of its leaders as president of the international gathering, it seems peculiarly appropriate that American geographers should make a special effort to send to Warsaw a large and representative group.

As a compliment to Professor Eugene Romer and in recognition of his long and distinguished service in the field of Polish cartography, it has been suggested that the American delegation might devote special attention to preparing an effective cartographic exhibit at Warsaw. Steps toward achieving this end are being taken.

Attention is directed to the fact that the meeting of the congress in Warsaw not only offers an unusual opportunity for American geographers to study, under exceptionally favorable conditions as regards both expense and skilled leadership, both the physical and the human geography of Poland on the excursions that precede and follow the congress, but also provides the occasion for visiting other parts of central and eastern Europe and the Near East.

Any person engaged in scientific research in the field of geography or interested in the results of geographical research may enroll as member of the congress. Moreover, representatives of government institutions, scientific societies, universities and other educational institutions, in countries belonging to the International Geographical Union (this includes the United States), may take part in the congress; these delegates should duly enroll as members of the congress. Persons not geographers but who have geographical interests, or who represent institutions not primarily geographic but which have large geographical interests (such as federal and state geological surveys, departments of agriculture, museums of natural history, etc.), are welcome. If such individuals plan for other reasons to be in Europe in the summer of 1934, they should arrange if possible to participate in the congress. Persons belonging to the families of members of the congress may take part in the congress, if they duly apply for membership to the secretariat.

Admission as a member of the congress will be granted upon filling in the form of application for membership and upon payment of the fee of 40 zlotys (approximately $7.50 at current exchange) and 10 zlotys for each person accompanying the regular member. Application blanks may be secured from the Secretary of the National Committee of the United States, Mr. W. L. G. Joerg, American Geographical Society, Broadway at 156th Street, New York City.

It is earnestly recommended that American geographers, whether or not they are able to go to Warsaw, should enroll themselves promptly as members of the congress. It is understood that the postal authorities may decline to issue a money order in zlotys, in which case prospective members should ascertain, at post office or bank, the rate of exchange on the date the money order is to be secured and get a money order for the equivalent, payable in American dollars. The value of the moderate enrolment fee will be returned in double measure in the form of publications of the congress. At the same time valuable support will be given to those charged with organizing the congress and a representative American membership will be assured.

The United States Government has taken official cognizance of the International Geographical Congresses, and through the Secretary of State has arranged for representation of the Government by a limited number of delegates. It is requested that those planning to be present at Warsaw notify the secretary, Mr. W. L. G. Joerg, in order that suggestions for appointment as delegates may in due course be made from among the number who will attend. Attendance of American delegates is always at their own expense.

Members may be appointed to represent public and scientific institutions, including universities. In such case no formality is necessary except notification by the institution to the secretariat of the congress.

Those planning to attend the congress will find further data of interest to them in the circulars of information issued by the committee on organization. Copies may be secured by addressing Mr. W. L. G. Joerg, American Geographical Society, Broadway at 156th Street, New York City.

DOUGLAS JOHNSON, *Chairman,*
CURTIS F. MARBUT, *Vice-chairman,*
National Committee of the United States
W. L. G. JOERG, *Secretary,*
International Geographical Union.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE DEMONSTRATION OF INTACT MAMMALIAN AND AMPHIBIAN NERVOUS SYSTEMS BY MACERATION OF WHOLE ANIMALS

THE demonstration of intact nervous systems of common laboratory animals has proved to be a useful device in the teaching of undergraduate biology. The method of producing such an effect is simple.

In the case of the frog, simple immersion in a solution of 30 per cent. nitric acid for a period of 24 hours results in complete decalcification of all bone, the disappearance of all connective tissue and more

or less complete maceration of the musculature of the animal. The nervous system, at least the brain, the spinal cord, the spinal nerves and the limb plexuses, remains intact. The action of nitric acid seems to be sequential in effect, acting first on the bone, then on the connective tissue. The result is the dissolution of the skeletal and muscular organization. The epithelium all over the body, both externally and internally, is soon disintegrated and the viscera do not long retain their organization.

The sympathetic nervous system does not seem to endure the maceration process. On the other hand, the central nervous system, together with the spinal nerves, resists the action of nitric acid for some time, with the result that by simple and careful teasing of the macerated tissue by pointed glass rods the whole nervous system is obtained complete or nearly so, depending on the care used in teasing. Most of the spinal nerves and the central nervous system are composed of relatively heavy myelinated fibers, while the fibers of the sympathetic nervous system are not or only very thinly so. It may well be that the presence of myelin sheaths slows up the action of nitric acid on the spinal nerves and the central nervous system for a long enough time to allow complete maceration of the rest of the body.

In the case of mammals, such as rats and guinea pigs, somewhat more care and apparatus are required for the best results. As the first action of nitric acid is the decalcification of bone, some care in extracting of the brain must be exercised. If the whole animal is simply immersed, as in the case of the frog, the head, consisting chiefly of the bony skull, is soon disintegrated. Thus the brain is ready long before sufficient maceration of the rest of the body has taken place. The precaution is necessary because the action on the nervous system appears to be one of hardening, the result being that if the immersion of some areas, particularly the brain, is too long, say 24 hours or longer, such tissue becomes exceedingly brittle, making easy handling of it practically impossible.

Maceration of complete small laboratory animals, such as rats or guinea pigs, should be carried out somewhat as follows: (1) Skin the animal completely, including the tail, the appendages and the head. This is to make the action of the acid on the bones and muscles more uniform and rapid. (2) Form a glass hook from glass rodding or tubing large enough to pass under the neck of the animal. Suspend the head by this hook from some suitable level above the immersion bath. (3) Immerse the rest of the mammal in the bath of 30 per cent. nitric acid for 36 hours. A large crystallizing dish or large Petri dish is perhaps the most satisfactory container for the bath. These dishes should not exceed 10 to 15 cm in depth. (4) After the 36-hour period allow the head to be immersed in the bath, leaving the head and body for another 8 hours. (5) Carefully tease the macerated muscle away from the nervous system. Not all the muscle tissue can be removed in this way. After all is removed that can be with safety, transfer the nervous system from the acid bath to an empty Petri dish of the same size as used for the bath. This transference can be easily done by simply inserting one of the glass rods under the brain and lifting the tissue out of the liquid. (6) Place the tissue in the empty Petri dish under a water faucet and let a stream of water gently drop on the tissue from some height. The force of the water will generally remove the remaining muscle tissue clinging to the nervous system.

The intact nervous system can be preserved in glycerine jelly, this method making a very satisfactory means of demonstrating to members of biology classes.

In such preparations by maceration, it will be found that the nervous system at the tips of the extremities, together with some of the spinal nerves, are occasionally lost. Skinning of the animals (unnecessary with frogs) aids in preventing this. In addition any loss can be considerably reduced if the most careful teasing is employed. The whole process seems to depend finally on the length of time of immersion. Inasmuch as the nervous system is quite resistant to the action of the acid, a period of 24 hours in the case of frogs and 48 hours with small laboratory mammals is not too long, excepting for the head region of mammals, immersion of which should not exceed 8 to 10 hours.

WILLIAM S. CORNWELL
THE UNIVERSITY OF ROCHESTER
SCHOOL OF MEDICINE AND DENTISTRY

THE ABSORPTION OF METHYLENE BLUE BY THE NEPHRIDIUM OF THE EARTHWORM

THAT the method for demonstrating the nephrostomes of the earthworm, published several years ago,[1] has met with some lack of success in the hands of certain workers has recently come to my attention. This difficulty is apparently due to failure to inject the dye in quantity sufficient to render the treated segments turgid. Under conditions of semi-flaccidity in the worm, the dye, when introduced dorsally, may fail to reach those parts of the nephridium lying near the mid-ventral axis.

In further work on the staining effect of methylene blue on the annelid nephridium, a better technique has been devised. An earthworm is anesthetized by immersion in a 0.2 per cent. aqueous solution of

[1] Elbert C. Cole, "The Demonstration of Nephrostomes in the Earthworm." SCIENCE, 62: 50–51, 1925.