It is an obvious fact, and I ought to apologize for remarking it, were it not that so much of our popular science is understood by the haste to imply an opposite conclusion. If a chemical analysis of the constituents of sea-water could take away from the glory of a mighty wave breaking in the sunlight, it would still be true that it was the mind of the chemist which delighted in finding the analysis. Whatever be its history, whatever its physical correlations, it is an undeniable fact that the mind of man has been evolved; I believe that is the scientific word. You may speak of a continuous upholding of our material framework from without; you may ascribe fixed qualities to something you call matter; or you may refuse to be drawn into any statement. But anyway, the fact remains that the precious things of life are those we call the treasures of the mind. Dogmas and philosophies, it would seem, rise and fall. But gradually accumulating throughout the ages, from the earliest dawn of history, there is a body of doctrine, a reasoned insight into the relations of exact ideas, painfully won and often tested. And this remains the main heritage of man; his little beacon of light amidst the solitudes and darknesses of infinite space; or, if you prefer, like the shout of children at play together in the cultivated valleys, which continues from generation to generation.

Yes, and continues for ever! A universe which has the potentiality of becoming thus conscious of itself is not without something of which that which we call memory is but an image. Somewhere, somehow, in ways we dream not of, when you and I have merged again into the illimitable whole, when all that is material has ceased, the faculty in which we now have some share shall surely endure; the conceptions we now dimly struggle to grasp, the joy we have in the effort, these are but part of a greater whole. Some may fear, and some may hope, that they and theirs shall not endure for ever. But he must have studied nature in vain who does not see that our spiritual activities are inherent in the mighty process of which we are part; who can doubt of their persistence.

And, on the intellectual side, of all that is best ascertained, and surest, and most definite, of these; of all that is oldest and most universal; of all that is most fundamental and far-reaching, of these activities, pure mathematics is the symbol and the sum.

H. F. BAKER

WORK GOING ON AT KILAUEA VOLCANO

FOR the past three months the "fires of Pelé" have been comparatively low, the conditions in the active pit of Halemaumau being that of unusual quiescence. The level of the bottom has also remained lower than at any other time since last fall, when it had a depth of about 700 feet. The last plane-table measurement obtained gave a depth of 550 feet and the subsequent change has been small.

Since its late maximum height of about 350 feet below the rim, in January of this year, the liquid lava lake has in its general movement been dropping, though a rise in June and July, 1912, presented an activity greater than any other recorded during the past thirty years. There was a molten lake 650 feet long by 450 feet wide. As many as six hundred fountains of liquid magma played simultaneously and threw the molten spray to heights of twenty to thirty feet, accompanied by a sound like the roar of heavy ocean surf. In December, after intermittent declines, the level of the lake again rose, though to a lesser altitude and accompanied with decreased activity; this condition continuing until the middle of February of this year. Since then the resultant effects have been a lowering of the surface of the lava column until, on May 1, it disappeared from all view either by day or through incandescence at night.

The lowering of the lava column was naturally accompanied by landslides due to the non-support of lower portions of the crater walls. Some of the avalanches were of considerable magnitude and duration; they gradually grew less in sound frequency and volume until, during the latter part of the month (June), they nearly ceased. Fumes and vaporous emanations have largely obscured the inner pit during the past months, and until lately the best views gained at brief intervals have shown the bottom to be largely free from molten lava. Some dozen steaming outlets surrounded with sulphurous deposits have at times revealed themselves in the bottom of the sunken well, in whose very lowest point a funnel-shaped depression descending into unknown depths has been momentarily disclosed. On the ninth of May an unusual detonation was heard toward the central portion of the pit and this has been succeeded by steam explosions resembling blasts from a locomotive's funnel. In accordance with the working hypothesis at the Hawaiian Volcano Observatory, the molten magma is due to rise on the approach of the summer solstice.

WORK AT THE VOLCANO OBSERVATORY

Since January, 1912, regular routine work has been going on in the Observatory of the Massachusetts Institute of Technology, on the very edge of the precipitous-sided caldera of Kilauea. In the Whitney Laboratory of Seismology built in the observatory cellar above steam cracks and heated from their emanations, four large seismographs are installed, including two heavy 100-kilogram Bosch-Omori trinometers, and one ordinary Omori seismograph for the registration of strong local earthquakes; and also one heavy Omori trinometer.

On May 19, Greenwich time, the heaviest shock of immediate origin yet recorded by the instruments was observed. It was felt by us at the Volcano House very distinctly, and even more at Hilo, thirty miles distant.

Ordinary microseismic motion has been constantly recorded by the instruments on the rim of the volcano's crater, and there are more rapid movements which have, in view of their obvious origin, been designated as "volcanic vibrations."[1]

On the very edge of the active Halemaumau, in the rough building of the Technology Volcano Station, a two-component Omori horizontal pendulum trinometer is installed on the concrete pier placed by the U. S. Geological Survey as a bench mark during the survey last year for the special map of the "proposed Kilauea Volcano National Park."

The instruments at the observatory will probably be connected with telephone at the brink of the lava lake, so that one standing on its very edge may correlate his observations with those being recorded two and one half miles away on the high surrounding edge of the Kilauea Sink; it will thus be possible to note the seismic effects of changes in molten magma, explosions, landslides, etc., which occur within a volcano's crater. Had such instruments been installed near the craters of Pelé and La Soufrière during the memorable 1902 eruptions they would not only have been of service to science, but in informing the distracted remnant of the populations in regard to the nature of the subsequent seismic disturbances.

Among the work being carried on under Director Jaggar are: photographic record of phases of volcanic activity, measurements of the surface of the magma column, experimental work with microphones, cinematographic registration of the activity of the molten lava, spectroscopic study of volcanic flames, optical pyrometry applied to the molten magma in the field, studies in the temperature of fumaroles and solfataras, as well as other investigations relating to the geology, mineralogy, petrography and natural history of Kilauea.

STUDIES FROM KITE PHOTOGRAPHY

In connection with the somewhat novel work now being conducted at Kilauea under

[1] H. O. Wood, *Bull. Seismo. Soc. of Am.*, Vol. III., No. 1.

the auspices of the geological department of Harvard University, of reproducing the volcano in naturalistic relief, it is proposed to make a series of aerial photographs from kites flown at heights of from one to several miles above the crater and adjacent region. Not only will the data obtained be applied to supplement the photographic survey just completed after three months of field work, itself probably the most comprehensive of its kind yet made for the reproduction of a land-form type, but it is hoped there may be secured an opportunity of novel comparison with lunar craters, which are more nearly approached by the Hawaiian type than by any others known to lie on the earth's surface. The kite photography will be conducted by expert F. W. Haworth, of Pittsburgh, who has developed this subject and pertaining apparatus to unequaled perfection.

ATTEMPT AT ACCURATE LAND RELIEF BY AMERICAN GEOLOGISTS

Primarily the purpose of the aerial photography is to furnish checks for and to supplement the data of the terrestrial, linear and photographic surveys, so that complete record of the surface forms of Kilauea will be obtained.

The aid of aerial photography in obtaining data for reproducing land in relief was employed in 1902, when the city of Washington was modeled for the U. S. Senate—views from a captive balloon—but this will probably be the first instance where kite photography has been called in to supplement the data requisite to construct a naturalistic model.

One of the oldest means employed for earth representation has naturally been actual relief, since it is the most truthful and indeed the only complete medium in which the solid world can be expressed, but strange as it may seem comparatively little attention has been given to its rational or scientific side, its aspect as a study in natural phenomena embodying for adequate treatment the observation, research and understanding which natural science demands. Thousands of diagrams in relief exist which place the arbitrarily taken points on some map into three dimensions, with little regard to the existing form and appearance of the part of the globe represented (or rather misrepresented), but they have neither been like, nor looked like, anything natural on earth. Those who understand the meaning of an ordinary map can see that the placing of its conventional data in a form of relief can never result in a true reproduction of the natural forms of earth surface, which for competent exposition must call for field observation and collection of the necessary field facts.

In the biological sciences similar procedure is well established, so that there are in our museums to-day specimens, especially of animal and plant life, which give forceful expression of the truth and vitality of the living outdoor world. Even more is there need of comparable naturalistic specimens in the earth sciences, for while most of the forms of botany and zoology are of size to be readily viewed, those of the earth's surface are so extensive and often complex that they can rarely be well comprehended in the field where frequently but a small portion of a unit is to be seen at once. Too long have geology and geography been without this unrivaled means for illustrating and forcibly interpreting the forms with which they deal, too long have the earth sciences been lacking adequate representation in the most comprehensive of all the natural arts, the one which rightly belongs to and can so richly enhance these sciences. There are signs, however, of an awakening. Men whose views have permitted seeing outside the customary methods of procedure have begun to recognize some of the need and value of the new work, and the Kilauea Crater problem now being undertaken is a result.

Kilauea Crater is situated on the island of Hawaii, American territory, within the "Proposed National Volcano Park." So new is the work of naturalistic land relief in this country that it may be said that scarcely a single American land form has been so reproduced (excellent work has already been done

in Europe and some representation of foreign types has been effected in the United States), hence the naturalistic reproduction in relief of Kilauea should mark two significant steps; first, representation in the new way of an American land-form type, and second, the entry of American geologists into this field, so useful in the promotion of their science.

GEO. CARROLL CURTIS
HAWAIIAN VOLCANO OBSERVATORY,
KILAUEA CRATER,
July, 1913

SCIENTIFIC NOTES AND NEWS

A TABLET, recording the place of birth of Sir William Turner, the distinguished anatomist, principal of the University of Edinburgh, has been unveiled in his native town of Lancaster.

AT the meeting of the section of tropical medicine and hygiene of the recent International Medical Congress, Sir Patrick Manson was presented with a gold plaque. It bears his portrait and on the other side an allegorical group representing science triumphing over disease in a tropical landscape.

COL. WILLIAM C. GORGAS has applied for four months' leave of absence in order to accept the invitation to advise on the sanitary conditions in Johannesburg, South Africa.

DR. ADOLF HURWITZ, professor of mathematics at the Zurich Polytechnic School, has been elected a member of the Accademia dei Lincei, Rome.

DR. THEODOR NEUBÜRGER, of Frankfort, known for his contributions to hygiene and anthropology, has celebrated the sixtieth anniversary of his doctorate.

COLORADO COLLEGE at its last commencement conferred the honorary degree of Sc.D. on Professor Theodore D. A. Cockerell, who holds the chair of zoology in the University of Colorado.

SIR JAMES GRANT, of Ottawa, was made an honorary life member of the Canadian Medical Association at its recent meeting.

DR. W. L. TOWER, associate professor of embryology in the University of Chicago, has gone to South America to gather material for the new bionomic laboratory just completed at the university. Professor Tower has been made curator of the laboratory, which will be equipped for the study of genetics and the problems of experimental evolution.

DR. GEORGE H. SHULL, of the Station for Experimental Evolution of the Carnegie Institution, has been granted a year's leave of absence, and will spend the greater part of the year in Berlin, in study and writing. He sailed on September 12 and will participate in the Generalversammlung der Deutschen Botanischen Gesellschaft which meets in Berlin on October 5. His paper will be on "Chlorophyllfaktoren und Buntblätterigkeit bei *Lychnis dioica.*"

DR. FREDERICK A. SAUNDERS, professor of physics at Syracuse University, is spending abroad a year's leave of absence. He will visit foreign laboratories and carry forward spectroscopic research in Professor Kayser's new laboratory at Bonn.

SAUL EPSTEEN, professor of engineering mathematics at the University of Colorado, has resigned to accept the position of insurance commissioner of Colorado.

THE Permanent International Eugenics Committee, which met in Paris on August 4, decided to hold the next International Congress in New York during September, 1915. Major Leonard Darwin presided, Mrs. Gotto acted as secretary, and the following countries were represented: England (Dr. Edgar Schuster), America (Dr. F. A. Woods), France (M. Lucien March), Germany (Professor A. Ploetz), Italy (Professor C. Gini), Denmark (Dr. S. Hansen), Norway (Dr. J. A. Mjöen).

DR. M. P. RAVENEL, head of the State Hygienic Laboratory, Wisconsin, presided over a session of the Fourth International Congress on School Hygiene devoted to university health. He also made an address on bovine tuberculosis at the fiftieth anniversary meeting of the American Veterinarians' Association in session in New York City, September 1–5.