in many cases, dermatitis on the ventral aspect of the neck between the forelegs and extending up almost to the lower lip, and some loss of hair especially on the face and neck. All these symptoms were followed by death.

On diet C the females showed the same symptoms about one month later than the males. However, the former showed the same phenomena in a large number of the mice as early as 7 months on the following diet (D): casein 31, sucrose 28, rancid lard 21, salt mixture 7, cod liver oil 3 and yeast 10 or 15. The cod liver oil was mixed with the other constituents just before feeding. The oral administration of cod liver oil three times weekly or of hydroquinone 5 mg three times weekly from the time of weaning failed to prevent the occurrence of the symptoms. Those receiving a tested vitamin E concentrate showed the disease somewhat later.

The following changes in diet C have not resulted in curing the symptoms nor have they prevented them when instituted at the time of weaning (the changes were made at the expense of the starch, and the diets were stored at 0° C.): yeast 15% and cod liver oil 5%; yeast 15%, cod liver oil 5% and casein 18%; yeast 15%, cod liver oil 5% and salt mixture 8%, 7% and 4%; in the female yeast 10% and cod liver oil 5%. The following substances have been ineffective in preventing the fatal outcome: vitamin A concentrate in the natural ester form, cod liver oil, ether extracted wheat germ oil, tested vitamin E concentrate, vitamins B_1 and B_6, riboflavin, nicotinic acid (.5% in diet C), alfalfa meal (10% and 20% in diet C), choline, lemon juice (entire lemon) and tomato juice. Mice were placed on the modified diets or given the various supplements when the deficiency was manifest by swelling and inflammation of the eyelids.

Purina Dog Chow and Rockland Mouse pellets prevented death and brought about apparent cure in most of the deficient mice in 4 to 6 weeks. A small percentage was resistant. Many natural foodstuffs have been incorporated into diet C at 10% and 20% levels and, up to now, fresh flaked wheat germ and aqueous liver extract were found to have the most potent curative properties. But under the experimental conditions observed by us so far, it has not been possible to obtain a 100% recovery with these two materials. A percentage varying from 40% to 60% died or was not completely cured, thus indicating either that the damage, if too extensive, is irreparable, or that the substances now tested are not the most potent. These observations would seem to indicate that a real deficiency exists for quite some time before it becomes apparent, thus making complete cure difficult. The substances showing curative properties, and others are now being tested both as preventives and curatives.

This work indicates a true nutritional deficiency disease for mice, since the symptoms are not observed in mice on stock diets nor do rats show these symptoms on similar diets. Over 1,100 mice have been used in these experiments and the regularity of the symptoms followed by the fatal outcome, unless the mice are removed from the synthetic diets, is further evidence that a deficiency exists. New Buffalo (Simpson) and Old Buffalo mice show the same symptoms on the same diets. Recently Woolley[2, 3] has shown that inositol or its derivatives are required by the mouse for normal growth and hair. Also Norris and Hauschildt[4] have found that the mouse requires a water soluble fraction of the vitamin B complex for growth and healthy skin.

CHRISTOPHER CARRUTHERS
THE BARNARD FREE SKIN
AND CANCER HOSPITAL,
ST. LOUIS, MO.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN APPARATUS FOR MEASURING MICROSCOPIC OBJECTS

IN studies on bovine anaplasmosis, it was found desirable to measure the anaplasms or marginal bodies occurring in the erythrocytes of infected cattle. These bodies measure less than 1 micron in diameter and an ordinary ocular micrometer disc is not divided into sufficiently small units to give the accuracy needed. Difficulty was experienced in using a camera-lucida and the ordinary scale drawn on paper because the markings were so close together that it was necessary to use intense illumination on the scale in order to see the rulings in the camera-lucida. As a result, the limits of the image of the object to be measured were not well defined.

In order to avoid these difficulties and measure in tenths of a micron with reasonable accuracy, an apparatus (Fig. 1) was devised to replace the ordinary measuring scales. A microscope was fitted with a monocular tube, an oil immersion lens, a 15× ocular, and a camera-lucida from which the mirror had been removed. A box 2 feet square and 1 foot deep was fitted with 4 electric lights and placed about 10 feet away from the microscope in a lateral direction. The open side of the box was turned toward the opening in the side of the camera-lucida and was covered by a large piece of cardboard in which the scale had been

[2] D. W. Woolley, *Jour. Biol. Chem.*, 136: 113.
[3] D. W. Woolley, SCIENCE, 92: 384.
[4] E. R. Norris and J. Hauschildt, SCIENCE, 92: 316.

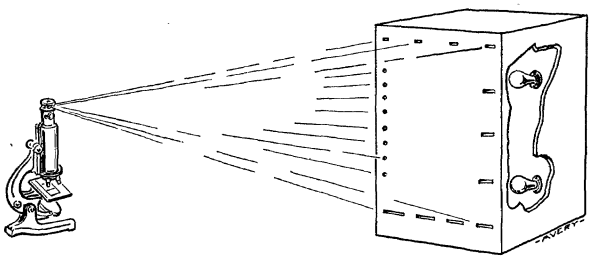

FIG. 1

made. For measuring in tenths of a micron, the scale consisted of a series of slits 1 mm in width and of various lengths. The length of each slit was calibrated so that the length of its image as seen through the camera-lucida corresponded to the length of the image of an object of known size when the object was placed on the stage of the microscope. The scale for reading in microns was made up of holes spaced at proper intervals along a line.

A stage micrometer was used to determine the proper lengths of the slits for reading in tenths of a micron, and for determining the proper spacing of the holes for the micron scale. To accomplish this calibration, the light-box was covered with a piece of cardboard upon which two points were determined to coincide with the images of two rulings on the stage micrometer when viewed through the camera-lucida. Using the known distance between these two points on the cardboard as a standard, the relative lengths for the slits desired were determined by subdividing the distance between the points with a pair of dividers. In making the slits as accurate as possible, holes were first made in the cardboard and the sides of the slits formed by strips of paper pasted over the edges of the holes.

In measuring with the apparatus, the object to be measured was moved about on the stage of the microscope and the dimensions of its image were compared with the lengths of the light-bars seen through the camera-lucida. Since the length of each light-bar represented a known value in tenths of a micron, readings were made direct.

While this apparatus was designed to measure anaplasms, which are less than 1 micron in diameter, it could well be adapted for measuring other microscopic objects. In order to facilitate the measuring of other than spherical objects, it is advisable to use either a microscope equipped with a rotating stage or to design the scale so that it can be rotated, in order to orient the object to be measured with respect to the appropriate light-bar or hole.

JOHN C. LOTZE
MARVIN J. YIENGST
U. S. BUREAU OF ANIMAL INDUSTRY

A SIMPLE DUPLICATOR FOR LABELING SLIDES

THIS duplicator (see Fig. 1) operates on the principle of the mimeograph. It may be made by gluing a thick layer of felt on the flat surface of a block of wood and covering it with a fine meshed cloth fastened to the sides of the block. Mimeograph ink is applied

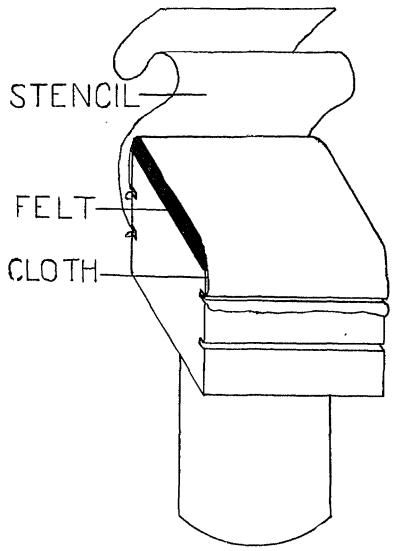

FIG. 1.

to the pad with a brush. A mimeograph stencil of desired size is typed or cut with a sharp stylus and fastened over the surface of the pad. In addition to print, descriptive sketches may be included in the label. The printing is done by touching the duplicator lightly to the surface of the label either before or after the label is pasted on the slide. Excess ink should be removed with a blotter inasmuch as only a limited amount of ink is absorbed by the label. As many as two hundred labels may be printed without reinking. The method may be employed for printing small specimen labels, blanks for collection data, etc. Larger pads may be used for other similar purposes.

PAUL H. RALPH

DEPARTMENT OF ZOOLOGY,
UNIVERSITY OF MICHIGAN

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