

PROCEEDINGS OF MEETINGS.

SESSION OF 1939-1940.

(All Meetings held in the Medical Science Building, Halifax.)

78th Annual Business Meeting, October 11th, 1939.

The President, Dr. H. S. King, read the annual address.

The Treasurer's report shows the receipts for the year to be \$2,394.85; expenditures \$1,196.28; reserve for publications in press \$400.00; leaving a balance of \$798.57. The Reserve Fund consists of Dominion Savings (Post Office) \$258.64, and a Dominion of Canada 4% Bond \$500.00, totaling \$758.64. The Permanent Fund consists of:

- (a) Telephone Bonds, 6% to 1941, then 4½% to 1966, \$1,000.00.
- (b) Dominion of Canada 4½%, \$1,000.00.
- (c) Dominion of Canada 4%, \$500.00. A motion of Dr. Johnstone was passed authorizing a transfer of approximately \$500.00 to the Permanent Fund when a suitable investment is found.

The Librarian's report records that there are 103,861 books and pamphlets in the library, that 1,994 books and pamphlets were received during the year and that 2,016 items were borrowed.

A new Constitution was unanimously adopted.

Officers elected for 1939-40 were as follows:

President.....	Dr. H. S. King.
1st Vice-President.....	Prof. R. J. Bean.
2nd Vice-President.....	Dr. Ernest Hess.
Corresponding Secretary.....	Dr. D. LeB. Cooper.
Recording Secretary.....	Dr. C. B. Weld.
Treasurer.....	D. J. Matheson, Esq.
Editor.....	Dr. H. S. King.
Librarian.....	Harry Piers, Esq.

Other Members of Council Dr. R. D. H. Heard,
 Dr. F. R. Hayes, George Barrett, Esq., Dr. A. E.
 Cameron, E. W. Todd, Esq.

Auditors Prof. W. P. Copp,
 P. R. Colpitt, Esq.

Nominees to the Government as members of the Provincial
 Science Library Commission . . Dr. G. H. Henderson,
 Dr. Ernest Hess.

1st Ordinary Meeting, Nov. 13, 1939. New ordinary mem-
 bers announced (elected by Council, Oct. 30th), H. R. Wyman,
 Esq., M.Sc., Hugh Davson, Esq., M.Sc., D. S. Ross, Esq.,
 M.Sc.

Papers: The Carbohydrate Metabolism of Developing
 Salmon Eggs, by Andrew Hollett. Steroids I. The Isolation
 of a new Androstanol-3 β -one and of Allopregnanol-3 β -one-20
 from the Urine of Pregnant Mares, by R. D. H. Heard and
 A. F. McKay. A Preliminary List of the Fishes of Malpeque
 Bay, by A. W. H. Needler.

2nd Ordinary Meeting, Dec. 11th, 1939. New student
 members announced (elected by Council, Nov. 27th). Mark
 Frank, Esq., B.Sc., and V. K. Collins, Esq., B.Sc.

The following resolution was passed, "In view of the un-
 bearably overcrowded condition of the Provincial Museum,
 and in view of the great importance of the museum to the
 educational and scientific life of the Province and as a tourist
 attraction, the Nova Scotian Institute of Science respectfully
 requests that as soon as possible adequate provision be made
 for the museum and for curators, and that in order to carry
 out these objects the Government pass a Museum Act pro-
 viding for the establishment of a commission to administer
 the museum, subject to the authority of the Minister of Mines."

Papers: Calyx End Structure of the Gravenstein Apple,
 by Hugh P. Bell. Permeability of the Eye Membrane, by
 Hugh Davson. Fish Enzymes as Leather Bates, by W. W.
 Johnston.

3rd Ordinary Meeting, Jan. 15, 1940. New members, Miss Helen Wentworth, B.Sc., student and A. St. C. Grant, Esq., M.Sc., ordinary.

Papers: The Oestrus-Inducing Gonadotrophic Substance II. A Comparison of the Infantile and Adult Rat Assays, by R. D. H. Heard. The Production of Dimethylamine in Cod Muscle Press Juice during Spoilage, by V. K. Collins. Eastern Canadian Flat Fishes, by R. A. McKenzie.

4th Ordinary Meeting, Feb. 12th, 1940. Tribute was paid to the late Harry Piers by the following resolution incorporated in the minutes, "This society desires to place on record its deep sense of loss in the death of Harry Piers who for more than 50 years has been a very faithful and active member. For 48 years as member of council and for 40 years as secretary he gave generously of his time and energy, not only to this society but to the advancement of natural science in this province. During these years there were times when he and the late Dr. A. H. MacKay were largely responsible not only for the scientific activity of the Institute but even for its continued existence. For his long service as secretary, for his faithful attendance at its meetings, and for his genuine and unselfish interest in natural science and in research, this Institute is deeply indebted."

Paper: Photo-Dynamic Haemolysis, by Hugh Davson and Eric Ponder. Demonstration: Portable Radium Detector, by G. A. MacDonald.

5th Ordinary Meeting, March 11, 1940. New student members announced (elected by Council, Feb. 26th), L. G. Elliot, Esq., B.Sc., E. A. Lewis, Esq., B.Sc., Father G. A. MacDonald, B.A., H. R. Coish, Esq., B.Sc., J. R. F. Warr, Esq., B.Sc.

Papers: Steroids III. Observations on the Constitution of a New Keto-Lactone from the Urine of Pregnant Mares, by R. D. H. Heard and M. M. Hoffman. An Adiabatic Calorimeter for Determining the Heat Capacities of Metals from 100°C to 200°C, by L. G. Elliott. Demonstration: Hirschfelder's Scalar Atomic Models, by R. D. H. Heard.

6th Ordinary Meeting, April 8, 1940.

Papers: Further Studies on the Decomposition of Ethylidene Diacetate Homologues, by J. C. Arnell and C. C. Coffin. The Capillary Resistance Test, by C. B. Weld. Demonstration: Practical Uses in the Laboratory for Bromide Paper, by R. J. Bean.

Following the scientific meeting, refreshments were served and there was further informal discussion.

C. B. WELD,

Recording Secretary.

ABSTRACTS.

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

THE CARBOHYDRATE METABOLISM OF DEVELOPING SALMON EGGS. Andrew Hollett, Fisheries Experimental Station (Atlantic), Halifax, N. S. (Read Nov. 13, 1939). Periodic estimations of the glucose and glycogen content of developing eggs and of egg fractions were made. It was found that all the carbohydrate in unfertilized and recently fertilized eggs was in the form of free sugar, and constituted less than 0.1 mg. per egg. Glycogen was first detected in the egg three weeks after fertilization. Except at hatching, there is an increase in glucose and glycogen with development, reaching a maximum in the larva about 65 days after hatching. The highest concentration of glucose was 0.33, and of glycogen was 0.53 mg. per egg. No glycogen was present in the yolk at any time during development. The liver begins to function as a storage place for glycogen about 40 days after hatching. From 60 to 70 days after fertilization, when the yolk is almost completely absorbed, the glucose and glycogen begin to decrease.

THE ISOLATION OF A NEW ANDROSTANOL-3(β)-ONE AND OF ALLO-PREGNANOL-3(β)-ONE-20 FROM THE URINE OF PREGNANT MARES. By R. D. H. Heard and A. F. McKay, Dept. of Biochemistry, Dalhousie Univ., Halifax, N. S. (Read Nov. 13, 1939). From the neutral fraction of equine pregnancy urine there has been isolated a new saturated hydroxy ketone, $C_{27}H_{46}O_2$, m.p. 187-187.5°, $[\alpha]_D^{24}$ -160°, which is precipitated by digitonin and which forms an oxime, m.p. 194-195°, and a benzoate, m.p. 206-208°. Oxidation with chromic anhydride in the cold yields a diketone, m.p. 157-158°, not identical with androstanedione-3, 17. The parent hydrocarbon was obtained by Clemmensen reduction of the dike-

tone and identified as androstane. The compound is therefore an androstanol-3(β)-one. Evidence is adduced that the carbonyl group is most probably located at C₆, C₇, or C₁₂. The occurrence of allopregnanol-3(β)-one-20, previously reported by Marker, has been confirmed.

CALYX AND STRUCTURE OF THE GRAVENSTEIN APPLE. Hugh P. Bell, Dept. of Biology, Dalhousie Univ., Halifax, N. S. (Read Dec. 11, 1939). The development and structure of the calyx end of the Gravenstein is compared with that of a number of other varieties. This comparison indicates:—(1) that the calyx end of the Gravenstein exhibits an unusual degree of variation in its mode of development; (2) that at maturity it is usually composed of a tissue which is exceptionally fissured and porous; (3) that most of these fissures and pores are radial slits; and (4) that, as these openings are so unusually large and numerous in the Gravenstein, its calyx end must be structurally weaker than the corresponding structure in the other varieties. It is suggested that the prevalence of open core in the Gravenstein is due to this structural weakness of the calyx end.

PERMEABILITY OF THE EYE MEMBRANE. Hugh Davson and J. P. Quilliam, Dept. of Physiology, Dalhousie Univ., Halifax, N. S. (Read Dec. 11, 1939). The permeability of the membranes of the eye has been studied using an isolated head preparation. It is shown that the diffusion of potassium is apparently independent of secretory activity. The results are discussed in relation to the nature of the aqueous humour.

FISH ENZYMES AS LEATHER BATES. W. W. Johnston, Fisheries Experimental Station (Atlantic), Halifax, N. S. (Read Dec. 11, 1939). Factors governing the activity of fish enzymes are to be discussed. A comparison made between the enzymes of the pyloric caeca and fish intestine and those of hog pancreas showed that the former were just as satisfactory as the latter for use as leather bates.

THE OESTRUS-INDUCING GONADOTROPIC SUBSTANCE II. A COMPARISON OF THE INFANTILE AND ADULT RAT ASSAYS. R. D. H. Heard, Dept. of Biochemistry, Dalhousie Univ., Halifax, N. S. (Read Jan. 15, 1940). Standardization curves pertaining to the 21 day old rat have been constructed for comparison with those pertaining to the adult animal of the same strain. The parameters with their standard errors of the transformed dosage-response curves are: $m \pm s_m = 0.966 \pm 0.016$ and $b \pm s_b = 5.45 \pm 0.68$, for the infantile rat by the three injection technique of administration (262 animals), $m \pm s_m = 1.364 \pm 0.042$ and $b \pm s_b = 3.14 \pm 0.92$, for the infantile rat by the single injection technique of administration (210 animals), and $m \pm s_m = 0.525 \pm 0.009$ and $b \pm s_b = 8.72 \pm 1.03$ for the adult rat (561 animals—single injection), where m is the logarithm of the dose in micrograms required to elicit 50% of responses, and b is the slope of the regression curve. Hence, when 20 animals receive the standard preparation, and 20 of preparation being tested, and the response in both cases is 50%, the limits of error at $P=0.99$ are respectively for the three test objects, 65 and 154%, 47 and 212%, and 76 and 131%.

EASTERN CANADIAN FLAT-FISHES. R. A. McKenzie, Fisheries Experimental Station (Atlantic), Halifax, N. S. (Read Jan. 15, 1940). This group of fishes yields a yearly catch of about seven million pounds

with a value of three hundred and fifty thousand dollars. The halibut is responsible for about half the catch, two-thirds of this coming from offshore banks. The other half is made up of the landings of six different species with the larger proportion again coming from the offshore banks. This offshore catch consists of only four species in the main. There is much confusion in the many names applied to the various Flat-fishes and even the Fisheries Statistics of Canada lists only the halibut specifically and groups all the others under two indefinite headings, namely, Flounders, Brill and Plaice, and Soles. A recent survey has shown just what species are landed in the various districts from the different fishing grounds. Halibut (*Hippoglossus hippoglossus*) and Canadian Plaice (*Hippoglossoides platessoides*) may be caught both in and off shore all around the Canadian Atlantic coast. The Yellow Tail (*Limanda ferruginea*) and Witch (*Gluctocephalus cynoglossus*) are taken mainly on the Nova Scotian offshore banks. The Winter Flounder (*Pseudopleuronectes americanus*) is found everywhere in the Maritime waters, but is captured nowadays chiefly along shore, while the Smooth Flounder (*Liopsetta putnami*) landings are made mostly in the Gulf of St. Lawrence, with a few in the Bay of Fundy and none off outer Nova Scotia. The Greenland Halibut (*Reinhardtius hippoglossoides*) is a rare visitor from the north while the Summer Flounder (*Paralichthys dentatus*) is a very rare visitor from the south. The Brill (*Lophopsetta maculata*) is also southern in origin but it is found, though not abundantly, in a number of suitable areas in these waters. By rearranging the present Canadian Flat-fish Statistics in the knowledge of what species are landed in the various districts, it is found that in order of commercial importance, they rank as follows,—Halibut, Canadian Plaice, Yellow Tail, Witch, Winter Flounder, Smooth Flounder—the last two being of very little importance at present. Specimens of seven of the nine species of Flat-fishes are on display.

THE PRODUCTION OF DIMETHYLAMINE IN COD MUSCLE PRESS JUICE DURING SPOILAGE. V. K. Collins, Fisheries Experimental Station (Atlantic), Halifax, N. S. (Read Jan. 15, 1940). Dimethylamine is produced in spoiling cod muscle press juice before the appearance of trimethylamine, but in much smaller amounts than the latter.

PHOTO-DYNAMIC HAEMOLYSIS. Hugh Davson and Eric Ponder, Dept. of Physiology, Dalhousie Univ., Halifax, N. S. (Read Feb. 12, 1940). Certain dye-stuffs are absorbed on to the surface of the erythrocyte and act as photo-sensitisers in a chemical reaction leading to the breakdown of the membrane. A special feature of this form of lysis has been investigated, and a theory has been put forward to account for it.

STEROIDS III. OBSERVATIONS ON THE CONSTITUTION OF A NEW KETO-LACTONE FROM THE URINE OF PREGNANT MARES. R. D. H. Heard and M. M. Hoffman, Dept. of Biochemistry, Dalhousie Univ., Halifax, N. S. (Read March 11, 1940). The hitherto undescribed compound was isolated by way of the semicarbazone, $C_{20}H_{29}O_2N_2$, m.p. 210° . Hydrolysis of the semicarbazone yielded the free keto-lactone, $C_{19}H_{25}O_4$, (α_D) $+70^\circ$, m.p. 252° . Opening of the lactone ring was effected with dilute alkali to the corresponding hydroxy-keto-monocarboxylic acid, $C_{19}H_{25}O_4 \cdot \frac{1}{2}H_2O$, (α_D) $+95^\circ$, m.p. 220° , which gave a semicarbazone, $C_{20}H_{29}O_4 \cdot N_2 \cdot \frac{1}{2}H_2O$, m.p. $270-272^\circ$, and a methyl ester $C_{20}H_{31}O_4$, m.p.

163-164°. Ring closure to the original lactone proceeded smoothly on distillation or treatment with mineral acid. Structure is discussed in the light of the above findings and the properties of degradation products.

AN ADIABATIC CALORIMETER FOR DETERMINING HEAT CAPACITIES OF METALS FROM 100° C TO 200° C. L. G. Elliott, Dept. of Physics, Dalhousie Univ., Halifax, N. S. (Read March 11, 1940). The specimen is heated electrically in an adiabatic all-copper jacket. The jacket is double walled, the outer wall of the jacket being automatically maintained 2° C below that of the inner wall. With this arrangement the heat losses from the inner wall are the same at all temperatures, so that the temperature difference between the specimen and the inside surface of the jacket is easily kept less than .002° C at temperatures as high as 200° C. The difficulties of insulation at these temperatures have been overcome by using glass insulated wire for the heating coils on the jacket and substances such as mica and asbestos for all other insulation. Results obtained with this apparatus are in complete agreement with values previously determined in the range 50° to 100° C.

FURTHER STUDIES ON THE DECOMPOSITION OF ETHYLIDENE DIACETATE HOMOLOGUES. J. C. Arnell and C. C. Coffin, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read April 8, 1940). Previously reported studies on the effect of molecular structure on the velocity of monomolecular reactions have been extended. These studies are described and the results discussed in the light of modern theory.

THE CAPILLARY RESISTANCE TEST. C. B. Weld, Dept. of Physiology, Dalhousie Univ., Halifax, N. S. (Read April 8, 1940). Pressure (Gothlin) and Suction (Dalldorf) methods are described in detail and typical results given in relation to purpura and scurvy. Different authors have frequently failed to agree in the interpretation of results and some reasons for discordant results are discussed. Vitamin D and activity of the sympathetic nervous system have previously been reported as affecting capillary fragility. Local changes in the degree of dilatation of skin capillaries are here shown to affect the test, and the extreme variation in the capillary resistance in different—even contiguous—regions of skin is stressed.