

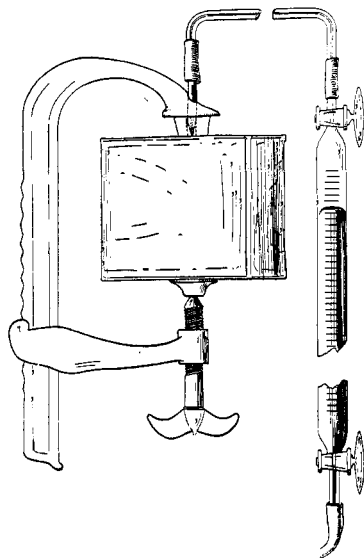
METHOD OF COLLECTING AND ANALYZING THE GASES IN CANNED GOODS.¹

BY CHARLES A. DOREMUS.

(Second paper.)

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THE first paper on this subject was read at the Second International Congress of Applied Chemistry, held last summer in Paris. As the publication of the proceedings has been delayed and would not reach some to whom this topic may be of interest, additional tests and analyses have been made and the accompanying illustration will possibly induce others to experiment further.



The first analyses of the gases in canned goods were effected in a Wilkinson gas analysis eudiometer. This instrument is similar in form to a Lunge's nitrometer. The graduated tube has a glass stop-cock at its upper extremity, above which is a detachable funnel. A large inverted funnel was joined to the lower end of this instrument, and the whole filled with water in a pneumatic trough. The can was punctured beneath the funnel.

¹ Read before the New York Section, June 11, 1897.

The bubbles of gas rose through the water and were measured and analyzed.

This operation was inconvenient. It permitted the gases to come into contact with much water in which some portion of gas might readily dissolve.

These inconveniences are overcome by the aid of the following device. A beveled, hollow, steel needle is attached to the upper arm of an adjustable clamp. The point and lower part of the shaft are covered by a rubber stopper, which serves as a soft pad; the lower arm is moved along the body of the clamp until the can to be pierced is held between the rubber stopper and the head of the screw. The upper part of the needle is connected by means of a capillary tube filled either with water or mercury, with a receiver also filled with either of these liquids. The receiver may be either a stop-cock eudiometer as just described, or a eudiometer with leveling tube attached.

The apparatus adjusted, a turn or two of the screw clamps the can tightly between the rubber pad at the top and the screw head below. The rubber yields to the pressure, making a tight joint around the needle. When the latter pierces the tin the contained gases of the can escape gently into the eudiometer.

Cans containing sound goods present a collapsed condition, owing to the condensation of the steam after processing. "Rattlers" are cans which yield to pressure. "Swells" are cans which seem ready to burst. Enough gas can generally be obtained from either of the above for systematic analysis. Sixty to eighty cc. of gas can often be collected. The internal pressure is sometimes sufficient to split a seam and allow some of the contents to escape, or to burst a can with violence.

After collecting the gases the can should be opened and its contents carefully examined. A putrid odor indicates, of course, decomposition. Where this is absent and the food appears perfectly sound and undecomposed the distention may be due to different causes.

A bacteriological examination is advisable.¹ Through the kindness of Dr. Lederle, of the Board of Health, samples of various canned goods have been sent me and submitted to analysis.

¹ Putrefaction of Albumins, O. Emmerling: *Ber. d. chem. Ges.*, 29, 2721-2726.

Carbon dioxide forms the chief constituent of the gaseous mixture where putrid odor abounds. In other cases hydrogen predominates. The contents of the cans show little change. There is no offensive odor. There is absence of bacteria. There are positive indications of the corrosion of the inner metallic surfaces. Sometimes there is a discoloration of the can as if a slight amount of hydrogen sulphide had been formed. The contents of such cans also yield the reactions of the metals. Hydrogen has also been found where the evidences of corrosion were not marked. With the above clues afforded by the inspection of the contents of the can, the gases in the eudiometer may be subjected to the action of proper reagents in such order as to determine at least the main constituents. The reagents may be allowed to enter the stop-cock eudiometer, or the gases be transferred to pipettes as is customary in gas analysis. The recognition of traces of substances whose odor is very marked is difficult; for some we have no adequate tests.

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MECHANICAL ARRANGEMENT OF FAT EXTRACTION APPARATUS.

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THE apparatus shown in the accompanying drawing has been in use in the Chemical Laboratory of the Brooklyn Health Department for the past eighteen months. It was designed to meet the demand often experienced in food laboratories where large numbers of samples of milk are submitted for analysis. Too often is the chemist given an unoccupied room of no apparent use for other purposes and is told to build a laboratory. The disadvantage of a small laboratory was experienced. A separate room could not be given up for fat extraction; consequently this work had to be performed in the general and only room in the presence of naked flames. It was, therefore, necessary to produce a piece of apparatus that was compact, free from any chance of explosion, of a capacity sufficient to meet all demands and simple enough to be operated by the laboratory boy. About two feet above the table, on the wall, is