which they convert sunlight into cellulose and other vegetable substances. The income will be expended through existing botanical units of Harvard University, and largely through the Harvard Forest at Petersham in cooperation with those associated with the Biological Laboratories, the Bussey Institution and the Arnold Arboretum. Dr. Cabot's gift can be used for direct research, without heavy capital investments for land, library or laboratory facilities.

President James B. Conant said in connection with the announcement of the gift:

> The foundation is a first and highly important step toward the creation in Harvard University of a broad and far-reaching program of advanced research and instruction in the whole range of the conservation of natural resources. The current reorganization of the Harvard Forest and the creation of the Harvard Graduate School of Public Administration have sharply focussed the attention of the university on the urgent need and the opportunity for such a program.

A statement made by Dr. Elmer D. Merrill, administrator of botanical collections at the university, reads in part:

> The extraordinary achievements in improving the vigor, hardiness and productivity of food plants and of domestic animals by scientific selection and by hybridization are common knowledge. Very little comparable work has ever been attempted in the case of forests, one of our most valuable plant associations. This in part is due to the baffling complexities involved in breeding improved strains of plants with such a long life span as trees, and in part to the fact that mankind has hitherto been able to rely largely on wild forests for timber and cellulose. It is only in the past 150 years that Europe has used intensive forest culture, and only in the past generation that America has made a beginning in that direction. As, however, only about fifteen per cent. of the forests of the world are under scientific cultivation and the rest are being threatened by destructive exploitation, the danger to the world's future supply of wood and cellulose is apparent. One important and promising solution of the problem lies in improving the strains of trees used in the cultivated forests of the world, and it is on that aspect that Harvard University is now enabled to launch a significant research program through the generous gift of Dr. Cabot.

Among those who will be actively engaged on the work at the start will be Professor E. M. East and Professor Karl Sax, who will study the hybridization of trees by artificial pollination in order to evolve more rapidly growing strains. They will attack also the problem of doubling the chromosome numbers in order to increase the size and especially the vigor and hardiness of selected species and to permit reproduction of hybrids by seed instead of by vegetative reproduction.

Professor K. V. Thimann will work on the vegetative propagation of the most promising natural strains, particularly of conifers. Vegetative propagation of trees presents the possibility of a short cut as compared with hybridization, since it permits working with immediately promising natural strains. Professor P. R. Gast, of the Harvard Forest, will continue his present experiments on the effect of controlled quantities of tree nutrients and solar radiation on the growth of trees, and will extend the work to nutritional qualities of natural forest soils and their improvement by the silvicultural treatment of the forest. Professor Gast will also have charge of the selection and propagation of the most promising natural strains of different trees, which are known, in many cases, even in the same species, to vary widely.

SEVENTH ANNUAL FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS

THE seventh annual meeting of the Field Conference of Pennsylvania Geologists was held at Bradford, Pa., over the week-end of May 28, 29 and 30. The attendance of fifty-one members and guests included, besides Pennsylvanians, geologists from Connecticut, New Jersey, New York, West Virginia, Ohio and the District of Columbia. The Conference Committee consisted of Professor C. A. Bonine, *chairman*, Professor C. R. Fettke and Stanley H. Cathcart. The local committee was made up by A. C. Simmons and J. C. Martin.

On Friday afternoon an inspection trip was made through the Kendall Oil Refinery, in Bradford, and this was followed by a visit to a lease of the Petroleum Reclamation Company. On Saturday the entire conference participated in a stratigraphic trip in the Bradford district, which was led by Professor Fettke. Strata in the Pennsylvanian, Mississippian and Devonian Systems were examined. These embraced the Mercer shale and coal, and the Olean conglomerate in the Pottsville Series (Pennsylvanian), the Knapp formation in the Mississippian, and the Oswayo, Cattaraugus and Chemung beds in the Devonian.

On Sunday, May 30, the group divided into two parties. Trip A, under the leadership of Dr. Kenneth Caster, spent the day in studying Pennsylvanian, Mississippian and Upper Devonian strata in the area covered by the Warren Quadrangle. The chief interest in the stratigraphic studies in the Bradford and Warren areas is concerned with their relationships to the Bradford and Venango Oil Fields of northwest Pennsylvania. Trip B, led by Professor Henry Leighton, journeyed to Erie, Presque Isle and vicinity to study Pleistocene and Recent shore-line features.

The annual dinner was held at the Emery Hotel in Bradford on Saturday evening. After the dinner, a presentation of local geology was given by Dr. Caster. During a brief business meeting following his talk an invitation from Dr. Arthur Bevan, state geologist of

Virginia, was accepted to hold the eighth annual meeting largely in Virginia. The Field Conference Committee consists of Dr. Arthur B. Cleaves, *chairman*, Professor Frank M. Swartz and Professor R. E. Sherrill.

ARTHUR B. CLEAVES,
Secretary-Treasurer

GRANTS OF THE GEOLOGICAL SOCIETY OF AMERICA

THE following twenty-seven grants in support of special research projects were authorized by the council of the Geological Society of America at a meeting held on April 24.

Maurice Ewing, Bethlehem. Grant of $4,700 covering construction of apparatus suitable for use in work on the deep-sea floor and provision for necessary auxiliary apparatus, and measurement of the thickness of sedimentary deposits beyond the edge of the continental shelf by means of this apparatus.

Alfred S. Romer, Cambridge. Grant of $3,500 covering assistance and incidental expenses involved in compilation of a bibliography of fossil vertebrates.

Edward B. Mathews, Baltimore. Grant of $700 covering assistance and expenses in compiling published chemical analyses of rocks.

Nelson H. Darton, Washington, D. C. Grant of $700 covering field and office expenses in completion of investigation of the overlap relations of Tertiary and Cretaceous formations in eastern Maryland and Virginia.

Bruce L. Clark, Berkeley. Grant of $500 for assistance in completing monograph on radiolarians from the Cretaceous and Eocene of Middle California.

J. T. Rouse, Columbus. Grant of $450 for field and other expenses connected with study of the volcanic rocks and related problems in the Shoshone Mountains, Wyoming.

David M. Delo, Appleton. Grant of $35 for completion of illustrations for a monograph on the North American phacopid trilobites.

Mrs. Helen Tucker Rowland, Ithaca. Grant of $300 covering traveling and office expenses connected with completion of monograph on the Caloosahatchie fauna of Florida.

A. C. Veatch, New York. Grant of $3,000 covering preparation and printing of charts in study of submarine valleys off the Atlantic Coast, beyond the 1,000-fathom line.

Marcellus H. Stow, Lexington, Va. Grant of $665 covering field and office expenses of study of sedimentation and stratigraphy of the northwestern part of the Big Horn Basin and the southern part of the Crazy Mountain syncline, Montana.

Mrs. Margaret F. Boos, Denver. Grant of $350 for field and office expenses of detailed study of granite plutons of the Indian Creek area, Denver Mountain Park.

David T. Griggs, Cambridge. Grant of $900 covering cost of building and installing a hydraulic press needed in further studies of the mechanics of rock deformation under conditions of high pressure and high temperature.

Howard A. Coombs, Seattle. Grant of $400 for field and office expenses of a comparative study of Mts. Rainier and Baker.

Vincent P. Gianella, Reno. Grant of $200 for field and office expenses of investigation of piedmontite mineralization in metamorphosed volcanic rocks near Reno, Nevada.

Ralph W. Imlay, Ann Arbor. Grant of $1,125 covering field and museum study and preparation of manuscript on Upper Jurassic marine faunas of northern Mexico and of certain critical areas for correlation of Jurassic and Lower Cretaceous stratigraphic sections.

Harry N. Eaton, Syracuse. Grant of $100 covering field expenses of study of glacial advances in Allegheny County, New York.

J. Harlan Johnson, Golden, Colo. Grant of $200 for laboratory and office expenses of study of algal limestones of the Upper Paleozoic section in the Rocky Mountain region.

Stuart A. Northrop, Albuquerque, N. Mex. Grant of $300 for traveling, living and office expenses of study of the paleontology and stratigraphy of the Silurian Chaleur series of the Port Daniel-Black Cape region, Gaspe.

George M. Stanley, Ann Arbor. Grant of $315 covering field and office expenses of study of lower Algonquin beaches in the Upper Great Lakes.

Perry Byerly, Berkeley. Grant of $900 for assistance in study of northern California earthquakes, as recorded at the group of stations of the University of California.

Paul D. Krynine, New Haven. Grant of $240 for traveling, field and laboratory expenses of sedimentary study of the Pleistocene deposits of the Bristol Gorge, Connecticut.

A. K. Miller and W. M. Furnish, Iowa City. Grant of $500 covering assistance and office expenses of detailed study of Permian ammonoids of the Guadalupe Mountains and adjacent areas.

Everett C. Olson, Chicago. Grant of $750 covering one half of the traveling and field expenses of an expedition to the Tambla locality, Province of Gracias, Honduras, to collect vertebrate fossils.

Arthur Keith, Washington, D. C. Grant of $500 for field expenses connected with studies of the Appalachian folded belt in the Province of Quebec.

Biological Abstracts, Philadelphia. Grant of $1,500 covering assistance in paleontological service.

T. T. Quirke, Urbana. Grant of $983.50 covering assistance and laboratory expenses of studies directed to the measurement of the index of refraction of opaque or nearly opaque substances by reflection.

W. F. Prouty, Chapel Hill. Grant of $1,000 covering field and other expenses connected with study of the origin of the bays in the Atlantic Coastal Plain area.

RECENT DEATHS AND MEMORIALS

DR. PHILIP B. WOODWORTH, consulting engineer, formerly dean of the School of Engineering of Lewis Institute, Chicago, and president of the Rose Poly-