papers on the program, which by reason of the fact that the academy has not organized sections, were all given in the same room and were related to various branches of science—astronomy, physics, chemistry, botany, economics, physiology, genetics, pharmacology and pathology. Seventeen of the papers were by members of the academy teaching or pursuing scientific courses in universities or colleges. The institutions represented were the University of Tennessee, Vanderbilt University, George Peabody College, The Southwestern, Memphis, State Teachers College, Murfreesboro, Tennessee Polytechnic, Cookeville, Carson and Newman College, Jefferson City, Tennessee. Some of the other members contributing papers were R. M. Williamson, director of the U. S. Weather Service, Nashville, "A New Element in Meteorological Observation"; Dr. William Litterer, Tennessee state bacteriologist, "Six Cases of Rocky Mountain Spotted Fever in Tennessee"; Latimer Wilson, of Franklin, Kentucky, "Features of Galactic Structure"; Dr. Lucius P. Brown, formerly food commissioner of New York City, now a farmer of Spring Hill, Tennessee, "Problems of Taxation in Tennessee from the Standpoint of Economics"; John H. DeWitt, Jr., chief engineer of the Radio Station WSM, Nashville, "Vertical Radiators for Broadcasting Stations." Mr. DeWitt in discussing his subject described the steel tower recently erected near Franklin, Tennessee. This is the tallest radiator in the United States, and though 878 feet in height and having a diameter of 38 feet 370 feet above ground, rests on an insulated porcelain plate only about two feet in diameter.

At the Academy dinner, on Friday evening, Professor Bircher, presiding, read a report by President Bliss on "The Reelfoot Lake Biological Station," and Dr. W. G. Harrison, of Birmingham, Alabama, delivered an address on "The History of Medicine." Dr. Harrison discussed especially the contributions of physicians to science in early times and the contribution of scientists to medicine in modern times.

The following officers were elected for 1933: Francis G. Slack, associate professor of physics at Vanderbilt University, *president;* Charles W. Davis, professor of biology at Union University, Jackson, Tennessee, *vice-president;* John T. McGill, professor emeritus of organic chemistry, Vanderbilt University, *secretary-treasurer;* Jesse M. Shaver, professor of biology, George Peabody College, *editor;* Miss Eleanor Eggleston, assistant-librarian, Vanderbilt University, *librarian.*

The meeting of the academy in the spring of 1933 will be held at Walnut Log Lodge, Reelfoot Lake, Tennessee.

JOHN T. MCGILL
Secretary-Treasurer

THE NORTHWEST SCIENTIFIC ASSOCIATION

THE ninth annual meeting of the Northwest Scientific Association was held at the Davenport Hotel, Spokane, Washington, on December 28 and 29, 1932. The attendance at the meeting was only slightly lower than that of the previous year, which marked the high point in attendance. In view of the prevailing financial conditions this year's large attendance was highly satisfactory. At the meeting this year, moreover, the out-of-town attendance was noticeably larger.

The presiding officer was Ivan C. Crawford, of the University of Idaho, the president of the organization. At the opening general session on December 28 an address was delivered by Dr. R. R. Parker, of the U. S. Public Health Service, Hamilton, Montana, on the subject "Tick Borne Diseases of the Rocky Mountain Region," and one by Dr. W. F. Thompson, of the University of Washington, Seattle, Washington, on the subject "A Deep Sea Fishery."

In addition to the general sessions, section meetings were held by the following sections: Botany-Zoology, Chemistry-Physics, Education-Psychology, Engineering, Forestry, Geology-Geography, Medicine-Surgery, and Social Science. The program of the Forestry section consisted of a symposium on "Forest Research Needs of the Inland Empire," papers on the progress and needs of research being given on each of the seven phases included, namely, silviculture, fire protection, tree diseases, insects, range management, utilization and economics.

At the business meeting on December 29 important amendments to the constitution were adopted relating to the enlargement of the number of trustees and outlining their duties. This makes possible a machinery for soliciting and caring for bequests, donations, etc., for the prosecution of research in the region. The association also accepted the invitation of the Pacific Division of the American Association for the Advancement of Science to affiliate with that organization.

The officers for 1933 are as follows:

President: Howard R. Flint, U. S. Forest Service, Missoula, Montana.

Vice-president: Thomas Large, Spokane, Washington.

Secretary-Treasurer: Otis W. Freeman, State Normal School, Cheney, Washington.

Councilors: Ivan C. Crawford, University of Idaho, Moscow, Idaho; E. E. Hubert, University of Idaho, Moscow, Idaho; Charles H. Clapp, State University, Missoula, Montana; J. W. Hungate, State Normal School, Cheney, Washington; E. F. Gaines, State College of Washington, Pullman, Washington.

Executive Committee of Trustees: F. G. Miller, Uni-

versity of Idaho, Moscow, Idaho; S. E. Lambert, Spokane, Washington; A. A. Cleveland, State College of Washington, Pullman, Washington.

Additional trustees: L. K. Armstrong, Spokane, Washington; Alfred Atkinson, State College, Bozeman, Montana; C. L. Von Ende, University of Idaho, Moscow, Idaho; R. H. Weidman, U. S. Forest Service, Missoula, Montana; Francis A. Thomson, School of Mines, Butte, Montana; E. O. Holland, State College, Pullman, Washington.

E. E. Hubert, editor of *Northwest Science,* the official publication of the association, was reappointed for the year 1933. Alfred L. Anderson, of the University of Idaho, will continue to serve as assistant editor.

The following were elected as chairmen of the various sections:

Botany-Zoology, A. L. Hafenrichter, State College, Pullman, Washington.

Chemistry-Physics-Mathematics, R. W. Gelbach, State College, Pullman, Washington.

Education, F. T. Hardwick, Whitworth College, Spokane, Washington.

Engineering, G. E. Thornton, State College, Pullman, Washington.

Forestry, F. G. Miller, University of Idaho, Moscow, Idaho.

Geology-Geography, E. T. Hodge, University of Oregon, Corvallis, Oregon.

Medicine-Surgery, R. E. T. Stier, Spokane, Washington.

Social Science, Claudius O. Johnson, State College, Pullman, Washington.

J. W. HUNGATE
Retiring Secretary-Treasurer

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A SIMPLIFIED METHOD OF STAINING ENDOSPORES

IN our search for simple and efficient stains for routine bacteriological work, the Wirtz[1] method of spore staining proved far superior to others. Hansen's[2] and Möller's[3] techniques make use of steaming carbol fuchsin and an acid decolorizer. Dorner's[4] method, as recommended by the Committee on Bacteriological Technic of the Society of American Bacteriologists, involves the use of nigrosin. Muzzarelli's[5] and Abbott's[6] methods are each good, but even these resort to an acid decolorizer. Wirtz's method proved less complicated than these. Wirtz fixed air-dried smears in osmic acid, stained with malachite green, and used dilute carbol fuchsin as both decolorizer and counterstain. Spores were stained green, cells red. There was no blending of colors such as is often encountered with red and blue dyes.

We have eliminated fixing in osmic acid, shortened the time of staining and substituted aqueous safranin for the dilute carbol fuchsin. The malachite green is made up as a 5 per cent. aqueous solution, allowed to stand one half hour and filtered. This solution seems to be stable. The technique then is: Make films in the usual manner and fix by flaming three times. Flood with malachite green solution and heat to steaming three or four times within one half minute. Wash off the excess stain under the tap for about one half minute. Apply a 0.5 per cent. aqueous safranin solution one half minute. Wash, blot dry and examine. This procedure is evidently more simple than the original method. The whole staining time involved is less than two minutes, and a minimum of steaming is required. Within wide limits it is impossible to overstain or to wash too long.

Application of this method to thirty strains of sporeformers at different ages showed that agar slant cultures incubated at 37° C. for 24 to 36 hours always contain vegetative cells, sporangia and free spores. Thus a complete morphological description can be obtained at this time. Films from week-old cultures, recommended by the Committee on Bacteriological Technique,[7] tend to show excess of free spores and few vegetative cells or sporangia. The search for these structures in such films is time-consuming.

The part of a slant culture from which growth is taken affects the results of the spore stain. Films made from the butt end of a slant show more vegetative cells and fewer sporulated cells than films from the dried upper end of the slant.

The simplicity of the technique and the beautiful differentiation obtained with it should make this method useful for the identification of sporeforming bacteria.

ALICE B. SCHAEFFER
MAC DONALD FULTON

DEPARTMENT OF BIOLOGY
MIDDLEBURY COLLEGE

[1] R. Wirtz, *Zentralblatt für Bakteriologie,* I Abt., Orig., 46: 727, 1908.

[2] Hansen, cited by Buchanan, "Bacteriology," 3d ed., p. 153, 1930.

[3] Möller, cited by Stitt, "Practical Bacteriology, Blood Work, and Animal Parasitology," 8th ed., p. 64, 1927.

[4] W. C. Dorner, cited by Committee on Bacteriological Technic, "Manual of Methods," Leaflet IV, p. 11, 1932.

[5] G. Muzzarelli, *Zentralblatt für Bakteriologie,* I Abt., Ref., 104: 484, 1932.

[6] Abbott, cited by Stitt, "Practical Bacteriology, Blood Work, and Animal Parasitology," 8th ed., p. 64, 1927.

[7] Committee on Bacteriological Technic, "Manual of Methods," Leaflet V, p. 5, 1930.