BACTERIOLOGICAL, PHYSIOLOGICAL, ETC.

Amino-Acid Nitrogen of Soil. R. S. Potter and R. S. Snyder. (*J. Ind. and Eng. Chem.*, 1915, **7**, 1049-1053.)—By Sörensen's formaldehyde titration method the authors could detect no appreciable amount of amino-acid nitrogen in soils, but the copper method of Kober (ANALYST, 1913, **38**, 567) is capable of detecting with considerable accuracy 1 part of amino-acid nitrogen in 500,000 of solution, and has been found very suitable for soil work. Even with this method, no amino-acid nitrogen could be found in the dilute acid extract of soils, and on adding small quantities of amino-acid to a soil before extracting with dilute acids, none could be found in the solution. On the other hand, on extracting with dilute alkali practically the whole amount added was recovered. No difference was found in the amount of amino-acid nitrogen extracted by dilute alkali in one, two, four, and six hours. A few soils were analysed for free amino-acid nitrogen, total amino-acid nitrogen, and total peptide nitrogen. The soils contained 0·151 to 0·21 per cent. of total nitrogen; the total amino-acid nitrogen ranged from 7·95 to 23·1 parts per million, the free from 5·45 to 14·7, and the total peptide from 30·9 to 31·5. Pot experiments showed that there is no tendency for the amino-acid to accumulate under the conditions of the experiment—viz., in a limed and unlimed acid soil, in a heavily manured and limed and a heavily manured, unlimed acid soil. Further, the soils with the larger amounts of manure showed a decided decrease in the amount of nitrate nitrogen at first, but a decided increase after four to six weeks. J. F. B.

Rapid Method of Counting Bacteria in Milk. W. D. Frost. (*Science*, 1915, **42**, No. 1077.; through *Bull. Agric. Intelligence and Plant Diseases*, 1915, **6**, 1529.)—About 0·1 c.c. of the milk is mixed with standard agar and spread over a definite area on a sterile glass slide, which (as soon as the agar is set) is incubated for six hours under conditions which prevent evaporation. It is then dried, stained, decolorised, and cleared, and the colonies counted under the microscope. The results thus obtained do not show greater variations than those given by standard methods. In the case of recently pasteurised milks a longer incubating period (*e.g.*, eight hours) may be necessary. C. A. M.

Simple Test for *B. Sporogenes* in Milk and Water. J. Weinziel. (*Science*, 1915, **42**, No. 1080; through *Bull. Agric. Intelligence and Plant Diseases*, 1915, **6**, 1530.)—The milk is placed in a sterile test-tube with sufficient paraffin wax to form, when melted, a layer of an eighth of an inch. The tube is heated for ten minutes in an oven at 80° C., and then rapidly cooled, so that the paraffin wax solidifies and forms a cover which excludes atmospheric oxygen. It is next incubated for twenty-

four hours at 37° C., and if *B. sporogenes* is present it attacks the lactose and produces a gas which raises the plug of paraffin wax. Commercial samples of milk thus tested gave the following results: In the case of 90 samples of 5 c.c. each there were 28 per cent. positive results; 112 samples of 10 c.c. each gave 37·5 per cent. positive results; while 34 samples of 15 c.c. each gave 50 per cent. positive results. C. A. M.

Improved Respiration Calorimeter for Use in Experiments with Man. C. F. Langworthy and R. D. Milner. (*J. Agric. Research*, 1915, **5**, 299-347.)—The apparatus described in this paper is a modification of that originally employed by Atwater and Rosa in 1892; the name "respiration calorimeter" indicates that it performs simultaneously the functions of both a respiration apparatus and a calorimeter. For the determination of gaseous exchange the principle employed is that of a respiration chamber and a system of air-purifying devices connected in series in a closed circuit. The air confined in the circuit is kept in circulation, the respiratory products imparted to it by the subject in the chamber being constantly removed and oxygen constantly supplied to replace that used. For the determination of heat produced in the chamber the device is a constant-temperature, continuous-flow water calorimeter, with walls impermeable to heat and air. The difference between the temperature of the water as it enters and that as it leaves the heat absorber may be easily read at any moment to 0·01°. Some ninety-five thermo-elements of special construction are arranged round the walls of the chamber, which, if equally spaced out, would be one for every 4·5 dm. square of surface; but since the temperature tends to vary more at the top, more elements are placed in the ceiling than lower down. The respiration chamber is 1·96 metres long, 1·96 metres high, and 1·19 metres wide; the total capacity of the empty chamber is 4,570 litres. Specially constructed openings for supply of food are made in the walls, and suitable furniture for the convenience of the subject, who may be occupying it for as long as two or three days at a time. As a check on the whole apparatus, alcohol is burnt in the respiration chamber, and from its known weight is calculated the calories theoretically obtainable. Another check device provides for the conversion of a known amount of electric energy into heat within the chamber by means of a coil of resistance wire. Very full details and descriptions of the numerous special devices employed to secure the very highest degree of accuracy obtainable are given, for which the original paper must be consulted. H. F. E. H.

Modification of Rose's Method for the Estimation of Pepsin. M. H. Givens. (*Amer. J. Pharm.*, 1915, **87**, 541.)—Rose's method requires the digestion of 0·25 per cent. solution of pea globulin in 10 per cent. sodium chloride at 37° C. for one hour, or at 50° to 52° C. for fifteen minutes with varying amounts of a previously neutralised gastric juice, usually diluted five times. Although the gastric juice is thus first neutralised, the digestion is made to take place in dilute hydrochloric acid of standard strength, so that, as Rose claims, the conditions are constant in every trial in respect to acidity, volume, protein content, and temperature. The author objects to this preliminary neutralisation of pepsin, since very dilute alkalies will inhibit, if not destroy, the action of pepsin. In order to avoid neutralisation and

consequent destruction of gastric juice, the following procedure is recommended: The gastric contents are strained through cheese cloth, the filtrate is diluted twelve and a half times, and into each of seven small test-tubes is measured 1 c.c. of a 0·25 per cent. solution of filtered pea globulin in 10 per cent. sodium chloride solution. To each tube is added 1 c.c. of 0·6 per cent. hydrochloric acid. The tubes are then allowed to stand about five minutes until the maximum turbidity develops. To the first five tubes distilled water is added as follows: To the first, 0·9 c.c.; to the second, 0·8 c.c.; to the third, 0·7 c.c.; to the fourth, 0·6 c.c.; and to the fifth, 0·2 c.c. To the sixth and seventh, none. The following amounts of the diluted gastric juice are then added: To the first, 0·1 c.c.; to the second, 0·2 c.c.; to the third, 0·3 c.c.; to the fourth, 0·5 c.c.; to the fifth, 0·8 c.c.; to the sixth, 1·0 c.c.; and to the seventh, 1·0 c.c., of the diluted boiled juice. All tubes are then immersed for fifteen minutes in a water-bath at 50° to 52° C. At the end of this time the tube is selected which is clear and contains the least amount of diluted gastric juice. Upon this basis the peptic activity is calculated as the number of c.c. of 0·25 per cent. globulin digested by 1 c.c. of undiluted gastric juice. If the original free acidity of the gastric juice be high, a dilution of twenty-five times in place of twelve and a half may be used. The gastric contents are never filtered, but strained through cheese cloth, as it is believed that in this way less enzyme is adsorbed. H. F. E. H.