London the collection is well forward. It should again be pointed out that every ton of nuts gathered means a saving of half a ton of grain. Present indications are that at least 25,000 tons of nuts will reach the Ministry of Munitions, but this is only about one eighth of the estimated crop for the country.

## UNIVERSITY AND EDUCATIONAL NEWS

A BEQUEST of $200,000 is left to Yale University by the terms of the will of the late Richard P. Sewell of Boston.

H. P. WOOD, head of the department of electrical engineering at the Georgia School of Technology, Atlanta, Ga., has been appointed president of the Academic Board of the United States Army School of Military Aeronautics, which has been established at the Georgia School of Technology.

PROFESSOR J. F. WILSON, who during the past year was professor of electrical engineering at Queen's University, Kingston, Ontario, has been appointed assistant professor of electrical engineering at the University of Southern California, Los Angeles.

DR. JOHN EDWARD MARR, F.R.S., fellow of St. John's College since 1881, university lecturer in geology at Cambridge University, has been elected to the Woodwardian professorship of geology in succession to the late Professor Hughes.

## DISCUSSION AND CORRESPONDENCE

### METHODS FOR PREPARING ANIMAL MATERIAL TO BE DISSECTED

POSSIBLY the most common fixing and preserving fluid used for dissecting material is formalin. It is relatively inexpensive and especially convenient for collecting expeditions where a concentrated fluid is desirable. Animals preserved in it have rigid joints, however, and every one is familiar with the disagreeable characteristics of such material during dissection. Alcohol is much better from the standpoint of the dissector, but it has limitations when used alone.

Some of the "embalming fluid" mixtures used in preparing human cadavers for dissection are also splendid for smaller animals. Those containing phenol, alcohol and glycerine with no formalin give relatively flexible joints and pliable tissues. They also render the material resistant to a large amount of drying in the open air of a laboratory during dissection. Phenol is a relatively non-volatile antiseptic, and glycerine is very effective in preventing drying. Alcohol counteracts the action of the phenol in the solution, on the hands of the dissector. A good and much used solution consists of equal parts of phenol, alcohol and glycerine. Another less expensive fluid with arsenic and considerable water added to the above was described by Dr. W. C. Lusk some years ago[1] with an excellent discussion of principles involved in preparing cadavers for dissection.

As penetration by such fluids is slow, the mixture should be injected through some large artery, a femoral or carotid in the case of mammals. Small animals may be placed in solutions of about 80 per cent. alcohol in water when it is not practicable to inject them. In such cases, the usual practise of making a slit, at least in the ventral abdominal wall, should be followed. After all the tissues have been fixed, the material may be removed to a container which holds an "embalming fluid," such as I have mentioned, much diluted with water. Ten or more parts of water to one of the "embalming fluid" may be used. In fact, I have kept material which had already been thoroughly fixed in either formalin or alcohol, for several years in a solution consisting of water with 1 to 2 per cent. of phenol and 5 to 10 per cent. glycerine, with or without a little alcohol. Single specimens thus preserved have been used in dissection for many months without deterioration, so long as they were not kept out of the solution for more than a few hours or so at a time.

It is customary in human anatomy to leave cadavers on the dissecting tables for months without soaking. The glycerine in their tissues is wonderfully effective in checking drying. Nevertheless, unless the atmosphere of the room is very moist a good deal of drying

[1] *Anat. Record*, Vol. 3, No. 1.

does occur. According to my experience, it is worth the trouble to give even such large bodies as the human, as much soaking occasionally as is practicable, in such a solution as I have just described. This should be done between class periods, at least twice a week, when the air of the room is at all dry.

When material comes to my hands already filled with formalin, I soak it in running water, for a number of hours, according to its size, to get rid of the formalin, before transferring it to a phenol-glycerine solution.

Material which has been thus prepared with a phenol-glycerine solution can be stored or shipped in airtight wrappings with no surrounding solution. In an important article on methods for preserving and storing cadavers Keiller[2] has described methods for preparing wrappings.

I have adopted the practise of shipping material, which has been thoroughly soaked in the dilute embalming fluid described in this article, in packages well wrapped and packed in excelsior. No fluid except that in the specimen is needed for a number of weeks, even in summer, if the packing is well done. There is much economy in weight, and expensive containers are not needed.

In some medical schools, cadavers are stored in airtight chambers with no fluid except for a dish of alcohol which keeps the atmosphere of the chamber saturated with alcohol fumes. This is the best of all storage methods that have come to my attention, for properly embalmed bodies, and it works well with other large vertebrates. I have found it successful in a warm climate, and I have never heard any criticism of the method by people who have tried it.

Much trouble from drying of material in the dissecting room can be avoided by keeping the air of the room very humid. Professor S. W. Ranson, Northwestern University Medical School, has called my attention to a device which he has found efficient in maintaining a humid atmosphere and which eliminates the drying troubles. This is the "Steamo Air Moistener," which can be obtained from "The Air Moistener Co.," 28 North Market St., Chicago. It is attached to steam radiators of various types. Directions are furnished for maintaining any desired percentage of humidity.

[2] *Philadelphia Medical Jour.*, December 29, 1900.

R. M. STRONG

ANATOMICAL LABORATORIES,
VANDERBILT UNIVERSITY MEDICAL SCHOOL

## SCIENTIFIC BOOKS

*Physical Chemistry of Vital Phenomena for Students and Investigators in the Biological and Medical Sciences.* By J. F. MCCLENDON, Assistant Professor of Physiology in the University of Minnesota. Princeton University Press, 1917.

In this concise book of less than 200 pages of text Professor McClendon describes and discusses briefly some of the more recent applications of physical chemistry to the analysis of vital phenomena. The field, although no longer new, is very large and calls for much further investigation; hence finality is scarcely possible at present, and the author describes his purpose as largely practical and tentative: "to develop a tool for physiological research," rather than to produce a systematic treatise on the subject. The space assigned to the different topics under discussion is very unequal; many of these are presented in the barest summary, with little attempt to reconcile conflicting statements or to reach unifying conclusions; while others, particularly those in which the author's own chief researches have been made, are treated in considerable detail. The book is intended for advanced students and presupposes more than elementary biological and chemical knowledge in the reader; condensation is carried to an extreme, and in many places one receives the impression of a succession of abstracts, in which both the selection and the omission of material seem arbitrary. In the later chapters, which deal with the more specifically biological topics (amœboid movement, tropisms, cell-division, fertilization, muscular contraction, oxidation, production of light and heat), the space is quite insufficient for adequate discussion, and the ac-