

FEEDING EXPERIMENTS ILLUSTRATING THE IMPORTANCE OF ACCESSORY FACTORS IN NORMAL DIETARIES. By F. GOWLAND HOPKINS.

(From the Physiological Laboratory, Cambridge.)

The experiments described in this paper confirm the work of others in showing that animals cannot grow when fed upon so-called "synthetic" dietaries consisting of mixtures of pure proteins, fats, carbohydrates, and salts. But they show further that a substance or substances present in normal foodstuffs (*e.g.*, milk) can, when added to the dietary in astonishingly small amount, secure the utilization for growth of the protein and energy contained in such artificial mixtures. . .

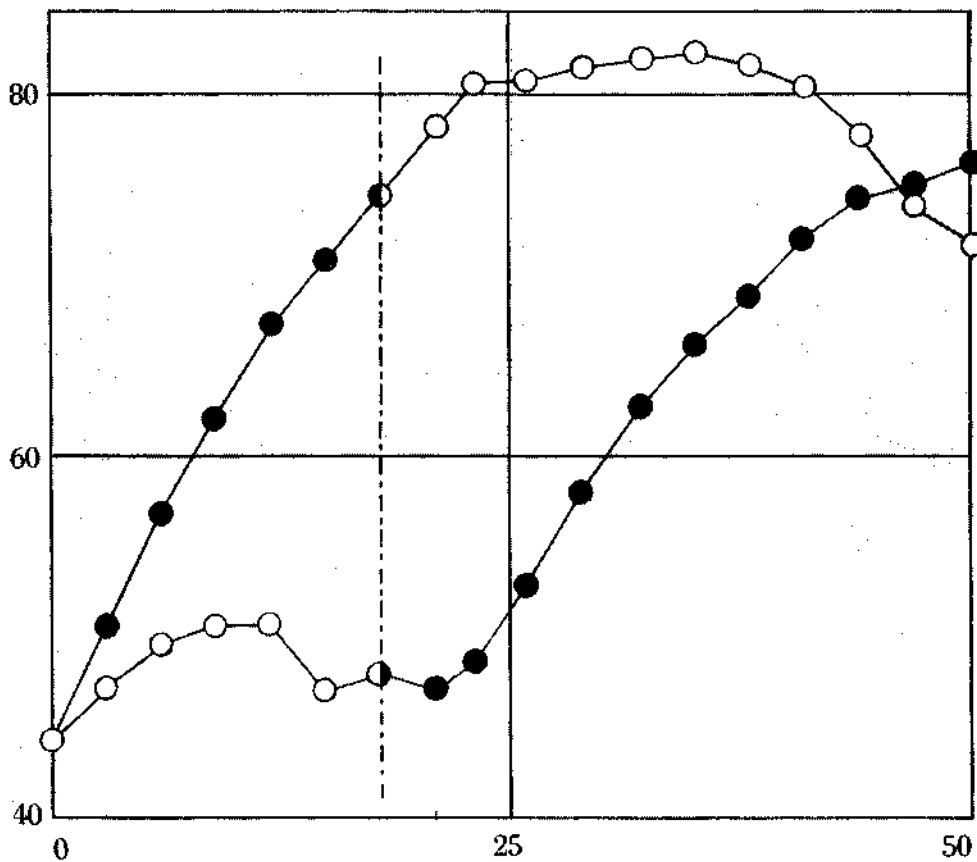


Fig. 2. Lower curve (up to 18th day) eight male rats upon pure dietary; upper curve eight similar rats taking 3 ex. of milk each a day. On the 18th day, marked by vertical dotted line, the milk was transferred from one set to the other. Average weight in grams. vertical; time in days horizontal.

. . . Summary

Groups of young rats were fed upon artificial mixtures of isolated casein, fat, carbohydrate, and salts. Side by side with them similar groups were fed on the same basal dietary, but with the addition of a minute ration of fresh milk.

In those experiments in which the basal diet contained fully purified material the rats without milk soon failed to grow. When the constituents were less completely purified, as when the protein was a commercial preparation of casein, slow growth occurred. In all cases the milk addendum, although its total solids amount to only 4%, or less, of the whole food eaten, induced normal and continued growth. A similar effect was obtained with protein-free and salt-free extracts of milk-solids and of yeast.

The total energy consumption of the animals under comparison was carefully determined, and it could be shown that the rats upon the purer dietary ceased to grow at a time when their intake was more than sufficient quantitatively to maintain normal growth.

The absolute consumption of the animals growing rapidly with the milk addendum was greater than that of those growing slowly (or not growing) upon the basal dietary alone; but the consumption per unit of live-weight, was, in comparable groups, nearly the same.

If growth continued (as upon the less pure basal dietary) it could be shown that the small milk addendum reduced the food consumption necessary for a given weight-increment to one-half or less.

Special experiments were carried out to show the effect upon growth-velocity of known increments in food when its quality is constant.

The results of these showed that any difference in the total intake of the rats in the main experiments, as between those upon milk and others without it, was very much too small to account for the great difference in their growth rates.

The milk ration was fed separately and in advance of the administration of the main dietary. It could not therefore affect the palatability of the food or diminish its monotony. In general, moreover, it was found that cessation of growth upon the pure dietary took place before any failure in appetite, although the consumption might, later, fall to a lower level.

It is therefore suggested that any effect of the addendum upon appetite must have been secondary to a more direct effect upon growth-processes.

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F. Gowland Hopkins: "... Importance
of Accessory Factors" 19

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