

PRESIDENTIAL ADDRESS

HARRY PIERS.

(Read Oct. 14, 1936).

In opening another session of the Institute, I desire again to express deep appreciation of the greatly prized honour you have done me by twice electing me to the highest position in a society which has been very close to my heart ever since I was a lad forty-eight years ago. During all that period I have never missed a meeting except through illness or some such unavoidable cause.

As it has become customary for a president to fill the chair not more than two years, the present address is in the nature of a valedictory. I wish to thank the officers and other members for their hearty support, to wish my more worthy successor the best of luck and to bespeak for him such favours as I have enjoyed.

Deceased Members.

During the year we have lost one of our oldest life-members, Professor H. W. Smith, B.Sc., late of the Agricultural College, Truro, N. S., whose death occurred at Truemansburg, N. Y., last July. He was educated at Cornell University, came to the Normal School, Truro, about 1884, and later was on the staff of the Agricultural College. He joined this Institute as an associate-member on 6 Jan., 1890, and in 1900 became a life-member. He contributed three papers on fertilizers and crops to our meetings, one of which was published in the Transactions (see vol. 8, p. 122, 1891, and vol. 10, p. ix, 1901). It was probably with regard to his work connected with the foundation and growth of the Agricultural College that he mostly deserves recognition.

Progress of the Institute during the Past Session of 1935-6.

The past session was a successful and productive one. The annual business meeting was held on 9 Oct., 1935, and the full number of seven ordinary meetings from 4 Nov.,

1935, to 4 May, 1936. These meetings were well attended for a provincial technical society, the average attendance being 21. The attendance of ladies has increased. A noticeable feature was the unusually full attendance at the council meetings. This indicates a lively interest, often at the sacrifice of convenience, which is gratifying.

At the seven ordinary meetings there were presented 20 papers by 24 authors, 5 of them being by joint authors. This is an average of about 3 papers at each meeting.

These papers may be grouped numerically under the following general subdivisions of natural science. All such subdivisions are noted in order that attention may thereby be drawn to the few branches which were not covered by some phase of research work: mathematics, 0; astronomy, 0; physics, 4; chemistry, 1; bio-chemistry, 1; geology, 0; palaeontology, 0; ethnology, 0; botany, 3; pathology, 2; embryology, 1; bryozoa, 1; fishes, 2 (zoology, total 6); chemical technology, 5.

These twenty papers gave evidence of painstaking research in the true scientific spirit, and will prove useful in advancing bit by bit our knowledge of these subjects.

From the standpoint of one interested generally in the fauna and flora of this region, subjects which some think should largely occupy the attention of a local society, important papers were: (a) Dr. V. D. Vladykov and R. A. McKenzie's excellent annotated list of the Marine Fishes of Nova Scotia, with keys for identification, notes on abundance, and illustrations of the various forms, which supersedes the marine section of J. M. Jones' List of 1879; and (b) Miss Margaret S. Brown's annotated list of the Mosses and Liverworts (Hepaticae) of Nova Scotia, in which are listed about 492 forms, including many which are new to this region. This greatly extends the somewhat meagre list compiled in 1876 by Dr. Lindsay from the collections of himself, Dr. A. H. MacKay, Dr. G. Lawson, and Dr. J. Somers. Dr. MacKay collected many forms after that period, but apparently did not publish the result.

The large number of useful papers on problems associated with the preservation of fish products is an evidence of the continued activity of the learned staff of the Fisheries Experimental Station at Halifax.

Not having yet seen the printed part of the Proceedings for the past session, I am unable to state how many of the before-mentioned papers are being published in full, and how many only presented in abstract, their publication taking place elsewhere.

Suggestions for Future Revisional Work in the Natural History Field.

With respect to the present need of thoroughly revised or new working-lists of our fauna and flora, it may be noted that in botany we still greatly require a revised list of our Nova Scotian plants, most of us having yet to refer to Dr. Lindsay's once-excellent list of sixty years ago, now out of print, and out of date as to the number of forms and the nomenclature.

At least we need a thorough revision of such perplexing local groups as our numerous *Solidagoes* (Golden-rods) and *Asters*, and possibly the *Violets*, groups which have been simplified by the work of recent systematists, but which are still extremely puzzling to a beginner when he has not at hand a modern local list which would minimize his labour. Local monographs on these groups, showing what forms we have, their abundance, and habitats, would be distinctly helpful to the many who take a general interest in our flora, as well as to specialists who are investigating the range of such plants. The northern location of Nova Scotia makes it important in regard to range and distribution, as it is a region where many southern forms pass out and boreal ones begin to be met with.

Very welcome monographic work may also be done on our Grasses and Sedges, as well as the Ferns, *Lycopodinæ*, Lichens and Algæ (exclusive of the *Diatomaceæ*, which MacKay has listed).

In zoology, many of the major groups, outside of our marine fishes, need revision in the light of recent additions as well as progress in nomenclature. This is a department to which the writer has long hoped to have time to make a contribution, by the compilation of many years' observations and records. The demands of routine work still, however, press heavily, and much that he would like to accomplish has regretfully to be deferred.

Most of the Invertebrata, with the exception of some popular groups, have hardly been touched, except as mentioned in Dr. Whitran's general list of the Marine Invertebrates of Canada. Here is a field for some one who will do the necessary collecting, and record the forms which occur here. The Invertebrates which have already received some attention are: the Fresh-water Sponges (by MacKay), Echinodermata (by Ganong), Mollusca (by Willis, Ganong and Campbell (?)), and some of the Insecta, such as the Orthoptera (by Piers), Neuroptera (?) (by Walker), Coleoptera (by Bethune (?) or Jones), Lepidoptera (by Jones, Silver, Russell, Perrin and others), and part of the Hymenoptera (Ants) (by Prest). From this we see how much is yet to be done in listing many of our lower forms of life, such as the Protozoa, Radiata, most of the Coelenterata, Articulata, Arachnida, Myriapoda, and many of the Insecta.

The 75th Anniversary of the Organization of the Institute.

As stated in my last presidential address, the present session is the seventy-fifth of this society, which is one of the most venerable of its kind in the Dominion.

The organization meeting took place on 31st December, 1862, and the first ordinary meeting on 19th January. The Institute was the successor of the N. S. Literary and Scientific Society of about 1859 to about 1862, of the very short-lived Halifax Literary and Scientific Association of about 1839-40, as well as of the still older Halifax Mechanics' Institute of 1831.

The three Canadian scientific societies which are older than our Institute are: (1) the Natural History Society of

Montreal, organized as long ago as 1827; (2) the (Royal) Canadian Institute, Toronto, 1849; and (3) the Hamilton Association for the Advancement of Science, 1857. Our neighbour, the Natural History Society of New Brunswick, Saint John, was also organized in 1862 and met till 1874, then became dormant, but was re-organized in 1880.

Of the original members of our Institute, several of whom I knew, not one is now living. The last survivor, that talented and lovable gentleman and great sportsman, Major-General Campbell Hardy, R.A., passed away at Dover, England, in 1919, whereby the last link which bound us with our inception was snapped. Those who succeeded the organizers have now mostly also departed, leaving us to carry on the torch and to see that what they accomplished by their freely-given work is not suffered to pass ungratefully into oblivion.

The Fiftieth Anniversary of the society (1862-1912) was marked by a commemorative meeting held on 20th January, 1913, at which the then recording-secretary presented a paper, prepared at the society's request, entitled "A Brief Historical Account of the Nova Scotian Institute of Science, and the events leading up to its establishment; with Biographical Sketches of its Deceased Presidents and other Prominent Members". This will be found in the Proceedings of the Institute, vol. 13, pt. 3, pp. lii-cxii.

It is for the society to now decide in just what form, if any, it would like to commemorate the passing of this further mile-stone in its career. I feel that you will agree that some really worth-while and appropriate recognition of the occasion should be made.

PROCEEDINGS OF MEETINGS

SESSION OF 1936-37.

(All ordinary meetings were held in the Medical Science Building, Halifax)

75th Annual Business Meeting, Oct. 14th, 1936. The annual address of the President was read by Harry Piers, Esq.

The Treasurer's Report showed that the receipts for the year amounted to \$2,553.08; expenditures \$1,857.59; leaving a bank balance of \$683.82 plus cash on hand \$11.67. The reserve fund consists of \$72.18 in Dominion Savings, and \$500.00 in Dominion of Canada 4% bonds. The Permanent Endowment consists of (a) Telephone Bonds, 6% to 1941, then 4% to 1966, \$1,000.00, (b) Two Dominion of Canada Bonds 4½%, \$1,000.00, (c) Dominion of Canada, 4%, \$500.00.

The financial year was exceptionally demanding owing to (a) The Publication of a Catalogue of Scientific Periodicals, and clerical work incidental to this. Aided by a grant of \$300 from the National Research Council and by the sale of the book the Institute has now recovered most of its outlay and further sales will soon show a profit; (b) The filling of gaps in the periodical files in the Library, for which purpose a net sum of \$106.93 has been withdrawn from the Reserve Fund to be restored over a period of two years; (c) The publication of an exceptionally large and well illustrated number of the "Proceedings".

The Corresponding Secretary reported that during the past year 384 back copies of the "Proceedings" have been sent out. The "Catalogue of Scientific Periodicals of the Maritime Provinces", a cloth-bound volume of 82 pages has been printed and 80 copies sold.

The Librarian's Report showed that during the year 2,542 books and pamphlets have been received, bringing the total to 79,127. In addition to these there are in the Provincial Science Library (with which that of the Institute is incorporated) 20,269 books and pamphlets, and in the Hugh Fletcher Memorial Library (also incorporated) 425 books.

The Government grant of \$500.00 has been continued and has been used for the purchase of books and for binding. During the year 842 books were borrowed, besides those consulted in the Library.

The Editor reported that the current number of the "Proceedings" was about to go to the printer.

New associate member announced (elected by Council Sept. 28); Dr. R. H. M'Gonigle.

Officers elected for 1936-37. *President*, G. H. Henderson, Ph.D.; *vice-presidents*, H. S. King, Ph.D.; R. J. Bean, M.S.; *treasurer*, D. J. Matheson, B.Sc.; *corresponding secretary*, Ernest Hess, Ph.D.; *recording secretary*, F. Ronald Hayes, Ph.D.; *librarian*, Harry Piers, Esq.; *members of the Council*, Donald Mainland, D.Sc.; C. C. Coffin, Ph.D.; Margaret R. Butler, Ph.D.; D. LeB. Cooper, Ph.D.; E. W. Todd, B.Sc.; Dixie Pelluet, Ph.D.; Harry Piers, Esq.; *auditors*, W. P. Copp, M.E.I.C.; S. G. Ritchie, D.M.D.; *nominees to the Government as members of the Provincial Science Library Commission*, G. H. Henderson, Ph.D.; Ernest Hess, Ph.D.

1st Ordinary Meeting, Nov. 9th, 1936. New members announced (elected by Council Oct. 26): ordinary member, Dr. C. B. Weld; associate member, Dr. A. C. Fales.

Papers: 1—A Survey of Lake Jesse, Nova Scotia, by M. W. Smith. 2—The Halo Complex of April 5th, 1936 at Church Point, N. S., by W. Haché. 3—Can Fresh Haddock Fillets Be Differentiated from Cod by the Precipitation Test? by G. A. McCurdy and V. D. Vladykov. 4—A Shell Disease in Lobster (*Homarus americanus*) Caused by Chitinivorous Bacteria, by Ernest Hess.

2nd Ordinary Meeting, Jan. 18th, 1937. New ordinary member announced (elected by Council Nov. 30); Dr. G. A. McCurdy.

Obituary:—The Institute learns with the deepest regret of the recent death in London, England, of its distinguished past-president, David F. Fraser-Harris, M.D., D.Sc. (Lond.), F.R.S.S.E. & C. He joined the Institute on 22nd Feb., 1912, ably filled the office of president from Oct. 1915 to Oct. 1918,

and since his return to England has been a valued corresponding member. The Institute desires to tender to his widow and son its sympathy in their sad bereavement.

Obituary:—The Institute learns with deep regret of the death of Joseph Perrin of McNab's Island, Halifax, who, although not a member of the society, had contributed to its printed transactions two authoritative papers on the Lepidoptera of this region. The sympathy of the society is tendered to the members of his family.

Papers: 1—Electrolytes in Molluscan Blood and Muscle, by F. R. Hayes and D. Pelluet. 2—The Protective Layers of the Apple and their Development, by H. P. Bell. 3—Platinized Glass as a Laboratory Substitute for Massive Platinum, by C. C. Coffin.

75th Anniversary Meeting, School for the Blind, Halifax, N. S., Feb. 15th, 1937.

A public meeting was opened at 8.30 p.m. with an introductory address by the President. The estimated attendance was 250. The address of the evening was given by Major-General A. G. L. McNaughton, President National Research Council of Canada, who spoke on "The Organization of Research in Canada". After the meeting the President of the Institute entertained the members and their wives at a reception in his home, to meet General McNaughton informally.

3rd Ordinary Meeting, March 15th, 1937. New members announced (elected by Council Feb. 1): ordinary members, F. C. Collier, Esq.; Prof. B. A. Fletcher; student members, A. C. Topp, R. L. Cunningham, F. B. Maddock, J. L. M. Thurlow, W. F. Monovan.

Papers: 1—Ekman's Theory Applied to Water Replacements on the Scotian Shelf, by H. B. Hachey. 2—Seasonal Variations in *Chondrus crispus*, by Margaret R. Butler. 3—The Halo Method of Age Determination of Minerals, by W. J. Noble.

4th Ordinary Meeting, April 12th, 1937. New members announced (elected by Council April 5): ordinary member,

Miss Evelyn M. Campbell; associate member, Mr. Norman E. Brown.

Papers: 1—Rare and Interesting Fishes and Salps in the Bay of Fundy and off Nova Scotia, by R. A. McKenzie and R. E. S. Homans. 2—The Deposition of the Halifax Series, by G. V. Douglas, R. L. Milner and J. MacLean. 3—On the Purine Metabolism of the Dalmatian Coach Hound, by E. G. Young, W. A. Crandall, C. F. Conway and J. Pottie.

5th Ordinary Meeting, May 3rd, 1937. New ordinary member announced (elected by Council April 26); Mr. G. A. Sandoz.

Papers: 1—The Effect of Molecular Structure on the Rate of Unimolecular Gas Reactions, by N. A. D. Parlee. 2—Equilibrium Moisture Content of Salt Fish Muscle, by D. LeB. Cooper. 3—Quantitative Changes in the Cytoplasmic Constituents of Developing Echinoderm Larvae, by D. Pelluet.

F. RONALD HAYES,
Recording Secretary.

ABSTRACTS.

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

A SHELL DISEASE IN LOBSTER (*Homarus americanus*) CAUSED BY CHITINIVOROUS BACTERIA. Ernest Hess, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Nov. 9, 1936). Chitinivorous bacteria have been isolated from the affected parts of diseased lobsters from several regions of the Maritime Provinces. While such bacteria are fairly common in nature, no previous record of their ability to attack the chitin of living organisms can be found in the literature.

ELECTROLYTES IN MOLLUSCAN BLOOD AND MUSCLE. F. R. Hayes and D. Pelluet, Dept. of Zoology, Dalhousie Univ., Halifax, N. S. (Read Jan. 18, 1937). Estimates of Na, K, Ca, Mg, Cl, and SO₄ were made in the blood and muscle of the Octopus (*Eledone cirrosa*), the Scallop (*Pecten maximus*) and the whelk (*Buccinum undatum*). No characteristic differences were found between the forms investigated, although they represent three molluscan classes. Sea water and blood are similar in composition and the concentration of the six ions accounts for the isotonicity of the two media. Muscle differs from blood and sea water, being much higher in K, and lower in Na and Mg, while the total molar concentration of the six ions in muscle is scarcely two-thirds that of sea water. Muscle chloride is of the order of 10 percent of that in sea water.

THE PROTECTIVE LAYERS OF THE APPLE AND THEIR DEVELOPMENT. H. P. Bell, Dept. of Botany, Dalhousie Univ., Halifax, N. S. (Read Jan. 18, 1937). The protective layers of the developing apple are hairs, cuticle, epidermis and hypodermis. The development of these four layers is followed from the middle of May to the time of harvest. At first the chief protection is afforded by the layer of hairs, but these either disappear or become ineffective by the middle or end of June. The cuticle may be detected as early as the middle of May. By the first of June it is 1 to 2 microns thick. Its thickness increases steadily until by the middle of September it is 25 microns thick. During its development it penetrates the epidermal layer. The epidermis and hypodermis develop as follows: until the middle of June their cells are vitally active and accommodate themselves to the rapid enlargement of the apple by cell division in a tangential plane; from then on they become flattened, elongated tangentially and finally crushed. During these changes the cell walls in the hypodermis thicken and the cells become filled with a dense deposit.

PLATINIZED GLASS AS A LABORATORY SUBSTITUTE FOR MASSIVE PLATINUM. C. C. Coffin, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read Jan. 18, 1937). Various substitutions of platinized glass for massive platinum in laboratory apparatus are discussed. Hydrogen electrodes, coulometer dishes, etc. are described.

SEASONAL VARIATIONS IN *Chondrus Crispus*. Margaret R. Butler, Dept. of Botany, Dalhousie Univ., Halifax, N. S. (Read March 15, 1937). The variations of ash, nitrogen and carbohydrate, in a series of monthly collections of *Chondrus crispus* from the same location, are compared with the variations in the carbohydrate complex extracted from them. Changes in the extracts are found to correspond with those of the whole plants. Therefore certain relationships which become apparent from a more detailed study of the extracts are taken as being expressive of those existing in the plant itself. From a study of the ratio of "ash sulphate to total sulphate" and of "carbohydrate to total sulphate" it is found that from January till May ethereal sulphates of the acid type predominate; while from May until October, the normal salts are in excess. From then until January there is a steady falling off in normal salts. The suggestion is therefore made that the acid type is a more permanent form, in the plant, and is metabolized only when the supply of normal salts is exhausted.

THE HALO METHOD OF AGE DETERMINATION OF MINERALS. W. J. Noble, Dept. of Physics, Dalhousie Univ., Halifax, N. S. (Read March 15, 1937). The purpose of this work was to improve the accuracy of the halo method. A number of experiments were carried out to eliminate errors due to focusing and illumination and as a result some improvement in accuracy of age determination has been achieved.

THE DEPOSITION OF THE HALIFAX SERIES. G. Vibert Douglas, Robert L. Milner and John MacLean, Dept. of Geology, Dalhousie Univ., Halifax, N. S. (Read April 12, 1937). A description of the rocks of the Halifax Series with analysis of the two main types—slates and siltstones and the conditions under which it is thought these rocks were deposited. This theory was tested by a mathematical analysis of many measurements taken by the authors in the railway cutting.

ON THE PURINE METABOLISM OF THE DALMATIAN COACH HOUND. E. Gordon Young, W. A. Crandall, C. F. Conway and J. Pottie, Dept. of Biochemistry, Dalhousie Univ., Halifax, N. S. (Read April 12, 1937). The

Dalmatian Coach Hound has been subjected to metabolic experiment over the early period of growth to adolescence. Synthetic purine-free diets have been fed containing single proteins using casein as standard to contrast the excretion of uric acid and allantoin with the dietary content of particular amino acids. In addition a standard basal diet of meat proteins has been supplemented by pure amino acids and purines.

THE EFFECT OF MOLECULAR STRUCTURE ON THE RATE OF UNIMOLECULAR GAS REACTIONS. N. A. D. Parlee, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read May 3, 1937). The decomposition velocities of esters of the methylene diacetate series are sensitive to certain structural changes. The relative rates of esters made from aldehydes containing 1, 2, 4 and 7 carbon atoms are respectively 1, 13, 19 and 19. The replacement of H by Cl atoms results in a slight decrease in rate; the introduction of a double bond gives a fourfold increase. The effect of the double bond appears to be independent of the rest of the molecule. Thus crotonylidene furfurylidene and benzylidene diacetates react at the same rate at all temperatures.

EQUILIBRIUM MOISTURE CONTENT OF SALT FISH MUSCLE. D. LeB. Cooper, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read May 3, 1937). Some measurements of equilibrium moisture contents of salt fish muscle indicate that these values are independent of temperature within the range studied, and all values become indefinite near the vapour pressure over a saturated salt solution at the temperature investigated.

QUANTITATIVE CHANGES IN THE CYTOPLASMIC CONSTITUENTS OF DEVELOPING ECHINODERM LARVAE. D. Pellet, Dept. of Zoology, Dalhousie Univ., Halifax, N. S. (Read May 3, 1937). An attempt is made to estimate the quantitative changes in the fat and mitochondria in unfertilized, fertilized eggs and early cleavages of *Arbacia*. Sections were cut 1μ and the fat granules and mitochondria were counted by means of a squared ocular of known area, giving an estimate of the total number in the whole egg, whose volume has also been measured.