

pyritic properties of acetanilid in 1888 opened to synthetic chemistry an entirely new field, the application of pharmacology to structural organic chemistry. Since this, organic synthesis has achieved triumphs in all departments of materia medica, covering the fields of hypnotics, antipyretics, local anesthetics, antiseptics, diuretics, arsenicals, etc. The study of the structure of such natural products as morphine, cocaine, quinine, adrenalin, etc., has enabled the synthetic chemist to supply us with a large number of remedies, cheaper and in many respects superior to nature's originals. Within the last ten years, new conditions have arisen, which through the combined influences of quackery and competition, have not only thrown discredit on the true and legitimate fields, but also through superiority of numbers threatened their very existence. In various parts of our country so-called "Chemical Companies" have been established by certain promoters, whose past history will not bear close scrutiny, the objects of such companies being to flood the market with cheap imitations of well-established synthetics employing for this purpose mixtures in which acetanilid plays the part of the ingredient. Since this chemical possesses antipyretic, analgesic and antiseptic properties, the field of substitution is large. Such practices are not only culpable but criminal, in that they endanger the life of the patient, defeat the purposes of the physician, and place the standard products substituted in discredit. Standard synthetic preparations have also to contend with another evil, and this is the flooding of the market with certain low-grade chemicals of Swiss origin, which are sold under titles that leave no doubt as to the purpose for which they are intended. Such imitations of standard medicinal synthetics which have attained standing in the medical profession are to be had through these channels at prices far below the legitimate cost of production.

Still another class of so-called synthetics have appeared, which practically flood the market and destroy confidence in the legitimate aims of true synthetic chemistry in the interests of pharmacology and medicine. This is the abuse and application of the term "synthetic" as applied to simple mechanical mixtures. Such preparations are given titles either similar in character to our true synthetics or such as would indicate their use; these are then variously described as "condensation" or "reduction-products," produced by secret processes upon a mixture of a number of well-known medicinal chemicals, securing thereby a "shot-gun" combination of them all. The following will illustrate:

Nephaldol: According to the manufacturers, this is prepared through the action of citric and salicylic acids on phenetidin in certain proportions, and after the reaction is over the resulting free acids are neutralized by quinine and sodium carbonate. Examination of this preparation has shown it to consist of a mixture of sodium salicylate, phenacetin and quinine.

Arseniol: This is given the simple title of sodiumchlorophosphoricoarsenate and is sold at \$9.00 a pound. Analysis has demonstrated it to consist of a mixture of sodium arsenate, phosphate and chlorid.

Nopain, lauded as a synthetic, consists of a solution of cocaine, phenol, adrenalin and glycerol in alcohol.

Many other citations might be made, but this suffices to illustrate the deception practised upon the medical profes-

sion, who, of course, are unable to distinguish the true from the false. Certain classes of physicians are not blameless for this condition of affairs, as the following notice will show. Recently a journal devoted to the exposure of business frauds, "Der seelle Geschaefstmann" of Cologne, has inserted in a reputable journal the following notice:

"For Physician. Wanted: Licensed physicians who are disposed to furnish favorable reports for advertising purposes of a newly introduced chemical preparation of epoch-making importance (germicide). Fee from 500 to 1000 marks."

As a result, a large number of offers from physicians were received in reply. One among these ran as follows: He was owner of a well-patronized dispensary in a large city and was not forced to earn tainted money. He was, however, prepared to give the desired opinion and thought it best for the manufacturer to furnish him with the report already prepared, as the manufacturer was the best judge of what was needed.

Further comments are unnecessary.

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NOTES AND CORRESPONDENCE.

THE NEW BRADY GAS FILTER.

Owing to the installation of gas engines for blast furnace gas in the largest iron and steel works throughout the country, the chemists of these various plants have been confronted with several problems in gas analysis. One of the most difficult of these to solve satisfactorily was the determination of dust in gas.

Before blast furnace gas can be used in gas engines it must be subjected to a thorough cleansing. This is usually accomplished in three steps: dry cleaners, wet cleaners and final mechanical scrubbers. When ready for the gas engine the gas must contain only about 0.005 of a grain of dust per cu. ft.

The fine physical condition of the dust in the engine gas (gas ready for engine), and the large amount of dust and moisture in the raw gas make the accurate determination of dust per cu. ft., in either case, no easy matter. It was after trying all the forms of apparatus now known for such determination, with little success, that the Brady Gas Filter was devised.

This apparatus consists of four parts as shown, disconnected, in Fig. 1. Part 1 (numbered from left to right) consists of a brass shell provided with an outlet and an inlet. Part 2, the filter, consisting of an ordinary 94 mm. by 33 mm. Soxhlet extraction shell, is supported within Part 1. The brass shell is of such diameter that there is a space of about 3/16 of an inch between the paper shell and the inner surface of the brass shell. The method of supporting the filtering shell within Part 1 is by securing the edge of the former between two correspondingly tapering cylindrical faces. One of these faces is within the inlet end of Part 1, and the other is on the outside of a brass cylinder, Part 3. These tapering faces form a wedge which securely holds the paper cartridge in place, acting as its own washer, and protecting a space of about 1/2 inch inside the opening of the filter paper from dust, so that it can be handled with safety after the experiment. Part 3 forms the extreme inlet of the apparatus, and is provided with inside threads so that

it can be screwed to a sampling pipe. Its inner surface must be perfectly smooth so that there is no chance for accumulations of dust before the filter is reached. Part 4 is a loose nut which holds Parts 1 and 3 together while in use.

The apparatus may be used in any position but the preferred arrangement is horizontal. When the gas to be filtered contains moisture the filtering device must be heated to about 100° C. by enclosing it in an asbestos-lined box,

termining the amount of precipitate as copper, cuprous and cupric oxides, the following method was adopted since it proved the most satisfactory and yielded the best of results if reasonable attention was paid to details. It might be said, further, that as such work often has to be done at odd times it is desirable to maintain a supply of sugar tubes¹ and only to titrate when there are a number of tests on hand. By exercising a little care the same tubes can be used repeatedly without change of felt.

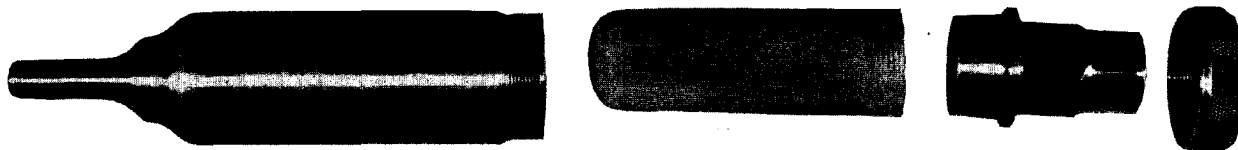


Fig. 1.

heated with an electric light, or by any other available means. The nipple on the exit end of Part 1 is provided with threads so that it can be removed and replaced with aluminium tubes, containing a dehydrating agent, in case it is desired to determine moisture in the gas (see Fig. 2).

The advantages of this apparatus as to simplicity are easily seen. Gravity seems to cause the heavy particles of dust to settle on the bottom of the shell, while the lighter particles form a porous coating on the upper surface. This action prevents the filter paper from becoming clogged as

The process consists of heating an aliquot of the "sugar solution with the mixed Allihn's solution (30 cc. of "white," 30 cc. of "blue" and 60 cc. of water) and filtering by aid of suction through a sugar tube with an asbestos felt supported by glass wool. The cuprous precipitate is transferred to the tube, washed with hot water until free from alkali and then with alcohol. The copper is dissolved in 5 cc. of concentrated nitric acid, thoroughly washed with hot water, and the filtrate run into an Erlenmeyer flask by means of suction. The solution is evaporated to small



Fig. 2.

long as heat enough is applied to keep the paper dry. About twice as large samples of gas can be passed through this apparatus as through any other we have ever tried. We have also found the number of grains of dust per cu. ft. to be higher when determined by this apparatus than with the others.

Thus far the device has been used for filtering blast furnace gas only, but there is no reason why it cannot be used to filter air or any other gas. The apparatus described is now being made and sold by E. H. Sargent & Co., whom I desire to thank for the loan of that shown in the illustrations.

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VOLUMETRIC DETERMINATION OF COPPER IN SUGAR ANALYSIS.¹

The co-operation of the laboratory in the experiments conducted by other departments of the Station has often rendered necessary quantitative determinations of reducing sugar, sucrose, lactose and starch in a variety of products. The final step in every case is the determination of the cuprous oxide precipitated from Allihn's solution by the reducing action of the sugar. After a rather long study of different methods of filtration and the various ways of de-

termining the amount of precipitate as copper, cuprous and cupric oxides, the following method was adopted since it proved the most satisfactory and yielded the best of results if reasonable attention was paid to details. It might be said, further, that as such work often has to be done at odd times it is desirable to maintain a supply of sugar tubes¹ and only to titrate when there are a number of tests on hand. By exercising a little care the same tubes can be used repeatedly without change of felt.

The process consists of heating an aliquot of the "sugar solution with the mixed Allihn's solution (30 cc. of "white," 30 cc. of "blue" and 60 cc. of water) and filtering by aid of suction through a sugar tube with an asbestos felt supported by glass wool. The cuprous precipitate is transferred to the tube, washed with hot water until free from alkali and then with alcohol. The copper is dissolved in 5 cc. of concentrated nitric acid, thoroughly washed with hot water, and the filtrate run into an Erlenmeyer flask by means of suction. The solution is evaporated to small

¹ An adaptation of the Low zinc-acetate method.

¹ Eimer and Amend, No. 3263.

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