mutual understanding and close cooperation for the future of civilization. If the association shall profit by the extraordinary examples of efficiency presented by industry, it will organize its varied and enormous resources in membership to make science in a broad sense the brightest light in the world.

In this local gathering there is something of hominess and comfort which we all enjoy. Here is expressed to an exceptional degree this kindly, unselfish spirit of science. But the meetings of the association as a whole are more like an army on the march. They involve masses and administrative machinery and simultaneous movements on a hundred fronts. Yet they can be so organized that each individual who attends them not only will commune with his fellow specialists, but, through addresses by the heroes of science and by symposia, will be raised to heights from which he can survey the field of operations of the great army of which he is a part. Then, in slightly paraphrased words of Byron, he will say at the close of each meeting of the association:

> I love not Nature less, but Man the more,
> From these our interviews, in which I steal
> From all I may be, or have been before,
> To mingle with the Universe, and feel
> What I can ne'er express, yet can not all conceal.

SCIENTIFIC EVENTS

THE OXFORD UNIVERSITY BUREAU OF ANIMAL POPULATION

THE first annual report of the Oxford University Bureau of Animal Population is summarized by a correspondent of the London *Times*. He states that the inception of the bureau is due to its present director, Charles Elton, whose researches on the regular fluctuations in numbers shown by many wild animals convinced him of the high theoretical and practical importance of the problem of animal population. The bureau was first established in 1932 with the aid of a grant from the New York Zoological Society and with the general approval of the University of Oxford. A trial period convinced the university authorities of the value of the work, and the bureau is now an official institution, with a grant from the university towards its expenses and a fellowship at Corpus for its director. The correspondent writes:

> The range of contacts established by the bureau is remarkable for what is still a small institution. Their main piece of research, on the fluctuations in numbers of voles, is supported by the Royal Society, the Forestry Commission, the Medical Research Council and the Agricultural Research Council, and there has been cooperation with such different bodies as the Scottish Meteorological Office and the London Zoo. The research on partridge numbers is chiefly financed by Imperial Chemical Industries, with aid from private estate owners throughout the country. A remarkable example of cooperative research is that on the fluctuation of the snowshoe rabbit in the North American continent. For this reports are analyzed from nearly 700 separate observers, from the Hudson's Bay Company, the Canadian National Parks Service, a paper corporation in Anticosti, the Alaska Game Commission, the Newfoundland Department of Natural Resources and the United States Bureau of Biological Survey.
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> Results of this and related inquiries have made it possible to build up a picture of fluctuations in Canadian wildlife for over 100 years. The period of the fluctuation was originally supposed to be determined by the 11-year sun-spot cycle, but the more accurate records now available show that this can not be. The period averages a little less than 10 years, and must be determined by some hitherto undiscovered climatic cycle. That this is likely to be so is shown by the research on vole plagues. The numbers of voles, it was found, fluctuate with a three- to four-year periodicity. Quite recently the superintendent of the Scottish Meteorological Office has discovered a rhythm in factors affecting storminess, which exhibits an identical rhythm that unquestionably (though by what precise means is still unknown) causes the voles' fluctuations. Thus for certain purposes animal numbers may constitute a new type of meteorological instrument, serving to detect hitherto unsuspected weather-cycles.

A side-line undertaken by the bureau is the investigation of the fluctuation in numbers of the semi-wild exotic animals which have been liberated in Whipsnade. The researches of the bureau have great practical importance. If adequate records are available scarcity due to persistent over-destruction can be readily distinguished from the purely temporary scarcity due to a "crash" in a normal cycle of fluctuation. Among the fur-bearing carnivores of Canada, for instance, the lynx and fox show normal cycles; but the marten has been over-trapped and now is no longer able to increase rapidly in numbers at regular intervals as it used to do.

THE MARIA MOORS CABOT FOUNDATION FOR BOTANICAL RESEARCH

THE establishment of the Maria Moors Cabot Foundation for Botanical Research is announced by Harvard University. The initial endowment is $615,773, provided by Dr. Godfrey L. Cabot, of Boston, a graduate of Harvard College in the class of 1882. The income from this fund is to be used for the first fifty years for plant research, all restrictions being removed after this period. The purpose of the gift is to investigate methods of increasing the rate of growth of plants, especially trees, and consequently the rate at

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