to Mary Cathrine Rowley, Canton, Illinois, and Bill Hahn, Rockford, Illinois. These awards were especially well received and help to maintain interest in the Junior Academy group. No one could have attended this meeting without realizing that the oncoming generation of scientists will be an active and able one.

On Saturday morning so many private cars were available that only two bus loads of academy members went on the museum trips. So many possibilities were offered that the number in attendance at any one meeting was small, but many reports of interesting and worth-while experiences were heard.

At the council meeting it was voted to accept the invitation of the University of Illinois to hold the annual meeting of 1942 in Urbana. This is in line with the policy of the academy to hold its meetings in various parts of the state. The section chairmen in charge of the several groups in the academy are:

Agriculture—C. H. Oathout, Macomb, Illinois.
Anthropology—D. E. Wray, Peoria, Illinois.
Botany—J. F. Stanfield, Chicago Teachers College, Chicago, Ill.
Chemistry—N. D. Cheronis, 5556 Ardmore Avenue, Chicago, Illinois.
Geography—J. E. Van Riper, Carbondale, Illinois.
Geology—A. H. Sutton, Urbana, Illinois.
Physics—F. L. Verwiebe, Charleston, Illinois.
Psychology and Education—J. M. Hughes, Northwestern University, Evanston, Illinois.
Social Science—John Kinneman, Normal, Illinois.
Zoology—O. Parks, Northwestern University, Evanston, Illinois.

The section chairman of the academy has always been the nucleus about which the Illinois Academy functions. A great deal of appreciation has been voiced for the work of the retiring chairmen and the officials at Northwestern who cooperated so effectively. Plans for the 1942 meeting at the University of Illinois are already being formed. Local officers to whom inquiries concerning the activities of the academy and in particular, questions on plans for the 1942 meeting, may be addressed are: *President,* Dr. T. H. Frison, Natural Resources Building, Urbana, Illinois; *General Chairman,* Dr. G. E. Ekblaw, Natural Resources Building, Urbana, Illinois; *Secretary,* Dr. R. F. Paton, Department of Physics, University of Illinois, Urbana, Illinois.

The chairman of the Junior Academy, Mrs. Mary Creager, Vienna, Illinois, has immediate charge of the Junior Science activities. It seesm likely now that facilities will be available at the University of Urbana to hold a more effective exhibit of science work in the secondary schools than is usually the case. Buildings will probably be available to permit setting up these exhibits for several days. Many high schools are already cooperating in this program and the activities of the science clubs in the high schools of the state are being recognized as an important tool of the educator.

Illinois wishes to announce also that active plans are underway to promote scientific meetings among interested student groups of college level. This movement is attracting much favorable attention among several of the state academies.

R. F. PATON,
*Secretary*

# SPECIAL ARTICLES

## THE EFFECT OF 2, 3, 5, TRIIODOBENZOATE ON THE GROWTH OF TUBERCLE BACILLI

IT has been shown that the addition of salicylate to a washed suspension of tubercle bacilli of the $B_1$ and H37 strains increases their oxygen uptake.[1] Certain other substances have similar effects and an attempt was made to find a compound which would inhibit the extra oxygen uptake. 2, 3, 5, triiodobenzoate was found to cause a marked inhibition (Fig. 1). The effect on growth of this and similar compounds was then tried.

Both the $B_1$ and H37 strains were used and gave similar results. The culture medium was a veal glycerine infusion broth adjusted to pH 6.7. The cultures were incubated at 37° C. The area of growth was measured daily and the average of five bottles was used for each point. When the areas showed definite differences the bottles were autoclaved and the bacteria filtered, dried and weighed. The differences found by area and weight usually checked within 10 per cent. The triiodobenzoate obtained from Eastman Kodak Company was recrystallized from glacial acetic acid and neutralized to pH 6.7. Fig. 2 shows that in very small concentrations it inhibits growth. If a culture which has not grown in the presence of triiodobenzoate is transferred to fresh medium, growth will occur showing that the cells have not been killed. If the drug is added during the rapid growth phase inhibition also occurs.

The importance of substitution in the ortho position of the benzoic acid is shown by the fact that 3, 5, diiodo-2-hydroxybenzoate is as effective as triiodobenzoate in inhibiting growth, whereas 3, 5, diiodo-4-hydroxybenzoate requires a much higher concentration. Salicylate itself, although it increases oxygen uptake,

[1] F. Bernheim, SCIENCE, 92: 204, 1940; *Jour. Bact.* (in press).

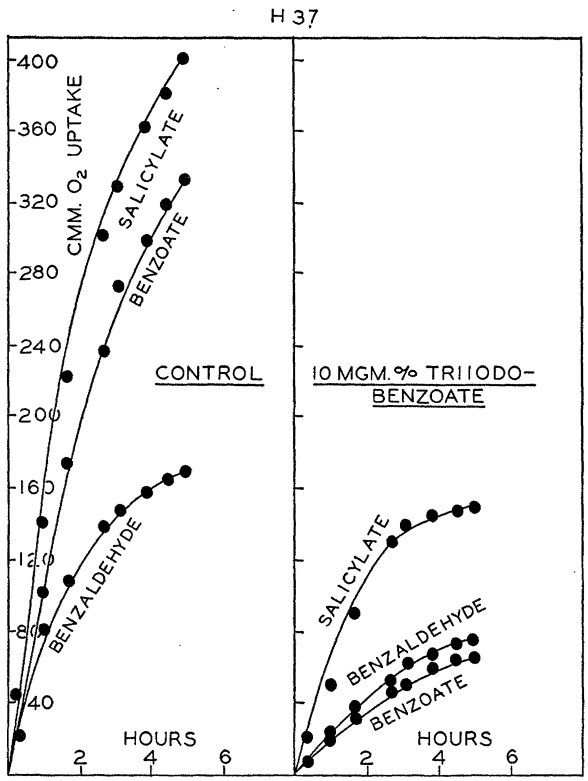


FIG. 1. The effect of 1.0 mg each of salicylate, benzoate and benzaldehyde on the oxygen uptake of a washed suspension of tubercle bacilli, H37 strain, in the presence and absence of 2, 3, 5, triiodobenzoate. pH 6.7. 37° C. The control uptake of the tubercle bacilli has been subtracted.

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.

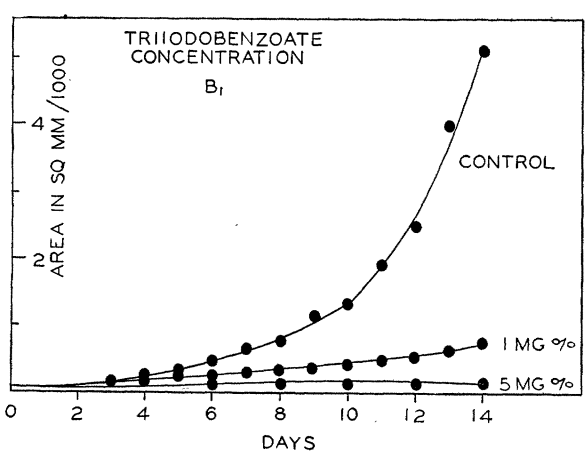


FIG. 2. The effect of 2, 3, 5, triiodobenzoate on the growth of the $B_1$ strain of tubercle bacilli.

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## 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.