

Some of the most interesting programs on the air are those of manufacturers of products sold through retail drug stores. The enterprising druggist will make the hosts of radio fame, salesman for his retail drug store.

Radio broadcasting is a new element in the social life of the public which brings outstanding entertainment into the private home at small cost. Radio advertising opens up a new medium for manufacturers through which they can reach millions of consumers and sell their product by word of mouth. Radio merchandising is a new field for the retail druggist which offers great returns if he will take advantage of its opportunities.

Broadcasting, Advertising and Merchandising are all in their comparative infancy—all have latent possibilities which are gradually being developed.

The report I have made to you is based on the results of less than six months' research.

Our first studies of this interesting and profitable subject have not only shown what can be done but have given us the perspective to plan further studies. Future work will undoubtedly develop additional methods of going after this valuable new business. The effectiveness of radio display under new and different conditions will shortly be studied and valuable compilations of data released.

A PROPOSED FORMULA FOR ZINC OXIDE OINTMENT.*

BY R. K. MILLER, H. G. DEKAY AND C. O. LEE.

INTRODUCTION.

The dispensary at Purdue University School of Pharmacy has the privilege of furnishing the Athletic Department of the University with a number of pharmaceuticals, including ointments, rubs, etc. About four years ago the trainer in charge of the athletes complained that the ointment of zinc oxide was so stiff and harsh in cold weather that the boys objected to it and refused to use it upon abraded areas. He asked if it could not be made a little softer. We replaced a part of the paraffin in the formula with liquid petrolatum and the preparation was acceptable to those concerned.

While we have not hesitated to supply a modified ointment of zinc oxide to our Athletic Department, we have continued to teach our students to make it according to the U. S. P. It is quite difficult to make an elegant ointment from the official formula. Few ointments give the average class in pharmacy as much trouble as the zinc oxide formula. We have tried all sorts of ways in technique in an effort to get a better product with the U. S. P. formula without any marked success.

During the past few months we have given some study and experimentation to the development of a more satisfactory ointment. It has been our purpose to do two things. *First*, to develop a more acceptable formula and, *second*, to simplify the method of making so that any pharmacist would always be able to

* Section on Practical Pharmacy and Dispensing, A. P. H. A., Miami meeting, 1931.

get a good product with a minimum of effort and time. It is believed that these aims have been accomplished, in part, at least.

EXPERIMENTAL.

Several compound bases were made up consisting of 85% to 90% white petrolatum. The remainder was composed of anhydrous lanolin, paraffin and ceta-
ceum. Table I gives the formulas that were tried.

TABLE I.—OINTMENT BASE FORMULAS.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Anhydrous lanolin	5%	5%	..	5%	5%	10%
Paraffin	5%	10%	10%	5%
Cetaceum	10%	5%	..
White petrolatum	90%	85%	90%	85%	90%	85%

The bases were made by carefully fusing the ingredients upon a water-bath. They were then stirred just enough to insure thorough mixing and set aside to congeal without further stirring. These bases were then used in preparing 20% zinc oxide ointments.

It is always a problem to incorporate any dry insoluble powder into a fatty base and have the ointment entirely free from grittiness to the sight and to the touch. The base lubricates the little granules or lumps so effectively that rather severe rubbing or grinding is very often necessary for great smoothness in the finished ointment. If the powder could be reduced to smoothness before being incorporated in the fatty base, then to complete the ointment would be a matter of thorough mixing. This idea was tried out in the manufacture of 20% zinc oxide ointments from each of the six bases represented in Table I. Three ointments

TABLE II.—20% ZINC OXIDE OINTMENTS.

Base.	Liquid used to form paste with ZnO.	Surface Blistering after Fifteen Days. At 33° C.		Surface Separation after Fifteen Days. At 33° C.	
		At 33° C.	In lab.	At 33° C.	In lab.
*No. 1	Alcohol	** +	+	—	—
*No. 1	Water	+	+	—	—
*No. 1	Glycerin	** —	—	—	—
*No. 2	Alcohol	+	+	Slight	—
*No. 2	Water	+	+	—	—
*No. 2	Glycerin	—	—	Slight	—
*No. 3	Alcohol	+	+	Slight	—
*No. 3	Water	+	—	Slight	—
*No. 3	Glycerin	—	—	Slight	—
*No. 4	Alcohol	+	+	Marked	—
*No. 4	Water	+	+	Marked	—
*No. 4	Glycerin	—	—	Marked	—
*No. 5	Alcohol	+	+	+	—
*No. 5	Water	+	+	+	—
*No. 5	Glycerin	—	—	+	—
*No. 6	Alcohol	+	+	+	—
*No. 6	Water	+	+	+	—
*No. 6	Glycerin	Slight	—	+	—

* See Table I.

** *Plus* for present; *minus* for absent.

were prepared from each base, using alcohol, water and glycerin, respectively, as liquids with which to form pastes with the zinc oxide. It was found that about 12 Gm. of glycerin would make a very smooth paste with 20 Gm. of zinc oxide in a short time by using either a mortar or a slab. Such a paste mixed readily with the bases. Alcohol and water worked reasonably well, also, but there was reason to believe that their use would be objectionable for stock ointments. This assumption was verified by subjecting the ointments to standing in the laboratory and to an oven temperature of 33° C. for a period of two weeks. The results of the experiment are given in Table II.

It was observed that surface blistering appeared in those ointments where alcohol and water had been used. Only in one case did slight blistering appear in ointments containing glycerin. As to separation upon standing, none was observable at laboratory temperature. At the oven temperature there was slight oily separation in several of the formulas. There was nothing to indicate, however, that the use of alcohol, water or glycerin was in any way responsible for the separation observed.

As a result of these observations the following formula for ointment of zinc oxide is suggested; (See Table II Base No. 1 with glycerin.)

Anhydrous lanolin	34 Gm.
Paraffin	34 Gm.
White petrolatum	612 Gm.
Glycerin	120 Gm.
Zinc oxide	200 Gm.

The procedure for making this ointment is as follows: Melt the paraffin in a suitable dish upon a water-bath. To it add the petrolatum and lastly the lanolin. When all is melted, stir just enough to insure thorough mixing and set aside to congeal. Rub the zinc oxide to a smooth paste with the glycerin and mix it with the required amount of the base.

The paraffin in this formula may be replaced with white wax or cetaceum. However, our study has not been carried far enough to see any particular advantage in these substitutions. The consistency of the finished ointment may be changed to suit one's fancy by varying the proportionate amounts of paraffin and petrolatum.

It appears to us that a compound base such as we have suggested has a great deal in its favor. It is simple in composition and very easy to make. Its consistency and keeping qualities are good. In fact, there is no reason why it should not prove to be a good stock base for a number of ointments. Studies are now being made in our laboratories in this direction. Hydrogenated oils, as ointment bases, are also being studied.

THE USE OF GLYCERIN, WATER AND OTHER AGENTS.

The use of glycerin, for the purpose of getting the zinc oxide into a smooth paste, has been made in the manufacture of the ointment. Williams (1) in 1886 recommended that 4 ounces of glycerin for each 5 ounces of zinc oxide be rubbed into a paste before being incorporated in a base of benzoinated lard and white wax. In 1900 Burrows (2) suggested that the zinc oxide be rubbed into a paste with an equal amount of water before being incorporated in a base composed of white petrolatum 50 parts and wool fat 10 parts. Later, Magoffin (3) used enough

glycerin to make a smooth paste of the zinc oxide before incorporating it in the base. He said, "It's but a little thing but it saves a lot of vexatious labor, is done in a few moments and is eminently satisfactory." We certainly agree that it saves a lot of vexatious labor. Cruse (4) used equal amounts of glycerin and zinc oxide to get an ointment free from grittiness.

A number of workers have used various oils to rub the zinc oxide to a smooth paste previous to incorporating it in the base. They report varying degrees of success. Such use of oils, of course, is quite logical but we prefer glycerin for ointment of zinc oxide.

NEED FOR AN IMPROVED BASE FOR OXIDE OF ZINC OINTMENT.

The U. S. P. X formula for ointment of zinc oxide makes a product that is too harsh and stiff, especially in cool weather, and the U. S. P. IX formula is entirely too thin for warm weather. It certainly should be possible to work out a formula which would be quite free from these objections.

The change from benzoinated lard to petrolatum, as a base for this ointment was made with considerable opposition, yet all knew how impossible lard was except for extemporaneous use. In 1915, Jones (5), in a paper entitled, "A Needed Change in Ointment of Zinc Oxide," reported a study of this ointment. He said, "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." In the discussion following the presentation of Jones' paper it was revealed that zinc oxide ointment, with a petrolatum base was a common product of pharmaceutical manufacturers and quite generally used in dispensaries. It seems that the discussion turned the tide in favor of a petrolatum base for this ointment.

It is to be regretted that the present official formula has been found to be so objectionable. Concerning it, Nitardy (6) says, "Ointment of zinc oxide seems to be entirely too stiff to be satisfactory for general use and it would seem desirable to change the paraffin content from 15% to about 5%." The ointment, as we have said, is not only too stiff but it is too troublesome to make.

THE QUESTION OF THERAPEUTICS.

The question of therapeutic value is sure to be raised in connection with a discussion of a change in type of base for any ointment. In an effort to be correct in the choice of the proper base for ointment of zinc oxide, Sollmann (7), in 1920, sent out a questionnaire to the American Dermatologists in which he asked for a statement of preference as to the base for this ointment. He says, "The concensus among the leading dermatologists is distinctly in favor of petrolatum as the basis of zinc oxide ointment as being equal to lard therapeutically and superior in consistency, keeping quality and absence of irritation." It was further suggested that lard could be used in extemporaneous ointments, if preferred.

In discussing this question, Gersterner (8) said, "In the case of zinc oxide ointment, however, the therapeutic value of the ointment depends upon the astringency of the powdered zinc oxide and not upon the nature of the base. Therefore, petrolatum would possess all of the advantages without any of the above mentioned disadvantages." Clark (9), in 1920, made a study of several compound formulas for zinc oxide ointment. Concerning the subject of therapeutics he said,

"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." As a result of his experimentation, Clark proposed the present official formula. We believe that it is far from a pharmaceutically ideal ointment and we have already stated our objections to it. At the time this formula was proposed Beringer (10) criticized it and stated that it was hard to get a smooth ointment with the amount of paraffin present.

We do not claim that our proposed formula for ointment of zinc oxide is ideal but we do believe it is an improvement over the past and present official formulas. We shall be glad to receive suggestions for further study and improvement.

REFERENCES.

- (1) *Am. J. Pharm.*, 58 (1886), 538.
- (2) *Merck's Report*, 9 (1900), 101.
- (3) *Drug. Circ.*, 49 (1905), 346.
- (4) *Pharm. Ztg.*, 51 (1906), 906. (Proc. A. Ph. A., 55, 701.)
- (5) *Jour. A. P. H. A.*, 4 (1915), 284.
- (6) *Ibid.*, 19 (1930), 1008.
- (7) *Jour. A. M. A.*, 75 (1920), 1420.
- (8) *Jour. A. Ph. A.*, 9 (1920), 491.
- (9) *Ibid.*, 9 (1920), 1171.
- (10) *U. S. P. Cir. Gen. Com.*, 5 (1920), 2039.

PURDUE UNIVERSITY, SCHOOL OF PHARMACY.

A NEW IODINE OINTMENT FOR ANTISEPTIC PURPOSES.*

BY CHARLES H. LAWALL AND LINWOOD F. TICE.

The U. S. P. ointment of iodine is an excellent counter-irritant but illogical as an antiseptic dressing.

A one per cent ointment was devised which has shown excellent results from the standpoints of both effectiveness and stability.

The ointment base selected was white petrolatum, this variety being almost entirely free from unsaturated hydrocarbons which of course would readily absorb iodine and consequently diminish its germicidal activity.

To use a fatty base for the purpose of furthering iodine absorption by the skin is striving for an end which according to most authorities is impossible and, even if it were possible, absorption of iodine would be undesirable in an antiseptic dressing; to get a systemic iodine effect following the use of an antiseptic preparation would be objectionable.

In preparing this antiseptic ointment, Dioxan was used. This is recently developed at the Mellon Institute, and is chemically a double ether, diethylene dioxide. This combination produces a stable mixture of iodine and petrolatum, an achievement which heretofore has been impossible as petrolatum alone will maintain the full iodine strength but a short time, as the element escapes by volatilization.

Dioxan is a remarkable solvent in that it is completely miscible with petrolatum and also completely miscible with water. Thus an ointment made by incorporating

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