greater portion of the resin content can be dissolved from the drug in a 15-minute maceration period. The efficiency of extraction of resin increases slowly with increase in the duration of the maceration period so that at the end of 36 hours less than 5 per cent of the resin remains undissolved in the marc. In the case of ipomea, equilibrium is reached at the end of 24 hours of maceration.

In this respect ipomea varies somewhat with other drugs studied. Husa and Magid (2) showed that equilibrium in the extraction of alkaloids by maceration from belladonna root in Nos. 40, 60 and 80 powders was reached in 15 minutes. In the case of jalap, Husa and Fehder (4) found that equilibrium in the extraction of resin was reached within 15 minutes. On the other hand, Husa and Lee (5) attained equilibrium only after 36 hours of maceration of 10 Gm. of podophyllum with 90 Gm. of alcohol.

Extraction by Percolation.—The results in Table IV show that more than 95 per cent of the resin content of ipomea can be obtained in 750 cc. of percolate from 250 Gm. of drug. At least 90 per cent of the resin is found in that fraction of percolate numerically equal in cc. to the weight in Gm. of drug taken for extraction. Moistening of drug before packing is without notable advantage. Extraction of resin is more complete from drug packed tightly than from drug packed less tightly.

Forced Percolation through a Long Column of Drug.—Using the method of forced percolation through a long column of drug it was found that more than 99 per cent of the resin could be extracted in the first 1000 cc. of percolate from 1000 Gm. of drug. The air pressure employed for forcing the menstruum through the drug was maintained at 5 to 6 lb. per sq. in. throughout the extraction process. The moistened drug was packed in small successive portions with firm pressure.

Using the same apparatus, Husa and Huyck (3) obtained full-strength fluidextracts of belladonna root without resorting to the collection of various fractions of weak percolates. They employed a pressure of 25 to 35 lb. per sq. in. Husa and Lee (5) found that as much as 99 per cent of the resin of podophyllum could be extracted in the first 1000 cc. of percolate from 1000 Gm. of drug if the drug had been packed in small successive portions with moderate firmness; the extraction was less complete with looser packing and when breaks occurred in the drug column during percolation. They employed a maximum pressure of 30 lb. per sq. in.

SUMMARY

A comparative study was made of the extraction of ipomea by various methods. Alcohol was found as efficient as alcohol-water (9:1) in the N. F. VI assay for ipomea. In the process of maceration of ipomea with an excess of alcohol, the greater portion of resin was dissolved from the drug within 15 minutes. In percolation experiments at least 90 per cent of the total resin of the drug was obtained in 250 cc. of percolate from 250 Gm. of drug. More than 99 per cent of the resin was obtained in the first 1000 cc. of percolate from 1000 Gm. of drug using the method of forced percolation through a long column of drug.

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Hydrogenated Oil as an Ointment Base

IV. Antiseptic Ointments*

By Geroge W. Fiero and Ted A. Loomis†

Bacteriological methods have been used by many workers to determine the antiseptic value of ointments. Considerable work has been done on the antiseptic value of phenol ointment (1). Husa and Radin (2) reported that the activity of phenol ointment is de-

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pendent upon the base. This being true, it would be apparent that other antiseptic ointments might vary in their activity with the ointment base employed. Hydrogenated oils, described in a previous paper (3) are valuable ointment bases because, although similar to lard physically, they do not develop rancidity as rapidly as lard.

EXPERIMENTAL

Bacteriological Technique.—The agar-cup method of the Food and Drug Administration was employed (4). Beef broth was prepared using 5 Gm. of beef extract, 5 Gm. of sodium chloride, 10 Gm. of peptone and water to make one liter. Nutrient agar consisted of 3% of agar dissolved in beef broth and adjusted to a p_H of 7. The test organism was a 24-hour broth culture of *Staphylococcus aureus.*

The sterile agar was melted, cooled to a temperature not exceeding 50° C. and inoculated with 1 cc. of culture to 100 cc. of nutrient agar. This was thoroughly mixed and 25 cc. of the mixture poured into Petri dishes and allowed to cool. Of course, all media and apparatus were sterilized by autoclaving.

Table I.—Antiseptic Action of Phenol Ointments

Hydrogenated Oil	Softening Point	Iodine Value	Antiseptic Zone (Mm.)
Cottonseed 1	36.3	66.7	0
Cottonseed 2	37.2	62.0	0
Cottonseed 3	39.4	66.9	0
Cottonseed 4	29.5	..	Trace
Cottonseed 5	31.3	66.0	0
Cottonseed 6	35.7	62.0	0
Cottonseed 7	41.5	62.7	0
Cottonseed 8	29.8	70.0	0
Cottonseed 9	41.8	57.9	0
Cottonseed 10[a]	38.0	60.5	0
Cottonseed 11[a]	37.7	65.0	0
Cottonseed 12[a]	37.7	73.0	0
Cottonseed A	..	53.0	0
Cottonseed *B*	..	59.5	0
Cottonseed *C*	..	65.9	0
Cottonseed *D*	..	70.7	0
Cottonseed *E*	..	74.9	0
Soy Bean 1	36.8	70.3	Trace
Soy Bean 2	36.5	72.0	0
Soy Bean 3	35.9	72–76	0
Soy Bean 4	35.8	74.0	0
Soy Bean 5	40.8	83.0	0
Coconut 1	..	5.1	0
Coconut 2	32.4	4–12	0
Coconut 3	43.0	4–12	0
Coconut 4[b]	34.4	1.5–3.5	2
Palm Kernel	..	0.5–1	0
Peanut Oil	40.7	73.3	0
Sesame Oil	42.7	57.7	0
Sesame Oil *A*	..	61.5	0
Sesame Oil *B*	..	65.5	0
Sesame Oil *C*	..	67.8	0
Sesame Oil *D*	..	73.3	0
Sesame Oil *E*	..	78.9	0
Lard 1	38.0	51.0	0
Lard 2	38.1	58–61	0
Untreated Lard	..	54.2	0
U. S. P. Ointment	..	....	0

[a] A mixture, chiefly cottonseed oil.
[b] With lecithin.

When solidified, a circular piece of agar 22 mm. in diameter was removed by means of a sterile modified cork-borer. This cavity was filled with the ointment being tested. The ointment was melted at as low a temperature as possible and poured into the cavity. The plates were incubated for 48 hours. After this time, they were examined for free zones around the samples. The absence of bacterial colonies in these zones indicated antiseptic activity, the width of the zone indicating relative efficiency.

Phenol Ointment.—Craw and Lee (1) found that U. S. P. phenol ointment (2%) was only slightly bacteriostatic and not a dependable antiseptic. On the other hand, they found that if the ointment was prepared with benzoinated lard, it had antiseptic properties. Since hydrogenated oils resemble lard, ointments were prepared using 2% of phenol dissolved in the molten hydrogenated oils. Data are shown in Table I. None of the ointments showed bacteriostatic effect.

Boric Acid Ointment.—Boric acid ointments were prepared using the official ointment base and in the same manner using ten per cent of the acid with hydrogenated oils. The data are shown in Table II. None showed appreciable bacteriostatic effect.

Table II.—Antiseptic Action of Boric Acid Ointments

Hydrogenated Oil	Softening Point	Iodine Value	Antiseptic Zone (Mm.)
Cottonseed 1	36.3	66.7	0
Cottonseed 3	39.4	66–69	0
Cottonseed 4	29.5	....	Trace
Cottonseed 6	35.7	62.0	0
Cottonseed 11	37.7	65.0	0
Soy Bean 1	36.8	70.3	0
Soy Bean 3	35.9	72–76	0
Soy Bean 5	40.8	83.0	0
Coconut 1	..	5.1	0
Coconut 3[a]	34.4	1.5–3.5	Trace
Peanut	40.7	73.3	0
Sesame	42.7	73.3	0
Lard 1	38.0	51.0	0
Lard 2	38.1	58–61	1
Untreated Lard	..	54.2	Trace
U. S. P. Ointment	..	....	0

[a] With lecithin.

Ammoniated Mercury Ointment.—Ointments of ammoniated mercury were prepared with the official ointment base and by incorporating ten per cent of

Table III.—Antiseptic Value of Ammoniated Mercury Ointments

Hydrogenated Oil	Softening Point	Iodine Value	Antiseptic Zone (Mm.)
Cottonseed 4	29.5	..	12–13
Cottonseed 5	31.3	66.0	10–12
Cottonseed 9	41.8	57.9	11–12
Cottonseed 10	37.7	65.0	11–12
Soy Bean 1	36.8	70.3	12–13
Soy Bean 4	35.8	74.0	12–13
Soy Bean 5	40.8	83.0	11–12
Coconut 1	..	5.1	10–11
Peanut	40.7	73.3	12–13
Sesame	42.7	73.3	10–12
Lard 2	38.1	58–61	11–13
Untreated Lard	..	54.2	10
U. S. P. Ointment	..	..	8

ammoniated mercury with melted hydrogenated oils. The data are shown in Table III. All of these ointments possessed bacteriostatic properties; those prepared with hydrogenated oils being greater than the official ointment prepared with petrolatum, wool fat and wax.

SUMMARY

Ointments of phenol, boric acid and ammoniated mercury were prepared, substituting partially hydrogenated oils for the official ointment base. Bacteriological tests with these ointments using *Staphyllococcus aureus* as the test organism indicated that boric acid or phenol ointments prepared with the official base or with hydrogenated oils possessed no bacteriostatic properties.

All ointments of ammoniated mercury were bacteriostatic. Those prepared with hydrogenated oils were superior to ointments prepared using the official base.

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Poisons and Poisoners*

By W. H. Blome and Michael Zajac†

Poisonous substances have been known since ancient times but, as is true of many things, no one knows who first recognized materials possessing such properties nor when such discovery was made. Some surmise that shepherds and others observed that browsing animals regularly avoided certain plants although they ate others growing in juxtaposition to them. Undoubtedly primitive man had personal and unfortunate experiences as a result of contact with, or of consuming, certain plants.

The word poison harks back to the Latin *potio*, a drink, draft, potion—thereby relating it to pharmacy and medicine—with the connotation of a noxious or deadly drink. It has come to denote the active or deadly agent itself rather than a solution or other dilution of the harmful substance. And since poisons are the *raison d' etre* of the science of toxicology it may be mentioned in passing that the root "tox" has been traced to an ancient word meaning "bow" or "arrow," or, in a very broad sense, to a tool or implement used in killing. From this some have made the deduction that man's first knowledge of poisons concerned natural septic poisons, because many primitive peoples smeared their arrows, spears or other weapons with the blood or other parts of animals previously slain, and which therefore probably were infected. Experience taught them that wounds inflicted with missiles thus prepared proved more generally fatal than did those occasioned by clean weapons. With such observations as a basis, primitive man dipped his arrows in various juices, brews and concoctions of harmless and harmful agents and then noted the results of his experiments. Why some of the things he smeared on his arrow tips seemed to be more effective in killing animals or enemies, while others were ineffective, he did not know; the phenomenon therefore constituted a mystery which he ascribed to the supernatural and regarded with superstitious awe.

According to Lewin, only few favored men, priests and rulers, in ancient times, knew any poisons or their properties, and he reasons quite logically that conditions of early times were similar to those which exist at present among the primitive peoples of Africa, India, Guiana, West Indies, Brazil and other countries, where the fetish priests and chieftains have a knowledge of such substances. These men prepare the poisons and administer them to persons accused of crime, who thereupon are required to submit to the ordeal in which Providence ostensibly intervenes in favor of the innocent, but punishes the guilty by death. The actual outcome is dependent upon the wish of the one in authority. It is stated that in cases in which the ordeal (calabar) bean is given to one accused, the priest or chieftain selects a good, active bean, or one that he knows to be innocuous, to the end that the recipient shall die or live, as the "medicine man" elects. Lewin states incidentally that in the Fiji Islands there are professional poisoners (*Todesmänner*) who secretly administer cumulative cardiac poisons.

According to some versions, poisons received attention in Greek mythology. Hecate, who is confused with other goddesses, and whose parentage is not clear, is said to have had the power to confer upon mortals, also to withhold from them, certain favors and blessings, and to have had command over all the mystic powers of nature which included wild plants possessing medicinal as well as toxic properties. The treatment of certain diseases, also of snake bites, came within her sphere of activities. She is said to have discovered poisons.

Aconite, named after a small town in Heractea, according to a myth, was the foam from Cerberus, the 3- to 50-headed dog that guarded the entrance

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