

may be used as inspirational material, helpful primarily in presenting methods for encouraging students in field studies. There are field books for nearly every plant or animal group. Many current magazines are beneficial in keeping the teacher informed concerning the whole field of natural history. "Natural History," "Nature Magazine," "Bird Lore," "The National Geographic Maga-

zine," "The Wilson Bulletin," "American Forests," and "Science Digest" are a few that may be mentioned. There are many Journals which are devoted to the more specific flora and fauna groups. United States government publications should not be overlooked. A weekly price list of bulletins may be secured from the United States Government Printing Office for the asking.

THE DIORAMA AS A TEACHING AID

The diorama as a visual teaching aid in biology and other secondary school sciences is rapidly gaining favor with instructors. As a project it is simple, adaptable, and easily constructed; when completed it has a definite vital lesson for each person viewing it.

The diorama combines the effective-

ness in perspective of the stereoscope and the esthetic qualities of the panorama. In modern exhibits it has been adapted to present methods of construction, lighting, and display.

For classroom purpose many types of material may be used. Actual specimens, drawings, paintings, and cut-outs



Diorama of life cycle of the frog

are all used effectively in developing particular scenes. Life cycles of plants and animals and their habitat relationships furnish excellent source materials. Scenes constructed to show typical events in the life of great scientists: Pasteur, Koch, Lister, Smith, Darwin, Mendel, and others can be made vivid and life-like.

The construction of a diorama is quite simple. After a scene is decided upon, a box is made to house the completed picture. The background is usually painted on a curved cardboard that fits into the back of the box, with the ends of the cardboard reaching the front end of the box. This curved piece will vary in size, shape, structure, and texture ac-

ording to the materials available and the effect desired. Other items consisting of actual specimens or of cut-outs of specimens may be used in the foreground.

The construction of dioramas by students will result in large dividends in the education of boys and girls. By the nature of the project the students are forced to do detailed and accurate work. The completed productions appeal to the esthetic as well as to the scientific sense. In addition to the benefits accruing to the creators themselves the school gradually gains a valuable teaching museum.

WILLIS W. COLLINS,
Idabel High School,
Idabel, Oklahoma

Biological Briefs

SELLEI, JOSEPH. *The Effect of Fluorescent Dyes on the Growth of Plants.* Growth 4: 145-156. August, 1940.

Chlorophyll is a fluorescent coloring material which is regarded by some as a "light catalyzer" for the plant, and it has been found that other fluorescent dyes may render the plant still more sensitive to light. Animals may be sensitized to light by dyes, also. Sheep, fed with buckwheat which contains a light-sensitizing factor, soon die. White mice injected with small amounts of eosin become extremely agitated and die if subsequently exposed to sunlight, but if taken to a dark room before they are completely exhausted they slowly recover. In the plant experiments, a very dilute solution of fluorescein was used for watering; concentrated solutions retard development. Of the plants properly treated, many grew noticeably faster; they bloomed earlier, their fruit ripened faster, and the yield was increased from

20% to 100%. Each plant has its own period of sensitivity and will not respond to the dyes at other times. The soil must be well fertilized, for the sensitized plant exhausts the ground quickly. The effect of the dyes was increased by the addition of small amounts of copper and iron salts.

MUNGER, THORNTON T. *The Cycle from Douglas Fir to Hemlock.* Ecology 21: 451-459. October, 1940.

Douglas fir, a very important tree for lumbering in the Pacific northwest, is not a climax species. It grows best in open stands, and does not reproduce in its own shade. As a forest of Douglas firs matures, hemlocks and other shade-tolerant trees creep in and eventually replace the firs. This means that the clearing of overmature forest stands by fires and lumbering has been the main factor in the abundance of this species.