Dr. G. F. White, of the U. S. Bureau of Entomology, will present a paper on the production of sterile maggots for surgical use. Dr. G. F. Otts and Dr. W. W. Cort, of the Johns Hopkins University, will speak on post-treatment infestation with Ascaris and hookworm. Other papers of distinct medical interest will be presented by Dr. R. B. H. Gradwohl, of St. Louis, Dr. E. C. Nelson, of the Johns Hopkins University, Dr. Ernest C. Faust, of Tulane University, and Dr. R. W. Glasser, of the Rockefeller Institute for Medical Research. A total of 76 papers will be presented at sessions of the American Society of Parasitologists.

CHARLES F. ROOS,
Permanent Secretary

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A RELIABLE METHOD FOR THE PRODUCTION OF NUTRITIONAL ANEMIA IN WHITE RATS

IN the production of experimental anemia in albino rats fresh cows' milk is widely used as the sole ingredient of the diet. This ability of fresh cows' milk to produce anemia is evidently dependent on its copper and iron components. In our experience it has been difficult to produce a uniform degree of anemia at the end of a given period of time. This has been due in no small measure to the fact that the iron and copper content of cows' milk varies with the breed of the cow, the diet of the cow, the season of the year (doubtlessly involving the diet) and the method used in collecting and storing the milk. When the fresh milk diet is used the milk rapidly sours in feeding jars and must, on that account, be given in several small doses daily. With such variations and inconveniences it has frequently been necessary to maintain the animals on the fresh milk diet for several months before a severe anemia developed. Because of these difficulties in obtaining consistent anemia in albino rats on the whole milk diet another form of milk has been tested in this laboratory. Klim, a whole dried milk, when fed as such, has caused the development of a severe anemia in albino rats much more consistently than the fresh milk diet. Water was given the animals in a separate container *ad libitum*. The Dryco brand of dried whole milk has not yet been used, for Supplee *et al.*[1] have reported that it does not support the production of anemia.

The mortality among the rats on the Klim diet, in our experience, has been much lower than with the fresh milk ration. The variation in the extent of anemia produced in the animals at the end of a given period of time was less. At the end of four weeks on the diet a typical group of 25 animals showed a maximum hemoglobin content of 3.8, a minimum of 2.5, and a mean of 3.1 grams of hemoglobin per 100 cc of blood. It has been found that occasionally a rat will grow much more rapidly than his fellows in a test. At the same time there is a more rapid decrease in the blood hemoglobin value of this rat with the result that at the end of four weeks there are but 1.8 grams per 100 cc of blood. These occasional exceptions have been discarded from the tests.

The growth of the animals on this diet is rapid and uniform. During the first few days they generally develop a diarrhea (perhaps associated with high lactose intake) but this clears up before the seventh day and has no apparent effect on the curve of weight increase.

The 100 animals whose growth and hemoglobin curves are shown in Fig. 1 were fed the Klim diet

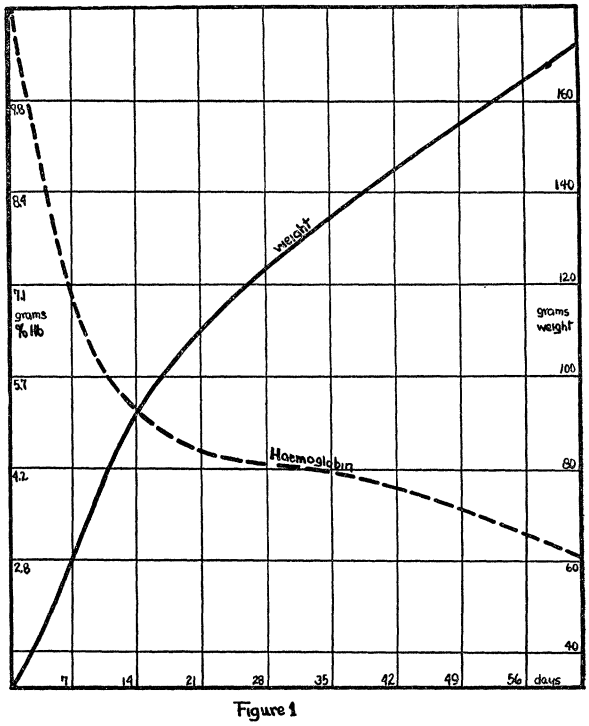

Figure 1

with no supplements. They were housed in heavily galvanized iron wire cages with false bottoms. They were not bred with the precautions recommended by Elvehjem and Kemmerer[2] nor caged in glass compartments,[3] for it appears that this is not necessary. It

[1] G. C. Supplee, O. D. Dow, G. E. Flanigan and O. J. Kahlenberg, *Jour. of Nutrition*, 2, 451, 1930.

[2] C. A. Elvehjem and A. R. Kemmerer, *Jour. Biol. Chem.*, 93, 189, 1931.

[3] (a) W. B. Nevens and D. D. Shaw, SCIENCE, 72, 249, 1930; (b) F. A. Underhill, J. M. Orten and R. C. Lewis, *Jour. Biol. Chem.*, 93, 13, 1931.

is possible that these additional precautions would have produced an even more severe anemia, however.

It was found that the three lots of Klim used in these tests contained about .00024 per cent. iron (standard colorimetric-thiocyanate method). No copper was detected in analyses which would detect one part of copper per million (pyridine-carbon tetrachloride-thiocyanate method). The amount of copper and iron in Klim will fluctuate, but the variation should be not nearly as extensive as it would be were small batches of fresh whole milk used, because a quantity of Klim may be purchased, stored and used in a series of single comparative tests, thereby eliminating the uncertainty which exists when the whole milk ration is used.

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A PRACTICAL TYPE OF MOUSE CAGE

IN keeping mice for laboratory work one of the major problems is to prevent the animals from contaminating and wasting their food.

After several unsuccessful attempts to build a type of cage which would answer the requirements, the following model was constructed. It was evolved from a type of cage used in the Bussey Institution of Harvard University and in this laboratory. The outside dimensions have not been changed, except for the slope of the roof. A cage of the following dimensions will accommodate 5 to 6 mice without danger to their health due to crowding.

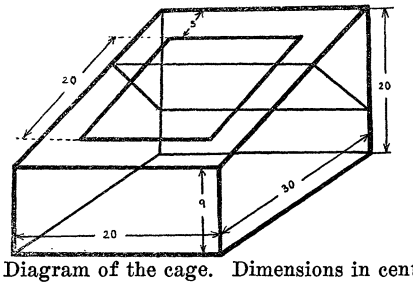

FIG. 1. Diagram of the cage. Dimensions in centimeters.

Floor space	20 × 30 cm
Front elevation	9 cm
Back elevation	20 cm
Door	15 × 20 cm
Food container	12 × 20 cm
Distance of the upper edge of the door to the upper edge of the food-rack	5 cm

The dimensions were chosen arbitrarily, but experience shows that they give the most satisfactory results. The door is kept in place by a flat water bottle. The 12 ounce water bottle has a perforated stopper through which runs a bent-glass-tube, the narrowed opening of which projects into the cage. The angle of the sloping roof is of importance; if the roof is made too steep the water runs out too fast and wets the sawdust on which the cage stands; if the slope is not sufficient, the hydrostatic pressure of the water in the bottle is not enough to permit the animals to drink.

The important new feature of the cage is the food container. It is made of wire netting of the same mesh as the cage itself (14 threads per decimeter). The food container may be filled with commercial "Dog Chow" or any other balanced ration in pieces of appropriate size (about 2 cm in diameter). The animals have no difficulty in eating through the meshes of the wire netting of the food rack. The food container is inclined to the back of the cage at an angle of about 45 degrees. The mice will eat with their heads upward and are forced to adopt a position which makes contamination of the food with urine or feces impossible. There is a considerable saving in food as there is no waste from spoiled food.

The door is arranged in such a way that it closes both the entrance to the cage proper and the food rack. Therefore the food will not spill when the cage is tipped to permit cleaning the bottom. The food rack may be filled once a week. The cost of constructing such a cage is not much higher than that of any other of the same material, while it saves much labor and safeguards the health of the animals, especially of the young, by preventing the consumption of contaminated food.

The model may be used for rats by adjusting the dimensions. For rats, wire mesh should be used which has 8 threads per decimeter.

This cage has been in use in this laboratory for a year and is found entirely satisfactory.

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MODIFIED HANGING DROP TECHNIQUE

IN the course of studies of the growth characteristics of molds, the writer found the normal hanging drop culture unsatisfactory because, with this technique, in a majority of cases the hyphae grow towards or on the spherical surface of the drop and only short sections can be brought into focus in any one field. In order to overcome this difficulty, the mold is grown in a thin film of medium which can be placed perpendicular to the axis of the microscope and thus the entire lengths of the hyphae in the field remain in