surface. The relatively low content of heavy minerals in the A horizon of soils belonging to the above zonal groups reflects the intensity of weathering to which they have been exposed.

Previous work by the writer[1] demonstrated that the content of heavy minerals in the upper part of forest soil bodies disturbed by the uprooting of trees was significantly higher than in adjacent undisturbed soil. This difference resulted from the translocation of material from the B or C horizons to the surface. The possibility that cultivation might similarly influence the vertical distribution of heavy minerals in soil profiles was considered.

During the summer of 1940 samples from unquestionably virgin soils and immediately adjacent cultivated soils were collected in Michigan and New Hampshire for laboratory examination. In all instances the sets of paired samples were collected from soils which seemingly differed only with respect to the cultivation factor. Miami, Colton and Hermon soil series were represented.

It has been found that the cultivated soils contain a consistently higher percentage of heavy minerals in the A horizon than do the comparable virgin soils. The results indicate that the vertical distribution of heavy minerals in the upper horizons of soil profiles may serve as an index of past agricultural use of land. This criterion may prove useful in studies concerned with the past history of land utilization. Work on the vertical distribution of heavy minerals in soil profiles is being continued and more detailed results will be published in the near future.

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REPORTING DATA ON ELECTRIC MOBILITY

RECENT interest in the electrophoresis of proteins has led to the publication of a large number of papers giving data on the speed with which proteins migrate in an electric field. Because the serum proteins near their isoelectric points move rather slowly, certain investigators expressed the electric mobilities in units of 1×10^{-5} cm/sec/volt/cm. However, other investigators studying ionic mobilities and the electric mobilities of microscopically visible particles have for many years expressed the electric mobilities in units of 1×10^{-4} cm/sec/volt/cm or its equivalent in μ/sec/volt/cm. There does not seem to be any justification for the use of the exceptionally low mobilities of proteins near their isoelectric points as convenient reference mobilities. In view of confusion which has arisen, it would be well for the conventional unit of 1×10^{-4} cm or μ/sec to be generally adopted by those in the field of electrophoresis. This will serve to eliminate a good deal of future error of the type which has already arisen.

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ANTIDOTING TOXIN OF PHYTOPHTHORA CACTORUM AS A MEANS OF PLANT DISEASE CONTROL[1]

OVER forty years ago phytopathologists realized that certain fungi formed toxins which were lethal to plant protoplasm and which paved the way for the advance of the pathogenic organism through the plant tissues. *Phytophthora cactorum,* which causes a wilt disease of many plants and the bleeding canker of hardwood trees, produces such a toxin when grown on various media. Foliated, succulent excised maple and tomato shoots wilt when placed in filtrates of liquid media upon which the fungus has grown.

This toxic effect can be antidoted, that is, made inactive by the addition to the filtrate of 0.5 per cent. aqueous solution of the di-hydro-chloride salt of di-amino-azo-benzene plus a solvent and penetrant ("Helione orange"). Healthy maple trees injected with the toxic filtrate have been killed, while the same toxic filtrate to which 0.5 per cent. of the di-amino-azo-benzene salt was added failed to injure the trees.

In excess of 350 confirmed trees, naturally infected by the bleeding canker fungus, have been injected with the antidoting chemical, and have subsequently exhibited stoppage of "bleeding" and marked improvement in vegetative growth. Whether the trees have been "cured" in any absolute sense remains to be seen, but the results indicate some possibilities to be explored in the practical control of plant disease.

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THE FIRST MATHEMATICS SECTION OF THE NATIONAL ACADEMY OF SCIENCES

MATHEMATICAL research in the United States was started at about the time that the National Academy of Sciences was incorporated (1863) and the first important mathematical research paper published in our country was written by Benjamin Peirce who was one of the earliest members of this academy and took an active part in its early meetings. It is therefore of interest to consider briefly the qualifications of the members of the first mathematics section of this academy. Their names are J. G. Barnard, William Chauvenet, H. A. Newton, Benjamin Peirce, Theo-

[1] Harold J. Lutz, *Yale University: School of Forestry, Bulletin 45.* 1940.

[1] Contribution No. 599 of the Rhode Island Agricultural Experiment Station.

dore Strong and Joseph Winlock. In the year 1925 the Mathematical Association of America established a prize for the best expository paper published in English during successive periods, which is now awarded every three years and is called "The Chauvenet Prize."

The name of Chauvenet is therefore also now well known to the mathematical public of our country as an important contributor to the advancement of their subject, especially along the line of clear exposition. The remaining four names of the first mathematics section of the National Academy of Sciences are probably now less widely known among American mathematicians but they also became known internationally as results from the fact that a number of the publications of each of them are noted in the widely used periodical called *Poggendorff's Handwörterbuch*. This was started in the same year as the National Academy of Sciences and is still being continued with increasing completeness as regards advances in science in the different countries of the world.

It is interesting to note that the later developments have proved that the National Academy of Sciences selected its first mathematical members with reasonable wisdom since the merits along this line are unusually difficult to judge by those working in other scientific fields. While this Academy has served from its beginning as an adviser of the national government along scientific lines it has wisely aimed also to encourage scientific work of high order throughout the nation by maintaining high standards for membership. By the election of a small number of "Foreign Associates" it has aimed to extend its influence beyond the borders of our own land and by including W. R. Hamilton and Michel Chasles in the first list of ten it has also exhibited wisdom along the line of mathematics in these selections.

Recently J. L. Coolidge of Harvard University published "A History of Geometric Methods" which was explicitly inspired by a work of Michel Chasles published a little over one hundred years ago (1837) but which is still widely used. This shows that some writings on the history of mathematics have been useful during a long period of time notwithstanding the fact that many more recent ones were so written that they were very soon regarded as out of date. Recently the Royal Irish Academy began the publication of the mathematical papers of W. R. Hamilton. The first volume appeared in 1931 and the second in 1940. Hence the early members of the National Academy of Sciences also made wise selections as regards the mathematical "Foreign Associates" in view of the enduring value of their works.

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SCIENTIFIC BOOKS

INFECTIOUS DISEASE

Biological Aspects of Infectious Disease. By F. M. BURNET, M.D., assistant director, Walter and Eliza Hall Institute, Melbourne. x + 310 pp. Illustrated. New York: The Macmillan Company; Cambridge, England: At the University Press, 1940. $3.75.

THE dawn of bacteriology was not interested to answer the question: In what manner have the human race and the Animal Kingdom become subject to the multiform epidemization so vividly experienced in the mass mortalities during the centuries preceding the discovery of bacteria? An elucidation of the nature of the infections prevailing at that time promised results of great practical and theoretical significance. To view an infection from the standpoint of the naturalist as analogous to or identical with the biological phenomena of parasitism is an achievement of recent years. By taking an anthropocentric attitude, the student of human disease, a human being himself and trained solely in medical bacteriology, conceived the infection as a struggle between man and microbe being waged with special weapons. In the foreground of his study was placed the altered state of the host—the disease. With the recognition of the so-called latent infections and the infections without an infectious disease, this strictly utilitarian concept was found untenable. With the realization that an infection may be studied with advantage as a branch of academic biology, it was likewise appreciated that it may be analyzed along ecological lines as a struggle for existence between man and microorganisms of the same general character as the competition between plant or animal species in nature. Those who by necessity were forced to interpret the dangers of infections, which emanate from the vast reservoir in the Animal Kingdom, fully acknowledge the guiding hand in the ecological concept of the epidemics induced by the population regulators—the microbian or virus parasites. Humble attempts to focus attention on both man and animal and on the microorganism as objects of equal interest have been made by a few authors in special monographs, but it is to the great credit of Burnet to present the teacher and, in particular, the student with a remarkable example of scientific writing and an invaluable summary on the biological aspect of infectious disease.

In 6 parts, subdivided into 15 chapters and dili-