

# 1949

## PUBLIC SEMINARS

- July 5—Dr. J. Wendell Burger, Trinity College. "The marine environment of Mt. Desert Island."
- July 12—Dr. Roy P. Forster, Dartmouth College. "Some enzyme systems in animals."
- July 19—Joint seminar with the Sigma Xi Club of the Jackson Memorial Laboratory at the Jackson Laboratory: Dr. John Welch, Harvard University. "Acetylcholine."
- July 26—Dr. Homer W. Smith, New York University College of Medicine. "Organism and environment: Dynamic oppositions."
- August 2—Dr. J. L. Fuller, Jackson Memorial Laboratory. "The work of the Hamilton Station."
- August 9—Dr. James Peskin, University of Michigan. "Visual pigments in animals."
- August 16—Dr. Margaret H. D. Smith, Tulane University. "Cellular transformations."
- August 23—Dr. Orville Dahl, University of Minnesota. "Pollen research."
- August 24—Dr. Warren Lewis, The Wistar Institute. "Cell movement."

## SENIOR INVESTIGATORS

- Dr. William Blake, Yale University School of Medicine. *vide* Bradley.
- Dr. Stanley E. Bradley, College of Physicians and Surgeons, Columbia University. Further studies of renal function in the harbor seal have been carried out during 1948 and 1949 in collaboration with Dr. Gilbert H. Mudge, Columbia University, College of Physicians and Surgeons. Dr. William D. Blake, and the Misses Lottie Fogel and Joan Hunt also participated at various times. Particular interest attaches to the excretion of electrolytes and water by these animals because it has been found that glomerular filtration (measured by creatinine clearance) may be changed physiologically over a very wide range, permitting quantitative appraisal of the relationship between filtration and reabsorption. Reductions in filtration to desired levels have been produced by forced apnoea; increases, by post-prandial hyperemia. A fairly good correlation between the level of filtration and water and electrolyte excretion has been observed. With reduced filtration, water and electrolyte output diminish strikingly; the sodium and potassium concentrations in the urine decrease; in most instan-

ces creatinine concentration increases, indicating a relative increase in water absorption. Experiments carried out in 1949 indicate that this effect cannot be attributed to augmented anti-diuretic hormone production. It is of interest that potassium secretion by the renal tubules was never observed though procedures effective in demonstrating it in dogs, such as mercurial diuresis, potassium loading and the like were tried. The renal function response to sodium, potassium and water loading with and without mercurial diuresis at various levels of glomerular filtration have been examined. This investigation will be continued in the coming year.

Dr. Robert Berliner, Columbia University. Current studies are concerned with a comparison of the clearances of ferrocyanide and inulin in several species of fish (dogfish, long and short-horn sculpin) with the purpose of simplifying and facilitating the measurement of glomerular filtration rate.

Dr. J. Wendell Burger, Trinity College. Burger, J. Wendell and Stanley E. Bradley, 1947. Some data on aortic blood pressure in the dogfish, *Squalus acanthias*. Anat. Rec. 99:114.

Circulation in the dogfish, *Squalus acanthias*. (with Stanley E. Bradley). Data in the form of blood pressures were secured for an attempt to define the general form of circulation in one species of fish, with special reference to the resistance imposed by the capillary-like sinusoids of the gills. Average ventral aortic pressures in so-called normal dogfish were 37.2 / 26.6 mm. Hg. range: 26/14 to 48/30, 44/36). Average dorsal aortic pressures were 27.9/22.0 mm. Hg. (range: 22/14 to 38/32, 42/30.) The average fall across the gills in systolic pressure was 9.3 mm. Hg., and in diastolic 4.6. Blood in the dorsal aorta is under pulsatile pressure which is substantially higher than its oncotic pressure. The branchial resistance modifies but does not markedly change the form of the arterial circulation. Venous pressure fall to zero at the heart; there seem to be no special mechanisms aiding in venous return. Arterial pressure tends to rise with increased heart rate, but a tendency to preserve a steady state over the range of normal heart rates (16-48 per minute) is also evident. Exploration with pharmacological agents to test the range of circulatory performance, and the controlling mechanisms were made. Work on vasomotor control is in progress.

James Case, Johns Hopkins University. Cultivation of tissues of the adrenal glands of the chick in preparation for a study of adrenal-pituitary function.

Dr. Samuel Corson, Howard University. Writing research manuscripts on edema.

Dr. Floyd Davidson, Baylor University. Effects of growth substances in the germination and early sporeling development of *Fucus* and *Ascophyllum*. Am. J. Botany, July 1950.

Dr. Roy P. Forster, Dartmouth College. Forster, R. P. 1949. The implication of aerobic phosphorylation in a variety of biological systems. Science (in press).

#### PROBLEMS IN PROGRESS

1. Water balance studies in marine fish. (with E. C. Matthews and Jerold Lucey.) Modern clearance techniques are used to measure renal response to increased water loads induced by removing protective slime from the body of surfaces of sculpins.

2. The application of physiological tests to the problem of glomerular degeneration with age in short-horn sculpins.

3. Is there a maximal limitation imposed upon the rate of secretory transfer in the simple undifferentiated renal tubules of the long-horn sculpin.

4. A comparative physiological approach to the specific functions of specialized regions of the vertebrate nephron.

5. Continued studies of the kinetics of renal tubular transport using the isolated tubule preparation.

Dr. Michael Ladd, New York University College of Medicine. Renal function was studied in the seal with special regard to the mechanisms of water excretion. Utilizing the wide variations in renal blood flow and filtration rate which can be obtained in this animal, (as demonstrated by earlier workers here) the relationship of the filtration rate to maximal water diuresis was studied. Preliminary results indicate that over a wide range of filtration rates, this relationship is fairly constant, confirming similar data obtained in non-aquatic mammals.

Dr. Dwight E. Minnich, University of Minnesota. The responses to light of various wave lengths by the rock barnacle, *Balanus balanoides* (L).

Active rock barnacles, *Balanus balanoides* (L). are extremely sensitive to decreases in illumination, responding by immediate retraction of the cirri and closure of the valves as noted by Cole ('32.) Increases of intensity are without effect. This response has been studied under carefully controlled conditions to 4 regions of the spectrum of equal energy content, viz. red 6500-7400A, yellow, 5600-6800A, green, 4500-5800A, and blue-violet, 3800-4850A.

By varying the intensity, thresholds for these wave lengths were determined, and the effectiveness of the wave lengths thus compared. To red the barnacles failed to respond. Yellow, green, and blue-violet all produced responses, green being about 3x as

effective as yellow which, in turn, was about 3x as effective as blue-violet. By repeated exposures, of 15", with 5" intervals between indiffuse white light of ca. 9 f.c., animals usually became at length adapted and failed to respond further. The number of trials for adaptation varied from 11 to 30 with an average of 15 to 16. A few individuals, however, failed to reach such a state, and hence could not be used. Animals were considered adapted to one wave length after 10 successive exposures with no response. A total of 15 individuals was studied, on 10 of which complete data were obtained, viz.,

1. green adaptation followed by blue-violet stimulation.
2. blue-violet adaptation followed by green stimulation.
3. yellow adaptation followed by blue-violet stimulation.
4. blue-violet adaptation followed by yellow stimulation.
5. yellow adaptation followed by green stimulation.
6. green adaptation followed by yellow stimulation.

In general, barnacles adapted to any use of the three wave lengths in question failed to respond to the other two. To this generalization, however, there were occasional notable individual exceptions, the significance of which is not yet clear.

Taken as a whole the data appear to indicate that the photoreceptors of the rock barnacle have but a single photosensitive substance with maximum absorption in the green, and that this species like those previously reported in similar experiments by this author is unable to distinguish different wave lengths of light.

Dr. Lawrence Raisz, New York University College of Medicine. *vide* Ladd.

Mrs. Barbara Rappaport, Yale University. The effects of casein hydrolysate on the growth of excised root tips.

Dr. James Peskin, University of Michigan. With Office of Naval Research support, a series of invertebrates representing several phyla were examined for the presence of photosensitive pigments. Invertebrate visual pigments are very imperfectly known.

Dr. Warner Sheldon, University of Pennsylvania School of Medicine. Sheldon, Warner F. and John J. Sayen. 1949. The heart muscle and the electrocardiogram in coronary disease. I. Survey of standards and methods of obtaining the anatomic data requisite for clinicopathologic correlations. *Am. Heart. Jour.* 38:517.

John J. Sayen and Warner F. Sheldon 1949. The heart muscle and electrocardiogram in coronary disease. II Difficulties of description and illustration of ventricular muscle lesions with a method for their graphic representation in a myocardial map. *Am. Heart Jour.* 38: (in press.)

Dr. Homer Smith, New York University College of Medicine. Work

- on: The Kidney, anatomy and function in health and disease.
- Dr. Margaret Smith, Tulane University School of Medicine. Animal tissue culture and the cultivation of virus tumor tissue.
- Dr. Philip R. White, Institute for Cancer Research. In 1947 the MDIBL inaugurated a program of training and research in the field of tissue culture, broadly interpreted as including the cultivation under aseptic conditions of tissues, organs, and embryonic stages of both animals and plants. This program is under the supervision of Dr. Philip R. White, head of the Department of General Physiology at the Institute for Cancer Research in Philadelphia. It has had special financial support from the Women's Auxiliary of that institution.
- Dr. White's personal research during the past three years was concentrated on the following projects: 1) the development of fully defined synthetic nutrients for the cultivation of animal tissues, a project which continues work carried on for several years in the laboratories in Philadelphia, 2) a study, both ecological (in the field) and physiological (in the laboratory) of a striking tumor which is epidemic in and restricted to Spruce trees on Mt. Desert Island. 3) Cultivation of intercallary meristems of *Laminaria sp.* 4) Cultivation of tissues of the sea perch *Pyura pyri formis*.

#### ASSISTANTS

- Charles Chidsey, Trinity College.
- Charles Crowder, University of Virginia School of Medicine.
- Miss Elizabeth Hoffman, Institute for Cancer Research.
- Miss Elaine Lackman, Wellesley College.
- Jerold Lucey, New York University College of Medicine.
- Raymond Rappaport (independent student), Yale University.
- William Vogel, Haverford College.