On the other hand, the human problem of applied heredity or eugenics is far from being such a simple business problem because the desired results can not be evaluated on a purely economic basis. In short, eugenics, unlike the biologically parallel breeding of animals and plants, is not a phase of economic zoology, except perhaps in the indirectly involved economic problems arising from human defectives and inefficients. Eugenics is at present a biological philosophy and must be developed and promulgated accordingly, namely, through education. As the biologist so well realizes, the production of better human strains involves not only the physical problems of heredity but also the vastly more complicated social, emotional and religious traditions which concern human families as they are organized to-day. Before established biological principles of heredity can be applied to the human race, either by individuals or by nations, a eugenic philosophy must be accepted. This is the next and necessary step in the program of the eugenic movement. More research may bring stronger conviction that the eugenic proposals are scientifically true; but little progress can be made except through an educational movement which distributes widely among intelligent people a eugenic philosophy which deals adequately with the biological, social and other factors involved. Such an educational movement for eugenics must be based on biology, and especially on zoology which more directly illustrates human life and its problems. By education I do not mean schools and colleges only, for I am thinking of the vast possibilities of popular education such as in the past year has been applied by lectures, magazines, newspapers, pamphlets and posters to the great food questions. An energetic and sweeping educational campaign will some day be necessary if the average intelligent citizen is to be made to realize what the eugenic proposition may mean for racial welfare. Here is a possible contribution of zoology to human welfare compared with which all others are of minor importance. As in the case of those philosophical principles of biology which may profoundly influence human thought and action, there is now in sight only one pathway leading towards progress in applying the established biological science to eugenic practise. That pathway is labelled "Education."

MAURICE H. BIGELOW
TEACHERS COLLEGE,
COLUMBIA UNIVERSITY

SCIENTIFIC EVENTS

VOLCANOES OF HAWAII

THE entire group of Hawaiian Islands, twenty in number, extending in a chain for hundreds of miles, is of volcanic origin, though some of the islets and reefs are but the wave-battered remnants of volcanoes whose fires died out long ago. The island of Hawaii has been formed by the coalescence of many recently formed volcanoes. The walls of the crater of the active volcano of Kilauea, on this island, are broken down on one side, giving access to its "lake of fire." This volcano has not always been gentle in its ways, but it is now so well behaved that the visitor can stand safely on the edge of its fiery pit and, if the volcano is active, watch the molten rock boiling and spouting 100 to 300 feet below. Sometimes many fountains throw up jets of glowing sulphurous lava and light up with ghastly glare the frowning crags that rim the crater. Then, suddenly and with deafening detonations, the jets rush together and convert the lake into a burning, seething, roaring mass, making a scene to which few others in the world are comparable.

Mauna Loa, on the island of Hawaii, and a neighboring volcanic cone, Mauna Kea, both nearly 14,000 feet above the sea, are among the highest island mountains in the world. On

the other islands of the Hawaiian group there are volcanic mountains scarcely less interesting. The crater of Haleakala, in the summit of East Maui, 10,000 feet above sea level, is one of the largest extinct craters in the world and is as well preserved as if its fires had been extinguished but a few years, instead of perhaps several hundred years ago.

The active volcanoes of Hawaii give a wonderful demonstration of the processes by which all these island mountains have been built up from the great depths of the ocean. Since the days of Captain Cook, geologists and others who are interested in the problems of volcanoes have visited the Hawaiian Islands and written about them.

Near the base of these mountains of igneous rock lie fields of sugar cane, which are just now of special interest. They are supplied with water from mountain streams and from wells and drainage tunnels that tap underground supplies. The Geological Survey, in cooperation with the Territory of Hawaii, has for several years been studying the water resources of the islands with a view to increasing the amount of water available for use in irrigation, and therefore in the output of sugar and other crops.

Several publications giving information on special phases of these interesting islands will be sent free on application to the Director of the United States Geological Survey, Department of the Interior, Washington, D. C. Among these are Water-Supply Paper 318, "Water Resources of Hawaii, 1909–1911," by W. F. Martin and C. H. Pierce, and Water-Supply Paper 336, "Water Resources of Hawaii, 1912," by C. H. Pierce and G. K. Larrison. These papers deal mainly with stream measurements and kindred subjects but contain also much information of general interest. A paper on the water supply of one of the neighboring islands is also available—Water-Supply Paper 77, "The water resources of Molokai, Hawaiian Islands," by Waldemar Lindgren. This paper contains an excellent map of the island.

Professional Paper 88 of the United States Geological Survey, Department of the Interior, "Lavas of Hawaii and their relations," by Whitman Cross, presents a summary of our present scientific knowledge of the lavas of the islands. With the exception of the introduction the book is mainly technical. It contains 97 pages and includes an excellent map of the Hawaiian Islands and diagrams showing the composition of the lavas.

THE DIVISION OF GAS WARFARE OF THE WAR DEPARTMENT

By direction of President Wilson all the activities of the government concerned with manufacturing poison gas for war and experimenting in the work of devising new methods were transferred to the control of the War Department on July 1.

The entire gas experimental work will be under the direction of Major General William L. Sibert, who recently returned from France, where he commanded the First Division of the regular army, and was assigned as chief of a special department on gas defense.

President Wilson has signed an order transferring the chemical section of the Bureau of Mines of the Department of the Interior to the War Department in accordance with the President's decision that measures for the use of gas as a weapon of offense and defense should be coordinated under the War Department. Experiments on war gas and masks have been divided among several branches of the government, including the Ordnance and Medical Departments of the army.

The most extensive work has been conducted by the Bureau of Mines, which established a special chemical laboratory at the American University on the outskirts of Washington. About 1,700 American chemists have given the government the benefit of their advice, experience, and services in this work, and important results are predicted.

Among the chemists whose services have been utilized by the Bureau of Mines in its Chemical Section in the gas experimentation are Dr. William H. Nicolls of 25 Broad Street, New York, President of the General Chemical Company; Dr. F. C. Venable, of the University of North Carolina; Professor E. C.