

ammonia was regulated so that about 4 drops were added per minute until the odor of ammonia persisted. The solution was then allowed to cool, one-fifth of its volume of concentrated ammonia was added and at the end of ten minutes the material was filtered through asbestos in a Gooch crucible using suction. The washing, drying and ignition was conducted as in the other analyses. The analysis showed the presence of 1.531 grammes MgO per 100 Cc.

The following is a summary of results by the various methods:

- (a) 1.567 grammes MgO per 100 Cc.
- (b) 1.600 grammes MgO per 100 Cc.
- (c) 1.636 grammes MgO per 100 Cc.
- (d) 1.575 grammes MgO per 100 Cc.
- (e) 1.629 grammes MgO per 100 Cc.
- (f) 1.650 grammes MgO per 100 Cc.
- (g) 1.531 grammes MgO per 100 Cc.

The mean of these results is 1.595.

CONCLUSIONS.

(1) These results clearly indicate that pharmacists and students who lack the facilities of the well-equipped laboratory can with the apparatus at hand in the drug store or laboratory, secure results which are practically the same as those obtained by the employment of more elaborate apparatus.

(2) That if necessary, the time required to make the assay can be much shortened.

(3) That the results obtained are practically the same whether the magnesium is determined in the original sample or in the ash resulting from evaporation and ignition.

(4) That it is more convenient and consumes less time to determine the magnesium in the original sample.

RESEARCH & ANALYTICAL LABORATORIES
OF THE
LOUIS K. LIGGETT Co.

THE STANDARDIZATION OF VETERINARY BLISTERING OINTMENTS.

BY GEORGE E. ÉWE.

The proportion of active ingredients in a veterinary blistering ointment as determined by chemical analysis, is not in direct ratio to the blistering power of the ointment. The reason for this is, that while analysis reveals the total amount of active ingredients, yet, only the effect of a variable and sub-total amount of the active ingredients is exerted in the actual blistering operation. The effect of the total amount of the active ingredients is impractical of attainment, because of the limitations surrounding the employment of a product, requiring contact in its use.

Since chemical analysis is not in direct ratio to the blistering power of ointments, a system of chemical and physical control of manufacture coupled with physiologic tests on the finished product is to be preferred.

CHEMICAL CONTROL OF MANUFACTURE OF BLISTERING OINTMENTS.

This consists essentially of analytical chemical control of the strength and purity of the ingredients used in manufacture. Some of the more commonly employed active substances are Cantharides (both Russian and Spanish variety), *Mylabris Cichorii* (or Chinese Blistering Fly), turpentine, glacial acetic acid, and red mercuric iodide.

In addition to the active substances, the constituents of the ointment bases also require analytical chemical control by appropriate methods.

The methods of analysis and standards for active substances used in veterinary blistering ointments:

Cantharides (Russian and Spanish): Methods of analysis: U. S. P. IX—Standard: Not less than 0.6 percent Cantharidin (U. S. P. Standard).

Mylabris Cichorii (Chinese Blistering Fly): Method of analysis: U. S. P. IX method for Cantharides—Standard: Not less than 0.6 percent Cantharidin (arbitrary standard).

Turpentine, glacial acetic acid, red mercuric iodide: Methods of analysis and standards: U. S. P. IX.

Constituents of ointment bases: Methods of analysis and standards: appropriate sources.

PHYSICAL CONTROL OF MANUFACTURE.

Checking system: This consists of an elaborate system of receipts, checks, and double checks employed by pharmaceutical manufacturing companies to insure that the finished product contains all of the ingredients and the proper amount of each as directed by the formula of the product.

Physical steps in manufacture: These include proper subdivision of the active ingredients when solid (for instance, Cantharides); proper mixing of the active ingredients with the base to form a uniform, homogeneous product of standard color, odor, and consistency; proper temperature and proper agents to insure that the maximum active constituents of the active ingredients are fully represented in the finished product (for instance, heat and acid in connection with fatty bases are required to insure the extraction of the cantharidin, the active constituent from the cantharides).

PHYSIOLOGIC TESTS OF FINISHED PRODUCT.

Physiologic tests of finished veterinary blistering ointments, before the ointments are issued to the trade, are necessary in order to insure success in use of the ointments by the veterinarian in actual practice. In making tests, it is necessary that the conditions of the tests simulate those employed in actual veterinary practice.

The following method has proven very satisfactory: Test animal: The Horse; using at least two or three different horses in order to eliminate the variation due to varying thickness of the skin of different horses.

Preparation of test animal: The area to which the ointment is to be applied is thoroughly cleaned and clipped. The area employed is usually the hock or gluteal muscles.

Application of test: The ointment is vigorously rubbed into the prepared area and observations are made at various times up to four or five days.

The effects to be noted are:

A—Amount of swelling.

B—Amount of exudation.

C—Sensitiveness of the area.

D—Whether the hair falls out or not.

In addition, an observation is to be made whether the hair comes back or not.

Standard: The effects produced by a standard blistering ointment of the same formula as the ointment undergoing test and which has been proven to possess excellent blistering power by repeated practical physiologic tests as described above.

A typical physiological report on a satisfactory blistering ointment is herewith reproduced as a matter of interest:

VETERINARY BLISTERING OINTMENT—LABORATORY NO. —

Effects.

| Horse No. 1. | Horse No. 2. | Horse No. 3. |
|-------------------|-------------------------------|-------------------|
| A—Slight swelling | A—Slight swelling | A—Slight swelling |
| B—Small vesicles | B—Exudate | B—Vesicles |
| C—Sensitive | C—Sensitive | C—Sensitive |
| D—No hair removed | D—Practically no hair removed | D—No hair removed |

Conclusions: A satisfactory blistering ointment.

SUMMARY.

Chemical analysis alone is not satisfactory as a means of standardizing blistering ointments, because the effect of the total amount of active ingredients is not exerted, owing to the limitations surrounding the employment of a product requiring contact in its use.

The standardization can be accomplished by chemical and physical control of manufacture of the ointments, coupled with physiologic tests on the finished product.

Detailed methods of chemical and physical control of manufacture and of physiologic tests on the finished products are described.

I am indebted to Dr. H. K. Wright of the Biological Laboratories of the H. K. Mulford Company, at Glenolden, Pa., for the details of the physiologic method outlined above.

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CHINESE CANTHARIDES (*Mylabris Cichorii*). A WORTHY CANDIDATE
FOR ADMISSION TO THE U. S. P.¹

BY GEORGE E. ÉWE.

Previous to the World War, the Russian and Spanish Cantharides of the U. S. P. were practically exclusively employed in medicine. One of the minor effects of the war was to cut short supplies of U. S. P. Cantharides, so that recourse had to be made to the use of Chinese Cantharides, which was readily available, and which was vaguely believed to approximate in activity the official Cantharides.

This forced use of Chinese Cantharides has resulted in the accumulation of a sufficient amount of evidence to warrant the statement composing the title of this communication.

This evidence embraces the following attributes of this material: External use, internal use, cantharidin content, pharmaceutical behavior, price, and availability.

¹ Credit is due Dr. H. K. Wright of the Biological Laboratory of the H. K. Mulford Company at Glenolden, Pa., for conducting the physiological tests on veterinary blistering ointments, mentioned in this communication.