SOCIETIES AND MEETINGS

THE ILLINOIS ACADEMY OF SCIENCE

THE Illinois Academy of Science held its twenty-third annual meeting at the University of Illinois at Urbana on May 2 and 3, 1930. The meeting was held in conjunction with the quarter-centennial celebration of the Illinois State Geological Survey, and was the best attended in the history of the organization. Over 600 were present at the various sectional meetings. As the result of an intensive membership campaign, about 250 new members were added, bringing the total membership to nearly 1,000. These new memberships include 23 new high-school science clubs which have become affiliated with the state organization.

At the business sessions of the academy a decision was reached to create a Hall of Fame for Illinois scientists. The committee selected to take charge of this project includes five members, all of whom are past presidents of the academy: Dr. M. M. Leighton, chief of the State Geological Survey, *chairman;* Dr. William A. Noyes, professor emeritus of chemistry, University of Illinois; Dr. H. J. Van Cleave, professor of zoology, University of Illinois; Dr. Henry C. Cowles, chairman of the department of botany, University of Chicago, and Dr. U. S. Grant, chairman of the department of geology, Northwestern University.

Other officers and committees elected to serve for 1930–1931 are as follows:

President, Fred R. Jelliff, the *Daily Register-Mail,* Galesburg.

First vice-president, William P. Hayes, University of Illinois.

Second vice-president, Arthur L. Epstein, Peoria.

Secretary, F. M. Fryxell, Augustana College.

Treasurer, George D. Fuller, University of Chicago.

Librarian, A. R. Crook, State Museum, Springfield.

Delegate to the American Association for the Advancement of Science, A. C. Walton, Knox College.

Delegates to the Conservation Council of Chicago, W. G. Waterman, Northwestern University, Evanston; V. O. Graham, University of Chicago.

F. M. FRYXELL,
Secretary

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A RAPID METHOD FOR STAINING SECTIONS OF THE SPINAL CORD AND BRAIN-STEM

SECTIONS used for class teaching of the central nervous system are commonly prepared by rather elaborate and time-consuming technique, even so-called rapid methods being relatively complicated.

In searching for a substitute to supply each student with a complete series to assure him a chance to examine every important feature, the writer found an exceptionally quick method of procedure, with the added advantage over the more complicated techniques that it furnishes a remarkably ready and direct correlation between gross and microscopic structure, and makes complete series unnecessary, though of course these are not superseded entirely.

Using this method students can select pieces of the cord or brain-stem which have been hardened a few days or longer, or which come from the cadaver, and cut through any desired region with a safety razor blade, to show in a few minutes the microscopic details of the parts cut. Thus one secures the readiest comparison and understanding of the buried microscopic structures and connections forming the basis of surface relief. This is one of the difficult problems of beginners, and it is most helpful for them to be able to repeat such studies, at will, through different levels.

Naturally the material of a dissecting room varies, and the sharpest pictures will come from the best fixed bodies; but there are advantages in having pathological conditions shown in some sections. It is also valuable to be able to demonstrate the results of specific lesions, as ascending or descending degeneration of various tracts, in subjects which have been examined for other correlated pathology.

To lay open, at will, and demonstrate quickly the finer internal relations of nuclei and connections of any cranial nerve or other special structure of the medulla prominent in surface views is a helpful preliminary to later more detailed study by other methods.

The method can be also used in testing conclusions gathered from symptoms and autopsy, without loss of time and sacrifice of material, since it marks out degenerate posterior funiculi or crossed and direct cerebrospinal tracts or other pathological features. I have not investigated this phase extensively beyond making tests of the practicability of such diagnosis. For the opportunity of making these tests on cords with known histories I have to thank Dr. N. W. Winkleman, of the department of neurology in the Medical School of the University of Pennsylvania.

The method here outlined is an adaptation of the "Rapid Iron Hematoxylin Technique" which was published by Dr. E. C. Cole, of Williams College, in

SCIENCE, November 5, 1926.[1] My own modifications of the technique are in connection with the special material used and the exceptional use of quite thick sections, together with the study of these in a strong reflected surface light, rather than by transmitted light from below through cleared sections. For special purposes it is possible of course to stain relatively thin frozen sections by this technique, and clear and study as usual, but the quicker method with thick sections seems preferable for the objects of this study.

The following steps of procedure are recommended.

(1) Material: Pieces of cord and brain-stem from cadavera in which formalin has been introduced beneath the dura and allowed to stand are most favorable. Some specimens which were evidently embalmed late showed fatty degeneration more or less markedly. Pieces of cord which have remained *in situ* during the dissection of the body can be removed to alcohol and put through this method from 95 per cent. alcohol. Fresh cords make excellent material after thorough hardening, poorly fixed and hardened specimens crumbling on cutting. Old bottled formalin or alcoholic material may often be used with good effect.

(2) Cutting: Sections should be smoothly cut free-hand, one or more millimeters thick, with a sharp, flat, thin razor blade. The thicker sections are preferable, though frozen sections of about 100 micra which do not curl or tear are quite usable. As has been said, it is feasible to cut thinner frozen sections, double stain, clear and mount in balsam, but these have restricted usefulness.

(3) Mordanting: Sections should stand in 95 per cent. alcohol for at least 5 minutes, then be transferred to Cole's mordant made as follows: 50 per cent. alcohol, 20 cc; ferric chloride, 1 grm; glacial acetic acid, 2 cc. Sections remain in this mordant for at least 5 minutes. For some material this process of mordanting is sufficient when prolonged till the details of structure have developed out sharply. The sections can then be removed to alcohol and studied without further treatment, but most material gives better results when stained as follows.

(4) Staining: First prepare Cole's "stock hematoxylin solution" as follows: absolute alcohol, 20 cc; sodium hydrosulphite (same as sod. bisulfite), 0.2 grm; distilled water, 5 drops; hematoxylin crystals, 1 grm. Use light brown crystals, not dark crystals of hematoxylin. A useful discussion of the staining will be found in Dr. Cole's original article.

Now add 5 drops of this just described stock solution to 10 drops of tap-water, and follow this with 1 drop of ammonium hydroxide. Before using let this mixture stand to ripen for 30 seconds. Now add 5 cc of 95 per cent. alcohol to this ripened staining solution and flood the section (which has been taken from its alcoholic bath) to cover its smooth-cut surface. Allow the stain to act for at least 5 minutes. This over-stains and must be differentiated.

(5) Differentiation: This should be accomplished by destaining through the action of 0.4 per cent. hydrochloric acid. The microscopic details of the gray matter can be thus brought out sharply in contrast to a darker background. It is sometimes well to stroke the surface with cotton or lens paper to remove sediment deposited from the stain. When sharp definition is obtained rinse off in slightly alkaline 95 per cent. alcohol and study by strong reflected light.

A very instructive picture of the grosser features and relations of the gray figure, compared in different regions, is secured by diluting the stain and using it briefly without differentiation. In this case the gray figure and septa stand out black against the lighter matter of the funiculi, but little detail is shown within the gray figure.

Dr. Cole's original paper contains interesting discussion of the various applications and problems connected with the use of his stain which does not seem to be known as well as it deserves.

(6) Lighting: Reflected light of strong intensity should be used, preferably concentrated on the surface of the section by a condensing lens. Under this lighting the section should be studied with a hand lens, binocular spectacles or a low power 48 millimeter objective on a compound microscope.

Of course the mordant and stock solutions will be prepared in advance for class work, and each student will follow the technique in watch-glasses and begin study of the specimens in a few minutes. Once stained, sections may be kept in alcohol for later examination.

This paper was finished at the Wistar Institute. I take pleasure in here thanking the director and staff of the institute for many helpful kindnesses while I worked there as guest this winter.

HENRY MCE. KNOWER

[1] SCIENCE, 64: 452–3.

CELLULOID CASES FOR MICROSCOPES, MICROTOMES AND BEAM-BALANCE CASES

BELL jars placed over microscopes are hazardous both to microscope and bell jar, because bell jars are cumbersome and heavy. A cone or cone frustum made of celluloid will answer as well, cost much less, be far more convenient and have a longer life than a glass bell jar.

Purchase a sheet of celluloid from a mail-order house or auto-supply store. Cut a sheet of stiff paper to form a cone to fit the microscope; use this as a