To the Joint Administrative Board of the Ohio Journal of Science: E. L. Rice and C. G. Shatzer.

W. H. ALEXANDER,
Secretary

THE TENNESSEE ACADEMY OF SCIENCE

THE Tennessee Academy of Science held its 1932 spring meeting on April 22, 23 and 24 at Memphis and Reelfoot Lake. Three sessions and the academy dinner on Friday evening, April 22, were held in the ballroom of the Peabody Hotel. Twenty-four papers were contributed by members from Memphis, Jackson, Nashville, Knoxville, and Franklin, Kentucky.

Dr. A. Richard Bliss, Jr., president, presided at the academy dinner, and Dr. Martin H. Fischer, professor of physiology in the University of Cincinnati, delivered an address on the "Constitution of Living Matter," illustrated with charts and chemical experiments. Three hundred and seventy-four members and guests were registered at the meeting in Memphis, and 154 attended the dinner.

On Saturday afternoon the non-resident members were taken in automobiles to Walnut Log Lodge, on Reelfoot Lake, where the fourth session was held that evening. The program consisted of a "Symposium on Reelfoot Lake," with special reference to its suitability as a location for a biological laboratory.

Several papers were devoted to the geographic and geologic features of the lake, its acquisition by the state for a public park and the setting apart by the 1931 General Assembly of ten acres and a building for a biological station for research, to be under the management and control of the Tennessee Academy of Science and an appropriation of $2,500 towards outfitting.

Following these were papers by the state commissioners of education, agriculture and public health on the value of such an institution to the state, and by the president of the Southwestern University on the interest and patronage of colleges and universities.

The remarkable richness of the lake and its environs in forms of vegetable and animal life was brought out by the state forester and the state game and fish warden and by Professors Jesse M. Shaver, of George Peabody College, Clarence E. Moore, of the West Tennessee Teachers College, and A. John Schwarz, of the University of Tennessee.

Dr. A. Richard Bliss, Jr., chairman of the habilitation committee, reported that the Cantillon Club House of eight rooms would be ready for use as a laboratory early next summer, the Walnut Log Lodge near-by to be used for residence of workers.

At a meeting of the Reelfoot Lake Biological Station trustees held on the morning of April 24, an executive committee was established, consisting of A. Richard Bliss, Jr., chairman, James B. Lackey, Richard G. Turner, Jesse M. Shaver, J. T. McGill, ex-officio, and the following resolution was adopted:

That the board of trustees of the Reelfoot Lake Biological Station invite the Tennessee State Departments of Education, Agriculture and Public Health, a number of universities and colleges and selected scientific organizations, each to appoint one or more research workers to take part in a physical and biological survey of Reelfoot Lake and its environs, to begin June 1, 1932.

Each department or institution may make such provision for expenses as it deems advisable.

Reports of the work are to be made to the trustees.

JOHN T. MCGILL,
Secretary

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A CONVENIENT METHOD OF PHOTOGRAPHING SMALL ANIMALS AT LOW MAGNIFICATION

DURING work on planarians I desired to take pictures of living animals in locomotion. The small size of the animals demanded pictures on an enlarged scale. Since in biological laboratories the need of photographing small living animals at low magnification frequently occurs, I will describe a method, which, in spite of its simplicity, leads to good results.

Photography on an enlarged scale requires either a relatively long exposure or a very intensive illumination of the photographed object. The intensity of the image formed by the lens on the photographic plate decreases as the square of the magnification increases. In order to take a picture of an object, *e.g.*, 5 times enlarged, it is necessary to use an exposure 25 times longer or stronger than for a picture in natural size. If a moving object has to be photographed, then the duration of the exposure is limited. It has to be considered that the speed of the motion in the image increases at the same rate as the magnification. A planarian, *e.g.*, which glides along with an average speed of 12 cm per minute and which has to be photographed five times enlarged, will move in the image with a speed of 60 cm per minute or 10 mm per second. To obtain a sufficiently sharp picture the exposure must not be longer than 1/50 second, if we suppose that a contour appears sharp when it is not broader than 0.2 mm. Should one wish a still sharper outline, *e.g.*, not broader than 0.1 mm, one would have to shorten the exposure even more (1/100 second). The picture can not be taken except by employing an extremely strong source of light or by using proper arrangements to concentrate light on the object. This difficulty increases when the depth of focus has to be improved by choosing a small diaphragm.

The main problem in taking pictures of this kind is therefore the question of the source of light. One may use for this purpose the "Edison Mazda Photoflash Lamp," which has recently appeared on the market. This is a glass bulb in the same shape as an electric light bulb, filled with oxygen and furnished with an aluminum foil. The aluminum may be ignited by an electric current and burns within the bulb, giving a very strong and fairly short flash (according to the statement of the manufacturers about 1/50 second).

A camera of the type of vertical cameras for microphotography has been used (Fig. 1, C). Such a

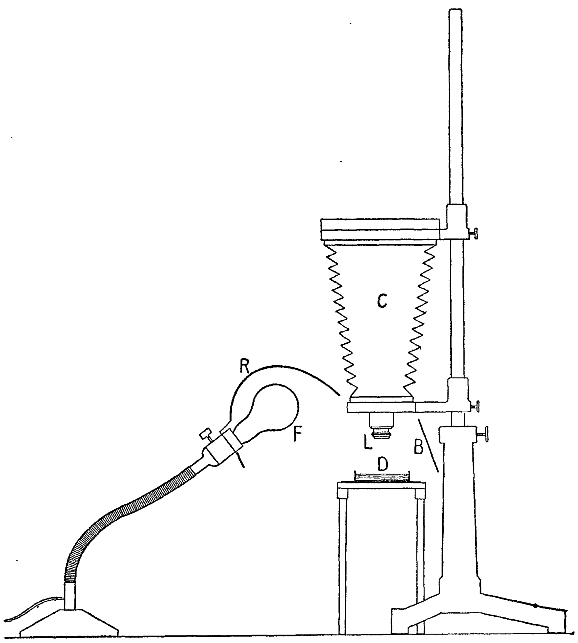

FIG. 1. Diagram of the arrangement of apparatus for taking pictures of small animals. (B) White cardboard for reflecting light; (C) camera; (D) Petri dish containing animals; (F) flash-bulb; (L) photographic lens; (R) reflector.

camera is kept in most of the biological laboratories. It combines two advantages: it allows great variation in the length of the bellows and takes pictures in a horizontal plane. Any other camera with similar characteristics will, of course, work the same way. The lower opening of the camera, which in microphotographic work is set on the eyepiece of a microscope, is closed with a photographic lens (L) with short focal length (about 5 cm). The animals are put into a shallow dish (D), *e.g.*, a Petri dish, and placed under the lens at the proper distance. The picture is focused on the ground-glass plate with the lens entirely open. It is necessary to mark the field of vision of the ground-glass plate on the Petri dish. That may be done by putting under the dish a sheet of dark paper with a properly shaped opening. Then a flash-bulb (F) is placed close to the dish (it may be as close as 15 cm), so that its light will fall on the object obliquely from above. Care must be taken that no light falls directly on the lens or is reflected to it from the water surface. The illumination is improved by a reflector (R) fixed behind the bulb. One may use a common table lamp with a reflector, substituting the flash-bulb for the light bulb. A sheet of white cardboard (B) on the opposite side of the object may be used to increase the lighting by diffuse reflection.

After these preparations the diaphragm is adjusted in order to obtain a proper depth of focus. In an enlargement of five times and in employing ordinary double-coated plates with fine grain (and therefore with only mediocre speed) a diaphragm with an opening of F/16 is permissible. The ground-glass plate is changed for the photographic plate. It is convenient to work in a room with dim artificial light. Then the lens may stay open for quite a while without the plate being affected by the incident light. No high-speed shutter is necessary.

The picture is taken when an animal is moving over the marked space in the dish in proper position and shape (planarians may to a certain extent be directed in their moving by a weak source of light). The exposure is made by igniting the flash bulb by turning an electric switch.

It is often advisable to photograph a small scale with the animal. Thus one may later check the magnification in the pictures.

In photographing water animals one must take care that no dust particles are floating on the surface of the water. These could spoil the picture by forming small depressions on the surface and so destroying the sharpness of the picture locally.

This method of directly photographing small objects at low magnifications may be useful also in other cases where a short exposure of the object is necessary.

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PERMANENT PRESERVATION OF THE HUMAN BODY BY INFILTRATION

A METHOD for preservation of small animals by paraffin infiltration has been previously described by