naval vessel and amphibian plane have been working together to increase the charted knowledge of the waters about the reef. The plane provided aerial mosaic pictures by taking vertical photographs from an altitude of eight thousand feet, which revealed the depth of the water beneath. The survey ship will proceed to sound all shallow waters revealed in the mosaic.

THE New York *Times* reports that the new vessel for Antarctic exploration being constructed in Glasgow by the British government will be the last word in efficiency for deep-sea sounding and biological and chemical investigation of southern waters. Not only will the vessel be capable of covering nine thousand miles without refueling, but echo-sounding gear will be installed and a special winch carrying five thousand fathoms of wire rope will enable working large nets at any depth. Three auxiliary machines will be carried for smaller nets and hydrological observations. There will also be large biological and chemical laboratories, a photographic room and a survey office. Six investigators will accompany the expedition. The officers and crew will number fifty. The vessel will be 232 feet long, steam propelled and be commissioned under the auspices of the Discovery Committee, which recently placed Captain Scott's old vessel *The Discovery* at the disposal of Sir Douglas Mawson and already has another vessel, *The William Scoresby,* working in the Antarctic.

SPACE on the fourth floor of the science building at the University of Southern California has been given over to experimental marine biology and survey work, with installation of running sea-water aquaria and other appropriate facilities, according to a report from Professor Francis M. Baldwin, in charge of marine biology work. Marine survey and invertebrate zoology are included in the summer session program, and space may be had by a limited number of independent investigators who have definite problems in hand, by application to Professor Baldwin. Two permanent tanks for sea-water and four auxiliary tanks for forcing the water around have been installed, and a reserve tank for the supply. The original supply of about 500 gallons came from four miles out in the Catalina Channel, and was dipped up in wooden buckets so that there would be no metal contact. As evaporation occurs, rejuvenation is effected by water added every week or ten days, and air is forced through to oxygenate it according to requirements stated on an automatic indicator.

THE will of the late Ogden Mills, of New York, who died on January 29, provides for the following bequests: The Home for Incurables, at 183d Street and Third Avenue, receives $500,000 under the will and an additional $500,000 under the codicil. Mr. Mills had been president of this institution and had given substantial sums to it during his lifetime. The American Museum of Natural History, to which he also contributed during his life, receives $100,000 under the will and an additional $400,000 under the codicil. The Mills Memorial Hospital at San Mateo, California, receives $200,000; Harvard College, $200,000; Grace Cathedral Corporation of San Francisco, $250,000; the Metropolitan Museum of Art of New York, $100,000; the New York Zoological Society, $50,000, and Phillips Exeter Academy of Exeter, N. H., $50,000. Mr. Mills was educated at Phillips Exeter and at Harvard.

DR. THOMAS BARBOUR, director of the Harvard University Museum, has left for Florida where he will join A. V. Armour for an extensive cruise, which will include Harvard biological and botanical foundations in southern latitudes. It is planned to proceed to Haiti, San Domingo, Porto Rico, then south through the West Indies to Trinidad, where the Imperial College of Tropical Agriculture will be visited. From there the course will be west through the Dutch Lesser Antilles to Venezuela, Colombia and Panama, stopping in the Panama Canal Zone for Professor Barbour's annual inspection of the Barro Colorado Island Tropical Research Station of the Institute for Research in Tropical America, of which he is chairman. On the way back a stop will be made at Tela, Honduras, where the expedition will visit the snake farm maintained by Harvard, the Antivenin Institute of America and the United Fruit Company. From there the expedition will proceed to Cuba to the Harvard Biological Laboratory and Botanical Garden at Soledad, Cienfuegos, Cuba. While cruising through the West Indies it is planned to visit the various tropical agricultural gardens and several of the smaller islands not touched by the regular trade routes, and, therefore, not visited by naturalists for many years. It is hoped to collect specimens of plants and seeds for introduction in the experimental stations at Summit, Canal Zone, Tela, Honduras and the Harvard Gardens in Cuba, and zoological specimens for the collections of the Museum of Comparative Zoology.

UNIVERSITY AND EDUCATIONAL NOTES

THE alumni and directors of the University of Akron, Ohio, have raised $175,000 toward the build-

ing fund of the proposed new university to be located three and a half miles from the center of the city.

THE department of sociology and anthropology at the University of Chicago has been dissolved and reconstituted as two separate departments. The department of sociology will be under the chairmanship of Dr. Ellsworth Faris, while the chairman for anthropology is Dr. Fay-Cooper Cole.

THE Grey University College at Bloemfontein, the chief town in the Orange Free State, has instituted a course leading to a degree in astronomy, the first in the Union. Professor Jan Paraskevopoulos, of the Harvard Observatory, and M. E. Jessup, of the University of Michigan, will conduct the course.

THE summer field course given at Grand Isle, Louisiana, under the auspices of the department of zoology of the Louisiana State University, will be repeated the coming summer from June 14 to July 24. The facilities of the laboratory are offered to research workers and others interested in marine biology during that season.

DR. RUSSELL M. WILDER, of the Mayo Clinic and Foundation, Rochester, Minnesota, has been appointed professor and chairman of the department of medicine at the University of Chicago. In the position of chairman of the department Dr. Wilder succeeds Dr. Franklin C. McLean, whose appointment as director of University Clinics was recently announced.

PROFESSOR KIRTLEY F. MATHER, of Harvard University, has been appointed exchange professor in geology at Tufts College.

DR. GEORGE T. HARGITT, of Syracuse University, and Dr. C. M. Child, of the University of Chicago, will serve next year as visiting professors at Duke University during the absence of Dr. A. S. Pearse, who has been granted a year and a half leave to aid in the establishment of the research work at Keio University, Tokyo, Japan.

PROFESSOR LINUS PAULING, at present at the California Institute of Technology, Pasadena, has been appointed lecturer in chemistry and physics in the University of California.

AT Harvard University, Sheldon fellowships enabling the recipient to travel for a year abroad have been awarded to Dr. Benjamin Kropp, instructor in zoology, and to Arthur Barton Brown, instructor in mathematics. Awards to students in physics have been made to James Holley Bartlett, Jr., and Clarence Melvin Zener; in botany to Walter Nicholas Bangham and Felipe Modesto Salvoza.

DR. ERIC D'ATH, pathologist at the Royal Prince Alfred Hospital, Sydney, has been appointed to the chair of pathology of the University of Otago, New Zealand.

DR. D. R. HARTREE has been appointed to the Beyer chair of applied mathematics in the University of Manchester. At present he holds a lectureship in mathematical physics at the Cavendish Laboratory, Cambridge.

DISCUSSION

THE INTERACTION OF MATTER AND RADIATION

NOT many years ago we pictured a beam of light as a procession of waves, possessing wave-lengths and amplitudes. The latter, however, became electric vectors always at right angles to the direction of propagation. Recently we have come to look upon light as a flight of bundles of energy, every bundle having an energy proportional to the frequency or *vice versa*. And in the *explanation* of any phenomena of light now we use the idea of waves or electric vectors or quanta as we wish, ignoring the characteristics unnecessary to the *explanation*. In accounting for the pressure of radiation we may use any of the three characteristics as Maxwell, Larmor and Einstein have, in turn, shown. Or we may arrive at the result by purely thermodynamic reasoning, as did Boltzmann. In this point we are much better off than the physicists of one hundred years ago who could not accept the possibility of radiation pressure, yet if we go back two hundred years we find that Newton required light to have a pressure on the basis of his quasi-quantum, *i.e.*, corpuscular, view of its nature.

Most of the progress of the past twenty years has been based on the idea of the quantum and its action upon or production by electrons capable of motion from one energy state to another. The ejection of photoelectrons by light of definite frequency, the emission of light of definite frequency by electrons of definite kinetic energy, all the phenomena of resonance and ionization potentials, of X-rays, the spectral series as visioned by Bohr, the new quantum mechanics which is replacing the Bohr picture, in all of these the compact bundle of energy—the quantum—is the essential quality of light. Occasionally the electric vector is brought into service, for example, in accounting for the prevailing direction of ejection of the photoelectrons. That direction is, on the whole, along the electric vector of the effective light beam.

A recent theoretical contribution, that of Smekal in 1923, although derived purely on the basis of quanta, may have an interpretation on the basis of