Agricultural Research Conference in 1932 could well be postponed. That has accordingly been done, and the time of the next conference and its place are at the present time in abeyance.

HARVARD UNIVERSITY has received a favorable decision under an adjudication in the estate of Stuart Wyeth, who died on December 30, 1929, which had been contested. The court awarded the residue of the estate, about $5,528,000, to the president and fellows of Harvard University, as provided by the will, together with about $300,000 in income.

THE will of Mr. James Arthur bequeathed to the Smithsonian Institution $75,000 to establish a yearly lecture on the sun, the balance of the income to be devoted to researches relating to the sun. After compromising the interests of certain heirs, the proceeds of the bequest amount to somewhat in excess of $50,000.

WE learn from the Johns Hopkins *Alumni Magazine* that the university has received gifts for the current expenses of the department of zoology; from Mr. W. P. Eno, for the fund for the "Atlas of the Fundus Oculi"; from Mr. S. Childs, for an addition to the endowment of the Institute of the History of Medicine; from Mrs. C. H. Stout, for the "following up of toxemic patients in obstetrics"; from the National Research Council, for the support of Dr. Whitehead's studies on insulating oils; from the American Child Health Association, for the support of the work of Dr. W. W. Cort in ascariasis; from the Rockefeller Foundation, for a fellowship held by Dr. E. L. Stebbins, of the School of Hygiene and Public Health.

Nature reports that the General Board of the University of Cambridge has made the following grants from the Worts Fund: £100 to the Zoological Station at Naples: £45 to Miss W. Lamb, of Newnham College, for the continuation of her excavations at Thermi; £45 to Dr. E. B. Worthington, of Gonville and Caius College, towards the expenses of the Cambridge Expedition to the East African Lakes; £45 to Dr. L. S. B. Leakey, of St. John's College, for archeological, paleontological and geological investigations in East Africa; £45 to G. Bateson, of St. John's College, for anthropological work in New Guinea; £30 to R. T. Wade, of Clare College, towards his expenses in connection with visits to museums in Europe to study fossil fish; £20 to P. W. Richards, of Trinity College, towards the expenses of a botanical expedition to the Sierra Nevada; £15 to I. H. Cox, of Magdelene College, for geological exploration in Baffin Land.

THE American Geographical Society, Carnegie Institution of Washington, Norwegian Geophysical Institution, Woods Hole Oceanographic Institution and the Cleveland Museum of Natural History are cooperating in the preparations for scientific work to be undertaken by the Wilkins-Ellsworth Trans-Arctic Submarine Expedition.

INVESTIGATIONS of the diseases of wild life have been consolidated by the Bureau of Biological Survey under a recent authorization by the Secretary of Agriculture. Dr. J. E. Schillinger, senior veterinarian of the U. S. Biological Survey, will be in charge of the work. The object is to coordinate the study of wild-life diseases, chiefly those affecting mammals and birds, and to determine the causes of outbreaks and methods of control. Laboratories will be established in Washington, D. C., and in the field, for observation and investigation of disease-producing agents and of disease conditions among animals and birds, both in the wild and under controlled conditions, as on fur and game farms.

A FURTHER adjustment in the boundaries of the Bryce Canyon National Park, Utah, is contemplated in the passage of the recent act of the Congress approved February 17. This act authorizes the president of the United States, by proclamation, to add to the park approximately 6,360 acres of public lands containing outstanding natural features which are of greater value for scenic and scientific purposes than for economic development. The act also eliminates 1,280 acres from the national park and adds them to the adjoining Powell National Forest.

DISCUSSION

ERASMUS DARWIN AND THE BIOLOGIC CONTROL OF INSECTS

IT is commonly believed that the idea of controlling insect pests through utilization of their natural enemies is a wholly modern conception, originating in the United States. That this is not altogether true is pointed out by Wheeler, 1928, in the chapter on "Insect Parasitism" in "Foibles of Insects and Men." He says:

> It is only within very recent times that what may be properly called an *economic* use has been suggested for certain parasitic and predatory insects, namely, that of controlling the insects injurious to our crops, forests, domestic animals, stored foods and fabrics. The notion of using predatory beetles in destroying garden pests seems first to have occurred to Boigiraud de Potiers in France in 1843 and in the following year to Antonio Villa, in Italy. The latter country also produced two

entomologists, Rondani and Ghilioni who, during the fifties and sixties of the past century first suggested the use of parasitic insects for similar purposes (p. 50).

It is worthy of note that Erasmus Darwin, the grandfather of the illustrious Charles Darwin, pointed out clearly the possibilities of biologic control in his "Phytologia, or the Philosophy of Agriculture and Gardening," published in London in 1800.

In the course of his very careful studies on the life history and habits of plant lice, "Most curious and important animals which may in process of time destroy the vegetable world," he did not fail to take careful account of the natural enemies. Concerning the larva of the Syrphid fly he says:

> The most ingenious manner of destroying the aphis would be effected by the propagation of its greatest enemy, the larva of the aphidophorous fly of which I have given a print and which is said by Reaumur, Tom. III, Mem. 9, to deposit its eggs where the aphis abounds and that, as soon as the larvae are produced, they devour hundreds around them with no other movements but by turning to the right or left, arresting the aphis and sucking the juices. If these eggs could be collected and carefully preserved during the winter, or protected from injury in hot-houses, it is probable that this plague of the aphis might be counteracted by the natural means of devouring one insect by another; as the serpent of Moses devoured those of the magicians (p. 356).

Again, referring to the white butterflies which deposit their eggs on cabbage plants:

> Cabbage caterpillars would increase in destructive numbers, but are half of them annually destroyed by a small ichneumon-fly which deposits its own eggs in their backs. . . . This ichneumon fly should therefore be encouraged if his winter habitation could be discovered.

It is not to be expected that so keen an observer would overlook the desirability of utilizing the larger natural enemies of insects.

> All these noxious animals might be destroyed or diminished by encouraging the breed of small hedgebirds, and perhaps of larks, and rooks by not taking their nests. I have observed that house sparrows destroy the maychafier. . . . The various species of linnets carry small caterpillars to their gaping young.

Whatever may be our estimate of the poetic ability, or the evolutionary theories of Erasmus Darwin, he may well be proclaimed the forerunner of modern economic entomologists. He discusses methods of trapping cutworms under rubbish, tree pests by trap bands and tar-paper, collecting and burning leaves to destroy the eggs of other species. He recommends the heating of grain to destroy its insect pests without injuring its germinating quality, and using hot water or steam against others. He found that the essential oils are all deleterious to certain insects, and learned by experience that while oil of turpentine would kill aphids it also killed the branches of a nectarine tree on which he used it. Arsenic, tobacco dust and tobacco fumes he used with varying degrees of success. Especially interesting were his experiments with sulphur which he used both in fumigation and in dusting, which might be accomplished with "a powder-puff, such as hair dressers use."

Particularly interesting is the fact brought to my attention some years ago by Professor C. R. Crosby that this early worker recommended the supposedly very modern lime-sulphur mixture as an insecticide.

WILLIAM A. RILEY

UNIVERSITY FARM,
ST. PAUL, MINNESOTA

A MATHEMATICAL PROOF

IN SCIENCE for January 16, 1931, it is stated that "Tropfke in the third edition (1930) of Volume 1 of his history does not furnish proof of Professor Miller's claims" relating to Babylonian mathematics. This raises the interesting question what conditions a mathematical proof must satisfy. Such a proof seems to imply not only that the arguments are correct but also that those for whom it is intended can follow these arguments completely. For instance, I have given what seems to me to be a proof of Sylow's theorem to many classes and yet I feel utterly unable to prove this theorem to one who knows nothing about the theory of groups, and this includes the great majority of the people whom I know. Similarly, proofs relating to the history of mathematics seem to imply that those for whom they are really proofs can look up the sources and verify the statements. In this sense no one can prove to me anything relating to the ancient mathematics of the Babylonians or of the Egyptians since I am unable to read their writings and can not verify that the translations thereof are correct.

One of my most noted teachers, Professor Sophus Lie, used to tell his students that he accepted many mathematical results which he had not completely proved himself but which he believed others had fully proved. He said that he felt that he had to do this in order to make rapid progress. Similarly, I would like to think that I knew some things about the ancient mathematics of the Babylonians and the Egyptians even if I am unable to go to the sources, and references to these sources seem to me to be of value only to those who can read the original writings. In particular, I am not able to determine whether the references which Tropfke gives to the division of the circle into 360 equal parts by the later Babylonians prove