

ABSTRACTS

(Papers read before the Institute but not published in the Proceedings.)

THE ABSORPTION AND EXCRETION OF ALLANTOIN. E. Gordon Young, Helen Wentworth and W. W. Hawkins, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read December 14, 1942). Allantoin may be recovered in the urine to the extent of between 50 and 80 per cent when given orally to dogs. In man only about 30 per cent is excreted after oral administration but 100 per cent after intravenous injection. There is likewise complete recovery when injected into dogs. The blood allantoin falls to normal in about five hours after a dose of 600 mgms. (Published in full in *J. Pharm. Expt. Therap.*, 81: 1-9, 1944).

FURTHER DEVELOPMENTS IN ISO-THERMAL CALORIMETRY. J. R. Dingle and C. C. Coffin, Dept. of Chemistry, Dalhousie University, Halifax, N. S. (Read December 14, 1942.) Recent work on the benzene-naphthalene calorimeter is described. Improvements in design and operating technique have shown that quantities of heat from 80 to 300 calories may be measured with a reproducibility of about 0.1 per cent.

THE DESTRUCTION OF BACTERIA IN SOLID FOOD PRODUCTS. A. J. Wood, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read December 14, 1942.) Ethylene oxide has been found to have a high degree of toxicity for all bacteria associated with the spoilage of food products. Fish, meat and vegetables have been rendered sterile by short time treatment with a relatively low partial pressure of ethylene oxide. The efficiency of treatment is markedly enhanced by treatment of the various materials after evacuation. The process is commercially applicable from the practical and economic standpoints. (Submitted for publication to *J. Fish. Research Bd., Canada.*)

SOME CONSIDERATION OF OSMOTIC PRESSURE PHENOMENA IN THE CRUSTACEA. N. Kesava Panikkar, Dept. of Zoology, University of Travancore, India. (Read January 11, 1943.) Though the majority of marine crustaceans are similar to other marine invertebrates in being isotonic with the sea water in which they live, there are certain species which show the ability to regulate their internal osmotic pressures to values lower than that of the surrounding medium. They are (1) a few shore-living and semi-terrestrial crabs belonging to the families Grapsida and Ocypodidae and (2) prawns belonging to the sub-family Palaemoninae. A similar behaviour exists in the brine-shrimp *Artemia*. The ecological factors that seem to be operative in the development of this type of osmotic behaviour are (1) the ability to live on land and (2) to penetrate into fresh water and, in the case of *Artemia*, the ability to survive in abnormally high concentrations of salt water. In the Palaemonid prawns there seems to exist an inverse correlation between temperature and salinity as found by acclimatization experiments and this is in agreement with the observed facts of the distribution of these prawns.

ABSCISSION OF LEAVES IN FRAXINUS AMERICANA L. V. Facey, Dept. of Biology, Dalhousie University, Halifax, N. S. (Read January 11, 1943.) Leaf abscission takes place in a definite region through the base of the petiole. The cells of this region remain meristematic. Prior to leaf-fall the calcium pectate of the middle lamella of these cells changes to pectic acid. The cellulose of the secondary walls remains unchanged.

Treatment of cut branches with dilute ammonium hydroxide prevented the leaves from falling as fast as those from untreated branches.

THE NORMAL ARSENIC IN HUMAN HAIR. E. Gordon Young and F. A. H. Rice, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read January 11, 1943.) Tests have been carried out to determine the best method of treating human hair prior to an estimation of its arsenic content from a medico-legal point of view. Continuous extraction with alcohol or ether, followed by dilute hydrochloric acid and dilute sodium hydroxide, removed between 70 and 90 per cent of the arsenic present. It also extracted arsenic from guinea pig hair deposited from intravenous injection. Hair soaked in arsenous acid retained its arsenic to about the same degree so that it appears as if no clear line of demarcation between internal and external arsenic in hair exists. (Published in full in *J. Lab. Clin. Med.*, 29: 439-446, 1944.)

MAGNESIUM AMMONIUM PHOSPHATE CRYSTAL FORMATION IN CANNED LOBSTER. A. Hollett, Fish Inspection Laboratory and Atlantic Fisheries Experimental Station, Halifax, N. S. (Read February 8, 1943.) Analyses were made to determine the concentration of magnesium, ammonia nitrogen, and inorganic and organic phosphorus in fresh lobster muscle and in canned lobster. Analytical results as well as experimental canning have indicated that the amount of struvite crystals in the canned product is limited and controlled by the concentration of magnesium. For this reason the use of sea water in any step of the canning procedure is a major contributory factor in struvite crystal formation in canned lobster. (Published in full in *J. Fish. Research Bd., Canada*, 6: 183-193, 1943.)

RELATION BETWEEN FEEDING AND THE SEXUAL CYCLE IN HADDOCK. R. E. S. Homans, Atlantic Biological Station, St. Andrews, N. B. (Read February 8, 1943.) The apparent correlation between feeding and the sexual cycle in the haddock, *Melanogrammus aeglefinus* (Linn), has been investigated. The investigation shows that as haddock approach the spawning period, they practically cease to take food. This fast is rigorously adhered to throughout the spawning period. On the completion of spawning the fast is broken and the haddock feeds very voraciously for a few weeks. (Submitted for publication in full to *J. Fish. Research Bd., Can.*.)

THE STIMULATING ACTION OF COLCHICINE ON OVULATION OF THE FROG'S OVARY IN VITRO. M. K. McPhail and K. M. Wilbur, Depts. of Pharmacology and Physiology, Dalhousie University, Halifax, N. S. (Read February 8, 1943.) It has been found that the alkaloid colchicine will potentiate the action of pituitary on the isolated frog's ovary (*Rana pipiens*). If colchicine is added to one member of a pair of pituitary-treated ovaries, that ovary will start extruding eggs earlier than the non-colchicine treated control; and further, the rate of extrusion will be greater and the total number of eggs freed larger. This action of the alkaloid has been demonstrated for 0.0001, 0.0005, 0.001, 0.005, 0.01 and 0.1 per cent solutions. Colchicine alone will not stimulate egg liberation. The alkaloid papaverine inhibits pituitary-induced ovulation in the isolated ovary.

The left ovaries have been found to be larger and to extrude more eggs than the right ovaries. These results are statistically significant. (Published in full in *J. Pharm. Expt. Therap.*, 78: 304-313, 1943.)

THE TAXONOMIC SIGNIFICANCE OF TRIMETHYLAMINE OXIDE REDUCTION BY BACTERIA. Elizabeth A. Baird and A. J. Wood, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read March 8, 1943.) The reduction of trimethylamine oxide by the family Enterobacteriaceae has been studied. Some five hundred cultures representative of all species included in this family have been tested. The colon-typhoid group have been consistently strong reducers of trimethylamine oxide. The genera *Shigella* and *Erwinia* do not appear to be active in this reduction. The relationship of this reduction to that of the nitrate reduction is discussed. (Published in part in *J. Bact.* 46: 106-107, 1943, and *J. Fish. Res. Bd., Can.*, 6: 194-201, 1943.)

ALLANTOIN AND LEUCOCYTOSIS IN MAN. E. Gordon Young and W. W. Hawkins, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read March 8, 1943.) A study of the normal blood picture of nine experimental human subjects, all adult males, showed the average variation in total leucocyte count to be 55 per cent, and the average variation in percentage neutrophils to be 34. The individual's highest count generally appeared in the afternoon, and his lowest count in the morning. There was no indication that digestive processes or exercise tended to raise the white cell count.

Despite claims made by various workers that in man a leucocytosis ensues from the ingestion of allantoin, it was impossible to demonstrate any leucocytic effect resulting from the ingestion of small single doses, large single doses, or repeated doses. It was found, however, that a neutrophilic leucocytosis resulted from the intravenous administration of as small a dose as 75 mgms. Published in full in *J. Pharm. Expt. Therap.*, 81: 10-16, 1944.)

PITCH DISCRIMINATION IN MAN. C. B. Weld, Dept. of Physiology, Dalhousie University, Halifax, N. S. (Read March 8, 1943.) The ability of 119 normal individuals, mostly medical students, to distinguish between two musical notes sounded one after the other, was determined. The instrument was a Maico Audiometer to which a variable control was added allowing the pitch of one note to be altered at will and the differences read to about 1 cycle/sec.

The range of discrimination with a reference note of 982 cycle/sec. extended from 1 cycle/sec. to something greater than 50 cycle/sec. with the mode (29 subjects) at 6-7 and the mean at 10.4 c.p.s. This compares with an unselected average reported by Seashore of about 1/17 tone or 7 c.p.s. Many subjects showed a better discrimination when the pitch was altered in one direction than in the other. At this level one-half tone is 61 c.p.s.

RAPID TITRIMETRIC ESTIMATION OF SODIUM CHLORIDE IN THE PRESENCE OF PROTEIN. W. J. Dyer, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read April 5, 1943.) Sodium chloride in protein containing samples has been determined by direct titration with standard silver nitrate solution, using dichlorofluorescein as an absorption indicator. An acetate buffer of pH 4.5 is added to the sample or solution. Under the conditions used silver is not absorbed by the protein present in the titrating solution, and results are comparable to those obtained by the Valhard method. The method has been applied to salt fish, canned

fish, bacon, fish meal and various salt pickles. (Published in full in Ind. Eng. Chem., Analyt. Ed., 15: 439-440, 1943.)

THE DECOMPOSITION OF ALLANTOIN BY BACTERIA. W. W. Hawkins, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read April 5, 1943.) Certain bacteria, including some normally present in the human intestine, possess the power of destroying allantoin when it is a constituent of their culture medium. (Published in full in J. Bact., 47: 351-353, 1944.)

PHENOTHIAZINE ANAEMIA IN DOGS. H. B. Collier and G. E. Mack Jr., Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read April 5, 1943.) Phenothiazine, when used as an anthelmintic, may cause a haemolytic anaemia in humans, horses, and dogs. Three dogs were treated with the drug at a dosage level of 5 grams per Kg. over a week. The haemoglobin, erythrocyte count and cell volume dropped 30-40% in about one week; jaundice and the appearance of Heinz bodies indicated erythrocyte destruction. Reticulocytosis and a sharp rise in mean corpuscular volume were evidence of regeneration of new cells. Leucocty-tosis accompanied the anaemia. The blood levels returned to normal in about one month.

When one dog was placed on a vitamin B free diet, the anaemia and the jaundice were intensified. The haemoglobin dropped 68% and plasma bilirubin rose to 10 mg. per 100 ml. Experiments are now being carried out on the effect of supplementing the diet with the vitamin B complex. (Published in full in Can. J. Res., Sect. E., 22: 1-11, 1944.)

THE INORGANIC NUTRIENT REQUIREMENTS OF *Escherichia Coli*. E. Gordon Young and Irene Pentz, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read May 3, 1943.) The effects of numerous metallic ions has been tried alone and in combination on the growth of *Escherichia coli* on a basal medium. This medium contained glycerol, ammonium sulphate, sodium chloride, sodium and potassium phosphates. Magnesium was shown conclusively to act as a growth stimulant between concentrations of 0.0005 g and 5 g per 10 c.c. Rhubidium, zinc, silicon, aluminium, calcium, strontium, and copper were neither depressants nor stimulants. Iron and manganese gave growth curves slightly above the basal medium alone. Cobalt and nickel were depressants above 22 g and 41 g per 10 c.c. respectively. In combination, iron and magnesium allow very nearly optimum growth as compared to that of nutrient broth. (Published in full in Arch. Biochem., 5: 121-136, 1944.)

INORGANIC CONSTITUENTS OF DEVELOPING SALMON EGGS: I. SODIUM, POTASSIUM, CALCIUM AND MAGNESIUM. Douglas A. Darcy; II. CHLORIDE AND PHOSPHATE. Charlotte M. Sullivan, Dept. of Biology, Dalhousie University, Halifax, N. S. (Read May 3, 1943.)

I. In the developing egg of *Salmo salar L.* the amounts of sodium and potassium remain constant throughout, while calcium and magnesium show a decrease. The larva loses sodium and potassium at a fairly rapid rate beginning at about half way to hatching; it loses calcium and magnesium at a slow rate at least from half way to hatching and probably from fertilization. Measurements were made only up to three weeks after hatching. The embryo had absorbed most of original sodium,

one-third of the potassium and about one-seventh of the calcium and magnesium up to three weeks after hatching.

II. Total phosphorus, inorganic phosphorus, and chloride, in whole eggs and constituent parts of eggs, have been estimated throughout development. Total phosphorus is constant up to a week before hatching when it begins to disappear from the system. Total phosphorus increases in the embryo, decreases in the yolk. Inorganic phosphorus increases throughout the observed period. It is not all used by the embryo, consequently it accumulates in the yolk. Chloride is lost from the system from fertilization on. The rate of chloride loss increases shortly before hatching. The chloride content of the embryo shows no change from the value obtained in the first observation made on the embryo alone.

There is a loss of chloride and of inorganic phosphorus from the egg at fertilization.