

2. The cells of young embryonic tissue contain also a reserve energy. They may grow in an atmosphere of pure nitrogen for a short time. This absence of oxygen leads soon, however, to their rapid disintegration. Oxygen is evidently necessary for their preservation as Warburg conceived it.¹

3. This ability for the cells to grow without oxygen is lost with development. It fails in the case of the cells of older embryos;

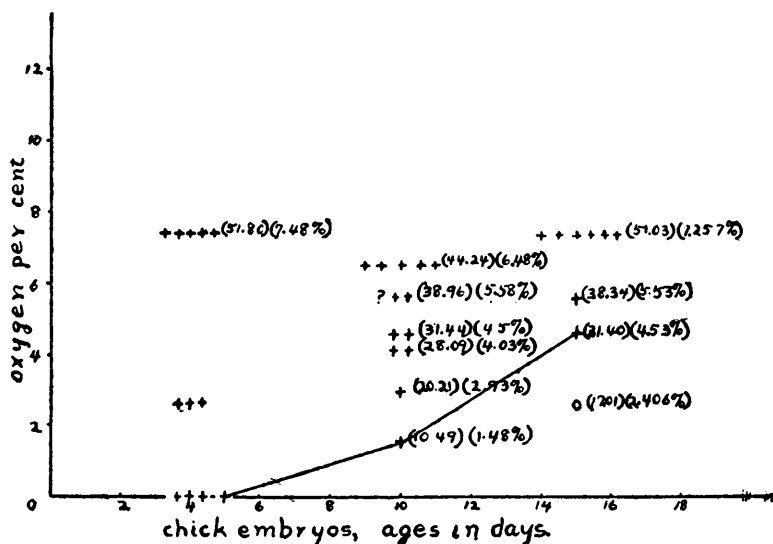


TABLE AND CURVE 1. The Relative amount of growth in the cultures is indicated by the number of + signs. That noted in the 4 day old embryonic tissue in 7.48 per cent. oxygen is comparable to what is seen in air.

as development proceeds, a greater and greater amount of oxygen is needed.

63 (1645)

Does growth require preformed carbohydrate in the diet?

By THOMAS B. OSBORNE and LAFAYETTE B. MENDEL.

[From the Laboratory of the Connecticut Agricultural Experiment Station, and the Sheffield Laboratory of Physiological Chemistry in Yale University, New Haven, Conn.]

Carbohydrates are ordinarily regarded as indispensable components of the food intake. This belief is based on the presence

¹ *Ergeb. Phys.*, 1916, xiv.

of more or less carbohydrate in the food mixtures consumed by man and the higher animals, and the fact that sugar is a constant constituent of the blood. Furthermore, it has been concluded that carbohydrates are essential for the proper metabolism of the fats because ketone substances may be excreted in diabetes when sugar fails to be burned up in the normal manner in the organism.

We have found that *rats receiving a diet in which the amount of digestible carbohydrate was at most exceedingly small can grow from an early age to adult size*. The rations which we fed included protein—casein, edestin, or lean beef which had been thoroughly extracted with boiling water—inorganic salts, agar-agar, lard, butter fat and 0.4 gm. daily of dried brewery yeast furnishing vitamin B. The yeast can scarcely be regarded as a significant source of available carbohydrate. Success was likewise attained in experiments in which no agar-agar was introduced. In the latter case the only obvious sources of preformed carbohydrate were the yeast employed and such carbohydrate impurities as might still adhere to the protein preparation fed.

64 (1646)

Paramecium calkinsi sp. n.

By LORANDE LOSS WOODRUFF.

[From the Osborn Zoölogical Laboratory, Yale University.]

There are at present four well-established species of *Paramecium* (*P. aurelia*, *P. caudatum*, *P. bursaria*, and *P. putrinum*) which fall naturally into two quite clearly defined groups. One group comprises *Paramecium aurelia* and *Paramecium caudatum* which are characterized by a relatively long spindle-shaped body. The other group includes *Paramecium bursaria* and *Paramecium putrinum* which exhibit a somewhat shorter and broader form, with a tendency toward a dorso-ventral flattening. All the species have a single micronucleus except *Paramecium aurelia*, which has two micronuclei each showing characteristic 'endosome' structure.¹

¹ H. S. Jennings and G. T. Hargitt: "Characteristics of the Diverse Races of *Paramecium*," *Journal of Morphology*, 1910, xxi, 495. L. L. Woodruff: "*Paramecium aurelia* and *Paramecium caudatum*," *Journal of Morphology*, 1911, xxii, 223.