throughout by electricity. In the laboratory a large room has been fitted up for the use of visiting naturalists, five of whom can be accommodated at the same time. They have at their disposal certain of the aquarium tanks and table-aquaria, as well as two boats for collecting fresh material, the *Max Weber,* working in the vicinity, the other a steamer of 322 tons displacement, the *Brak,* for longer voyages.

BACTERIOLOGISTS having cultures of red chromogenic bacteria are requested to forward sub-cultures to Mr. R. S. Breed, New York Agricultural Experiment Station, Geneva, N. Y. A monographic study of this group of bacteria is in progress and comparative material is needed. Records of source, time of isolation and by whom isolated should accompany cultures. Proper credit will be given in publications for any assistance given.

DR. J. F. ILLINGWORTH, formerly professor of entomology in the University of Hawaii, after spending four years in Australia on a special investigation of the pests of sugar cane for the Queensland government, has returned to his home at Honolulu, where he has been appointed research associate in entomology at the Bishop Museum. At present Dr. Illingworth is engaged as specialist on the Green Japanese Beetle problem, by the U. S. Department of Agriculture, and is traveling in the Orient. The past season was spent in a general survey of this pest in Japan, where, unfortunately, he lost all his equipment in the Yokohama catastrophe. Since Dr. Illingworth is to investigate Chinese territory during the coming season, he has selected Shanghai as temporary headquarters, care of the American consul.

UNIVERSITY AND EDUCATIONAL NOTES

CONTRACTS have been awarded for the construction of the hall of chemistry for the University of West Virginia, Morgantown, which will be erected at a cost of $750,000.

IT is planned to build a hospital at the Ohio State University at Columbus at a cost of $500,000.

THE London County Council Education Committee has agreed to recommend the council to establish two. Sir Robert Blair fellowships for applied science and technology, each of the value of £450 for one year.

THE board of regents of the University of Michigan Medical School has approved a combined course in pharmacy and medicine for students who wish to prepare for scientific careers in research laboratories, or for educational, scientific or pharmaceutical manufacturing institutions. The new combination course requires three years in the College of Pharmacy and two years in both the pharmacy and the medical schools. The five years of study leads to a degree of bachelor of science in pharmacy. Two more years in the medical school will give the degree of doctor of medicine.

AT Yale University the appointments of five instructors on the faculty to assistant professorships are announced. These include Arthur H. Smith, physiological chemistry; Erwin George Gross, pharmacology and toxicology; Howard W. Haggard, applied physiology, and Lester C. Lichty, mechanical engineering.

THE *Bulletin* of the American Mathematical Society records the following promotions and appointments: Associate Professor S. Lefschetz, of the University of Kansas, to a full professorship of mathematics; Associate Professor J. W. Calhoun, of the University of Texas, to a full professorship of applied mathematics; Mr. A. S. Hathaway to be professor of mathematics at Friends University, Wichita, Kansas; Assistant Professor E. C. Keifer, Iowa State College, to be head of the department of mathematics at James Millikin University; Professor D. A. Lehman, of Goshen College, to be professor of mathematics at Bluffton College.

PROFESSOR A. E. JOLLIFFE, M.A. (Oxford), has been appointed to the university chair of mathematics, of the University of London, tenable at King's College.

DR. HANS KNIEP, of the University of Würzburg, has been appointed professor of botany at the University of Berlin to succeed Professor Haberlandt.

DR. FRIEDRICH MULLER, of the University of Tübingen, has been appointed professor of anatomy in the German University at Prague.

DISCUSSION AND CORRESPONDENCE

THE METRIC SYSTEM IN AGRICULTURE

FROM time to time there have appeared in SCIENCE suggestions for promoting the adoption of the metric system of weights and measures in the United States. One promising field of propaganda that has apparently been neglected by devotees of this rational system of measurements is that of reports of agricultural experimentation. On account of the wide distribution of such reports and the large number of persons reached the influence of such propaganda on the popular mind probably would be great. For those interested in the movement and occupying positions permitting the use of them, the following concrete suggestions are made:

(1) That new, especially long-time, experimental fields be platted in units of the metric system, and results from them be reported in both the metric and English systems.

(2) That results from field and other experiments, not laid out in the metric system, be reported in technical bulletins, also in a few selected popular bulletins, in terms of the metric and English systems.

After all, such reporting of results would not be a radical departure from the usual method, for research workers are quite familiar with the metric system from their study of European literature. Also, it is comparatively easy to transpose from one system to another; for a meter is comparable to a yard and the expression, kilograms per hectare, is approximately the same as our common expression, pounds per acre.

In the platting of new experimental fields in the metric system those in charge would not only be furthering a worthy propaganda but probably would be preparing their experiment station and its constituents for an inevitable change; for many of the long-time experimental fields are expected to be used as laid out for thirty years or longer, and it is very likely that such a period will see the virtual, if not complete, adoption of the metric system in this country.

It is not necessary at this time to enumerate all the forces that are expected to bring about the adoption of the metric system or the advantages of the system in agriculture; a few will suffice. We are, as a nation, fast becoming internationally minded; a common system of measurements becomes more inportant. History is being made rapidly nowadays; events that formerly took generations for accomplishment now occur over-night. Important data and events are being published both in technical and popular publications in units of the metric system.

As against the disadvantages of readjustment in changing from the English to the metric system, we may place the advantages of saving of labor and time in calculations and of more simple and rational division or combination of field plots. The meter is a little better than the yard for distance between large intertilled crops; and the are or hectare can easily be made to contain plants numbering multiples of tens where an exact number of plants is desirable.

A. B. BEAUMONT
MASSACHUSETTS AGRICULTURAL COLLEGE

SUCCESS OUT OF FAILURE

BY how narrow a margin success is at times separated from failure is of daily experience in business affairs. It is not appreciated how it is of importance also in scientific matters. Langley died broken hearted over the criticisms and ridicule he was given about his airplane. Yet Curtiss, putting a more powerful engine in it, vindicated Langley's theories and to-day his name is preeminent in aeronautics.

Oersted, the Danish physicist, in 1819, noticed the deflection of a magnetic needle by the action of a current flowing through a copper wire near the needle. Ampère, a mathematical prodigy at 13, immediately on hearing of the experiment, amplified the subject and in a short space of time worked out the laws which have become the basis of electro-dynamics. We owe to him the word "galvanometer," the instrument which measures current strength. We now denote the unit of current strength as the Ampère, and Ampèremeters are familiar instruments.

Ampère was so profoundly impressed from his mathematical studies of the subject that he made few experiments to verify his theories. He spoke of them as demonstrated. He was as sure of his hypotheses as Leverrier, the astronomer, was from his calculations of the orbits of the planets convinced that another planet must exist in a particular region of the heavens at a certain time. The discovery of the planet named Neptune was a remarkable verification of abstract scientific theory.

So Ampère, as it is related by Rauol Pictet, the eminent Swiss physicist, who liquefied oxygen and other gases and thus paved the way for wonderful developments in chemistry, biology and physics, was induced to give an experimental demonstration of his theories. The audience hall of the Observatoire was chosen for the event and a brilliant audience gathered.

Ampère discoursed on his theories. His blackboard demonstrations were convincing.

According to theory, a coil of insulated copper wire if suspended should place itself parallel to the equator when a galvanic current is passed through it. One face of the coil should point north, the other south. These faces should be attracted or repelled by a magnet brought near, as a north pole of a magnet is attracted by a south pole of another magnet, or repelled by a north pole. Indeed, two suspended coils or "solenoids" should behave like two magnets.

Many pieces of apparatus had been built to verify the postulates of Ampère, but the firm which made them delivered them on the lecture table too late to test them out.

When Ampère, with the assurance and complete conviction that the coils would behave as predicted, made the demonstration, one after another of the pieces failed to respond. The audience, appreciating his distress of mind, gradually dispersed, and he, returning home with tears streaming down his face, so Daniel Colladon, his assistant, told Pictet, sought consolation in a game of chess with a dear friend.

Colladon, expert mechanician, immediately tested the pieces of apparatus. A common defect was found in a too great friction of the bearing surfaces to be overcome by the feeble currents employed.

He devised a new method of suspension. The ends