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.

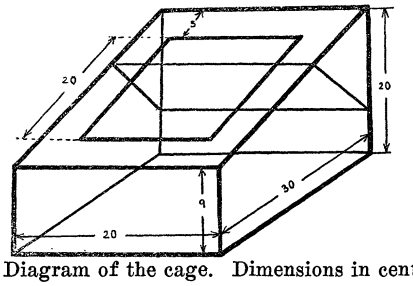

FIG. 1. Diagram of the cage. Dimensions in centimeters.

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

focus. This type of hanging drop culture is described below.

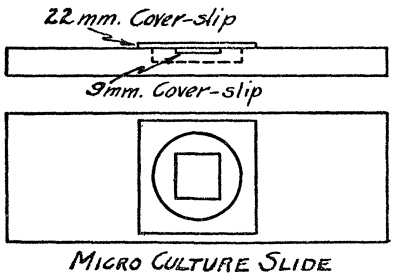

FIG. 1

A suspension of mold spores is made in any suitable liquid culture medium. A small drop of this suspension is transferred with an inoculating loop to the center of a 22 mm cover-slip. On top of the drop is placed a 9 mm cover-slip, easily made by quartering an 18 mm slip. The large cover-slip, carrying the smaller one, is then inverted and placed over the hollow chamber of a micro culture slide and the edges sealed with petrolatum to prevent evaporation of the medium. The smaller cover-slip is held firmly by the surface tension of the film of medium. Two views of the culture slide are shown in the accompanying diagram.

This technique has proved very satisfactory for the observation of growing molds over relatively long periods of time. With practice one can obtain films containing few or many spores at the start, depending upon the density of the original inoculation and the size of the drop used. The size of the drop also determines the thickness of the film which can be varied from 5 to 40 microns. If care is used in cleaning the cover-slips, uniform films free of air bubbles can easily be obtained. If desired the entire operation can be carried out aseptically.

If a hollow chamber about 15 mm in diameter and 3 mm deep is used, there appears to be enough oxygen present to support normal growth of the spores near the edge of the smaller cover-slip. Spores near the center of the smaller cover-slip at times fail to germinate, probably because of the lack of sufficient free oxygen. Since the total amount of medium present is relatively small for the amount of growth which takes place, the supply of foodstuff is more quickly exhausted and concentration of the waste products increases more rapidly than in the normal test tube or plate culture. Only the vegetative hyphae of such molds as the Penicillia and Aspergilli remain in the film of medium; the fertile hyphae grow in the air at the edge of the small cover-slip.

By the use of this type of culture, it has been possible to take a motion picture of mold growth during a five-day period. Rapid motion of small granules within the hyphae has been observed. With some types of molds, immiscible metabolic products separate in the medium. Variations in morphology caused by varying amounts of available oxygen can be observed. The writer has found this type of culture very satisfactory for photomicrographic work.

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SPECIAL ARTICLES

THE ORIGIN OF THE CELLULAR DEBRIS IN VAGINAL SMEARS OF THE GUINEA-PIG

THE mammalian vaginal discharge ordinarily contains at some time or other in the oestrus cycle large and small non-cornified epithelial cells, large cornified epithelial cells, leucocytes (mainly polymorphonuclear), erythrocytes and mucus. It is generally known that the leucocytes reach the vaginal lumen by diapedesis through its epithelial lining and that the large non-cornified and cornified cells are sloughed from its epithelium. There has also been every reason to believe that the erythrocytes come from mucosal hemorrhages of the uterus, and possibly in some cases by way of the oviduct, following the rupture of the ovarian follicles. The only cell type over which there seems to be much question is the small non-cornified epithelial cells which often occur in clumps or sheets in the vaginal secretions. These have been assumed to be of uterine origin.

We used eight adult guinea-pigs, ranging from oestrus through postoestrus to the dioestrus condition. None were prooestrus. A normal vaginal smear was made from the living guinea-pig. The animal was then killed by illuminating gas, the abdominal wall opened, and the vagina, uterus and oviducts exposed. A horn of the uterus was cut across near its upper end, and, by means of an eye-dropper, physiological saline was gently injected into and sucked back from the uterus above the section. A drop of this was allowed to evaporate on a slide. Another transverse cut was made below the previous one and the process repeated, the discharge again being obtained from that part of the uterus above the section. Smears were thus made from the uterine cornu, uterine fundus, the vagina near the cervix and the vagina. Since, however, no differences were observed in smears taken in different parts of the uterus, or in smears taken in different parts of the vagina, we continued to make