

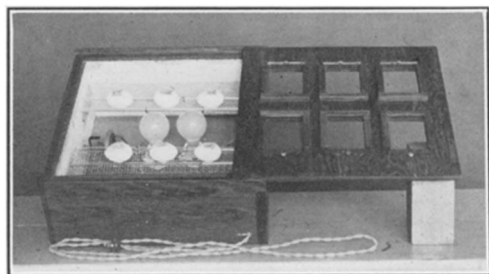
An Incubator for the Study of Living Embryos

S. EDMUND STODDARD

High School, Blackfoot, Idaho

In the perusal of biological science at the Blackfoot High School the study of developmental processes has been given a prominent position. Surely in life science the study of the development of life is important. To aid these studies an incubator was constructed that may be of interest to other biology teachers.

A box was constructed having a length of 18 inches, a width of 18 inches, and a height of 8 inches. The box was lined with wood fiber for the conservation of heat. In the lid are six glass windows, each being 4 x 3 inches. The glass over each window can be removed separately for the insertion of eggs without necessitation of the removal of the larger lid. Figure I shows the finished incubator



INCUBATOR

FIG. I. Photograph of an incubator used in the study of living embryos. A section of the shell is removed, a cover glass is cemented over the opening, and the egg is placed under one of the glass windows.

with lid removed. The wafer-type ther-

mostat can be clearly seen. Two 60 watt Mazda bulbs are used as a source of heat. The eggs are placed on wire supports and kept in place by two glass rods.

Each day for six consecutive days a section of the shell of a hen egg was removed and the egg placed beneath a window. After a section of the shell was removed several methods were employed in the construction of a miniature window. One method was the cementing of a piece of sterilized white cellophane in place of the shell. A second procedure was the cementing of a three-fourths' inch cover glass over the opening. Collodion was used to adhere the glass to the shell. Small amounts of cotton were inserted in openings between the shell and the glass. The cotton was then covered with a layer of collodion. A third method was the use of adhesive tape to fasten the cover glass to the shell.

By use of this incubator one will have at the end of six days a demonstration of growing embryos for use in class demonstrations.

LANTERN SLIDES

Doubtless a large number of teachers have been making their lantern slides for years but how many have ever tried to teach students to make those particularly suited to the needs of the course and the locality? Even in the large schools

where money is available for the purchase and filing of slides it may not always be possible to find those that exactly suit the immediate needs.

For this reason students started project work on a series of lantern slides. Only four microscopes were available for classes of thirty or more students and no microprojector was at hand. Consequently it was difficult to show students the actual materials. Careful drawings were made of living and preserved specimens and from microscopic slides, several students working on each topic. The best drawing in each case was selected and used in making the lantern slides. Glass plates of regulation size were coated with the prepared material, a kind of albumen needed to make the drawings adhere to the glass. Then under a magnifier India ink was applied either with small brushes or drawing pens to the outline which had been traced on with a blunt needle. Some students taking art were able to sketch and color drawings of habitats, various stages in the life of ancient man and to make some original settings to show the development of the camel and the horse. Some students sketched museum specimens of odd shapes and queer forms to show various attempts of nature in producing higher forms. One was very clever in sketching portraits of famous scientists and making scenes depicting their lives.

When the sketches were made, two glass plates were fastened together with the drawing between. After binding them together with passe partout or any commercial binding and affixing the labels in the proper corners to aid in showing them, the slides were numbered and cataloged. A brief description of each

slide was prepared and also placed in the proper file. When all slides on one unit or topic were completed an illustrated lecture was prepared and after one or more practice periods outside of school hours those students most interested and competent presented the lecture to the whole class.

In this manner it was possible to build permanent equipment on any topic desired. When a slide was no longer useful or a better one was produced it was very simple to separate the glass plates by soaking in water and then dissolving the albumen by heating the water. Thus the glass could be used again. When it was not possible to buy glass plates they were cut from ordinary glass but they were not quite so clear.

Sometimes, because of lack of other material, the students project drawings from microscopic slides on the light colored walls of the classroom, on the daylight screen or on the white curtain screen and use those for their own drawings. Students work individually on topics and units. Material is always available and many different forms may be studied in the same laboratory period. One requirement, however, is essential—that the student see and study the original slide or specimen in so far as possible before he makes use of any drawing aid.

RUTH A. DODGE
Johnstown High School
Johnstown, N. Y.

Living Cocoons;—15 for \$1.00 including Luna & io, **Tropical butterflies**, India or S. America 15 for \$1.00, many showey butterflies from 6¢ each, Riker mounts, Entomological Supplies, List Free.

Butterfly World Supply House,
297 East 98th Street, Brooklyn, N. Y.
