

biology in one community and quite out of the question in another. It is manifestly impossible to devise a laboratory and field manual that can be followed blindly in any other community than the one in which it was written. It is up to

the teacher to make the proper adjustments. Even under the most favorable circumstances no course can rise above the level determined by the scholarship, enthusiasm, sincerity and understanding of the teacher.

## Photomicrography in Biology

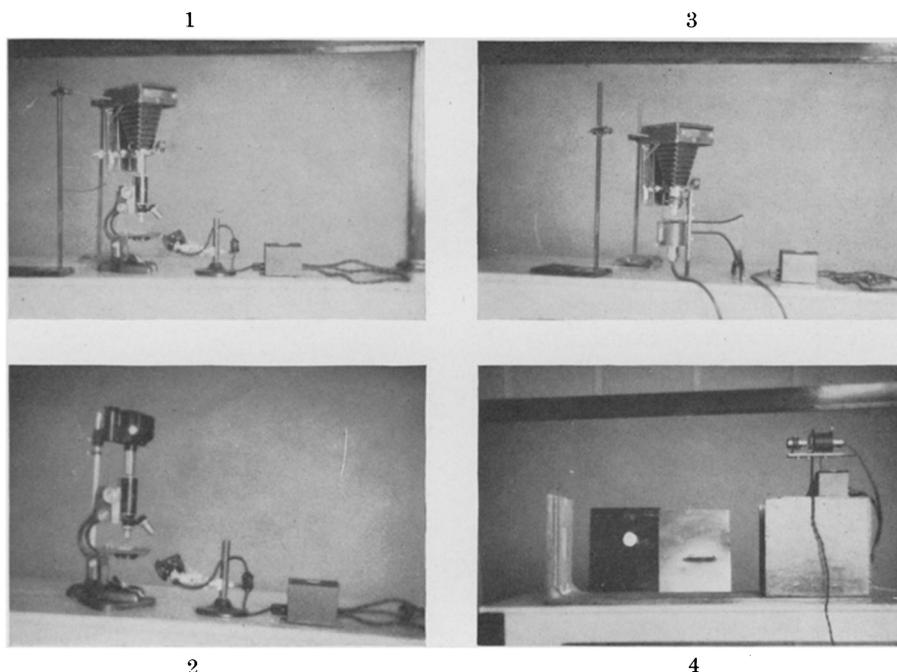
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A very basic activity of biology is the use of the microscope. By the application of this instrument a new world is explored by the student. After studying the more or less minute the student surely is interested in placing such observations on record. The taking of photomicrographs is an excellent pro-

cedure for making such recordings and likewise opens to the student the science of photography.

The present article presents four variations in the technique of photomicrography. These are illustrated in the Figure. Number 1 illustrates the taking of photomicrographs by use of a



Photograph showing four methods of taking photomicrographs. In Number 1 a standard camera is used. Number 2 illustrates the use of an amateur outfit. Number 3 demonstrates the use of a micro projector. Number 4 shows the method employed in making photomicrographs with positive paper.

standard camera having a ground glass on which to focus the image. The lenses of the camera are removed and the instrument supported by two ring stands. The image is brought to a sharp focus on the ground glass by adjustment of the microscope. The light source is a six volt bulb. A transformer is therefore needed to step-down the 110 volt alternating current.

Number 2 is the same as the first illustration except the camera is an amateur Bausch and Lomb photomicrographic outfit.

In Number 3 the same camera is used as explained in Number 1. However, the microscope is replaced by a micro projector. The projector uses a 6 volt bulb and transformer. This setup has been used very successfully by the writer. Four magnifications can easily be employed. There are two different powers of objectives furnished with the projector. These can be removed and the two objectives from a standard microscope used in their place. Even illumination is easily obtained and this ensures good pictures.

The setup in Number 4 has been devised by the writer for the purpose of

taking photomicrographs on positive paper. This eliminates the negative but has the handicap of the necessity of an exposure for each picture. However, if only a few prints are desired it is of decided value. The project gives to the student opportunity for the study of a different process in photography. The micro projector is placed in the box. The front of this container is open but is constructed for the sliding in place of the two perforated metal squares. The first metal to be put in place is the one with the circular aperture. Through this opening the image is projected and brought to a focus on a paper held by the upright support. The second metal having the narrow slit is adjusted so that the lower third covers the circular opening of the first plate. The positive paper is put in place. The metal having the narrow slit is then dropped; the slit in moving across the circular opening gives the exposure. By varying the width of the slit the length of exposure can be varied. If a long exposure is necessary the image is projected through the circular opening for the required time. With this instrument pictures can be taken quickly and easily.

## Why Study Biology?

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The word Biology comes from the Greek "bios" meaning life. Today as never before, we are in search of the means of Better Living, of More Abundant Life. Biology, the science of life, should be able to point out the means of obtaining, both subjectively and objectively, these ends. It should give us the

knowledge and the inclination toward activities which bring about happy and successful living.

The great basic needs of life are food, clothing and shelter; health, marriage and happy home and social life; an interesting occupation; and a satisfactory philosophy of life. Biology interprets