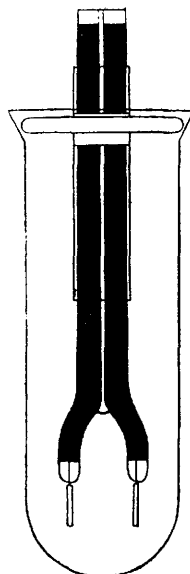
BACTERIOLOGICAL, PHYSIOLOGICAL, ETC.

A Physico-Chemical Method for Comparing the Antiseptic Value of Disinfectants. S. B. Schryver and R. Lessing. (*Journ. Soc. Chem. Ind.*, 1909, **28**, 60-65.)—The authors propose to measure, by means of the alteration of electrolytic conductivity of the liquid, the rate of chemical change produced in a protein-

containing mixture infected with bacteria, and to observe the variations in this rate of chemical change in the presence of certain concentrations of disinfectants, as compared with a standard phenol.

The medium used is either gelatin-peptone or sodium caseinogenate-peptone mixture containing about 5 per cent. of gelatin or sodium caseinogenate (*i.e.*, caseinogen dissolved in the requisite amount of sodium hydroxide) and 1 per cent. of Witte's peptone. In all cases a mixed infection from fæces is employed, as this was found to produce a more rapid change than a pure strain inoculation. The ordinary method, as usually described, was used for determining the electrolytic conductivity, the electrodes of the apparatus employed being shown in the accompanying figure. These electrodes consist of platinum plates made of fairly stiff pieces of metal 10 mm. square and placed 20 mm. apart, and coated with platinum-black. These were fused into the glass tubes here figured, the tubes being filled with mercury, into which the wires connecting the electrodes with the remainder of the apparatus were placed. The tubes were fitted by means of rubber into a glass collar which rested on the rim of the outer tube, and enabled the position of the electrodes to be conveniently adjusted. The electrodes thus constructed can be used in many determinations, and readily moved from one test-tube to another. These test-tubes were 30 by 95 mm., and were kept with their contents in a bath at 37° C., at which temperature all the determinations were made. A single coil of about 100 ohms serves as a counterbalancing resistance.



Previous investigations have shown that the curves representing (1) the conductivity of the caseinogen solution in different stages of digestion, and (2) the nitrogen in the filtrate from the tannic acid precipitate, were very similar in form. In the following experiment the results given in the table below were obtained: A sterile solution of 5 grams of gelatin and 1 gram of peptone in 100 c.c. of liquid was infected with fæces and incubated at 37° C. During the early period of incubation the liquid was thoroughly shaken up to insure uniform infection of the liquid. At the commencement of incubation, and at intervals of twenty-four hours, 10 c.c. of the mixture was weighed out, diluted to 100 c.c., and 40 c.c. of tannic acid mixture added, the solution further diluted to 200 c.c. and filtered, and the nitrogen determined in 150 c.c. of the filtrate.

Time of Incubation.	Nitrogen in Filtrate (Milligrams).	Resistance in Ohms.	Conductivity in Gemmhos.
Beginning	11·3	156·6	6·39
1 day	13·0	125·7	7·96
2 days	19·3	55·0	18·18
3 ,, ...	43·9	39·0	25·64
4 ,, ...	56·0	30·0	33·33
6 ,, ...	89·3	18·3	56·64

When an experiment with varying amounts of a disinfectant is to be made, the infected gelatin and peptone liquid, warmed and well mixed at 37° C., is placed in six sterile flasks, 90 c.c. in each, to which are added 10, 5, 2, 1, and 0·5 c.c. of a 5 per cent. solution of standardised phenol; the remaining flask has no disinfectant added. The liquid in each case is made up to 100 c.c. with sterile water. Quantities of 15 c.c. of the liquid from each are taken out at intervals, and the conductivity determined. Time must be allowed for the electrodes to attain the temperature of the liquid (37° C.). The retarding effect of the smaller quantities of disinfectant is well shown in the results, while total inhibition is shown in the case of the larger amounts. Different disinfectants may be compared similarly.

This communication is of a preliminary nature, and the authors have not attempted to express a numerical relationship in comparing the value of various disinfectants. This could, however, be done by determining the relative quantities of the disinfectant just necessary to entirely inhibit putrefaction during a given interval of time. The method can be employed both in testing coal-tar disinfectants and in other cases also, and both anaerobic and aerobic cultures may be made and tested by the method. A. R. T.

Apparatus for the Estimation of Catalase in Milk. R. Burri and W. Staub. (*Zeit. Untersuch. Nahr. Genussm.*, 1909, **17**, 88-89.)—The apparatus described is intended for the estimation of the catalytic action of different samples of milk, the oxygen liberated from hydrogen peroxide by the action of the enzyme being measured for this purpose. As is seen from the figure, the apparatus consists of a graduated tube, the tube being slightly enlarged below the graduations, so that the space between the zero-point and the stopper will hold exactly 13 c.c. A small cylinder of agar jelly is placed in the graduated portion of the tube, so that its lower edge coincides with the zero point of the graduations; the tube is then inverted, 10 c.c. of the milk to be tested are introduced into the wider portion of the tube, and then 3·1 c.c. of a 1 per cent. hydrogen peroxide solution. The stopper is inserted cautiously, causing the excess of hydrogen peroxide solution (0·1 c.c.) to escape. The tube is then placed in an incubator at a temperature of 38° C., and the oxygen evolved read off after a definite length of time. W. P. S.

The Differentiation of Enzymes in Milk by Means of Tests for Hydrogen Peroxide. C. H. La Wall. (*Amer. Journ. Pharm.*, 1909, **81**, 57-59.)—The methods used for the detection of boiled or sterilised milk may be applied conversely to the detection of hydrogen peroxide. In Dupouy's method a pronounced blue coloration is obtained on adding to 5 c.c. of raw milk a few drops of an aqueous solution of paradiamidobenzene, followed by a few drops of hydrogen peroxide solution. The author's experiments show that this coloration is obtained on adding the paradiamidobenzene solution to a raw milk containing down to 15 parts of absolute hydrogen peroxide per 100,000. Similarly, in Wilkinson and Peters' method

(ANALYST, 1908, **33**, 401), a blue zone is obtained with raw milk containing as little as 15 parts per 100,000 of hydrogen peroxide. Both methods are superior to the potassium chromate and sulphuric acid test for hydrogen peroxide. It was found that small amounts of hydrogen peroxide in milk (up to 3 parts per 1,000) could not be detected a few hours after the addition had been made, although the milk remained sweet for several days. On now testing this milk for enzymes by the two methods mentioned above, positive results were obtained by Dupouy's test, but not by Wilkinson and Peters' test. This difference was very pronounced in the case of milk containing from 15 to 30 parts of hydrogen peroxide per 100,000. In the presence of larger quantities (up to 3 parts per 1,000) the Dupouy test was prevented after several days, whilst the other test was immediately prevented. Hence, hydrogen peroxide destroys the enzyme that reacts in the latter test more rapidly than the enzyme in the Dupouy test. Eventually it inhibits the action of both enzymes, causing the milk to react like boiled or sterilised milk. C. A. M.

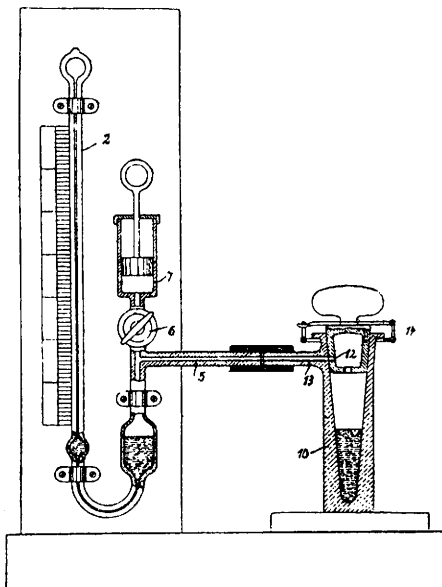
Chemical Methods for Distinguishing Carbon Monoxide-Hæmoglobin from Oxyhæmoglobin. K. Bürker. (*Zeit. biol. Tech. und Methodik*, 1908, **1**, 146; *Zeit. anal. Chem.*, 1909, **48**, 205-207.)—The author has investigated a large number of the proposed methods for the differentiation of carbon monoxide-hæmoglobin from oxyhæmoglobin, and has selected the following modifications of Zaleski's and Welzel's tests: The blood containing carbon monoxide and a control blood containing oxygen are diluted a hundred times with water, care being taken to agitate the carbon monoxide blood as little as possible, since the compound is unstable in the air. The cylinder must be tightly corked. If the test is required to yield a rapid result with a transient effect, 5 c.c. of each of the solutions of blood are placed in two test-tubes, and treated with 5 drops of concentrated copper sulphate solution. The contents are mixed by inverting the tubes once, and the carbon monoxide blood should then show a purple-red colour, whilst the ordinary blood is coloured green. Small differences are best detected by looking at the contents of the tubes from above. In a few minutes the carbon monoxide blood also turns greenish, but the difference may be made to last longer if only 1 drop of copper sulphate be employed. If the test is not required immediately, but is desired to be permanent, 5 drops of a freshly-prepared solution of tannin are used instead of the copper sulphate. In the case of the carbon monoxide blood, the flocculent precipitate which is formed remains rose-red in colour; in the case of the ordinary blood, it gradually becomes dirty red and finally brownish, and the difference remains perceptible for months. The tube containing the carbon monoxide blood must be tightly corked whilst the test is effected. J. F. B.

Estimation of Reducing Substances in Urine. J. E. Abelous. (*Compt. Rend. Soc. Biol.*, 1908, 62; through *Bull. Soc. Chim.*, 1909, [iv.] **5**, 78-79.)—Ten c.c. of the urine are mixed with 0·5 c.c. of a 1 per cent. solution of indigo carmine, and slowly titrated with $\frac{N}{10}$ bromine solution until the colour becomes distinctly yellow, without any greenish tint. Each c.c. of bromine solution consumed by the reducing substances corresponds to 0·0008 gram of oxygen. Cold bromine in neutral or acid

solution does not oxidise urea, creatinine, xanthine, or hippuric acid. Uric acid is oxidised, and should therefore be removed beforehand by means of basic lead acetate, which does not precipitate the other reducing substances in urine. The only precaution to be observed in the titration is not to have the liquid alkaline.

C. A. M.

Fermentation Saccharometer. H. Breddin. (*German Pat.*, 206-399, April 1, 1908; *Chem. Zeit. Rep.*, 1909, **33**, 69.)—In this apparatus a manometer (2) is fixed to a stand. The longer arm of the manometer terminates in a closed bulb; the shorter arm carries a side-tube (5), and is connected by way of the tap (6) with a compression cylinder (7), in which a piston can be moved up and down. The stopper of the fermentation vessel is held down by a screw clamp (14); it is hollow, communicating with the interior of the vessel, and, when in a certain position, also with the side-branch of the manometer by means of a small hole (12) and the tube (13). When in use, a certain volume of liquid is placed in the fermentation vessel, the yeast is added, and the volume is made up to a gauge mark by the addition of water. The stopper is closed, and the vessel is placed in the incubator. When fermentation is complete, the vessel is cooled to the temperature of the room, the side-arm (13) is connected with the branch of the manometer, and the stopper is rotated until the hole (12) communicates with the tube (13). The pressure of the gas produced by the fermentation can then be observed on the manometer, the tap (6) being closed.



J. F. B.