process is better suited to encourage independent thinking. When the student's interest and initiative have been aroused he can the more readily be led to realize the necessity of logical arrangement of ideas.

Since pupils differ widely in ability to absorb and to utilize knowledge and also in the kind of lives they will lead after leaving school and college, the real success and value of any method will depend on its adaptation to the personality of the pupil. The ancient method of professorial lecturing and student note-taking is noticeably lacking in objectivity and individualization. The opposite extreme of detailed and minute laboratory study of specimens and processes achieves great objectivity at the expense of perspective and broad understanding. It fosters habits of mental short-sightedness. A middle course is indicated, individual laboratory work suited to the student, supplemented by reading, demonstrations and discussion in which the student has an opportunity to take part.

The question has its economical aspect also. When a limited sum of money is apportioned to departments of science an obligation exists to expend it advantageously. Duplication of simple, inexpensive apparatus easily manipulated by the students and the purchase of single pieces of more complex apparatus for purposes of demonstration would seem best.

The entire abandonment of individual laboratory work would surely be antagonistic to the purpose of mental development. Research is unnecessary to prove that point. Investigation to determine beneficial modifications of present laboratory practice in order that it may be better adapted to the interests and needs of the students would be more to the point.

M. LOUISE NICHOLS

PHILADELPHIA, PENNSYLVANIA

POSITIVE GAS PRESSURE IN POPLAR

IN line with a recent article in SCIENCE entitled, "Positive Gas and Water Pressure in Oaks," by C. A. Abell and C. R. Hursh (SCIENCE, 1895, p. 449), I am reminded of three cases of positive gas pressure, all in large trees of *Populus tacamahaca* Miller (*P. balsamifera* L.) in a recent summer in northern Michigan. In all three cases there was a distinct hiss as soon as the instrument borer went in about 2–3 cm, which continued during most of the rest of the boring. The pressure was not sufficient to force the core out of the increment borer and could be heard only in the vicinity of the tree. One of these trees, which was 40.6 cm in diameter, was cut down. This tree was sound throughout and bled very actively from the stump.

Hundreds of borings on the two aspens (*Populus tremuloides* Michx. and *Populus grandidentata* Michx.) in no case were accompanied by any evidence of positive pressure.

FRANK C. GATES

KANSAS STATE COLLEGE OF AGRICULTURE AND APPLIED SCIENCE

SOCIETIES AND ACADEMIES

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE thirtieth annual meeting of the North Carolina Academy of Science was held at State College, Raleigh, N. C., on May 8 and 9. Papers were presented before the general section of the academy on Friday morning and afternoon. On Friday evening the retiring president, W. F. Prouty, professor of geology in the University of North Carolina, gave the presidential address on "The Origin of Folded Mountains." On Saturday morning the academy met in the following sections: general section, chemistry section, mathematics section and physics section. Eighty papers and twenty-four exhibits were on the program. (Abstracts of most of these and complete papers of several will appear in an early number of the *Journal of the Elisha Mitchell Scientific Society.*)

Resolutions of respect were passed in honor of two deceased members, William Cain, Kenan professor emeritus of mathematics in the University of North Carolina, and John William Nowell, professor of chemistry in Wake Forest College.

The executive committee reported the election of thirty-four new members during the year, and the reinstatement of eight former members. One hundred and eighty-six registered at the meeting.

Walter Burke Davis, a student of the Greensboro Senior High School, was declared the winner of the high-school science prize, a silver loving-cup, for the best essay submitted by a high-school student. (Essays for 1931 were confined to the fields of biology and geography.)

The officers elected for the year 1931–32 were:

GENERAL ACADEMY

President, F. A. Wolf, Duke University.

Vice-president, W. E. Speas, Wake Forest College.

Secretary-treasurer, H. R. Totten, University of North Carolina.

Executive Committee, the above officers; Bert Cunningham, Duke University; W. L. Porter, Davidson College; F. W. Sherwood, N. C. Agricultural Experiment Station.

Representative to the A. A. A. S., H. R. Totten, University of North Carolina.

CHEMISTRY SECTION

Chairman, L. A. Bigelow, Duke University.
Vice-chairman, F. W. Sherwood, State College.
Secretary-treasurer, H. D. Crockford, University of North Carolina.
Councilor, L. G. Willis, State College.
Executive Committee, A. S. Wheeler, R. W. Bost and W. C. Vosburg.

MATHEMATICS SECTION

Chairman, E. T. Browne, University of North Carolina.
Secretary, E. R. C. Miles, Duke University.

PHYSICS SECTION

Chairman, J. L. Lake, Wake Forest College.
Secretary, Calvin Warfield, North Carolina College for Women.

The thirty-first annual meeting of the North Carolina Academy of Science will be held at Wake Forest College, Wake Forest, N. C., in the spring of 1932.

H. R. TOTTEN,
Secretary

THE VIRGINIA ACADEMY OF SCIENCE

THE Virginia Academy of Science held its ninth annual meeting in Norfolk, on April 24 and 25 with a registration of 242.

The evening address to which the public is particularly invited was delivered by Dr. William A. Kepner, of the University of Virginia, on the subject "A Modern Drift in Biological Thought." There were 111 papers read before the various sections.

A new section was authorized at this meeting—a section on medical sciences. It is expected that the new section will function along the lines of Section N of the American Association for the Advancement of Science. Physicians in Virginia who are interested in the fundamental medical sciences, such as anatomy, bacteriology, biochemistry, embryology, pathology, pharmacology and physiology, will be welcomed to membership in the academy and to participation in the activities of this and other sections.

It is confidently expected that this new section will grow rapidly, as it offers scientifically inclined physicians an opportunity to read scientific papers before an appreciative audience, to take part in stimulating discussions and to become acquainted with other like-minded scientific men.

Dr. I. D. Wilson, of the Virginia Polytechnic Institute, was elected president for the coming year, and Dr. H. E. Jordan, of the University of Virginia, new member of the council.

E. C. L. MILLER,
Secretary-Treasurer

SCIENTIFIC APPARATUS AND LABORATORY METHODS

RUTHENIUM TETROXIDE AS A FIXATIVE IN CYTOLOGY

IN the preparation of certain tissues for microscopic examination, use is frequently made of osmium tetroxide as a fixing or killing agent. This use is largely to avoid coagulants which would materially change the natural structure of the protein constituents of the cell. This note is to call attention to the possibility of the use of ruthenium tetroxide for this purpose, inasmuch as this compound is one of the two examples of the highest state of oxidation known, the other being the corresponding osmium compound.

Ruthenium tetroxide decomposes very readily and is a very energetic oxidizing agent. It is difficult to prevent its decomposition in solution even when kept in the cold and in the dark. We have been most successful in this respect when saturated chlorine water has been used as solvent. Ruthenium tetroxide is supplied in sealed glass ampoules which may be crushed under the cold solvent with no difficulty or danger. It forms a golden yellow solution from which after several weeks a black deposit of the lower oxides of ruthenium separates, at which time its fixing properties have largely disappeared. A stock solution was prepared by breaking a one gram ampoule of the tetroxide under 100 cc of chlorine water. The tetroxide is not very soluble and the greater part remains undissolved so that a saturated solution with respect to the tetroxide is still maintained even after the majority has passed into the lower oxides. For use as a fixative, the stock solution was diluted about twenty times with either distilled water or a $\frac{1}{4}$ to 1 per cent. formic or acetic acid solution.

The ruthenium tetroxide fixative was used extensively on pollen mother cells of *Tradescantia zebrina* (Hort) and closely compared with osmium tetroxide. The ruthenium salt was found to be extremely useful in obtaining the chromonematic structure of the chromosomes at all stages. The morphological results of these studies will be published elsewhere.[1] From our experiences it appears that ruthenium tetroxide is preferable to osmium tetroxide when used for the purpose described. The advantages are, however, partly offset by the fact that ruthenium tetroxide will

[1] B. R. Nebel, "On the Structure of the Chromosomes in *Tradescantia zebrina* (Hort.)," *Zeitschr. f. Zellforschg.* In press.