of plants in primitive culture for food, clothing and household purposes, leads directly into the domain of human history and anthropology.

The study of the origins of the names of plants and their folk-lore, in connection with the literature of wizardry, magic, necromancy, the healing art and poetry, furnishes an abundance of material of decided human interest and value.

The study of the plant as a machine, in the light of its adaptations of structure to habitat, to secure survival, and to effect fertilization and the distribution of seeds and spores, in its economy in the use of material, and in its conservation of resources, is a field of distinctively cultural value. Certainly the field study of the struggle of plant societies with one another for existence and for supremacy, and with their general biological and physical environment, furnishes material for thought, analogous to the study of social evolution, and from which social lessons can be derived.

Without in any way cheapening its disciplinary value as science, a great opportunity is thus open to elementary botany, of becoming a subject of far more practical value, interest and importance, both in the field of education, and in the development of agriculture.

HERBERT F. ROBERTS
UNIVERSITY OF MANITOBA

GRANTS FOR RESEARCH OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

AT the annual meeting of the association in 1918 the Committee on Grants for Research was organized for the year 1919 as follows: Henry Crew, Chairman; N. L. Britton, W. B. Cannon, J. McK. Cattell, R. T. Chamberlin, L. I. Dublin, G. N. Lewis, G. H. Parker and Joel Stebbins, Secretary. The sum of four thousand dollars from the funds of the association was assigned by the council to the committee for distribution in support of investigations. The committee did not hold a formal meeting, but transacted all of its business by correspondence, and by the middle of June had distributed the entire sum at its disposal in the following grants.

Astronomy

Five hundred dollars to Professor E. B. Frost, of the Yerkes Observatory, for the securing, measurement and reduction of stellar spectrograms. Additional assistance in this work with the 40-inch telescope will greatly increase the mass of results being accumulated concerning the motions of stars.

Physics

One hundred and fifty dollars to Professor A. L. Foley, of Indiana University, for experiments on the speed of sound very close to the source. This investigation is in extension of the important and rather remarkable results which Professor Foley has recently published in the *Physical Review*.

One hundred dollars to Professor Orin Tugman, of the University of Utah, to meet the cost of a monochromatic source of light to be used in finding the change of conductivity in a thin metallic film when exposed to ultra-violet light—a problem which has acquired new importance in view of the rapidly developing electronic theory.

One hundred and fifty dollars to Professor E. M. Terry, of the University of Wisconsin, for work on the modulation of radio-energy employed in wireless telephony.

One hundred dollars to Professor F. C. Blake, of the Ohio State University, for aid in prosecution of a study of electric waves and dielectric constants.

Chemistry

Three hundred and fifty dollars to Dr. Gerald L. Wendt, of the University of Chicago, for the investigation of the photochemical reactions of hydrogen and chlorine. He has been able to show that under the action of alpha rays and in the vacuum discharge tube hydrogen forms a chemically very active form, which probably has the formula H_3. From a valence point of view

the existence—and even more so the properties and the method of formation—of this gas are of great interest. There is some evidence that chlorine is also activated by exposure to light, but the evidence is contradictory. The mechanism of the effect of ultra-violet radiation on chlorine, including the possibility of the existence of an ozone form of chlorine, will be investigated.

Geology

Two hundred and fifty dollars to the Seismological Society of America to enable the society to dispatch capable men to study the phenomena of earthquakes as promptly as possible after their occurrence. When an important earthquake has occurred a delay of even a few days in sending an experienced seismologist to the locus of the quake will usually mean that many important pieces of evidence have deteriorated in value or have been wholly destroyed. This grant has been made in recognition of the urgent need of the Seismological Society for a sum available for immediate use whenever there occurs an earthquake which promises to give important results.

Two hundred dollars to Dr. Roy L. Moodie, for the preparation of sections of fossil bones which show lesions of ancient disease, and for the making of photomicrographs of these sections. Dr. Moodie, by a careful study of the bones of ancient vertebrates, is succeeding in tracing many present diseases far back in the geological record. These discoveries which are opening up a new field—paleopathology—are arousing much interest both among geologists and among the members of the medical profession.

Zoology

Five hundred dollars to Professor C. H. Eigenmann, of Indiana University, to defray part of the expenses of the Irwin expedition to western South America. The object of this expedition was to collect the fresh-water fishes from parts of Peru, Bolivia and Chile and thereby to supply the necessary material for the study of important faunistic questions.

Two hundred dollars to Dr. P. W. Whiting, of Franklin and Marshall College, for investigations on the Mediterranean flourmoth and its hymenopterous parasite, hadrobracon. The money is being spent for cytological equipment, breeding boxes, and apparatus for control of temperature and humidity. The work has thus far been carried on at the Marine Biological Laboratory, Woods Hole, Massachusetts, and at Lancaster, Pennsylvania. Somatic and germinal variations, sex determination, and sex ratio are being investigated.

Botany

Five hundred dollars to the editorial board of *Botanical Abstracts* for aid in establishing this new and important periodical, which has already met with much success and provides a long-needed method of bringing the current results of botanical investigation to the service of a great number of students.

One hundred dollars to Dr. Gilbert M. Smith, of the University of Wisconsin, for aid in a study of the plankton of the lakes of southwestern Ontario.

Anthropology

Two hundred dollars to Dr. Aleš Hrdlička for *The American Journal of Physical Anthropology*. Dr. W. H. Holmes, head curator of the department of anthropology of the U. S. National Museum, wrote as follows: "Referring to Dr. Hrdlička's request for financial aid in the publication of the *American Journal of Physical Anthropology*, I take the liberty of seconding his request. The *Journal* fills a very important place in the field of anthropological science and is in the hands of our ablest students of this branch. The facts that at first the patrons of the *Journal* are necessarily limited in number and that the expenses of publication are just now nearly doubled will, I am sure, enlist your sympathy, and I sincerely trust that you may find it possible to lend the doctor a hand."

Social and Economic Science

Two hundred dollars to Miss Myra M. Hulst, of New Haven, Connecticut, for in-

vestigations into the mortality of graduates from American colleges for women. Miss Hulst reports that she has completed the mortality rates for graduates from Smith and Vassar and that she has nearly completed the tabulation of the records for Wellesley College. Preliminary results indicate that graduates from women's colleges enjoy extraordinarily low death rates, consistent with their favorable economic and social status. The research was recommended by Dr. Dublin, under whose direction it is being carried on.

Medicine

Four hundred dollars to Dr. Leslie B. Arey, of the Northwestern University Medical School, in support of his study of the origin, growth and fate of the giant cells, or osteoclasts, usually held responsible for bone dissolution. It has been found that osteoclasts arise chiefly by the fusion of depleted bone-formative cells, the osteoblasts; they further increase by taking to themselves osteoblasts and bone cells, but ultimately degenerate and disappear. There is no convincing evidence that osteoclasts are the specific agents of bone resorption. That they are degenerating, fused osteoclasts accords better with the known facts.

Education

One hundred dollars to Dr. S. A. Courtis, Detroit, Michigan, toward the expenses of securing a comparison based upon a survey of Boston schools in 1845 with present-day schools from Maine to California.

JOEL STEBBINS,
Secretary

SCIENTIFIC EVENTS

THE BRITISH ASSOCIATION AND SCIENTIFIC RESEARCH

PROFESSOR JOHN PERRY, treasurer of the British Association, made some remarks before an evening discourse on September 11, at the recent Bournemouth meeting of the association which he summarizes for *Nature* as follows:

After paying printing and office expenses, the funds of the British Association are devoted to scientific research. For more than eighty years we have spent more than £1,000 a year on research, long before ordinary people had heard of research.

Every year we form many research committees; each of them is formed of the foremost men of science of Great Britain, who receive none of the money themselves, and their accounts for mere out-of-pocket expenses are carefully audited. These researches in the past have created some entirely new sciences, have led directly and indirectly to the creation of many new industries, and they have largely produced the world's present natural knowledge. And now to my point. Yesterday a very prominent member of the association asked me about our finances. I had to admit that even before the war we were meeting with difficulties due to the increased cost of printing, and other things, that since the war we have been behindhand to the extent of more than £1,000 every year, and that we have never yet asked for the help of moneyed men. The only gift we have ever received from a moneyed man was a voluntary gift from Sir James Caird, who handed me £11,000 at the Dundee meeting. My questioner said we ought to ask for help, and that he was willing to start a fund with a sum of £1,000. At this moment he does not wish to have his name mentioned.

I need not dwell on the importance of our research work, as I feel sure that every person here who has himself done original work shares my opinion that when we limit our expenditure on research, and especially on pure scientific research, we shall begin to be a bankrupt association—bankrupt, that is, morally from the point of view of science, if not actually in the financial sense.

The moneyed men of Great Britain are most willing to help any good object when they get proof that it really is a good object. We can not complain of want of their help, for they did not know the facts. At the same time, the treasurer of an association with such a record as ours does not feel happy at the prospect of begging for help.

In the two days of the meeting following that on which I made this statement, the fund was raised to a total of £1,475. I intend to publish in due course a list of names of donors and donations.

To illustrate by many instances (as I might) our claims as to the importance of our researches would unduly prolong this letter, and any selection of a few examples would be unrepresentative. I will cite a single illustration: The National Physical Laboratory, the scene of researches of which the importance to the nation during the war and earlier can not be overestimated, had its origin