

PRESIDENTIAL ADDRESS.

HARRY PIERS.

(Read October 9, 1935).

In my first presidential address at the opening of the seventy-fourth session of the Nova Scotian Institute of Science, I would like to express my deep appreciation of the unexpected honour done me, one year ago, in electing me to the presidency of one of the oldest scientific societies in Canada. I feel that you do not need any assurance that the Institute has ever had my keenest interest as well as my loyal, whole-hearted service.

Glances at the Past.

Being now the senior active member of the society, the occasion naturally brings vividly to my mind many thoughts of the past, some of which may perhaps be pardonably noted, personal though many of them may be.

The first meeting I attended was in November, 1887, when I was a lad of seventeen years, a student at the Halifax Academy, but also studying daily, under the aged Dr. David Honeyman, in the Provincial Museum. The meetings were then being held in the drafty draughting-room of the Provincial Engineer's office on the top floor of the Province Building. Dr. John Somers, the seventh president, a long-moustached, grey-headed, kindly ex-army-surgeon of the American Civil War, and a keen but perhaps not very precise fungologist and general botanist, was in the chair, and the paper was one by my preceptor, Dr. Honeyman, on "Glacial Geology in Nova Scotia," in which he referred to some slight assistance I had given him in the way of material for his then favourite theme. The discussion in those days was always quite formal, and all who joined in it arose to address the chair.

Then my association with the Institute goes back forty-eight years or three-fifths of the period of its existence; and since then attendance at meetings has never once been missed except through illness or some such unavoidable cause.

The society was then composed of men, every one of whom, with the exception of Mr. F. W. W. Doane, has since passed away. There were 34 ordinary members and 5 associates, or a total of 39, not counting corresponding-members. The equivalent numbers today are 65 and 13, a total of 78, or exactly twice the number of forty-eight years ago. In the intervening years the population of the city has increased from about 37,500 to about 60,000.

Among the more prominent men attending the meetings in those days were: the aged, yet sprightly, Dr. Honeyman, a doughty opponent of some of Sir William Dawson's views, and the rather young and dry-humoured Edwin Gilpin, geologists; grave-faced and experienced Dr. Lawson and kindly Dr. Somers, botanists; Andrew Downs, the veteran ornithologist, formerly the proprietor of the first zoological garden in America, and one-time correspondent of Audubon; Arthur P. Silver, a young but keen lepidopterist and sportsman, later author of "Farm, Cottage, Camp and Canoe in Maritime Canada"; the also young, auburn-haired, keen-eyed, vivacious and quick-witted Dr. J. Gordon MacGregor, physicist; light-hearted, companionable Augustus Allison, meteorologist; the ever black-haired, thick-browed, quiet, but kindly Maynard Bowman, analyst; big, open-hearted Martin Murphy, an Irish engineer of wide experience and marked ability; as well as the venerable William Gossip, who knew all about printing, the very tall and stately, and unusually long-bearded W. C. Silver, the small, quiet John J. Fox, and the sober-faced Alexander McKay, supervisor of schools,—the three latter of whom, particularly the last, were generally interested in science and natural history. Among occasional attendants and lecturers from out-of-town, were the rather austere-featured Rev. Dr. George Patterson, archaeologist and historian from Pictou, and the stalwart Rev. Dr. John Ambrose whose long residence in coastal parishes caused him to be an authority on our marine food-fishes. Dr. J. B. Gilpin and J. M. Jones ("Bug Jones" as his many friends called him), both of whom had contributed very largely to the Transactions, had gone into retirement; and A. H. MacKay did not

arrive in Halifax till a couple of years later. Of all these gentlemen, only Downs, Gossip, Jones and J. B. Gilpin had been original members.

They nearly all seemed very old to my boyish eyes, yet their average age was about fifty-five, ranging from twenty-four to seventy-eight. All but three (E. Gilpin, F. W. W. Doane, and A. P. Silver) wore beards or at least side-whiskers; and all were dignified, courteous and kindly gentlemen of the old school, and were ever ready to assist a youngster. You may, however, be assured that the awed high-school lad felt decidedly insignificant in such grown-up and experienced company, and always silently occupied a back seat, although listening intently to all that was said.

Early in 1888, on the day after my eighteenth birthday, I was permitted to read my first paper, one on the occurrence of some rare fishes and on fish development. In November of the same year, during the presidency of Dr. MacGregor, my true and ever-lamented friend and the society's most energetic president, I was elected a member, and at the same meeting was appointed assistant-librarian, which position was held till 1890. In November, 1891, I entered the council, and three years later became recording-secretary, and, as you know, served as such for forty years.

In contrast with conditions existing at present, when efficient and painstaking officers divide the work, for many years various duties fell upon the recording-secretary. Up till 1903 he billed for, collected and gave receipts for all fees, which were then transferred to the treasurer for inclusion in his accounts. Then from 1901 to 1908 he was editor of the Proceedings and Transactions; from 1902 was librarian; and furthermore, until recent years, almost all routine correspondence was carried on by him. So that, perhaps, in his day he took, as far as he was able, his full share of the work, and was glad to do it.

Hoping that the foregoing reminiscent remarks from one of the society's "old-timers" have not been wearisome, we will now pass to the concerns of the immediate past.

Review of the Past Year.

In reviewing the work and events connected with the Institute during the past year, I must first refer with much sorrow to the passing of Daniel Alexander Murray, Ph.D., late professor of applied mathematics at McGill University, Montreal. He was born in Colchester Co., N.S., and educated at Dalhousie and John Hopkins Universities, and in Berlin and Paris. He then devoted himself to teaching in his native province, first in the Dartmouth schools, then as principal of Shelburne Academy. Later he became tutor of mathematics at Dalhousie University, associate-professor of the same subject in the University of New York, instructor in Cornell University, and then a full professor at Dalhousie. Since 1907 he had been on the staff of McGill. He was a member of various notable learned societies, and published well-known treatises on "Differential Equations," "Integral Calculus," "Plane Trigonometry" and "Spherical Trigonometry." He joined our Institute in December, 1903, and had been associated with it up to the time of his death. I trust that a fuller obituary, recording his eminent services in his chosen field, will appear in the Proceedings.

The appointment of our fellow member, Dr. E. W. H. Cruickshank, the distinguished professor of physiology at Dalhousie University, to a highly important chair at Edinburgh, is a matter which calls for our heartiest congratulations; but mingled with our pleasure at the well-deserved honour done him, is a sense of deep regret at the loss of one of our most prominent members. We wish him and his talented wife every success, and know that he will not forget the tie which has bound him for nearly seven years with a small but earnestly working society in New Scotland, nor she her prominent association with musical life here.

This approaching departure of Dr. Cruickshank recalls the appointment, thirty-four years ago, of one of our former presidents, the late Dr. J. Gordon MacGregor, to the chair of natural philosophy in the same great university, then lately occupied by the eminent Tait; on which occasion a dinner

was tendered to the man who was no doubt the most energetic and inspiring president we have ever had.

During the past session eight meetings were held, including the annual business one, from October to May, at which the average attendance at the ordinary gatherings was twenty-three as compared with twenty in the previous year, while at the popular lectures the attendance was about one hundred, and fifty.

At the seven ordinary meetings twenty-three papers were presented, being an average of about three at each meeting. Two of the meetings were of a popular nature; one of them being devoted to an address by Mr. T. E. Kloss on the Chemistry of Paper-making, and the other to addresses by Dr. Henderson on Simon Newcomb, by Dr. Bean on the Historical Development and Present Programme of the Institute, and by Capt. Mitchell on Life-saving Appliances on Merchant Ships. There was also one demonstration by Mr. J. R. Dacey on Chemiluminescence. To all who thus contributed to the success of the session, we tender sincere thanks.

The papers may be thus classified: physics, 2; mineralogy, 1; geology, 3; meteorology, 1; botany, 1; chemistry, 1; biochemistry, 1; zoology, 7 (made up of: crustaceans, 1; insects, 1; and fishes, 5); useful arts, 4 (made up of: public health or medicine, 1; life-saving, 1; chemical technology, 1; and food-treatment, 1); and biography and history, 2. This indicates that the programme has been of a highly diversified character, with papers on zoology (7), the useful arts (4), geology (3), and physics (2) prevailing.

While speaking of our meetings, I voice the feelings of all in expressing thanks to the staff of the Medical Science Building for the long-accorded privilege of using the biochemistry lecture-room for our monthly gatherings, and also for the frequent use of a projection-lantern.

In June last there was published part 3 of volume 18 of the Proceedings, for the session 1933-4, consisting of 79 pages, containing 9 papers printed in full, some 32 illustration maps, figures and graphs, as well as abstracts of 12 other

papers. Comparing this with previous parts of the same volume, we find that part 1 (1930-1) contained but 2 full papers, 11 abstracts, and 21 pages; part 2 (1931-2), 5 papers, 7 abstracts, and 51 pages; and part 3 (1932-3), 9 papers, 7 abstracts, and 149 pages. This is an average of $6\frac{1}{4}$ papers, $9\frac{1}{4}$ abstracts, and 75 pages in each of the four parts.

Progress in printing the Proceedings for the past session (vol. 19, part 1) will be reported upon by the capable editor, Dr. King. As the part will be a large one of about 150 pages, containing seven papers, including an extensive and important one on our marine fishes, its cost will make a considerable inroad on our never-too-large treasury.

As you know, the Institute has undertaken, under the able and freely given direction of our energetic corresponding-secretary, Dr. Hess, the compilation of a much needed catalogue of all scientific journals which are available in the various libraries of the Maritime Provinces, chief among which is that of our own Institute in the Provincial Science Library. This laborious work, which when issued will be of great assistance to research-students, is now about completed, and as the expense of publication will be considerable, we are pleased to know that greatly appreciated financial assistance has been granted by the National Research Council of Canada.

We should not neglect to mention that at the last annual meeting a lady, Dr. Margaret R. Butler, was for the first time elected a member of the Council, and we may foresee the time when a lady will preside over the destinies of the society. In this connection it will be recalled that in December, 1900, the first lady, Miss A. Louise Jaggar, then at Smith Cove, N.S., but later of Cambridge, Mass., was admitted an associate member, and the innovation was hailed with enthusiasm. We now have three ladies among our ordinary and associate members, and of recent years several important papers have been their welcome contribution to our Proceedings.

During the past summer a notable event in the history of science, as it affects this province, was the unveiling of an inscribed tablet erected by the Historic Sites and Monuments

Board of Canada, at the little village of Wallace Bridge, Cumberland Co., to commemorate the birth and career of Simon Newcomb, Nova Scotia's world-famous astronomer. This well-deserved tribute to a great man was the result of the efforts of our vice-president, Dr. G. H. Henderson, and the drafting of a suitable inscription had been deputed to a committee of this Institute of which he was the head. The president and members were cordially invited by Prof. D. C. Harvey to be present, and a card was sent to all members urging them to be present, but I fear that only your president and vice-president were able to take advantage of the kind invitation. The ceremony took place before a large and distinguished assembly, on 30th August, 1935, the principal address being given by Dr. Henderson, while others who spoke were His Honor Lieut.-Governor Covert, Mr. Norman Armour, the U. S. Ambassador to Canada, Dr. Raymond C. Archibald, Dr. Newcomb's daughter, who unveiled the tablet, and others.

*The Approaching 75th Anniversary of the Institute's
Organization.*

Now, to look somewhat into the future, it is probably not too soon to bring to mind the fact that this Institute, which was organized on 31st December, 1862, will begin its Seventy-fifth Annual Session in the autumn of 1936. That time might very appropriately be the occasion of some sort of commemorative meeting such as was held on the completion of a half-century of activity, on 20th January, 1913. Three-quarters of a century of uninterrupted and productive work in the field of science in this province is surely worthy of more than mere passing notice. I am sorry to say that most of us will not be here when the more note-worthy centenary arrives, and therefore we would now like to take befitting notice of such an outstanding milestone as the seventy-fifth when it is passed on the long road leading into the as yet unexplored region of scientific endeavour in Nova Scotia.

Field-meetings.

We recall that very many years ago the Institute held occasional field-meetings, but they were usually not well attended, and have not since been revived. It has occurred to me that possibly at some future time an experimental effort might be made to resuscitate what should be a popular and pleasant way of increasing general interest in the geology and natural history of our locality. Perhaps this might be tried through a meeting under the guidance of Prof. Douglas, at which prominent features in the geological structure underlying Halifax might be demonstrated in an attractive and practical manner. In this connection it may be noted that our sister society, the Nova Scotia Historical Society, has for a number of years met with success in holding summer excursions to points of historic interest in and about Halifax. Such excursions, both historical and scientific, are still quite popular in England. Our trouble would be that most of our members are then away on their vacations.

In conclusion I desire to thank the officers, particularly the Treasurer, and the Corresponding and Recording Secretaries, for their freely-given services during the year, and the members of the Council for the notably large attendance at their meetings. Our gratitude is also due to the Editor, Dr. King, and the Editorial Board, nor should we forget the services of our two representatives on the Provincial Science Library Commission, and of our delegate to the meeting of the Royal Society of Canada.

PROCEEDINGS OF MEETINGS.

SESSION OF 1935-36.

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

74th Annual Business Meeting, Oct. 9th, 1935. The annual address of the President was read by Harry Piers, Esq.

The Treasurer's Report showed the financial situation to be as follows: Receipts during the year, \$1385.35; expenditures, \$422.08; leaving a balance in the savings bank of \$963.27. The reserve fund contains \$243.48 in Dominion Savings, and \$500.00 in a Dominion of Canada Bond. The Endowment fund consists of \$1000.00 in Telephone Bonds, and \$1500.00 in Dominion of Canada Bonds.

The Corresponding Secretary reported that during the year 266 back copies of the "Proceedings" had been sent out. His work of preparing a Catalogue of Scientific Periodicals in the Libraries of the Maritime Provinces was showing satisfactory progress, aided by a grant of \$100.00 from the Institute and \$300.00 from the National Research Council of Canada. It was anticipated that the catalogue would be published during the current session.

The Librarian reported that the Provincial Government grant of \$500.00 had been made as usual.

The Editor reported that one number of the "Proceedings" had appeared during the past summer and another was in press.

Officers elected for 1935-36. *President*, Harry Piers, Esq.; *vice-presidents*, Prof. George H. Henderson, Ph.D., Prof. Harold S. King, Ph.D.; *treasurer*, Donald J. Matheson, B.Sc.; *corresponding secretary*, Prof. Ernest Hess, Ph.D.; *recording secretary*, Prof. F. Ronald Hayes, Ph.D.; *librarian*, Harry Piers, Esq.; *members of the Council*, Capt. W. F. Mitchell, Prof. Donald Mainland, D.Sc., Prof. C. C. Coffin, Ph.D., Prof. R. J. Bean, M.S., Margaret R. Butler, Ph.D., Prof. G. V. Douglas, M.Sc., D. LeB. Cooper, Ph.D.; *members nominated by the Institute to the Provincial Science Library*

Commission, Prof. G. H. Henderson, Ph.D., Prof. Ernest Hess, Ph.D.

1st Ordinary Meeting, Nov. 4th, 1935. New members announced (elected by Council Oct. 28); Ordinary member, John M. Morton; associate members, George R. Smith, Arthur Kelsall.

Obituary:—The Institute learns with deep regret of the death of Captain Walter Frederick Mitchell on October 24th. Captain Mitchell was elected a member of the Institute in 1927 and was entering upon his fifth term as a Councillor. Sixty-three years of age, he had had an eventful career on the sea and at the time of his death was Superintendent of Pilots for Halifax and Acting Examiner for Masters and Mates. In three popular lectures he shared his store of experience with us. In the Council meetings his unique personality will be greatly missed. Though not a scientist himself, he had a fine appreciation of pure science.

Papers: 1—The marine fishes of Nova Scotia, by V. D. Vladykov and R.A. McKenzie. 2—The sterilization of canned fisheries products, by D. Cooper. 3—*Schizoporella unicornis*, a Bryozoan new to Canada, by D. Pelluet and F. R. Hayes.

2nd Ordinary Meeting, Dec. 9th, 1935. New student members announced (elected by Council Nov. 25); Dennis W. Watson, N. E. Brown. Papers: 1—The deterioration of "marinated herring," by Ernest Hess and Dennis W. Watson. 2—Studies on explosive antimony; the magnetic susceptibility, by C. C. Coffin. 3—The behaviour of bone and cartilage of young guinea-pigs under the influence of anterior pituitary extract of cattle, by Ruth Silberberg.

3rd Ordinary Meeting, Jan. 13th, 1936. New members announced (elected by Council Dec. 30); Ordinary members, Ruth Silberberg, Martin Silberberg, Arthur Labrie; associate member, J. Fred. Hockey. Papers: 1—Behaviour of thyroid under the influence of two growth stimuli simultaneously applied, by Martin Silberberg. 2—Some bacteriological aspects of fish handling, by N. E. Gibbons. 3—Development of the fruit bud of the apple (McIntosh Red) in Nova Scotia, by Vera Facey.

4th Ordinary Meeting, Feb. 10th, 1936. Papers: 1—The detection and measurement of incipient spoilage in fish muscle, by S. A. Beatty. 2—Three rare fish from Passamaquoddy Bay, N.B., by R. H. M'Gonigle and M. W. Smith. 3—Determination of selenium in gold concentrates, by Harold S. King and Evelyn O. Nickerson.

5th Ordinary Meeting, Mar. 9th, 1936. Papers: 1—The mosses of Nova Scotia, by Margaret S. Brown. 2—On the heat capacity of silver, nickel, zinc, cadmium, and lead from -80° to 120° C., by Arthur J. C. Wilson. 3—Smoke-curing of fresh fillets, by E. P. Linton and D. LeB. Cooper.

6th Ordinary Meeting, Apr. 8th, 1936. New members announced (elected by Council Mar. 30); Ordinary member, Margaret S. Brown; student member, Ross Homans. Papers: 1—Observations on the development of storage scab of apples, by J. Fred. Hockey. 2—The metabolism of developing salmon eggs; a quantitative study of the total fat content, by D. M. Ross. 3—Pleochroic haloes of the thorium family, by D. P. Crawford.

7th Ordinary Meeting, May 4th, 1936. Papers: 1—The separation and characterization of the proteins of egg white, by E. Gordon Young. 2—Further studies on the breakdown of complex molecules, by J. R. Dacey and N. A. D. Parlee.

F. RONALD HAYES.

Recording Secretary.

ABSTRACTS.

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

THE STERILIZATION OF CANNED FISHERIES PRODUCTS. D. LeB. Cooper, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Nov. 4, 1935). The rate of heat penetration into cans of solidly packed fish and fish pastes was measured and shown to be independent of the nature of the fish within the limits of accuracy required. The results were applied to an equation expressing the rate of heat penetration into cans, and found to agree with the theory.

THE DETERIORATION OF "MARINATED HERRING", by Ernest Hess and Dennis W. Watson, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Dec. 9, 1935). Marinated herring which are preserved by curing in vinegar, salt and spices are consumed without cooking. As the concentration of the curing agents used is limited by their palatability, and as no heat is applied

at any time, the product is semi-perishable, unless stored at ice-box temperatures. At room temperature deterioration begins after about one month's storage in the form of a softening and loosening of the skin, followed by softening and disintegration of the flesh without noticeable spoilage odours. Experiments have shown that neither micro-organisms nor acid hydrolysis play an important part in this break-down of the fish flesh. The most important agent was shown to be enzymatic hydrolysis, by means of studies on bacteria-free filtrates of fish muscle extracts and on samples of marinated herring preserved under toluol. The enzyme action may be decreased by using higher salt concentrations in curing, or by using salt herring instead of fresh herring as raw material. Further means of inhibiting enzymatic hydrolysis at room temperature are under consideration.

STUDIES ON EXPLOSIVE ANTIMONY. THE MAGNETIC SUSCEPTIBILITY. C. C. Coffin, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read Dec. 9, 1935). Explosive antimony is only half as diamagnetic as ordinary crystalline antimony and is therefore in all probability a true super-cooled liquid.

THE BEHAVIOUR OF BONE AND CARTILAGE OF YOUNG GUINEA-PIGS UNDER THE INFLUENCE OF ANTERIOR PITUITARY EXTRACT OF CATTLE. Ruth Silberberg, Dept. of Pathology, Dalhousie Univ., Halifax, N. S. (Read Dec. 9, 1935). Young guinea-pigs were injected with one to one and a half cc. of anterior pituitary extract of cattle daily for periods from 4 days to 1 month. The conditions of bone and cartilage were examined. In another series of animals the bones of one lower leg were fractured and the growth phenomena at the stumps were observed over periods from 4 days to 3 weeks. As a result of both series a distinct stimulation of the growth of cartilage was noted with hypertrophy and hyperplasia of the different cells, followed by an accelerated calcification of the newly grown cartilage, which may cause a premature closure of the epiphyseal line and a faster healing process of the fracture.

BEHAVIOUR OF THYROID UNDER THE INFLUENCE OF TWO GROWTH STIMULI SIMULTANEOUSLY APPLIED. Martin Silberberg, Dept. of Pathology, Dalhousie Univ., Halifax, N. S. (Read Jan. 13, 1936). The experiments were carried out in young guinea-pigs in order to analyze the behaviour of the thyroid gland under the influence of two stimuli simultaneously applied. Potassium iodide and anterior pituitary extract of cattle were used as exogenous growth-promoting substances, while the development of compensatory hypertrophy is to be considered as due to an endogenous growth stimulus. 1. By combined administration of potassium iodide and anterior pituitary extract each substance exerts its specific effects on the thyroid, but usually no real intensification takes place. 2. Correspondingly, under varying conditions the influence of injections of the extract of cattle anterior pituitary on the growing thyroid (compensatory hypertrophy) is established, as follows: The development of this compensatory hypertrophy may interfere with the growth-promoting effects of the extract, while the influence of the extract is diminished compared with the behaviour of the normal gland under the influence of the extract. Therefore as far as growth phenomena are concerned one may conclude that: The influence of two growth stimulating energies simultaneously applied can be explained in accordance with the rules of interference.

SOME BACTERIOLOGICAL ASPECTS OF FISH HANDLING. N. E. Gibbons, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Jan. 13, 1936). Rise in bacterial numbers in fish muscle juice follows the rise in volatile base Nitrogen. Bacterial counts on peritonea of iced fish show that thorough washing has little effect on time of storage. Penetration of gut in non-feeding

fish is slow; in feeding fish enzymatic action causes "belly burn" before bacterial penetration.

DEVELOPMENT OF THE FRUIT BUD OF THE APPLE (MCINTOSH RED) IN NOVA SCOTIA. Vera Facey, Dept. of Botany, Dalhousie Univ., Halifax N. S. (Read Jan. 13, 1936). The differentiation of the fruit bearing tissue is traced from the first appearance of primordia on June 8 to the mature flower the following May. In other reports a differentiated flower growing tip was not identified so early, but the development from then until the Autumn parallels the development of the apple as reported for the northern United States and England. For Nova Scotia, development is reported as continuous throughout the winter, although previous accounts from other places do not record any development between late Autumn and early Spring. The winter buds resist infiltration. To overcome this difficulty a new technique is described by which, except for the few minutes when solutions were changed, the buds were kept in a vacuum from the time they were first put in alcohol, till the infiltration with paraffin was completed.

THE DETECTION AND MEASUREMENT OF INCIPIENT SPOILAGE IN FISH MUSCLE. S. A. Beatty, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Feb. 10, 1936). A method for the determination of trimethylamine in cod and haddock muscle has been devised. In cod and haddock stored at temperatures between 0°C and 20°C the development of trimethylamine parallels the rise in bacterial population. Putrefactive odors are always detected at approximately the same trimethylamine level. Since the rise in trimethylamine is significant before any putrefactive odor can be detected, the trimethylamine value is not only a qualitative test more sensitive than ordinary organoleptic tests, but also a quantitative measure of spoilage.

THE DETERMINATION OF SELENIUM IN GOLD CONCENTRATES. Harold S. King and Evelyn O. Nickerson, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read Feb. 10, 1936). A study has been made of the bromide method of estimating selenium. About 95% of selenium may be recovered by this method. The presence of gold, tellurium or arsenic does not interfere. The concentrates from Waverley contained 0.01%, from Goldenville, 0.02%, from Brookfield, 0.04% and from Montague, 0.06% Se.

ON THE HEAT CAPACITY OF SILVER, NICKEL, ZINC, CADMIUM AND LEAD FROM -80° TO 120°C. Arthur J. C. Wilson, Dept. of Physics, Dalhousie Univ., Halifax, N. S. (Read March 9, 1936). This paper is a continuation of the work of Bronson, Chisholm and Dockerty. (H. L. Bronson, H. M. Chisholm and S. M. Dockerty, Canadian Journal of Research 8 282-303 (1933). S. M. Dockerty, Canadian Journal of Research 9 84-93 (1933).) The heat capacities of silver, nickel, zinc, cadmium and lead have been measured in the temperature range -80° to 120°C. The method used was the adiabatic electric heating of a kilogram or more of the metal being investigated. The measured values of the heat capacities were plotted against the temperature on large graphs and a smooth curve drawn through the points. The average deviation of the points from the curve was considerably less than .1% in all cases. The following equations have been found to fit the curves with the maximum deviations noted:

for silver	$C_p = D(220/T) + 1.23_3 \times 10^{-5} T^{1.16}$	maximum deviation	.04%
for nickel	$C_p = D(372/T) + 3.64 \times 10^{-6} T^{5/3}$	"	.1%
for zinc	$C_p = D(235/T) + 3.75 \times 10^{-6} T^{3/2}$	"	.07%
for cadmium	$C_p = D(160/T) + 9.63 \times 10^{-7} T^{5/3}$	"	.1%
for lead	$C_p = D(88/T) + 3.06 \times 10^{-6} T^{1.38_3}$	"	.15%

where $D(\Theta/T)$ represents the Debye function and the units are joules/gram°C. A discussion is given of the theoretical significance of the constants in these equations.

SMOKE-CURING OF FRESH FILLETS. E. P. Linton and D. LeB. Cooper. Fisheries Exp. Sta. (Atlantic), Halifax, N.S. (Read March 9, 1936). Variables affecting the smoking of fresh fillets were investigated experimentally. These include type of smoke, velocity of the smoke system, and psychrometric conditions inside the smoke hold or tunnel. The results show that if suitable conditions be maintained fresh fillets may be cured in two to four hours. This compares with the present practice of smoking for eight to eighteen hours. Differences in types of products are discussed.

OBSERVATIONS ON THE DEVELOPMENT OF STORAGE SCAB OF APPLES. J. Fred Hockey, Dept. of Botany, Acadia Univ., Wolfville, N.S. (Read April 8, 1936). Climatological conditions during the autumn of 1933 provided suitable moisture and temperature for three complete cycles of infection prior to harvest. It was found that storage scab was the symptom produced from late season infection by conidia of *Venturia inaequalis* (Cke.) Wint. prior to harvest. Storage of fruit from five to twelve weeks, depending on the temperature, was necessary before the symptoms developed. Fungicidal dips at harvest failed to prevent the appearance of the disease. It was apparent that infections took place prior to harvest.

THE METABOLISM OF DEVELOPING SALMON EGGS: A QUANTITATIVE STUDY OF THE TOTAL FAT CONTENT. D. M. Ross, Dept. of Zoology, Dalhousie Univ., Halifax, N.S. (Read April 8, 1936). The fat content of the developing salmon has been studied from fertilization to the end of the yolk sac period. The range covers 103 days and the average temperature at the beginning was 6°C. and at the end 9°C. 40 samples of 100 individuals each were taken, including unfertilized eggs, unhatched eggs, larvae, shells and separated yolks and embryos. The lipoids were extracted wet with alcohol-ether, re-extracted with petroleum ether and estimated by Backlin's micro carbon combustion method. A drop of 62% in the fat of the embryonic system has been recorded. This drop appears to be confined to the last four weeks of the yolk sac period. Fat is stored rapidly in the embryo up to the hatching period when the process falls off completely. It is resumed about ten days later. The maxima for the rates of fat combustion and of fat storage by the embryo occur at the same time, during the fifth week after hatching. The variation in the intensity of the fat absorption process has been calculated and the results compared with similar data for the chick.

PLEOCHROIC HALOES OF THE THORIUM FAMILY. D. P. Crawford, Dept. of Physics, Dalhousie Univ., Halifax, N.S. (Read April 8, 1936). These haloes, which are quite rare, have been studied by means of the halo photometer. All the alpha particles from the thorium family have been accounted for and the ring radii are in good agreement with values obtained in present day laboratory experiments. A discussion is given of errors involved and accuracy obtainable by this method.

THE SEPARATION AND CHARACTERIZATION OF THE PROTEINS OF EGG WHITE. E. Gordon Young, Dept. of Biochemistry, Dalhousie Univ., Halifax, N.S. (Read May 4, 1936). The proteins of the white portion of the hen's egg have been separated into several fractions by two methods. These fractions have been analysed and compared mainly to determine the extent and behavior of the mucoproteins present. Analyses for nitrogen, sulphur, cystine and glucosamine have been performed. The absence of ovoglobulin

is maintained. Ovomucin has been found possessing characteristics which distinguish it from other mucins and which depend upon the mode of isolation. The nature of the chalazae has been determined from analytical similarity to be that of ovomucoid. The separate identity of these fractions in natural egg white is questioned.

FURTHER STUDIES ON THE BREAKDOWN OF COMPLEX MOLECULES. J. R. Dacey and N. A. D. Parlee, Dept. of Chemistry, Dalhousie Univ., Halifax, N.S. (Read May 4, 1936). The investigation of the effect of structural changes on the stability of ethylidene diacetate homologues has been continued. The replacement of H by Cl atoms does not change the activation energy but does decrease the probability of reaction. The replacement of a H atom by a phenyl group increases the reaction rate and lowers the energy necessary for reaction. The results to date are discussed from the point of view of modern theories of intramolecular energy exchange.