

ABSTRACTS

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

CRITERIA FOR THE RECOGNITION OF DEVELOPMENTAL STAGES IN SALMON (*Salmo salar*). D. Pelluet, Dept. of Biology, Dalhousie University, Halifax, N. S. (Read November 15, 1943.) A series of 16 stages is established for the embryological history of the salmon, ranging from fertilization to the development of the fry. Each stage is characterized by a diagnostic feature which can be easily recognized in the living egg or embryo without the aid of sections. A comparison is made between these stages and others proposed by workers for various types of teleost fishes. The early phases of the development up to the closure of the blastophore claim the special attention of several of the workers. It has been pointed out that a similar diagnostic feature does not imply that these different forms of teleosts will show agreement in other phases of development. (Published in full in *J. Morphology*, 74: 395-407, 1944.)

PRODUCTION OF TRIMETHYLAMINE IN CHOLINE BROTH BY ENTEROBACTERIACEAE. Frances Keeping, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read November 15, 1943.) About 300 identified bacterial cultures of members of the family Enterobacteriaceae were grown in nutrient broth containing choline hydrochloride (Eastman) 0.5%. The presence of trimethylamine was determined at one, two and seven days (Wood and Baird, 1942.)

Members of the genera *Serratia*, *Salmonella*, *Eberthella*, *Klebsiella*, and *Erwinia* were unable to produce trimethylamine from choline. In the genus *Proteus*, *P. mirabilis*, *P. vulgaris*, and *P. rettgeri* produced trimethylamine from choline. Strains of *Escherichia* and *Aerobacter* differed in their ability to break down choline. In the genus *Shigella* the single species *S. alkalescens* was able to utilize choline. Since this test easily distinguishes *S. alkalescens* from other *Shigella* species, including *S. paradysenteriae* with which it is frequently confused, it should be of value in clinical laboratories.

Repeated serial transfer in choline broth and plain nutrient broth has shown that the ability or inability of a culture to produce trimethylamine from choline is a constant characteristic.

Quantitative studies with *S. alkalescens*, using a colorimetric method of trimethylamine determination (Dyer, 1943), have shown that glucose inhibits choline breakdown. Mannitol, which is also fermented by this species has no effect. This suggests that choline is used as an energy source by bacteria and that glucose is used in preference to choline and choline in preference to mannitol. (Published in part in *J. Bact.*, 47: 309-310, 1944.)

THE HAEMOLYTIC ACTION OF LYSOLECITHIN AND SAPONIN. K. M. Wilbur and H. B. Collier, Depts. of Physiology and Biochemistry, Dalhousie University, Halifax, N. S. (Read November 15, 1943.) Hemolysis was followed by measuring the opacity of cell suspensions photoelectrically. The opacity varied with changes in cell volume over a wide range of tonicity. Using hypertonic and hypotonic solutions it was found that initial cell volume affected the rate of hemolysis by saponin and by lysolecithin: increase in volume slowed the action of saponin and accelerated that of lysolecithin. Sodium citrate shrinks the cells, and brought about a corresponding change in the rate of hemolysis by the two lysins. Oxalate brought about an acceleration with saponin, but had no marked effect on lysolecithin. Glucose inhibited lysolecithin hemolysis. The general conclusion is that saponin and lysolecithin differ in their effects

upon the cell membrane. This is substantiated by results with mixtures of the lysins. (Published in full in *J. Cell. Comp. Physiol.*, 22: 233-249, 1944.)

ON THE DETERMINATION OF MINOR DEGREES OF COLOR BLINDNESS: THE USE OF THE EASTMAN "COLOR TEMPERATURE METER" AS AN ANOMALOSCOPE. C. B. Weld, Dept. of Physiology, Dalhousie University, Halifax, N. S. (Read December 13, 1943.) The Eastman Color Temperature Meter allows one to vary the proportions of a red-green mixture so as to match a standard yellow. If one uses a standard light source, the instrument thus becomes an anomaloscope, useful in the study of individuals deficient in their sense of red or green and differing from normal people in their judgment of yellow (anomalous trichromat).

Using the instrument in this way the red-green-yellow color sense of 100 individuals was determined; they were also checked by Ishihara charts for red-green color blindness. Two-thirds of the normal subjects gave readings of the standard light source (3300° K) within the range 3100-3500° K, and four-fifths between 3100 and 3700° K, while the remainder of the Ishihara normal gave readings between 2800 and 4400° K. All those abnormal by the Ishihara charts gave readings even further removed from the true color temperature reading and most of them indeed could not properly match the colors at all, giving very erratic readings, often off the scale altogether. Minor degrees of color blindness are well shown by the instrument.

ON THE OPTICAL ACTIVITY OF ALLANTOIN. E. Gordon Young and W. W. Hawkins, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read December 13, 1943.) The procedure of Fosse, Thomas, and deGraeve (*Compt. rend.* 198: 689, 1934) for the preparation of *l*-allantoin by the action of allantoinase from *Soja hispida* has been repeated twice on commercial allantoin. No optical activity could be detected on the initial crude product or the purified substance employing a saturated solution in a 4 dm. tube in a Hilger polarimeter. It is noteworthy that neither the lactam nor lactim formula can be constructed with Hirschfelder atomic scale models, without great strain in the closure of the ring. The symmetrical formula of allantoin can be readily constructed.

THE ESTIMATION OF VOLATILE PHENOLS IN SMOKED FISH. H. V. French and E. P. Linton, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read February 14, 1944.) The volatile phenolic substances in smoked fish were estimated with Folin's colorimetric reagent. The phenol content is directly proportional to the time of smoking and remains constant irrespective of the time of storage or the state of decomposition of the smoked fish. The phenols are found mainly in the surface layers of the smoked fish even after prolonged storage. The method provides a satisfactory means for measuring the smoke content of the fish. (Published in full in *J. Fish. Research Bd., Can. Vi*: (4): 338-48, 1945.)

THE COLORIMETRIC DETERMINATION OF TRIMETHYLAMINE. W. J. Dyer, Atlantic Fisheries Experimental Station, Halifax, N. S. (Read February 14, 1944.) A discussion of titration and colorimetric methods, with the development of a new colorimetric method depending on the formation of a yellow trimethylamine picrate.

LEUCOCYTOSIS AS AN INDEX OF PYROGENICITY IN FLUIDS FOR INTRAVENOUS USE. E. G. Young and F. A. H. Rice, Dept. of Biochemistry, Dalhousie University, Halifax, N. S. (Read March 13, 1944.) A study

has been made on the dog of criteria indicating the presence of pyrogenic substances in distilled water. Leucocytosis was the most sensitive, being measurable in three to six hours after intravenous administration and lasting for many hours. Progressively less sensitive were neutrophilia, leucopenia, and hyperpyrexia. (Published in full in *J. Lab. Clin. Med.*, 29: 735-741, 1944.)

A SCHEME FOR REPRESENTING INTER-RELATIONSHIPS AMONG THE THERMODYNAMIC FUNCTIONS. C. C. Coffin, Dept. of Chemistry, Dalhousie University, Halifax, N. S. (Read March 13, 1944.) It is shown that most of the important thermodynamic equations can be obtained at once from a simple energy diagram in which intensity factors are plotted against capacity factors. It is presented mainly as a scheme for introducing to students the more abstruse concepts of the subject.

HEPARIN AND BLOOD FAT. C. B. Weld, Dept. of Physiology, Dalhousie University, Halifax, N. S. (Read April 17, 1944.) The observation of Hahn that alimentary lipemia in dogs is cleared within a minute or so by heparin has been confirmed and extended. The visual opacity of the lipemic plasma is promptly removed by intravenous heparin in dogs, cats, rabbits, and humans. Heparin has no such effect *in vitro*. While some degree of parallel relationship between the total plasma lipid and the opacity of the plasma is common, the opacity of the plasma in lipemia may clear with no change or even with an increase in plasma lipid.

In attempting to determine the site of action of the heparin, lipemic heparinized blood has been perfused through the leg and through the liver. Heparin has also been injected into an animal (cat) whose hepatic artery, portal vein, and mesenteric arteries had been occluded. The liver is implicated but is probably not solely responsible for the clearing of the lipemic blood.

ESTIMATION OF THE ANTIHEMOLYTIC VALUE OF THE BLOOD. H. B. Collier and K. M. Wilbur, Depts. of Biochemistry and Physiology, Dalhousie University, Halifax, N. S. (Read April 17, 1944.) Previous workers have found that on incubation of blood serum the lysolecithin content increases. This is believed to be related to hemolysis *in vivo*. We have found that the extraction method for lysolecithin determination gives very low results. No specific method for lysolecithin has been developed to date. The method adopted was a direct titration, with pure lysolecithin, taking 50% hemolysis as the end-point. In this way the antiheolytic value of the blood can be expressed in terms of lysolecithin. The effect of various factors such as time, temperature, enzyme inhibitors, oxygen tension, has been determined. (In press, in *J. Lab. Clin. Med.*, 1944.)

LACTIC ACID: A CORROSIVE POISON. E. G. Young and R. P. Smith, Depts. of Biochemistry and Pathology, Dalhousie University, Halifax, N. S. (Read April 17, 1944.) The deaths of three premature infants have been investigated both pathologically and chemically and have been found due to acute gastritis following the administration of an acid milk mixture containing an excess of lactic acid. After administering *per os* a lactic acid milk mixture, containing 10.1 grams in 30 c.c. to rabbits, death followed in 10 minutes, 2, 6, and 40 hours in four animals. The symptoms and findings were identical with those of the infants, and death was attributed to acute hemorrhagic gastritis. There was a moderate degree of acidosis. Lactic acid must therefore be regarded as a corrosive poison and due care must be exercised in its use as an infant food. (Published in full in *J. Am. Med. Assoc.*, 125: 1179-81, 1944.)