

tubes for several days at room temperatures, but in the egg, death of the embryo may be followed very shortly by mortality of the protozoa.

No pathogenic action by these protozoa on the chick embryo has ever been noted. If left in the incubator for the full incubation period, normal chicks hatch out. Trichomonads are no longer present, since the allantoic fluid has disappeared.

It is apparently not necessary for the trichomonads to be entirely free of bacteria in order to multiply in the allantoic fluid, since the presence of saprophytic air-contaminants has been found not to prevent their development. If, however, the bacteria kill the chick embryo, the trichomonads die in a day or two.

Preliminary series of experiments indicate that eggs which have been incubated about 12 days are more satisfactory for cultivation of *Trichomonas foetus* than eggs incubated for shorter or longer periods. An incubation temperature of 37° C. is better than 34.5° C. or 39° C.

Trichomonas muris from the rat has also been cultivated in developing eggs, but no sub-cultures have been attempted to date.

Since protozoa have already been cultivated in artificial culture media and in tissue culture, the use of developing chicken eggs offers a third type of medium which may prove of value in experimental propagation studies.

N. D. LEVINE*

C. A. BRANDLY*

ROBERT GRAHAM

LABORATORY OF ANIMAL PATHOLOGY AND HYGIENE,
UNIVERSITY OF ILLINOIS

THE PRODUCTION OF GOITER IN CHICKENS¹

ALTHOUGH goiter in poultry has been noted in iodine-deficient areas,² no report of its experimental production has been found. We have obtained goiter in chickens with a ration containing .145 mg per kilo of iodine, and have prevented goiter by the addition of 5 mg per kilo of iodine to the same ration.

Five hundred White Leghorn chicks were used in the two lots. The basal ration contained 71.5 per cent. yellow corn meal, 25 per cent. soybean oil meal, 1 per cent. casein, 0.5 per cent. salt, 2 per cent. bone ash, 0.001 per cent. activated animal provitamin (50,000 units of D per gram), 0.015 per cent. manganous sulfate, and 0.03 per cent. of a salt mixture. The

* Assigned by the State Department of Agriculture to assist in diagnostic and research work.

¹ This work is being conducted through an investigator-ship established by the Iodine Educational Bureau, Inc., New York. The Vitamin D solution was generously supplied by Dr. J. J. Waddell, Biological Laboratory, E. I. du Pont de Nemours and Company, Wilmington, Delaware.

² H. Welch, *Montana Agr. Exp. Station Bulletin*, 214, 1928.

vitamin G requirements for growth were supplied by liquid skim milk.³

Thyroid weights of chickens fed the basal ration were 130 per cent. of the control thyroid weights at 6 weeks, 240 per cent. at 12 weeks and 294 per cent. at 18 weeks. In extreme cases, thyroids have been found to approximate twenty times normal weight.

Histopathological examinations of the enlarged thyroids at these intervals during growth showed an absence of colloid and a hyperplasia of the living cells of the follicles. These changes were apparent at 6 weeks and increased in severity with age. Thyroid glands from the control group remained normal.

Work on the iodine requirements of poultry is being continued.

A. R. PATTON

H. S. WILGUS, JR.

G. S. HARSHFIELD

COLORADO AGRICULTURAL EXPERIMENT STATION,
FORT COLLINS, COLORADO.

³ G. F. Heuser, H. S. Wilgus, Jr., and L. C. Norris. *Poultry Science*, 11: 105, 1938.

BOOKS RECEIVED

- ADAMS, FRANK D. *The Birth and Development of the Geological Sciences*. Pp. v + 506. 78 figures. 14 plates. Williams and Wilkins. \$5.00.
- British Guiana Papers; Scientific Results of the Oxford University Expedition to British Guiana in 1929*. Illustrated. Oxford University Press. \$7.00.
- DEAVER, GEORGE G. *Fundamentals of Physical Examination*. Pp. 299. 126 figures. Saunders. \$2.75.
- HECTOR, J. M. *Introduction to the Botany of Field Crops; Vol. I—Cereals*. South African Agricultural Series. Pp. xi + 478 + xxxiv. 190 figures. Central News Agency, Johannesburg. £3.10.0 per set.
- HOOTON, EARNEST A. *Crime and the Man*. Pp. xvi + 403. Illustrated. Harvard University Press. \$3.75.
- MACDERMOT, H. E. *Sir Thomas Roddick; His Work in Medicine and Public Life*. Pp. xiii + 160. Illustrated. Macmillan. \$2.00.
- MUENSCHER, WALTER C. *Poisonous Plants of the United States*. Pp. xvii + 266. 75 figures. Macmillan. \$3.50.
- MUDGE, COURTLAND S. and FLOYD R. SMITH. *A Fundamental Approach to Bacteriology*. Pp. vii + 265. 17 figures. J. W. Stacey, San Francisco.
- NEYMAN, J. and E. S. PEARSON, Editors. *Statistical Research Memoirs, Vol. II, December, 1938*. Pp. 149. Illustrated. Department of Statistics, University College, London. 15 s.
- Papers in Physical Oceanography and Meteorology, Vol. VII, No. 1; Fluid Mechanics Applied to the Study of Atmospheric Circulations, Part I, December, 1938*. Pp. 125. 24 plates. Massachusetts Institute of Technology and Woods Hole Oceanographic Institution. \$1.50.
- Research—A National Resource; I, Relation of the Federal Government to Research; Report of the Science Committee to the National Resources Committee, November, 1938*. Pp. vii + 255. Superintendent of Documents, Washington. \$0.50.
- SINNOTT, EDMUND and L. C. DUNN. *Principles of Genetics*. Third edition. Pp. xiv + 408. 147 figures. McGraw-Hill. \$3.50.
- Sixième Assemblée Générale à Edimbourg du 14 au Septembre 1936; Bulletin N. 23, Transactions of the Meetings of the International Commissions of Snow and of Glaciers*. Pp. xiv + 804. Illustrated. Association Internationale d'Hydrologie Scientifique, Paris.