the human body such as heart action, movements of the stomach and intestines, the flow of blood and the intake and output of air. (5) A laboratory for photographic and cinematographic study of bodily processes and conditions. (6) A laboratory for the study of electricity in its relation to the diagnosis and treatment of disease.

DR. BARTON WARREN EVERMANN, director of the museum of the California Academy of Sciences, has, with the authority of the council, sent two men from the museum staff to the Galapagos Islands to do scientific work. The men sent are Mr. Joseph R. Slevin, curator of herpetology, and Mr. Frank Tose, chief of exhibits. They sailed from San Francisco as the guests of Captain G. Allan Hancock on his private yacht, the *Ococa,* on November 23. They planned to finally reach the Galapagos Islands about the first of December, where they expected to remain some time. The purpose of the expedition so far as the academy is concerned is to do general collecting for the museum and to obtain accessory materials for a number of habitat groups, including at least one species of gigantic tortoise and one or two of the giant iguanas. Captain Hancock is interested in scientific problems and especially in photography. He has taken with him as his official photographer Mr. George E. Stone, an expert in moving pictures and still photography. The expedition will return to San Francisco about the middle of January.

THE proposed standard on symbols for hydraulics has been prepared by subcommittee No. 2, of which G. E. Russell, professor of theoretical hydraulics of the Massachusetts Institute of Technology, is chairman. This subcommittee was organized on May 3, 1926, by direction of the executive committee of the sectional committee on scientific and engineering symbols and abbreviations of the American Society of Mechanical Engineers for the purpose of recommending a list of standard symbols for use in the field of hydraulics. The proposed tentative standard has received the approval of the subcommittee and is now being circulated with a request for criticism and comment. Communications should be addressed to Preston S. Millar, secretary of the sectional committee.

Museum News states that a request for a city appropriation of $10,000 for 1928 has been made by the San Diego Society of Natural History, which bases its plea on the fact that its museum is open to the public daily, without charge, and that it maintains a school service, lecture program, nature walks and excursions and carries on explorations and research work. City funds are granted to three similar institutions in the city.

AN out-door botanical and biological laboratory and demonstration ground will be developed at the University of Wisconsin, if plans originated by Regent M. B. Olbrich, of the state university, and approved by the board of regents at its December meeting carry through. The regents appropriated an $83,000 balance in the Tripp Estate fund to aid in the purchase of land adjoining Lake Wingra, with the understanding that at least as much more will be provided from other sources. The Olbrich plan provides for the purchase of from 700 to 1,000 acres with a frontage of 8,000 feet on Lake Wingra—the whole of what is known as the Lake Forest area at Madison. The tract would be set aside as a forest preserve, arboretum and wild life refuge.

GIFT to the State of Massachusetts of twenty-six acres in Boxford, to be used as an addition to the Crooked Pond Wild Life Sanctuary, has been announced by William A. L. Bazeley, state commissioner of conservation. The givers are the Associated Committees for Wild Life Conservation, representing the Massachusetts Audubon Society, the Massachusetts Fish and Game Protective Association and the Federation of Bird Clubs of New England, Inc.

THE college of agriculture of the University of Wisconsin has been authorized by the university regents to engage in a cooperative program of forest conservation research with the state conservation commission and the U. S. Forest Service. The problem which will first be studied under the authorization of the regents is treatment of farm wood lots and swamp tracts. Problems relating to commercial forest tracts also are included in the general program.

UNIVERSITY AND EDUCATIONAL NOTES

THE Yale University endowment fund drive has passed its goal of $20,000,000.

AT George Washington University the college of engineering, which was formerly under the department of arts and sciences, has been replaced by a separate school of engineering in the recent reorganization of the university.

DR. M. ALLEN STARR has given $2,500 to constitute the Starr Fund for the department of neurology in Columbia University, either the principal or income of which may be used at the discretion of the executive head of the department.

DR. GUSTAV BOHSTEDT, chief of the animal husbandry department of the Ohio Agricultural Experi-

ment Station, has been called to the University of Wisconsin to head the research investigations in animal husbandry, a position made vacant by the resignation of F. B. Morrison, assistant dean of the College of Agriculture, who recently accepted the directorship of the New York Agricultural Experiment Stations.

AT the University of California, E. O. Essig, associate professor of entomology and associate entomologist, has been appointed professor of entomology and entomologist at the experiment station. Dr. Edwin C. Van Dyke, associate professor of entomology, has been appointed professor of entomology.

DR. WALTER BARTKE has been appointed assistant professor in mathematical astronomy at the University of Chicago.

DR. F. R. DAVISON, who for the past two years has been head of the bacteriology and biochemical departments of the Wm. S. Merrell Company, has resigned to accept the position of assistant professor in biochemistry at Rutgers University.

DR. ISADORE D. BRONFIN, medical director of the national Jewish Hospital, Denver, has been appointed assistant professor of medicine at the University of Colorado School of Medicine, Denver.

P. C. RAIMENT, demonstrator in biochemistry at the University of Oxford, has been appointed to the chair of physiology in the State University of Egypt, at Cairo.

DR. STANISLAS LORIA, professor of theoretical physics at the University of Lwów, Poland, has been appointed professor of experimental physics and director of the physical laboratory at the university. Professor Loria spent two years, 1923 and 1925, in America working and lecturing as research associate at the California Institute of Technology.

DISCUSSION AND CORRESPONDENCE

WEIGHT AND TEMPERATURE

THERE is a recurrent myth to the effect that mass varies with temperature, hoary with age, familiar to most physicists and chemists. It has been investigated many times and reported as due to convection currents of heated air acting either on the hot object weighed or on the balance pan.

The apparent loss in weight of a heated object is perfectly definite and repeatable and is of the order of 50 milligrams for a platinum crucible or pyrex beaker having a surface of 100 square cm. when heated to 600 degrees. The balance pan is protected from rapid heating by a ring or gauze of highly oxidized metal and the heated object left on it but a few seconds, just long enough to get the direction of the first swing. The temperature curve so obtained is a smooth hyperbola. The effects of convection and of expansion of the balance arm are relatively sluggish in coming into play and are readily recognized and avoided by any one familiar with precise weighing.

The apparent loss in weight is roughly proportional to surface and not to mass. This was shown by comparing the effect on a thin platinum crucible with that on a platinum button. The curves of loss in weight per unit area, plotted against temperature, were nearly coincident for glass, platinum and sheet gold but lower for aluminum, copper and iron (polished wire, coiled). The change with temperature is large at the lower temperatures, becoming less and less until at 900° it is too small to measure.

Since hygroscopic materials change in weight on heating in the manner just described, the effect was at first attributed to loss of adsorbed water. A lump of gold was weighed, then rolled into sheet, weighed, then melted into a lump, alternately, six times, each time heated to 600° to remove grease but weighed cold. A film of moisture would cause the sheet to weigh more than the button. A consistent difference of 1.2 mg. was found, probably due to adsorbed moisture, whereas the loss of weight on heating was of the order of 40 mg. Hence that loss could not be due to driving off adsorbed water.

Next a platinum crucible and the sheet gold were suspended in a furnace and thus weighed at various temperatures. The only change in weight found was a slight gain (2 mg.) such as would be caused by the decreased density and buoyancy of the heated air within the furnace. This disposed of the hypothesis of adsorbed moisture driven off by heat.

Finally, a crucial experiment indicated the actual cause of the apparent change in weight. The effect was first carefully determined on a platinum crucible. Repeating with the crucible *inverted* showed precisely the same loss in weight. Then a second crucible, slightly larger than that heated, was used as a cover for the heated inverted crucible, completely enclosing it down to the balance pan and eliminating convection currents entirely. In this case also the loss in weight was the same as before. The three losses check to within less than 2 per cent.

Warm air in contact with a heated surface must be at the same pressure as the surrounding atmosphere but less dense and more viscous. If it be lightly held in position (weakly adsorbed) by the solid, it will in effect increase the volume of the solid and therefore enhance the buoyancy of the surrounding air. To produce the losses in weight observed, layers of fixed air 0.5 to 3 mm. deep would be required. This explanation is not entirely acceptable