which, four months ago, was as nice a product as one could desire. Granular lumps are now perceptible to the naked eye. This is strong proof that the cause of the trouble is not due to the zinc oxide, but rather to the lard.

My conclusion is then, that just as long as we continue to use benzoinated lard for a base, we must continue to expect trouble from this ointment.

That the lard is the cause of the granulation can be proved by substituting

petrolatum in its place. Such an ointment will remain smooth for an indefinite period. I have here a sample that is nearly one year old, and is perfect in appearance.

It is not my purpose to suggest another method for manipulating the present formula so as to make a permanently smooth ointment, for because of the peculiar composition of the lard, which was previously explained, I do not believe it can be done.

I sincerely believe, however, that the next edition of the U. S. P. should replace the benzoinated lard with a petrolatum base. This idea is not original with the writer. The Swiss and French Pharmacopœias use a base of white petrolatum, thus proving that two countries are aware of its superiority. Several manufacturing houses have, during the past few years, made a special ointment with a petrolatum base, in addition to the regular U. S. P. product.

The question may be raised that lard is better absorbed by the skin than is petrolatum, and according to some recent research reports it is quite likely that it is. Cushny says that "emollient preparations promote the absorption by the skin of drugs dissolved in them because the fat mixes readily with the thin layer of oily sebaceous matter which covers the skin." Inasmuch as the zinc oxide is not dissolved in the lard, the difference in absorption value between lard and petrolatum is of little value in this case. Just how zinc oxide ointment acts when applied to the skin, is hard to determine. Some claim it to be merely soothing. If so, would not the result be just as satisfactory without the zinc oxide? Others claim it to be healing because of its astringency. This seems quite probable, and Cushny says the astringency of zinc compounds is due to their forming insoluble albuminates. This is purely, then, a local action and in my opinion should take place from a petrolatum base as well as from lard.

If the choice of base has no advantage from a therapeutic standpoint, but has from the pharmaceutical, why should we not make a change in its formula?

The simplest formula would consist of 20% of zinc oxide and 80% white petrolatum. This makes a fine product, but is quite a bit softer than we are accustomed to see it and would therefore alter the consistency of every other established preparation which it enters into. The following formula, which is hardened with white wax gives a product resembling the consistency of the present ointment.

Zinc Oxide	200 Gm.
White Wax	150 Gm.
White Petrolatum	650 Gm.

Rub the zinc oxide, which must be free from gritty particles, with an equal weight of melted white petrolatum until smooth and add to this the remainder of the white petrolatum which has been previously melted with the white wax. Strain the ointment while warm and stir thoroughly until it congeals.

One more point of interest, is that the U. S. P. ointment is stronger than that of any other Pharmacopœia. Those of the Swiss, Spanish, Japanese, French, Netherlands and German Pharmacopœia contain 10% of zinc oxide; the Austrian and British, 15%; and finally the U. S. P. which stands alone with 20%. I believe that 10% of zinc oxide is quite sufficient, inasmuch as it is probably not absorbed by the skin, and the extra 10% is wasted.

These suggestions are presented, not as representing any new discovery, but with an idea of trying to convince the Revision Committee that the time has arrived to change the base of this ointment and avoid inflicting another ten years of hardship on the pharmacist.

The white petrolatum base makes a smooth, white ointment which does not granulate or turn rancid. Why not adopt it in the next U. S. P.?

DISCUSSION.

MR. STOLZ:—"That paper appeals to me, and I thank the gentleman for having written such a beautiful paper, because I think zinc ointment is a very serious question with a great many of us.

"A number of the manufacturing houses put up zinc oxide ointment and we buy it in twenty-five and fifty pound lots. We happened to get in a jar from Squibb & Son and when we had used about ten pounds of it it became granulated. We took it up with the representative and he simply told me 'Mr. Stolz, we make our ointment U. S. P. with benzoated lard. We hear that complaint all over.'

"I would like to ask Mr. Cook if they have done anything in the new Pharmacopœia toward changing the base."

CHAIRMAN COOK:—"The formula is to be retained."

MR. GRAY:—"I have been serving the leading physicians of Chicago in a hospital for eight years, and we have used nothing but the vaseline base for zinc ointment."

MR. I. A. BECKER:—"My house also furnishes a zinc oxide ointment with vaseline base."

DR. WILBERT:—"We have been using it for twenty-five years,—so long as this is an experience meeting."

MR. STOLZ:—"You will find ninety *per cent.* of manufacturing houses sending out zinc oxide ointment with petrolatum base."

MR. E. R. SELZER:—"I move that this section recommend to the Revision Committee the adoption of petrolatum as a vehicle instead of benzoated lard."

MR. WILBERT:—"I second the motion."

CHAIRMAN COOK:—"The motion before the house is that it is the sense of this section or at least it is recommended by this section that the Revision Committee adopt petrolatum instead of benzoated lard in zinc oxide ointment."

Motion duly carried.

MR. L. C. HOPP:—"I think the great trouble with zinc oxide ointment is that the benzoated lard becomes slightly rancid, and you can overcome that to a certain extent by using a little alkali mixing it with your lard. I tried that and it worked out all right. We have doctors who insist that lard be used in their preparations, and one man in particular, when he is prescribing zinc oxide ointment and don't know where the prescription will be put up, specifies 'This shall be made up with benzoated lard.'"

MR. GRAY:—"I would suggest, if it is in order, that we classify our ointment absorbent and non-absorbent. I believe some pharmacopœias do that."

MR. JONES:—"I anticipated some argument on this question and I would like to say I have worked on some experiments to see if we could not use a mixed base of benzoated lard and petrolatum, and I found I could use twenty-five *per cent.* of lard and still make quite a good ointment, but the experiment has not been standing long enough to warrant me in incorporating it in the paper. They have been standing about six months and look very good."

MR. W. F. JACKMAN:—"This is one point I do not think we have considered, a number of our citizens in the United States object to the hog on religious grounds as well as sanitary grounds, and to meet such a situation one-fourth wool fat and three-fourths petrolatum I think is fully equivalent to the formula under discussion."

CHAIRMAN COOK:—"The next order of business on the program is the election of officers, but as explained to the section on Tuesday, the Council have directed or have arranged in their own minds that this section be discontinued as a section. It becomes a special committee of the Practical Pharmacy section. The chairman of that special committee is to be appointed by the Section of Practical Pharmacy."

"All the other set features having been taken care of, I will offer the opportunity at this time,—it is just twenty minutes to twelve and the automobile ride, I believe, is at 2:30—I will allow any time now to the consideration of any one of these preparations before you, which you may be specifically interested in. We will get the samples out here and give you an opportunity to tell briefly, if possible, any difficulty you may have, so these criticisms may go before the committee. All the criticisms that have come in will be before the committee."

DR. WILBERT:—"Before the members leave the room, and in view of the fact that this is the last session of this particular section, I would like to move a vote of thanks to the Chairman for the excellent work he has done in connection with this particular section. I think his getting together this exhibition is an object lesson that may well be appreciated, and the only unfortunate thing is that more men in the retail business have not been able to see it

or have not taken time to look at the various preparations of the exhibit and profit by the possible short-comings that have been evidenced thereby.

"I would move, Mr. Secretary, that a rising vote of thanks be extended to the Chairm for the excellent work he has done in this section."

SECRETARY THUM:—"A motion has been made and seconded that a vote of thanks be extended to Chairman Cook for the excellent work he has performed in this section. All in favor of this motion will please rise."

(Unanimously carried.)

CHAIRMAN COOK:—"Thank you, gentlemen. I am sure that the success of this section has depended upon the splendid coöperation of about fifty members of the A. Ph. A., and thanks are due them.

"If there is no special preparation you wish to discuss, a motion to adjourn will be in order."

DR. WILBERT:—"I make the motion, Mr. Chairman."

Motion carried.

HIGH EXPLOSIVES IN WARFARE.

The high explosives being used for artillery shells in the war constitute the subject of an interesting article in *Nature*. For military purposes explosives of the nitro-glycerin class and many others are excluded, because the military high explosive must be sufficiently insensitive to shock to prevent its being exploded when struck by projectiles or when submitted to the shock of being fired from a gun as the charge of shell. Gun-cotton, containing a considerable amount of moisture, was formerly used for many years. This provided an excellent and safe explosive for military mines and purposes of destruction and as a charge for torpedoes, but was not suited for use in shells. The high explosives chiefly being used for shell-firing at present are picric acid, trinitrotoluol, and ammonal. Picric acid, which superseded black gunpowder, has been in use in most countries under the names of melinite, lyddite, shimose powder, etc. But, although sufficiently insensitive to shock, it has the disadvantage of readily attacking metals and forming picrates, which are much more sensitive and liable to explosion. Ammonal is a mixture of ammonium nitrate, trinitrotoluol, charcoal, and aluminum in fine powder. It is safer and more powerful than picric acid, but needs to be very carefully guarded from moisture on account of the hygroscopic character of ammonium nitrate. Trinitrotoluol, known under the names of Trotyl, Tritolo, Tolite, Tritol, Trilite, and T.N.T., is the most widely used military high explosive. It is less sensitive to shock than picric acid, is chemically stable and unaffected by water and metals, and can be fused and run into shells in the molten state. Hard blocks of suitable size and shape are covered by electroplating them with copper, to prevent their being broken or chipped. The destructive effect of an explosion is caused by the almost instantaneous conversion of the solid explosive into gases at a very high temperature, with the consequent sudden exertion of an enormous pressure. In addition, where the explosion takes place in a closed space, the resulting gases, especially carbon dioxide, may have poisonous effects on anyone having to breathe them.