BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A. G. DuMez, Reporter on the Progress of Pharmacy.

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Properties of corn starch
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Timmerman, Helen A.
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J. pharm. et chim., 5 (1927), 473
Chemnitius, F.
Preparation of strychnine
Chem.-Ztg., 50 (1926), 845; through *Pharm. Zentralh.*, 68 (1927), 377
Evers, Norman
Color test for ergot alkaloids
Pharm. J., 118 (1927), 721
Germuth, Frederick G.
Colorimetric detection of morphine compounds
Am. J. Pharm., 99 (1927), 340
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Nicotine in tobacco
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Worenine, a new alkaloid of Coptis Japonica
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J. Pharm. Soc. Japan, 542 (1927), 279
Kondo, H., and Tomita, M.
Studies on the alkaloids of Cocculus sarmentosus, Diels
J. Pharm. Soc. Japan, 542 (1927), 265
Morton, C.
New method of locating the end-point in alkaloidal titrations
Pharm. J., 118 (1927), 761
Warnat, K.
Constitution of boldine
Ber. deutsch. chem. Ges., 58 (1925), 2768; through *J. pharm. et chim.*, 5 (1927), 545
Wattiez, N.
Iodometry applied to the assay of some alkaloids
Bull. Acad. Roy. Med. Belg., vol. 4, p. 148; through *J. pharm. et chim.*, 5 (1927), 555

OILS, FATS AND WAXES.

Caulkin, H. A.
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Bäckström, Hans L. J.
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Daniel, L.
Sodium thiosulphate as an indicator in alkalimetry
J. pharm. et chim., 5 (1927), 487
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Chemistry and the supply of drugs
J. Roy. Soc. Arts, 75 (1927), 405
Wherry, Edgar T.
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Am. J. Pharm., 99 (1927), 342

INORGANIC CHEMICALS.

Chemnitius, F.
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Bull. soc. pharm. Bordeaux, 65 (1927), 50
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Qualitative and quantitative method for the detection and estimation of nitrates and nitrites
Pharm. Ztg., 72 (1927), 672

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Detection of chlorides in mercuric oxide
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Volumetric assay of iodides
Pharm. J., 118 (1927), 723
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Attempts to separate the isotopes of mercury by chemical means
J. Am. Chem. Soc., 49 (1927), 1500
McNabb, Wallace M.
Determination of arsenic pentoxide as magnesium ammonium arsenate
J. Am. Chem. Soc., 49 (1927), 1451
Merz, Albert R.
Monopotassium phosphate
J. Am. Chem. Soc., 49 (1927), 1511
Nau, André
Volumetric procedure for the determination of sodium
Bull. soc. pharm. Bordeaux, 65 (1927), 67
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Healing earths
Apoth. Ztg., 42 (1927), 662
Schenk, D.
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Wokes, Frank, and Barr, Joseph R.
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ORGANIC CHEMICALS.

Besson, H.
Polarimetric determination of tartaric acid by the formation of tartar emetic with the aid of an antimony salt
J. pharm. et chim., 5 (1927), 539
Bogert, Marston T., and Taylor, Walter H.
Synthesis and study of certain new derivatives of phenacetin
J. Am. Chem. Soc., 49 (1927), 1578
Breteau, Pierre
Methods of analysis and chemical evaluation of the arsenobenzenes
J. pharm. et chim., 5 (1927), 521
Cocking, T. Tusting
Estimation of cineole
Pharm. J., 118 (1927), 725
Germuth, Frederick G.
Detection of lactic acid in the presence of other acids
Ind. Eng. Chem., 19 (1927), 852
Hocking, F. A.
Purity of ether
Chem. & Drug., 106 (1927), 592
Jones, Lauder W., and Major, Randolph T.
Substituted o-alkyl hydroxylamines chemically related to medicinally valuable amines
J. Am. Chem. Soc., 49 (1927), 1527
Leboucq, J.
Detection and quantitative analysis of cyanates
J. pharm. et. chim., 5 (1927), 531
Leffmann, Henry, and Trumper, Max
Notes on the fuchsin-sulphurous acid test
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Middleton, G.
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Determination of iodine in desiccated thyroid according to the Dutch Pharmacopœia
Pharm. Weekbl., 64 (1927), 255; through *Chem. Abstr.*, 21 (1927), 1518
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Fluorescein and some of its derivatives
J. Am. Chem. Soc., 49 (1927), 1272
Samseon, O.
Melting point of glycerol
Compt. rend., 182 (1926), 846
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Investigations of the dependence of hydrolysis of cocaine on hydrogen-ion concentration
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Quantitative estimation of small amounts of glucose
Pharm. Weekbl., 64 (1927), 485
Scott, R. D., and Will, E. G.
A modified Calvert test for diethylphthalate
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Tikkanen, E.
Influence of alcohol on the alteration of ether and the use of phenolphthalein in testing for the decomposition products
Pharmacia, 6 (1926), 232; through *J. pharm. et chim.*, 5 (1927), 449
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Note on iron and ammonium citrate, B. P.
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Volmar, J.
Utilization of the phenomenon of fluorescence in the analysis of foodstuffs
J. pharm. et chim., 5 (1927), 435
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Detection of carbolic acid in commercial cresols
Pharm. J., 118 (1927), 775

DRUG WORK OF THE BUREAU OF CHEMISTRY.*

After statements relative to the coöperation of the Bureau of Chemistry with the Contact Committee of the Pharmaceutical Manufacturers, Mr. Murray referred to other drug work the Bureau is doing. He said in part:

"For the past year particular attention has been devoted to anæsthetics. Ether demands careful watching because, although it may meet pharmacopœial requirements for purity at the time of packing, it is apt to deteriorate. The manufacturers have been seeking for the cause and cure of this difficulty and at the present time a Bureau chemist is devoting his entire time to the problem. Any important discoveries will, of course, immediately be made available to the industry. This, incidentally, is an illustration of the way in which the Bureau seeks to coöperate with the industry in preventing violations of the law.

"Magnesium citrate solution, because of the volume of the output and the keen competition among the manufacturers, will be investigated in the immediate future. Preparations of so-called 'cod-liver oil extracts' are being investigated to determine whether or not they really represent the essential therapeutic properties of the oil."

ANTISEPTIC AND ACIDOPHILUS PREPARATIONS.

"Numerous products on the market intended for personal use and for which antiseptic claims are made are being examined for the purpose of learning whether or not they are entitled to such designation. A considerable proportion of them have been found not to possess antiseptic properties when used as directed; many are offered under representations which are misleading, regardless of their antiseptic value. A preliminary survey of the *bacillus acidophilus* and *bacillus bulgaricus* preparations on the market was made last summer. The results indicated a rather unsatisfactory situation. The trade was notified through the public prints, and individually also, of the conditions found. This has afforded manufacturers ample opportunity to make all necessary investigations and bring their products into compliance with the law. Plans are now being made for a reinvestigation and legal action against any of these products which may be found in violation of the act.

"Crude drugs, both imported and domestic, are being given attention. The new Pharmacopœia makes compulsory biological assays for ergot, digitalis, cannabis, strophanthus and aconite. It is the purpose of the Bureau to examine a sample from every single lot of these drugs offered for entry at our ports. While it is a physical impossibility for the Bureau to examine every individual bale and each part of each bale of imported crude drugs, and thus cannot relieve manufacturers of the duty of examining the quality of the crude drugs they buy, it will do all it can to keep substandard, deteriorated, or otherwise adulterated drugs out of the channels of trade.

"Investigations of glandular products in general will soon be under way for the purpose of ascertaining how the products are manufactured, what representations are made for them, and what the bases for such representations are.

* Parts of an address by A. G. Murray before American Drug Manufacturers' Association, Asheville, 1927.

"What we designate in the Bureau as 'Sherley Amendment products,' because they constitute the class to which this Amendment to the food and drugs act is directly applicable, demand a large share of our attention. In addition to products of secret composition, the so-called 'patent medicines,' this class includes all substances, mixtures, or preparations of every kind for which therapeutic claims are made. It includes articles intended for sale to or through physicians as well as those intended for sale directly to the consumer. It includes not only medicines intended for human use, but those for stock, poultry, dogs and the other lower animals also. While a vast improvement in the labelings of these products has occurred since the passage of the food and drugs act, it does not yet require Diogenes to locate examples of extravagant, exaggerated, or otherwise unwarranted labeling."

REORGANIZATION OF THE BUREAU.

"As you all no doubt know, there will be a reorganization within the Department on July 1st. The present Bureau of Chemistry will go out of existence and its functions thereafter will be divided between two new organizations. The regulatory work including the administrations of the food and drugs act, the insecticide and fungicide act, the naval stores act, the import milk act, the caustic poison act and other regulatory acts will be delegated to a unit to be known as the Food, Drug and Insecticide Administration. This unit will be headed by Mr. Walter G. Campbell, the present Director of Regulatory Work of the Department, who is personally known to many of you. Mr. Campbell has been intimately associated with the administration of the food and drugs act almost from the beginning, first as Chief Inspector, then as Chief of the Eastern Food and Drug Inspection District, then for several years as Acting Chief of the Bureau of Chemistry. Secretary Wallace made him Director of Regulatory Work of the Department.

"Drug Control will be headed by Dr. Geo. W. Hoover, whom I do not need to introduce to this audience. Dr. Hoover also has been in the service since the inception of the act. He was a member of Dr. Wiley's famous poison squad. His association with and interest in the Bureau's drug work preëminently fits him for the task assigned him. With these two men to guide the new organization and its drug work an efficient, sane and constructive administration is assured.

"Your Secretary asked me to discuss the recently enacted caustic poison law, but as the Department has not yet formulated its plan of enforcement nor issued any regulations regarding it, I regret that I am not able to give you more than an outline of the act itself. It applies to preparations containing certain specified caustic substances—twelve of them—intended for household use—and in certain specified concentrations. Such preparations are to be labeled 'poison' and antidotes are to be specified. Enforcement of the act will probably devolve upon the unit in the new administration which is charged with the enforcement of the insecticide and fungicide act. The law appears to be specific in its provisions, and pending formulation of rules and regulations for its enforcement I would suggest that copies of the act be secured from the Bureau of Chemistry and that articles which come within its scope be labeled in accordance with your own interpretation of its provisions."

TESTING ANTISEPTICS.

In an address before the recent annual meeting of the American Drug Manufacturers' Association Dr. George F. Reddish, formerly of the U. S. Insecticide and Fungicide Board, said, in part, as follows:

"After a thorough consideration of all the factors involved, we have found our present method of testing antiseptics to be the most satisfactory. Briefly the method is as follows:

"*M. aureus*, the most common of the pyogenic microörganisms, is grown in nutrient broth composed of 0.5 per cent Liebig beef extract, 1.0 per cent Armour's peptone, and 0.5 per cent sodium chloride in distilled water, adjusted to p_H 6.6 to 6.8. After three successive transfers in this broth at 24-hour intervals, incubated at 37° C., 0.5 cc. of this broth culture is added to 5 cc. of the undiluted or diluted antiseptic in large tubes which are held at 37° C. At intervals of 5, 10 and 15 minutes, transfers are made from this antiseptic culture mixture to sterile tubes of broth of the above composition and incubated at 37° C. for 48 hours. The tubes are then observed for evidences of growth. The dilution of the antiseptic which is capable of killing this test organism in 5 minutes is considered to be efficacious when used in practice. The preparations which are tested by this method are the ordinary antiseptics for use on the skin, for cuts, wounds, mucous membranes, etc., and mouth washes which claim antiseptic properties. In this test, the organic matter is present in the form of broth and culture. This is more convenient and less expensive than the practice of adding organic matter separately. The test being carried out at body temperatures gives the antiseptic the benefit of greater activity at the higher temperature and is much fairer to the preparation being tested than is the room temperature quite generally used in the past.

"Those preparations which are sold in tablet or powder form from which antiseptic solutions are made by the addition of solvent, such as water, etc., are examined by the test outlined above.

ANTISEPTIC OILS.

"Some antiseptic preparations have the active ingredient incorporated in some inert mineral oil. Regardless of the nature of the oil base which carries the active ingredient, the test as outlined above would not be applicable. Instead a method which we call the Filter Paper Method is used. This test is, briefly, as follows:

"No. 2 Whatman Filter paper is cut into pieces about 0.5 cm. square, placed in a test-tube, plugged with cotton and sterilized in the hot air oven at not over 170° C. (to prevent charring). The desired number of these sterile squares are then immersed in a 24-hour broth culture of the test organism, *M. aureus*. This culture must be a fresh resistant strain which is not killed by 1–70 phenol in 10 minutes nor by 1–80 phenol in 15 minutes at 20° C., following the method given by me in a previous publication. These paper squares, impregnated with the culture of *M. aureus*, are then fished out with a sterile culture wire (bent on the end) and transferred to the antiseptic. It is kept immersed in this preparation for 5 and 15 minutes, when they are transferred to a tube of broth (10 cc.) of the above composition. By shaking thoroughly at intervals over a period of

5 to 10 minutes, the excess of the antiseptic oil is washed off from the paper squares. The pieces of paper are then fished out and transferred to another tube of broth (10 cc.) and incubated at 27° C. for 48 hours. The tubes are then observed for growth.

"Some of the antiseptic oil preparations we have examined so far are recommended for use in such a way that only short-time application is involved. If they are recommended for use in wet dressing where contact with the infective organisms is assured over a long period of time, an inhibitory test would then be applicable.

ANTISEPTIC POWDERS.

"Under this heading we include all powder preparations which claim to be antiseptic and which are applied directly to the skin, mucous membranes and infected surfaces. Those powders which are used in such a way that no conditions are established whereby they are kept in continued contact with the infected surface, such as talcum powders, tooth powder, etc., are examined by the 'Filter Paper Method' as follows:

"Sterile filter paper squares impregnated with *M. aureus*, as outlined above, are covered on both sides with the powder and allowed to remain in this intimate contact for 5 minutes (explain 5-minute period). At the end of this time period these pieces of paper are fished out and transferred to a tube of broth and, after the adhering powder is shaken off, again for 48 hours. Those powders which are recommended for dusting into infected wounds may be examined as outlined later.

TOOTH PASTES AND SHAVING CREAM.

"In the examination of these two types of preparations we are faced with the necessity of determining their efficiency in the undiluted state because it is practically impossible to fix a definite dilution of each product which will simulate the dilution of the preparation when used in practice. We have, therefore, seen fit to test the antiseptic properties of these preparations undiluted. Contact with infective organisms is very short at best, and a test to determine killing effect is applicable. The 'Filter Paper Test' is used for this purpose and the procedures as outlined above are followed, *M. aureus* being the test organism. In this case the impregnated pieces of paper are completely covered with the paste and this contact allowed to continue for 5 minutes at 37° C.

"Because of the fact that some dentifrices may be more effective in solution than in the paste form, a 50 per cent solution is also made and tested by the filter paper method in the same manner as indicated for the undiluted paste. The active ingredients have a better opportunity of coming into contact with the bacterial cells when in a solution. If the tooth paste or shaving cream kills *M. aureus* either in the undiluted form or in a 50 per cent solution (1–1) in 5 minutes at 37° C. it will be considered as an antiseptic preparation.

LOZENGES AND SUPPOSITORIES.

"Lozenges and suppositories for which antiseptic claims are made are examined in a manner which approximates to a great extent the conditions met in practice. These preparations dissolve slowly, giving a solution of their active ingre-

dients in the local secretions. There is no way of accurately determining the concentration of solution obtained in the practical use of such products. For this reason we simply test these preparations in a concentrated aqueous solution. In this case more benefit is given the sample than is probably justified, but considering all the factors involved this is the fairest method of testing. The filter paper method is then used as follows: Pieces of paper impregnated with *M. aureus* are allowed to remain in a saturated aqueous solution of the product for as long a time as is required for the preparation to dissolve when used as directed. For the antiseptic lozenges this requires about 10 to 15 minutes. Some suppositories require a longer time and the period of the test is regulated by the time it takes for solution in distilled water. The usual procedure for the filter paper test is followed.

ANTISEPTIC SOAPS.

"For the testing of antiseptic soaps the filter paper method is applicable. In fact, filter paper simulates fairly closely the conditions found in the skin. In the case of liquid soaps, the undiluted soap is used in the filter paper test as outlined above. If the soap is in powder or cake form, a thick lather is made aseptically in sterile water in a sterile petri dish, and the filter paper test carried out in the usual manner.

SALVES AND THE LIKE.

"When such preparations as these are used in practice, the active ingredients are held in intimate contact with the infective microörganisms and can render them innocuous by simply preventing their activity. Since these preparations do remain in contact with the infected surfaces for long periods of time when used in practice, laboratory tests for their efficiency should simulate these conditions as nearly as possible. It is evident that such tests as have been outlined above would not be applicable; we are not interested here in killing organisms within a certain length of time. If an antiseptic salve, for example, does prevent the growth of microörganisms in an infected area, it will not only prevent them from doing harm, but will also render them easy prey for the leucocytes. For this reason, the following method is applicable for this type of product:

"*M. aureus* of normal resistance is grown at 37° C. in the broth described above and transferred in this medium for three consecutive days. One-tenth of a cc. of this culture is added to 15 cc. melted nutrient agar at 45° C. (0.5 per cent agar in the above broth base), the culture thoroughly mixed in the agar and poured into a sterile petri dish and allowed to cool at room temperature. As soon as this inoculated agar has hardened, the salves and ointments, previously melted at 37° C., are spread over a small surface of the inoculated agar with a sterile glass rod. Melted sterile vaseline is spread on another part of the inoculated agar in the same manner and the plate, inverted, incubated at 37° C. for 48 hours. A duplicate test is made at the same time, in which the melted salve or ointment is streaked on the bottom of a sterile petri dish with a sterile glass rod and 15 cc. of nutrient agar inoculated with 0.1 cc. of *M. aureus* broth culture poured over it. A vaseline control streaked in the same way is included in this test, also. After being incubated it will be noted that colonies of *M. aureus* grow immediately adjacent to the vaseline control and even under or above it, according to whether it is streaked on top

of the agar or on the bottom of the plate. There is no active ingredient in pure vaseline which will prevent the growth of *M. aureus*. However, in effective antiseptic salves and ointments a part of the active ingredients contained in them is absorbed into the agar and by their presence prevents the organisms present from growing. Therefore, the plate will show a clear zone around the antiseptic salve or ointment which is in marked contrast to the turbidity of the surrounding medium caused by the heavy growth of the organism. In treating infected surfaces with preparations of this nature, it is necessary that the active ingredients leave the inert base and become free to surround the infective organisms. It is only in this way that the preparation will be of benefit in preventing the growth of these microörganisms. If the antiseptic were so securely incorporated into the inactive base that it could not become free to attack the microörganisms, or if the base were of such a nature that the antiseptic could not separate from it, the value of such preparations so far as the antiseptic ingredients are concerned would be lost. Plain 1.5 per cent agar simulates fairly closely the conditions met with in skin and wounds. It is permeable, semi-solid, isotonic, and constitutes a valuable laboratory means of approximating the conditions found in human and animal tissues, at least so far as the preparations under consideration are concerned.

"In testing bunion pads, corn plasters, surgical dressings, and powders for wound dressings for which antiseptic claims are made, the procedure just given is employed. These preparations are simply placed on top of a poured agar plate containing *M. aureus*, and on the bottom of another plate, and covered with agar inoculated with *M. aureus*, and incubated at 37° C. for 48 hours. The antiseptic in such products permeates the agar medium and prevents the growth of the test organism. The amount of antiseptic contained and its solubility, together with the ease with which it leaves the base, are factors in determining the width of the clear zone around these preparations.

ANTISEPTIC DYES.

"In examining antiseptic dyes, a more complicated situation presents itself. When these dyes are applied to infected surfaces or wounds, they penetrate the tissues and are expected to continue their action long after they have been applied. Since it is difficult to be assured of this continued action in all kinds of antiseptic dyes, and since in regulatory work it is not possible to make a complicated, detailed study of each one, for the present it seems consistent to use a test showing actual killing power. For this purpose the filter paper test is applicable. This test is carried out exactly as outlined above, with the additional precaution in which even greater attention must be given to washing the papers free from the dye in the first tube of broth to which it is transferred. In this case also, *M. aureus* is used as the test organism and the test is carried out at 37° C. for the usual time periods.

"Laboratory tests cannot simulate exactly the conditions met with in practice and a certain amount of arbitrariness must be encountered with respect to methods to be used. In the tests outlined here, it is evident that the procedures, while not simulating practical conditions exactly, do approximate them to a certain degree and fairly closely considering the artificial nature of a laboratory test. More complicated methods would be expensive, involved and time-consuming