

eter, an invention of a commercial company, which has been used by the Coast and Geodetic Survey in hydrographic surveying for over nine years. The deep water fathometer has been of great value for depths of about 15 fathoms (90 feet) to 3,000 fathoms (18,000 feet), the deepest water so far surveyed by the bureau. Not built primarily for surveying, a small variation in depth indication was found to obtain in the apparatus. Having a nearly constant value, this produces a larger percentage of error in shallow water than in water of greater depths. After using the deep water fathometer for nearly a decade as a surveying instrument, the shoal fathometer was developed for the required accuracy for the shallow depths ordinarily covered by means of leadline sounding.

The general method of measuring depths by all fathometers is to produce a sound in the water at the bottom of the ship. This sound travels to the bottom and returns as an echo, picked up by a hydrophone, or electrical ear, in the bottom of the vessel. The fathometer measures precisely, and translates automatically into depth, the elapsed time from the sound production to the return of the echo, and indicates this depth by means of a neon-tube flash on a rotating disc graduated in fathoms. In the shoal fathometer, supersonic frequencies are used for the sound production; that is, a note produced electrically, too shrill for the human ear to detect.

Since sound in sea water has a velocity of about 4,800 feet per second, some idea may be had of the accuracy of the time element in this newly developed instrument, which must measure the elapsed time for the sound to travel, for example, a depth of 12 feet to the bottom and return, a total distance of but 24 feet, requiring only five one-thousandth of a second for the round trip. As the instrument is designed to measure this depth within one tenth of a foot, its accuracy of measurement of time elapsed must be within four one-hundred-thousandth of a second.

When sounding by the old "handlead" method, at a cruising speed of some 5 knots, say in 10 fathoms (60 feet), it is possible to get one sounding every 30 seconds, for it takes that long to heave the lead and haul it in again. That represents one sounding for every 254 feet. A survey ship equipped with a shoal fathometer can travel twice as fast, securing 20 soundings every second. As this represents one sounding every ten inches, it furnishes an almost continuous profile of the bottom.

WORK IN PROGRESS AT THE WISTAR INSTITUTE OF ANATOMY

At the regular October meeting of the Board of Managers of the Wistar Institute of Anatomy the director in his report described as follows the research

work in progress at the Philadelphia laboratories and of the six laboratory guests of the Morris Biological Farm:

Dr. Donaldson is engaged in a study of the growth of the eye under normal conditions—the eye is characteristic of the strain; on the senescence of the nervous system; on the changes in the mutant albino from Dr. King's colony and, in collaboration with Dr. King, on a study of the effects of captivity on the wild gray rat.

Dr. King is continuing her work on the genetics of the rat, including mutations and with special reference to the effects of captivity on growth, fertility, longevity and sex ratio.

Dr. Coghill has resumed his work on the growth of the sensory nervous system by the quantitative method of counting the nerve cells in the spinal ganglia and correlating the facts with physiological function.

Dr. Angulo is working on the embryological differentiation of the nervous system in relation to the increase of physiological activity.

In addition to members of the institute's staff regularly engaged in scientific work at the Morris Biological Farm there were present during all or a portion of the summer the following laboratory guests:

Dr. Edward L. Corey, assistant professor of physiology, University of Virginia. Dr. Corey made a detailed study of the foetal heart of the albino rat by analysis of kymographic records. Records of more than 200 rat foetuses were made and forty-one young rats were recorded under various experimental conditions.

Dr. Arnold A. Zimmermann, assistant professor of anatomy, University of Illinois, College of Medicine, devoted his attention to the development of the lymphatics in the opossum. He was able to examine some thirty series of sectioned opossum embryos and found on the eleventh day of gestation the most important part of the developmental history of the lymphatics.

Dr. O. Larsell, professor of anatomy at the Medical School of the University of Oregon, completed his study of the cerebellum of the opossum. Dr. Larsell followed the growth of the cerebellum from the earliest recognizable stage to the adult form. He found the opossum brain at birth typically reptilian.

Cooperating with Dr. McCrady experimental studies were made on pouch young to determine when and what part of the vestibular portion of the ear first begins to function.

Dr. G. Mackmull, formerly instructor in histology and embryology, Jefferson Medical College, is making a study of the absorption of carbon by body tissues when implanted in capsules or injected into the body cavity of the axolotl.

Dr. A. R. Moore, professor of general physiology, University of Oregon, and lecturer in general physiology at the Hopkins Marine Station, California, was engaged in a study of the physical constitution of plasmodium. In cooperation with Dr. Larsell, Dr. Moore was also engaged in a study of the modification of structure and function of living nerve elements following centrifugation with the ultra-centrifuge.