either on mass-spectra of a pure uraninite from Varuträsk, northern Sweden, which is probably of slightly older age than the minerals investigated, or on the mass-spectra published by Nier of the uranium isotopes from uraninite from Wilberforce, Canada. Neither is it visible on mass-spectra taken of two monazites of about the same age. It is, therefore, not probable that this mass-line 237 belongs to any isotope of 90 thorium or 92 uranium, and since it has so far been found only in the tantalo-niobates it is most probable that it belongs to an isotope of the chemical element of the odd number 91 "Eca-Tantalum."

The mass-line 237 must belong to an element which is radioactive, since all known elements and isotopes in this part of the system of elements are radioactive. On account of its odd mass-number it can not, however, belong to the uranium- or the thorium-series, the members of which all have even mass-numbers. The members of the actino-uranium series have all odd numbers, but these numbers are all 4 n smaller than 235, where n is from 1 to 7, and the ultimate decay product is lead 207. Were not actino-uranium itself but an element of larger mass, the mother element of the actino-uranium series, such element ought to have the mass 239, but a transition product of mass 237 can not occur in the actino-uranium series. *The mass-line 237 must thus belong to an element, which is a member of a so far unknown radioactive series.* This element 237 may be either the parent element of such a new series, or originate from a uranium isotope, so far unknown, which had already decayed at a time before the uranium minerals investigated had been formed.

As an ultimate stable product of such a fourth radioactive series we should by analogy with the three other radioactive series expect to find lead of mass 205 or 209. Now Aston had in earlier papers ascribed two such isotopes to common lead (0,03 per cent. of 205 and 0,85 per cent. of 209), but seeing that these were not obtained by Bainbridge and Jordan, also Aston has later been of the opinion that they do not exist in ordinary lead. The very exact measurements by Nier show that the limit to which they could be present in the ordinary lead investigated by him does not exceed 0,01 per cent. for 205 and 0,0009 per cent. for 209. The limiting value for 205 is, as will be seen, fairly high, compared, for instance, with the percentage of radioactive potassium 40 in ordinary potassium (0,012 per cent.) and of uranium II in uranium (0,006 per cent.). Neither has the present author ever observed any lines 205 and 209 on the mass-spectra he has taken of ordinary lead from old Fennoscandian galenas. Some of the spectra containing the mass-line 237, however, show also a weak line at 205 besides Pb 206, 207 and 208, but from some of these spectra photometric results can not be obtained on account of the strength of the neighboring Hg-line 204. The occurrence of a mass-line 205 or the spectra containing mass-line 237 would indicate the presence in the two old tantalo-niobates investigated of an early member of this new, fourth radioactive series together with the stable endproduct of this series lead 205.

Further investigations in order to separate and enrich the uranium-, eca-tantalum-, thorium- and lead-groups from these minerals are being undertaken in order to obtain further information, but the uncertain conditions during the European war, which now as earlier at any moment may lead to conditions in which research work is interrupted, makes it necessary to communicate already at this stage the observations made.

WALTER WAHL

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The communication by Professor Wahl was read as part of a discussion of papers by Professor Nier at the Conference on Nuclear Physics on October 30. It is worth noting that the work by Professor Nier upon the isotopes of lead which has been so interesting to geologists has, with one exception, not been upon lead derived from the minerals of the tantalo-niobate group. It is, therefore, important that more work be done along this line, and in another letter Professor Wahl expresses his keen desire to have duplicate material to check his work with Professor Nier. This is of course a problem for the Committee on the Measurement of Geologic Time, which met at the same time as the conference, and if there are any who have leads derived from this group of minerals or who have material which would be available, I should be very glad to hear from them.

ALFRED C. LANE,
Chairman, National Research Committee on Measurement of Geologic Time

PLANS FOR THE FUTURE OF THE VIRGINIA ACADEMY OF SCIENCE

THE responsibility of organized science to society, and its failure to fully accept this responsibility, is a matter that has given us concern for many years. Obviously, organizations in the specialized sciences, such as the American Chemical Society, American Association of Zoologists, etc., can contribute only in their respective fields of activity. More inclusive organizations, however, some of them embracing the best talent in practically all the branches of science represented in their community, city or even state, have frequently ideal opportunity for helping in the solution of pressing problems. Further, we believe the

spirit of *noblesse oblige* should have a large share in determining the activities of such groups once they have become strongly entrenched in public confidence and esteem.

Well-set-up state academies of science, with the more or less detached point of view inherent in them, are typical examples of such organizations as may be of great practical service, both in projecting new activities of state-wide concern without conflict with other existing organizations, and in contributing helpfully to worth-while activities already set up and at work.

Such was the idea that motivated us in asking the Virginia Academy of Science to give us the privilege of appointing carefully selected groups of men and women to think their way through Virginia's many problems and to help in developing a long-range program through which our organization might serve the state over a long period of years.

Before the appointment of such committees, the entire membership was asked two questions, as follows:

1. What, in your judgment, should be the primary objectives of a State Academy of Science?
2. Please outline rather carefully, and in order of their importance, three or more distinct contributions that the academy may and should make to Virginia in the next five years.

Replies to these questions were ample and full enough to give us a clear understanding of what projects such committees might study intensively. Not satisfied to trust these suggestions without supporting evidence from other groups, the same questions—with full explanatory letters—were sent to all Academy of Science secretaries in the country, all members of the National Association of Science Writers, and to a selected group of distinguished men and women whose influence carries weight in national and international scientific affairs. Replies from these sources were strikingly full and constructive. With these data in hand, thoroughly abstracted and tabulated, we undertook the most difficult task in connection with this plan, namely, the selection of the personnel of the Long Range Planning Committee, upon whom would rest the responsibility of doing most of the work.

The mechanics: Twenty of the most experienced and interested members of the academy were asked to nominate five or more individuals who, in their judgment, would be satisfactory members of such a group. This brought a hundred available nominees in no way limited to academy membership. From this list, with the aid of a committee of four, the group was chosen.

The interests of its personnel should become a part of this paper: Editors of two of Virginia's best-known newspapers, one of whom has been president of the Virginia State Chamber of Commerce; a member of the Governor's State Planning Board; the State geologist; the superintendent of public instruction in Virginia and the executive secretary of the Virginia Education Association; the publicity director of the State Chamber of Commerce; the dean of the University of Virginia; chief chemist of the Virginia State Department of Agriculture; the executive vice-president of one of our large tobacco by-products organizations; the president of Virginia Polytechnic Institute; the assistant director of research in the American Tobacco Company; a leading Virginia surgeon; the president of a leading woman's college; a professor of psychology of the University of Virginia, who is chairman of the research committee of the academy; a distinguished publicist—retired—but who devotes himself wholeheartedly to state-wide projects which have their roots in science; the president of Virginia's largest chemical and laboratory supply firm; and three chemistry department heads of Virginia colleges.

In addition to the Long Range Planning Committee, it has been deemed wise to appoint what is being known as the "Consultants" group of 23 men and women who expressed their willingness to help the committee whenever their services might be required. They represent a cross section of the most distinguished Virginians in their respective fields. It would seem of considerable significance that in making up these committees of 42 men and women, only one individual declined appointment and this on the ground that the war work in which he is engaged would make his acceptance impractical.

It has taken several months to gather the data and tabulate them, select committees and in other ways perfect the organization, but the machinery is now well set up and ready to begin the selection of the problems for immediate and future study.

Throughout all this planning we have kept before us certain objectives. In the first place we have attempted to acquaint leading laymen in Virginia with what the academy is, and with their cooperation what it hopes to become as an agent for constructive service. Second, through the State Board of Education, Virginia Education Association, the State Planning Board, industry, professional and academic institutions, and other agencies, to integrate as far as possible study of and work on such problems as might come well within the province of academy activities.

That the plan is fully worth-while is well attested by the cordial approval it has received from hundreds of men and women whose wisdom and experience entitle them to the confidence we have had in their advice. What the future holds for such a broad and long-range plan depends, of course, upon the wisdom,

sustained enthusiasm and industry of that small group making up the committee, to the selection of which the academy has given so much earnest consideration.

WORTLEY F. RUDD,
President

VIRGINIA ACADEMY OF SCIENCE

THE PRESENTATION OF SCIENTIFIC PAPERS

IN listening to the reading of scientific papers I have often experienced difficulty in following the author's train of thought, because of the too conscious effort I have had to exert to hear his words. The difficulty is not in my ears, for I have not yet lost the notes of such birds as the golden-crowned kinglet and the grasshopper sparrow. The trouble is not with the reception, but with the delivery, and I know I am not alone in the—I had almost said exasperation—I feel in hearing a good paper spoiled in the delivery. I have particularly in mind the last meeting of the American Ornithologists' Union. Fortunately, many of the speakers at that meeting spoke distinctly and well, and among these I remember particularly a woman member who took the center of the platform, held her head up and her manuscript at just the right distance, and read distinctly in a clear voice that carried to all parts of the hall. When I hear a paper so delivered I wonder why such an example is not more generally followed.

The purpose of this letter, however, is not simply to complain, but to offer a concrete suggestion. That is, that all inexperienced speakers—yes, and some that are not without experience—should get advice from the more experienced before undertaking to address an audience. I am sure it is not a matter of embarrassment or lack of confidence with most of the offenders. It is simply that they do not realize how unsuccessful they are in making themselves intelligible, nor do they know how to cure their faults of enunciation and expression. Doubtless some speakers need more than a word of advice, need a real lesson or even a course of lessons to teach them to open their mouths, use vocal cords, lips and tongue correctly, and keep the voice up at the end of each sentence. Of course we don't want oratory, and this letter is not written with the object of promoting the business of teachers of elocution! What we have a right to ask of our speakers, I think, is the acquirement of a clear and common-sense manner of communicating their information and ideas to an intelligent audience.

FRANCIS H. ALLEN

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SCIENTIFIC BOOKS

SEDIMENTARY PETROGRAPHY

Sedimentary Petrography, with Special Reference to Petrographic Methods of Correlation of Strata, Petroleum Technology and Other Economic Applications of Geology. Third edition, completely revised. By HENRY B. MILNER. London: Thomas Murby and Company; New York: Nordeman Publishing Company (Inc.). 666+xxiii pages; price, $10.00. 1940.

THIS third edition of Milner's standard text and reference book on sedimentary petrology has been partly rewritten and much new material has been added to include the latest developments in this relatively new and rapidly growing branch of petrography. About 150 pages have been added to the text, and, in addition, the size of the book has been increased from crown 8vo to demy 8vo.

In the new edition the problem of sampling is treated in more detail than in the former editions. Methods of preparing thin sections of friable and porous samples are discussed. A chapter on mechanical analyses has been added. Such methods of mineral concentration as the electrostatic, dielectric and flotation are described, and x-ray, fluorescence and microchemical methods of study are discussed. The section on methods of testing sedimentary rocks—for such properties as acid solubility, density, porosity, etc.—has been elaborated. Many more minerals are included in the section of diagnostic properties of the minerals. A section on applied petrography has been added in which are discussed such subjects as stratigraphic correlation, oil geology, ceramics, criminology, industrial maladies, etc.

The book is in large part a discussion of the methods and technic found by the author useful in the study of the loose detrital sediments. The methods of separating and studying the heavy mineral fraction from such rocks are discussed in detail, and many pages are devoted to a description of the diagnostic properties of the minerals found in sedimentary rocks. Some space is devoted to sampling, the study of consolidated sediments and mechanical analyses. Several chapters are devoted to the application of sedimentary petrology, to such problems as the correlation of sediments, soils and economic problems.

The book is an excellent, well-balanced treatment of the history, technique, methods, principles and economic application of sedimentary petrology. It is very well illustrated and contains excellent and extensive references to the literature.

ESPER S. LARSEN

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