

If the list of Diagnostical Reagents is to be continued, why not enlarge, and increase it, and especially the clinical tests, if a pharmacist is to aid a physician? As it is, too much is dark and confusing, and the information needed must be obtained elsewhere.

The Tables of Thermometric Equivalents on pages 628 to 632 are nice to look at, but of no real value. Why not give boiling point tables, and the physical factors and corrections for altitude? Out here the boiling points of the U. S. P. are useless in determining substances, and identifying substances by distilling or melting them. One must always go to physical chemistry data and tables to know where he stands. If the U. S. P. is to serve us in the West in this respect, at an altitude from 5,000 to 7,000 feet, as it does those in the East at sea level, some vital changes must be made. If the U. S. P. is to serve the drug analyst and forensic chemist in matters pharmaceutical, changes in boiling points will be necessary for those in such high altitudes.

The tables of specific gravity of the acids and ammonia, and for the determining of the percentages of alcohol are good, and are very useful for quick assay. But what about the tables on pages 650, 651, 652 and 653? They are splendid, but too brief. To the average person too much is left to be interpreted or guessed at, and only experts know the value of them. Why not extend them to include more of similar tables, as is done in bulletins of the Bureau of Standards, so as to cover all the important apparatus used in pharmacy, with an added explanation as to their use? It certainly would be an improvement and show advancement of the scientific phase of pharmacy, which is the chief emphasis of Part II.

The Metric Equivalents and Tables for Converting Metric Quantities are good, and should be continued.

The above thoughts and questions are set forth with the idea of getting at the why of this and that in the U. S. P. Part II especially. It is time that the pharmacist be in the front line with the brother professions and not always trailing and taking their dust. Therefore the remarks are made with the idea that the U. S. P. become a scientific standard in Part II, especially along the chemical, pharmaceutical and pharmacological lines that are therein used in standardization and assaying.

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OINTMENT OF ZINC OXIDE.*

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Early in 1918 the Medical Department of the Army asked assistance from the Council on Pharmacy and Chemistry of the American Medical Association in the selection of medicaments for the use of the Army. Among these medicaments was ointment of zinc oxide and the Chemical Laboratory of the A. M. A. was called upon for suggestions in connection with this item. A number of questions were at once raised and work was started to decide upon the best practicable

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formula for ointment of zinc oxide from the standpoint of therapeutic activity and keeping qualities.

So much has been published on the subject of ointment of zinc oxide that the writer has refrained from any attempt to present a review of the literature, but draws his own conclusions from his study of the published articles. Any one wishing to review the literature will find a very complete list of references and brief abstracts in the Digest of Comments on the U. S. P. and N. F. published by the Hygienic Laboratory of the United States Public Health Service. The volumes of the Proceedings and the Year Book of the American Pharmaceutical Association also contain many references to articles on the subject.

In discussing ointment of zinc oxide we may divide the subject into two distinct parts, therapeutics and keeping qualities. Subordinate to these are the subjects of physical characteristics and composition.

THERAPEUTICS.

In looking over the published work on this ointment we are made aware of some very conflicting statements as to its use as a therapeutic agent. A careful summing up of these opinions leaves one with the strong impression that ointment of zinc oxide is used solely for its local, emollient, and astringent effect, or as a protective. The most convincing evidence in this connection is a recent report by Dr. T. Sollmann to Sub-Committee 13 of the Committee of Revision of the U. S. P.¹ This report is based upon a questionnaire submitted to the members of the American Dermatological Association by its secretary, Dr. U. J. Wile. It is pointed out here that the question of absorption does not enter into the case and even if it did to determine its extent is a well-nigh hopeless task. This is in accord with the writer's experience. When this work was started it was the intention to devise some scheme for determining the absorption of the various samples made. A few experiments and an examination of the literature completely discouraged such attempts, for the present at least. For the purpose of this present paper, then, the writer considers the question of therapeutics as unimportant since any ointment will be satisfactory if it has the desired keeping qualities and physical characteristics. The formulas originally designed, because of their supposedly ready absorption, are still discussed, but from the last-mentioned standpoints only.

KEEPING QUALITIES.

As to the keeping qualities of the host of formulas proposed the published evidence is overwhelmingly against lard as a vehicle. It is quite generally conceded that an ointment made with lard, even benzoinated lard, will become rancid in time. This is as the writer found it during about fifteen years of experience with this ointment. The only way to have a U. S. P. ointment free from rancidity is to make it with perfectly fresh lard and in quantities that will be disposed of within a few weeks. Frequently the lard will be unsatisfactory to begin with, if not carefully selected. That this is not the case with ointment properly made with good petrolatum as a base, is pointed out by a number of writers and supported by the experiments recorded here.

¹ See *Jour. A. M. A.*, Nov. 20, 1920, p. 1420.

PHYSICAL CHARACTERISTICS.

It is generally conceded that an ointment of zinc oxide made with lard as a vehicle will granulate. This has always been the writer's experience. The petrolatum ointments do not granulate.

The best melting point is a difficult factor to determine. Temperature is such a variable quantity that no one formula will answer under all conditions.

A good zinc oxide ointment should be free from lumps of oxide or grit, *i. e.*, perfectly smooth. This can be accomplished by proper manipulation with most any of the vehicles proposed. The writer maintains that the best way to insure this (aside from mixing in a mill) is to use a glass slab and a spatula for mixing. The larger the quantity of ointment the larger the slab and spatula should be. Keep the slab warm and the task is not a difficult one even with quantities of five pounds.

Most ointments made with lard and wax will show shrinkage, *i. e.*, they will shrink away from the walls of the container. Most of those made with yellow petrolatum and with lanolin will show some separation of oily matter and some shrinkage. All this is objectionable.

To devise a single formula which gives an ointment possessing all the desirable qualities and none of the undesirable is out of the question, in the writer's opinion. All that can be done is to select a formula that comes nearest to doing this under average conditions. Should the needs of a physician be unusual, or the conditions unusual, then the physician should write a special prescription. It is very desirable, however, to have a basic formula which the physician can easily modify to meet his particular needs, that is, one which might be perfumed, made a little harder, might be diluted, etc. (The U. S. P. ointment contains twenty percent of zinc oxide which is twice the strength of most other pharmacopoeias.) To be in a position to recommend such a formula a number of ointments were prepared and have been under observation since June 1918. The absorbability was in mind when the ointments of the lanolin type were made, but since that question has been eliminated they are considered along with the others only on the basis of keeping qualities and physical characteristics.

The composition of the various ointments prepared is given below. They have been kept under conditions about the same as in a pharmacy.

OINTMENTS OF LARD TYPE.			
No. 7.	Crisco.....	67.5 Gm.	Paraffin..... 15 Gm.
	White wax.....	12.5 Gm.	Zinc oxide..... 20 Gm.
	Zinc oxide.....	20 Gm.	No. 12. Petrolatum, yellow..... 65 Gm.
No. 8.	Lard, benzoinated.....	70 Gm.	White wax..... 15 Gm.
	White wax.....	10 Gm.	Zinc oxide..... 20 Gm.
	Zinc oxide.....	20 Gm.	
OINTMENTS OF PETROLATUM TYPE.			OINTMENTS OF LANOLIN TYPE.
No. 1.	White petrolatum.....	65 Gm.	No. 2. Lanolin, anhydrous..... 65 Gm.
	White wax.....	15 Gm.	Paraffin..... 15 Gm.
	Zinc oxide.....	20 Gm.	Zinc oxide..... 20 Gm.
No. 4.	White petrolatum.....	65 Gm.	No. 3. Lanolin, anhydrous..... 65 Gm.
	Paraffin.....	15 Gm.	White wax..... 15 Gm.
	Zinc oxide.....	20 Gm.	Zinc oxide..... 20 Gm.
No. 11.	Petrolatum, yellow.....	65 Gm.	No. 5. Lanolin, anhydrous..... 45 Gm.
			Paraffin..... 15 Gm.
			Water..... 20 Gm.
			Zinc oxide..... 20 Gm.

OINTMENTS OF LANOLIN TYPE.

No. 6.	Lanolin, anhydrous	20 Gm.		Hydrous lanolin	10 Gm.
	Petrolatum, yellow	45 Gm.		Zinc oxide	20 Gm.
	White wax	15 Gm.	No. 10.	Hydrous lanolin	40 Gm.
	Zinc oxide	20 Gm.		Petrolatum, yellow	40 Gm.
No. 9.	Petrolatum, yellow	70 Gm.		Zinc oxide	20 Gm.

In addition to the above, a sample of strictly U. S. P. ointment was prepared at the same time as the others and is included in the discussion.

The conclusions are drawn from an examination made in November 1920, about 2¹/₂ years after the preparation of the samples.

The results are summarized in the table below.

Lard type.	Odor.	Consistency.	Smooth.	Oily.	Shrinkage.
No. 7	objectionable	little hard	yes	no	some
No. 8	objectionable	hard	granular	no	much
U. S. P.	objectionable	soft	granular	no	none
Petrolatum type:					
No. 1	slight	good	yes	no	very little
No. 4	odorless	good	yes	no	none
No. 11	objectionable	good	yes	yes	none
No. 12	objectionable	good	yes	yes	some
Lanolin type:					
No. 2	very objectionable	good	yes	yes	much
No. 3	very objectionable	hard, gummy	yes	slight	much
No. 5	very objectionable	good	yes	no	some
No. 6	objectionable	good	yes	yes	none
No. 9	objectionable	soft	yes	yes	some
No. 10	objectionable	soft	yes	yes	none

CONCLUSIONS.

1. Lard makes an ointment that develops a disagreeable odor and one that granulates.

2. Yellow petrolatum makes an ointment that develops a disagreeable odor. The writer would be inclined to discount the evidence presented by Nos. 11 and 12 had he not seen the same thing happen in other like cases and with some samples of yellow petrolatum alone.

3. Lanolin makes an ointment with an unpleasant odor even when fresh. This becomes more disagreeable in time.

4. White wax gives an ointment that has some disagreeable odor and one that is very liable to shrink.

5. Ointments made with yellow petrolatum or containing lanolin are likely to show some separation of oily drops.

6. The ideal ointment is No. 4, made with white petrolatum and paraffin. It could easily be made harder by adding more paraffin. It could easily be diluted with petrolatum or with petrolatum and paraffin. It could easily be perfumed. It would not be readily acted upon by other medicaments which a physician might wish to add. It is odorless, does not shrink, and does not separate or granulate.

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