primary amino groups in the physiological activity of lactogenic hormone.

CHOH HAO LI
WILLIAM R. LYONS
MIRIAM E. SIMPSON
HERBERT M. EVANS
INSTITUTE OF EXPERIMENTAL BIOLOGY AND DIVISION OF ANATOMY, UNIVERSITY OF CALIFORNIA, BERKELEY

MULTIPLE NATURE OF THE RAT "FILTRATE FACTOR"—A COMPONENT OF VITAMIN B_2[1]

IN our attempt to purify the "filtrate factor,"[2] a dietary component of vitamin B_2 essential for rat growth, we have obtained evidence that this factor must consist of at least two entities, one of which is extractable from acid solution by diethyl ether; the second factor remains in the residue.

The methyl alcohol soluble fraction from cane molasses was adsorbed on fuller's earth. The filtrate was acidified and extracted for 72 hours with ether in a continuous extractor (Preparation I). The residue was subjected to a second 72-hour extraction (Preparation II). These extracts, as well as the residue (Preparation III), were fed to female rats maintained on a vitamin B complex-deficient diet supplemented with thiamin, riboflavin and a source of B_6 in the form of a wheat germ eluate. Each preparation was fed for 56 days at the equivalent of 3 gm daily of the original molasses. The gain in weight (above that of the controls) was: Preparation I, 60 gm; Preparation II, no gain; Preparation III, 58 gm.

At this point it may be noted that black, gray and hooded rats receiving Preparation I exhibited no change in pelage coloring, while those receiving Preparation III showed a marked graying of black hair and a lightening of gray hair, although the nutritive state and growth were essentially the same in groups I and III. This experiment was repeated with new preparations and again the graying was observed in the rats receiving the residue and the coat was normal in those receiving the ether extractable fraction, although again growth was comparable in both groups. The graying of fur in "filtrate factor"-deficient rats was first noted by Morgan, Cook and Davison[3] and by Lunde and Kringstad.[4] The present work would seem to indicate that the "anti-graying" activity goes with the ether extractable component of the "filtrate factor."

The evidence for a relationship between the "chick anti-dermatitis factor" and the "rat filtrate factor" is conflicting. Woolley *et al.*[5,6] and Jukes[7,8] have demonstrated that pantothenic acid (Williams) is the "chick anti-dermatitis factor."

Hoffer and Reichstein[9] and Subbarow and Hitchings[10,11] have shown that the fraction extracted with ether is in all probability pantothenic acid and is a component of the rat "filtrate factor"; however, El Sadr and co-workers[12] found that β-alanine did not replace the liver or yeast "filtrate factor." Woolley *et al.*[5] have reported that the "chick anti-dermatitis factor" is readily destroyed by alkali. We have prepared an iso-amyl alcohol extract from a rice bran preparation. Its activity was not destroyed by heating in 1 N NaOH solution at 100° C. for 1 hour. It would, therefore, appear that the factor extractable with iso-amyl alcohol is not identical with the "chick anti-dermatitis factor."

ALI MOHAMMAD
OLIVER H. EMERSON
GLADYS A. EMERSON
HERBERT M. EVANS
INSTITUTE OF EXPERIMENTAL BIOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY

[1] Aided by grants from the Board of Research and the College of Agriculture, University of California, from the Rockefeller Foundation, New York, and from Merck and Company, Inc., Rahway, New Jersey. Assistance was rendered by the Federal Works Progress Administration, Project OP 665-08-3-30, Unit A-5. The following materials were generously contributed: Betabion (Thiamin) by Merck and Co., Riboflavin by Hoffmann-LaRoche, molasses by Waialua Agricultural Co., courtesy of Mr. John Midkiff, wheat germ by General Mills, Inc., and rice bran extract by the Galen Company.

[2] S. Lepkovsky, T. H. Jukes and M. E. Krause, *Jour. Biol. Chem.*, 115: 557, 1936.

[3] A. F. Morgan, B. B. Cook and H. G. Davison, *Jour. Nutr.*, 15: 27, 1938.

[4] G. Lunde and H. Kringstad, Avhandl. Norske Videnskaps. Akad. Oslo I, Mat. Naturv. Klasse 1, 1, 1938.

[5] D. W. Woolley, H. A. Waisman and C. A. Elvehjem, *Jour. Am. Chem. Soc.*, 61: 977, 1939.

[6] D. W. Woolley, H. A. Waisman and C. A. Elvehjem, *Jour. Biol. Chem.*, 129: 673, 1939.

[7] T. H. Jukes, *Jour. Am. Chem. Soc.*, 61: 975, 1939.

[8] T. H. Jukes, *Jour. Biol. Chem.*, 129: 225, 1939.

[9] M. Hoffer and T. Reichstein, *Nature*, 144: 72, 1939.

[10] Y. Subbarow and G. H. Hitchings, *Jour. Am. Chem. Soc.*, 61: 1615, 1939.

[11] G. H. Hitchings and Y. Subbarow, *Jour. Nutr.*, 18: 265, 1939.

[12] M. M. El Sadr, H. G. Hind, T. F. Macrae, C. E. Work, B. Lythgoe and A. R. Todd, *Nature*, 144: 73, 1939.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN ELECTRIC STERILIZER FOR THE CULTURE ROOM

To avoid the use of an open flame in culture room or transfer case a small electric sterilizer has been used for a number of years and found to be highly satisfactory. The constant heating of the culture space resulting from the use of a gas jet or an alcohol lamp; the resulting convection currents of air carrying con-

taminating spores; the production of harmful gases and the fire hazards are all eliminated by substituting a low rectangular frame of transite containing a number of turns of nicrome wire connected to the lighting circuit.

The details of the sterilizer are given in the accompanying sketch (Fig. 1). When using the sterilizer a pedal switch operates to turn the electric current on

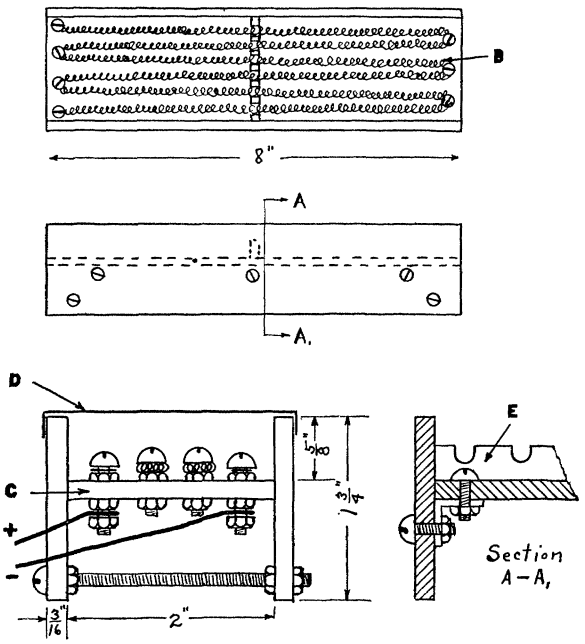

FIG. 1. Electric sterilizer, showing frame of 3/16" transite which bears the coils of resistance wire B on a shelf C. The "12 to the inch" mesh galvanized wire screen D, covers the frame, prevents direct contact with the heating coil B and is used to hold various cultural instruments such as wire needles, special knives, scalpels, chisel forceps, long museum forceps and other instruments and materials during sterilization. In B the length of resistance wire from a cone-heating unit is looped around binding bolts at both ends and supported in the center by a slotted strip of transite E to prevent lateral contact between segments of the coil.

and off, keeping the heating coil hot only during the period when the culture instrument is being held over the mesh screen. The instrument is first dipped in alcohol and either held momentarily over the screen or laid upon it until the alcohol ignites and burns off. Glass rods used in special cultural technique for testing toxicity of preservatives in wood can be dipped in alcohol and a number of them placed over the screen for sterilization before placing them on the test fungus mat. The sterilizer is placed on a sheet of asbestos paper laid on the culture room table or the floor of the culture case in a position most handy for the worker.

The electric sterilizer is submitted for trial to those workers who desire, for one reason or another, to eliminate the open flame in the culture chamber.

ERNEST E. HUBERT
WESTERN PINE ASSOCIATION,
PORTLAND, OREGON

THE INFLUENCE OF CENTRIFUGATION ON THE AGGLUTINATION OF PNEUMOCOCCI[1]

THE usual methods for detecting agglutinins (excepting the relatively crude slide agglutination), require 18–24 hours. Fleming,[2] stimulated by earlier observations of Gaehtgens[3] and of Gates,[4] employed centrifugation.

It was observed during observations on antigen-antibody balance in treated cases of pneumococcal pneumonias that centrifugation increases the rapidity and accuracy of agglutinin detection.

One half cc portions of the different antibody dilutions were mixed with 0.5 cc portions of bacterial suspensions. Readings were made after ½, 1 and 2 hours' incubation at the following temperatures: 4° C., 20° C., 37° C. and 55° C. and again after refrigeration at 4° C. overnight. The results obtained by this method were compared with those observed after immediate centrifugation of the antigen-antibody mixture for 5 minutes at 2,000 r.p.m. Immediate development of strongly positive reactions were observed in all tubes after centrifuging for 5 minutes. Reactions were always more definite than those obtained with water bath incubation for two hours and overnight refrigeration. The "inhibition-zone," observed after incubation in the water bath in tubes containing an excess of antibody, was eliminated.

PAUL F. DE GARA

[1] From the Medical Service of Harlem Hospital, Department of Hospitals, New York City, N. Y., and from the Littauer Pneumonia Research Fund, New York University College of Medicine. These studies received financial support from the Littauer Pneumonia Research Fund, of New York University College of Medicine, from the Metropolitan Life Insurance Company and from Mr. Bernard M. Baruch, Jr., Miss Belle N. Baruch and Mrs. H. Robert Samstag.

[2] A. Fleming, *British Jour. Exp. Path.*, 8: 231, 1928.

[3] W. Gaehtgens, *Munch. med. Woch.*, 53: 1351, 1906, and *Arch. Hyg.*, 56: 377, 1908.

[4] F. K. Gates, *Jour. Exp. Med.*, 35: 63, 1922.

BOOKS RECEIVED

BALL, ALICE M. *Compounding in the English Language.* Pp. 226. Wilson.

Science Reports of the Tôhoku Imperial University. Fourth Series. (Biology.) Vol. XIV, Nos. 2 and 3. Pp. 121–326. Illustrated. Maruzen, Tokyo.

TAYLOR, JAMES H. Vector Analysis. Pp. ix + 180. Prentice-Hall. $2.85.