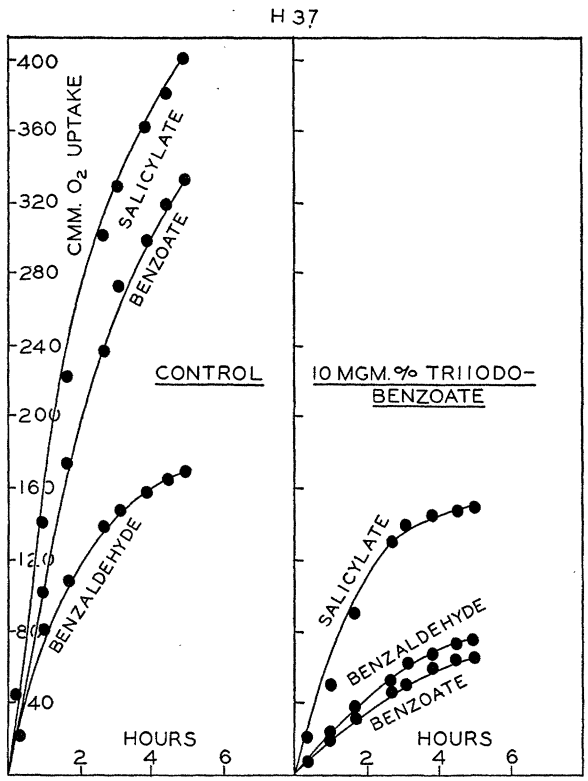

FIG. 1. The effect of 1.0 mg each of salicylate, benzoate and benzaldehyde on the oxygen uptake of a washed suspension of tubercle bacilli, H37 strain, in the presence and absence of 2, 3, 5, triiodobenzoate. pH 6.7. 37° C. The control uptake of the tubercle bacilli has been subtracted.

inhibits growth. The effect of many other similar compounds will be reported elsewhere.

Triiodobenzoate is tolerated by rats when given intraperitoneally in daily doses of 100 mg/kg. Daily doses of 100 mg/kg by mouth are tolerated by guinea pigs. 1.0 gm a day can be taken orally by man without apparent ill effects. It is absorbed from the gastrointestinal tract.

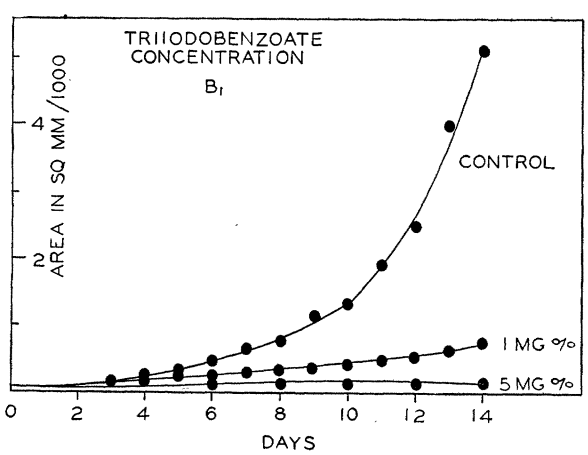

FIG. 2. The effect of 2, 3, 5, triiodobenzoate on the growth of the B_1 strain of tubercle bacilli.

ARTHUR K. SAZ
FREDERICK BERNHEIM
DUKE UNIVERSITY SCHOOL OF MEDICINE

THE MINIMUM BASE VALUE OF HEAT PRODUCTION IN ANIMALS

THE writers and their associates have advocated in several papers[1-8] the idea that there is an energy expense of utilization of the body tissue nutrients as katabolized, which implies that the base value of heat production is less than that of fast.

This conception, which may be considered to follow from the observation by Rubner,[9] and by others later, that there is an increase in heat production accompanying the increase in protein katabolism during fast, involves important consequences which the authors would emphasize in relation to the determination of the heat increments (dynamic effects) of nutrients and of diets.

With the understanding that metabolizable food nutrients and metabolizable nutrients of body origin are in essentially the same fundamental status as sources of nutrient energy, and that the nutrients from both sources, as katabolized at planes of nutrition below that of energy equilibrium, represent in part net energy and in part energy expense of utilization, the authors and their associates take the position that heat increments based on the heat production of fast, or determined under conditions implying the heat production of fast as the base value, are in error by the amount of the dynamic effect of the body nutrients spared.

In recent calorimetric experiments at this institute, the results of which are not yet published in detail, an attempt was made to estimate the base value of heat production in cattle.

In these experiments the energy expense of utilization of the body nutrients katabolized during fast was estimated as the increase in heat production following the feeding of oleo oil and dried beef muscle (to represent the body nutrients katabolized during fast) to steers established in approximate energy equilibrium; and the net energy of the body nutrients katabolized (the heat production of fast minus the energy expense of utilization of the fasting nutrients) was considered to represent the theoretical minimum base value of heat production.

1 *Jour. Agr. Research,* 34: 166, 1927.
2 *Ibid.,* 37: 253, 1928.
3 *Ibid.,* 40: 37, 1930.
4 *Ibid.,* 43: 1003, 1931.
5 *Jour. Nutr.,* 5: 183, 1932.
6 *Ibid.,* 15: 505, 1938.
7 *Ibid.,* 21: 257, 1941.
8 *Ibid.,* 8: 509, 1934.
9 "Die Gesetze des Energieverbrauchs bei der Ernährung," 1902.

In the calorimetric experiments referred to the energy expense of utilization of body nutrients katabolized was tentatively found, as an average of five determinations, to be equivalent to 14.4 cal. per kilogram of live weight during fast and equal time standing and lying, or to 12.6 calories per kilogram during fast in the lying position alone, or to 26.5 per cent. of the metabolizable energy of the oleo oil and dried beef muscle fed to represent the body nutrients katabolized.

To demonstrate the significance of the theoretical base value of energy metabolism, a graph is presented (Fig. 1) representing previously determined curves of

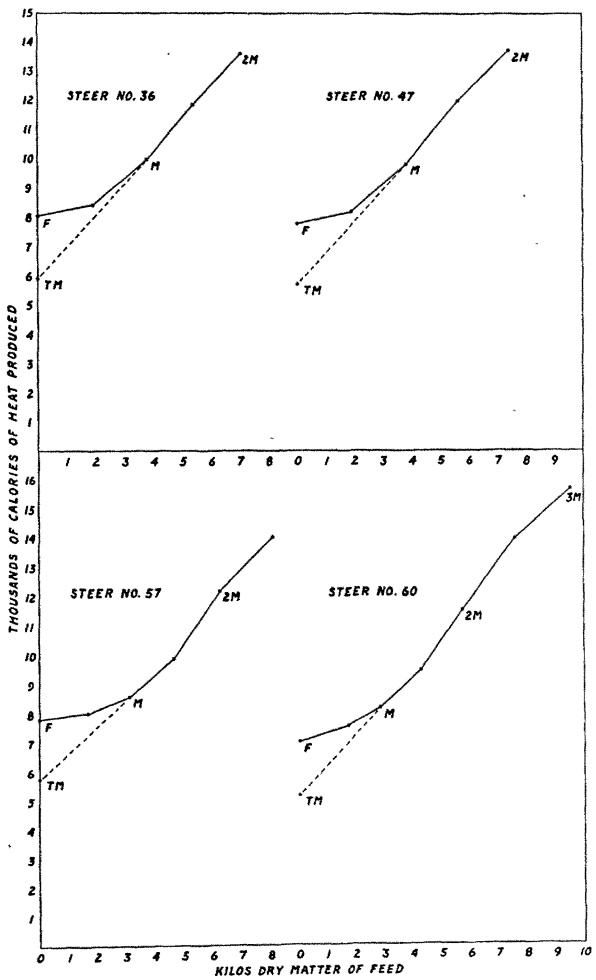

FIG. 1. Relation of heat production to food consumption, as observed and as corrected for dynamic effect of body nutrients katabolized. M = maintenance, F = fast, and TM = theoretical minimum heat production.

heat production in relation to food consumed with four steers, (1) as observed, and (2) as corrected by the use of the recently determined factor for computing the dynamic effect of body nutrients katabolized.

The curve of heat production in relation to the energy of the food, so corrected, becomes nearly a straight line up to the moderately high level at which the metabolizability of the food begins to diminish, thus providing a basis for the expression of energy values of diets, and energy requirements of animals, both for maintenance and for body increase in the same terms, presumably without extensive error.

While it is obviously impossible directly to measure this theoretical base value of heat production, as defined, the indirect estimation which is presented serves at least to illustrate the point of view that there is such a value, and that dynamic effects of nutrients as directly observed at planes of nutrition below that of energy equilibrium are fundamentally invalid.

The maintenance heat production, therefore, is considered the most nearly correct base value from which to measure dynamic effects in nutrition.

It is impossible to make a full statement of the philosophy of this matter in so short a communication, and a detailed discussion will be presented elsewhere.

E. B. FORBES
R. W. SWIFT
THE INSTITUTE OF ANIMAL NUTRITION,
PENNSYLVANIA STATE COLLEGE

ESTIMATION, ISOLATION AND IDENTIFICATION OF AUXINS IN PLANT MATERIAL

FOR estimation and concentration of auxins the following methods have been used, namely, the diffusion method,[1] the extraction process,[2] the enzymatic method (lipase,[3] chymotrypsin[3a]), the alkaline alcoholic hydrolysis[4] and the biological digestion method.[3]

The biological digestion method of Kögl, Haagen-Smit and Erxleben as performed by feeding experiments on humans is capable of giving the total hormone content, both the free hormone and the precursor form (or bound form) as well. By necessity this method is limited in its application.

Using the results obtained in the biological digestion method as a criterion for the assay of the total growth hormone set free in dormant tissues, the following more practical method was developed, whereby one is able to remove an amount which is equivalent to the amount of the growth promoting substances obtained by the biological method. This modified procedure has been in use in this laboratory for the past two years in the investigation of auxin-like substances in high

[1] F. W. Went, *Rec. Trav. Bot. Neerl.*, 25: 1–116, 1928.
[2] G. S. Avery, *Am. Jour. Bot.*, 26: 679, 1939; K. V. Thimann and F. Skoog, *Am. Jour. Bot.*, 27: 951–960, 1940.
[3] F. Kögl, A. J. Haagen-Smit and H. Erxleben, *Zeits. physiol. Chem.*, 220: 137–161, 1933.
[3a] F. Skoog and K. V. Thimann, SCIENCE, 92: 64, 1940.
[4] F. Kögl, A. J. Haagen-Smit and H. Erxleben, *Zeits. physiol. Chem.*, 225: 215–229, 1934.