PRESIDENTIAL ADDRESS.

A. H. LEIM.

(Read October 11, 1933).

It is my privilege to-night to present a brief review of the events of the seventy-first session of the Nova Scotian Institute of Science, which session has just closed.

One of the duties devolving on the President at this time is happily light. No members of the Institute have died during the year.

During the session six ordinary meetings were held at which the average attendance was twenty. Three ordinary members and one student member were elected to the Institute.

From the surplus accumulated during the seventieth session amounts of five hundred dollars each were set aside in the Reserve Fund and the Permanent Endowment Fund. These amounts were invested in a Dominion of Canada long term bond.

The Provincial Government grant of five hundred dollars was again given during this year.

Part II of Volume 18 of the "Proceedings" was issued and the thanks of the Institute are due to the Editor and the Editorial Board for having carried out the work preparatory to its publication. It is gratifying to note an increase in size of the publication over that of the preceding year; a growth which will be continued in part III of the volume.

It has been encouraging to note that a paper originating outside the Maritime Provinces but dealing with the fauna of these provinces has been sent to us for publication by Dr. E. M. Walker. This paper will be doubly welcome as belonging to the category of natural history lists, the absence of which from the "Proceedings" of recent years has been repeatedly deplored.

The scientific papers presented at the ordinary meetings have been varied and interesting. Fifteen papers were included, four of them being joint ones. While all might not

agree with my classification they may be referred to the following groups:

Three each in the fields of Chemistry and Zoology.
Two each in Biochemistry and Physics.
One each in Anatomy, Bacteriology, Geology, Meteorology and Navigation.

None of the papers presented was of a highly popular nature and in planning the programme for the coming year it would seem desirable to include at least one evening when a distinctly popular lecture would be presented after suitable advertisement. This would be in accordance with the desire formerly expressed by the Institute.

I should like to take the liberty of suggesting that the time is ripe for another in the series of Science Exhibitions. Two of these were carried through by the Institute in November of 1926 and 1928 and the record indicates that they were successful beyond the expectations of those concerned at that time. This seems to have been generally recognized among the members of the Institute and by many non-members who assisted in preparing and demonstrating the exhibits. The one objection which has been voiced concerns the great amount of effort which is necessary in staging such an exhibit.

One of our main reasons for believing that it is time for another such exhibit is that the student body at the University will have almost completely changed since 1928. If it can be arranged we would consider it to be a worth while endeavour to have one of these exhibitions sufficiently often so that each group of students would have an opportunity once during their college course of learning something of scientific methods and results. To those students who are enrolled in science courses such an exhibit is perhaps not very necessary or valuable but to students in Faculties other than Science and Medicine such an exhibition offers much.

Every four or five years is perhaps not too often to remind the less transitory residents of Halifax that the Institute exists and that research work is being carried on in this city and elsewhere in the province.

We would further suggest that the Institute consider limiting any individual Science Exhibition to one or two of the Departments of Science rather than attempting to include them all. By choosing the groups in rotation the necessary effort would be lessened and the exhibition could be confined to one building or at most to two adjacent ones.

Our Secretary in his capacity as Librarian of the Provincial Science Library has reported a decided growth in the use of that library during recent years. This is a matter of gratification to the Institute which has had such a large share in building up the Science Library.

In conclusion I wish to thank the members of the Institute for honouring me by my election as President. It is a pleasure to acknowledge the assistance of the members of the Council in administering the affairs of the Institute.

PROCEEDINGS OF MEETINGS.

SESSION OF 1933-34.

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

72nd Annual Business Meeting, Oct. 11, 1933. The President, Dr. A. H. Leim, in the chair. Others present: Dr. G. H. Henderson, Dr. H. S. King, D. J. Matheson, Dr. E. Hess, Capt. W. F. Mitchell, Dr. S. G. Ritchie, Dr. J. H. L. Johnstone, Dr. E. G. Young and H. Piers.

The President delivered an address in which he reviewed the work of the Institute during the past year. So far as known no death had occurred in the roll of members.

The Treasurer's report showed that the receipts for the year were $2,141.16; expenditures, $1,320.38; balance in current account, $820.78; in reserve fund, $732.13; and in permanent endowment fund, $2,500.00.

The Corresponding Secretary reported that 183 back numbers of the Proceedings had been mailed. The mailing list of the Proceedings had been revised, and now contains the names of 98 members; 349 scientific societies, libraries, government departments and museums in 53 countries, with which an exchange of publications is maintained; and 323 university and college libraries, government departments, etc., to which complimentary copies are sent. This makes a total mailing list of 770.

The Librarian reported that, during the year ended Sept. 30, 1933, 3,463 books and pamphlets had been received through the Institute's exchange list; and that the total number in its library on that date was 69,707. The number of accessions to the entire Provincial Science Library (with which that of the society is incorporated) in the same period was 3,739; and the total number in the Library on Sept. 30, 1933 was 89,916. Of these, 69,707 belong to the Institute; 19,885 to the Science Library proper; and 324 to the Hugh Fletcher Memorial Library. With the Government's grant of $500.00 a number of books on pure and applied science were pur-

chased, and 113 volumes were bound. During the year 881 books were borrowed besides those consulted in the Library.

The Editor reported on progress in printing the Proceedings.

The following were elected officers for the year 1933-34: *President*—Alexander H. Leim, Ph.D., ex-officio F.R.M.S.; *vice-presidents*—Prof. George H. Henderson, Ph.D., Prof. Harold S. King, Ph.D.; *treasurer*—D. J. Matheson, B.Sc.; *corresponding secretary*—Ernest Hess, Ph.D.; *recording secretary and librarian*—Harry Piers; *councillors without office*—D. J. Mackenzie, M.D., Capt. W. F. Mitchell, Rev. Bro. W. Cornelia, Prof. C. C. Coffin, Ph.D., Prof. F. R. Hayes, Ph.D., D. Mainland, M.D., and Prof. R. J. Bean; *auditors*—Prof. W. P. Copp and P. R. Colpitt.

1*st Ordinary Meeting, Nov.* 13, 1933.—Prof. F. R. Hayes presented a paper on "The Metabolism of Developing *Cyclopterus lumpus* Eggs;" and Prof. G. H. Henderson, one on "A New Method of Determining the Age of Minerals."

2*nd Meeting, Dec.* 11, 1933.—It was announced that Drs. J. S. Bagnall, D. LeB. Cooper and W. W. Johnston, of Halifax, had been elected ordinary members on Nov. 27. Papers were presented by Prof. Muriel V. Roscoe, Wolfville, on "The Cytology of Certain Cultivated Apples;" by Prof. N. B. Dreyer on "The Effect of Some Barbituric Acid Derivatives on the Intestine of the Cat;" and by E. Hess on "Cultural Characteristics of Marine Bacteria in Relation to Low Temperatures."

3*rd Meeting, Jan.* 15, 1934.—On motion of Mr. Piers and Dr. Ritchie it was resolved that the N. S. Institute of Science learns with deep regret of the death of its senior member, Dr. John Stewart, who passed away at Halifax, Dec. 26. He had joined the Institute Jan. 12, 1885, and for many years was a frequent and much interested attendant at its meetings. The Institute desires to express its sympathy with the members of his family in the loss which they have sustained. In moving the resolution Mr. Piers gave an account of the life and eminent services of the deceased gentleman. It was reported that

Miss Margaret D. Webster, B.Sc., had been elected a student member Jan. 2. Copies of the printed Proceedings, Vol 18, pt. 3, 1932-33, were laid on the table. Dr. S. G. Ritchie presented a paper on "The Determination of the Initial and Final Sets of Plaster-of-Paris;" and Stuart Johnston, B.Sc., one on "A Microscopical Study of Polished Surfaces of Explosive Antimony."

4th Meeting, Feb. 12, 1934.—It was announced that Miss Margaret Butler, Ph.D., had been elected an ordinary member Jan. 29. Papers were presented by A. L. Geddes, on "The Decomposition of Complex Molecules at High Pressures;" and by Dr. N. B. Dreyer and Miss D. Webster on "Effects of Arterial and Venous Occlusion on the Intestine."

5th Meeting, Mar. 12, 1934.—It was announced that Prof. A. C. Cuthbertson, Ph.D., Sackville, N.B., had been elected an associate member Feb. 26. Papers were presented by Prof. C. W. Startup on "The Effect of Insulin on the Metabolism of Heart Muscle;" by Donald M. Ross on "Monstrosities in Salmon Embryos;" and by Dr. A. H. Leim on "Water Temperatures in Grand Lake, N. S."

6th Meeting, Apr. 9, 1934.—Owing to Dr. Leim's transfer to St. Andrews, N. B., the chair was occupied by the first vice-president, Dr. Henderson. Papers were presented by Norman B. Gillies on "A Lunar Phenomenon on the Night of Feb. 25, 1934;" by Miss H. R. Belyea and Miss W. Scott on "The Conditions of Sedimentation of the Halifax Formation as Observed in Point Pleasant Park;" by R. L. Milner "On the Solubility of Gold in Ferric Sulphate;" and by Prof. G. V. Douglas and C. K. Howse "On the Location of Ore Shoots in Mineral Deposits."

7th Meeting, May 7, 1934.—Papers were presented by Prof. H. S. King on "Fractional Distillation: Analysis of Organic Liquids;" by the same gentleman and Miss Mary K. Merriam on "Preparation of m-Xylyl Chloride;" by J. R. Longard and Prof. J. H. L. Johnstone on "An Improved Bridge for the Measurement of Small Capacities, and Some Preliminary Measurements of the Variation of Dielectric Constant of

Rutile with Temperature;" by W. A. Crandall on "The Relation of Arginine and Histidine to the Synthesis of Purines in the Dog;" and by Prof. A. F. Chaisson of Antigonish and M. H. Friedman of Montreal on "The Effect of Histamine, Adrenaline and Destruction of the Spinal Chord on the Osmotic Pressure of the Blood in the Skate."

HARRY PIERS,
Recording Secretary.

ABSTRACTS.

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

THE METABOLISM OF DEVELOPING *Cyclopterus Lumpus* EGGS. Frederick Ronald Hayes, Dept of Zoology, Dalhousie Univ., Halifax, N. S. (Read Nov. 13, 1933). Determinations of the water, protein, fat and ash contents of the developing eggs of the common lump-sucker, Cyclopterus lumpus, have been made. The results suggest that the following periods in egg development exist: (a) from fertilization to the 6th day, characterized by decreased water and increased fat and protein (up to the late embryonic shield stage); (b) from the 6th to the 10th day, showing increasing water and decreasing fat and protein (up to the stage of rudimentary unpigmented eyes); (c) from the 10th day onwards (to the time when the yolk sac is completely absorbed), showing increasing water and fat and decreasing protein. The ash content did not change significantly during the period investigated.

A NEW METHOD OF DETERMINING THE AGE OF MINERALS. G. H. Henderson, Dept. of Physics, Dalhousie Univ., Halifax, N. S. (Read Nov. 13, 1933). The effect of the actinium series in pleochroic haloes of the uranium type was discussed and shown to lead to a new method of finding the age of the mineral bearing the haloes. Application of the method was made to three biotites which have been studied in detail. (Published in full in Proc. Roy. Soc. A. **145**, 591-8 (1934)

THE CYTOLOGY OF CERTAIN CULTIVATED APPLES. Muriel V. Roscoe, Dept. of Biology, Acadia Univ., Wolfville, N. S. (Read Dec. 11, 1933). Some eighteen varieties of apples grown in the Annapolis Valley have been studied cytologically. Fourteen varieties have been found to be diploid and four triploid. Regularity of chromosomal action is characteristic of diploids in contrast with the irregularity of action on the part of triploids. Homology and a balanced relationship of the chromosomes, rather than environmental factors, explain the normal reduction figures of the diploid varieties. The application of the findings to problems of the breeder and the grower is pointed out.

CULTURAL CHARACTERISTICS OF MARINE BACTERIA IN RELATION TO LOW TEMPERATURES. Ernest Hess, Fisheries Exp. Sta. (Atlantic), Halifax, N. S. (Read Dec. 11, 1933). Growth and normal pigment formation of Pseudomonas fluorescens and Flavobacterium deciduosum (isolated from cod fish slime) on nutrient agar have been observed at 0°C, -3°C and -6.5°C.

Ps. *fluorescens* maintained motility at these temperatures for over five weeks. i.e., longer than at temperatures above O°C. Practically all cultural characteristics of these organisms and *Achromobacter* x were evident at -3°C. Nitrate reduction, proteolysis of fish muscle protein and fluorescence on fish extract agar were the least cold-sensitive of the reactions, becoming evident at -3°C in as short periods as 5, 7 and 12 days, respectively. These temperatures are the lowest recorded in the literature at which evidence of normal cultural characteristics have been observed for any bacteria. Prolonged cultivation of the test-organisms at 5°C. produced "adapted" strains that were more active at O°C. and especially at -3°C., than strains sub-cultured at 20°C., O°C or -3°C. With few exceptions, no "adaptation" to cultivation at O°C. or -3°C. occurred.

A MICROSCOPICAL STUDY OF POLISHED SURFACES OF EXPLOSIVE ANTIMONY. Stuart Johnston, Dept. of Chemistry, Dalhousie Univ., Halifax, N. S. (Read Jan. 15, 1934). The explosive crystallization of amorphous antimony is revealed by the microscope as a spherical wave travelling through the metal. Various aspects of the phenomenon as well as attempts to measure the velocity of the explosive wave are discussed.

THE DECOMPOSITION OF COMPLEX MOLECULES AT HIGH PRESSURES. A. L. Geddes, Dept of Chemistry, Dalhousie Univ., Halifax, N. S. (Read Feb. 12, 1934). The decomposition velocity of gaseous paraldehyde has been found to diminish with increase of pressure. This effect is predicted to be general and is attributed to a relatively slow interchange of energy between different parts of the molecule.

EFFECTS OF ARTERIAL AND VENOUS OCCLUSION ON THE INTESTINE. N. B Dreyer and Dorothy Webster, Dept. of Pharmacology, Dalhousie Univ., Halifax, N. S. (Read Feb. 12, 1934). Arterial occlusion for periods up to 30 minutes does not interfere with intestinal recovery. The immediate response is a short stimulation followed by dilatation. Venous occlusion for five to ten minutes leaves no bad after effects. For periods of twenty to thirty minutes, exudation into the intestine takes place and an increase in mobility.

THE EFFECT OF INSULIN ON THE METABOLISM OF HEART MUSCLE. C W Startup, Dept. of Physiology, Dalhousie Univ., Halifax. N. S. (Read Mar. 12, 1934). It is shown that when there is an adequate supply of sugar in the blood the energy requirements of the heart are met by carbohydrates. When the blood sugar is used up, the heart apparently falls back on fat rather than protein for its energy. It seems possible that protein may form a transitory stage in the change over from carbohydrate to fat.

DESCRIPTION OF A LUNAR PHENOMENON ON THE NIGHT OF FEB. 25, 1934. Norman B. Gillies, Dept. of Geology, Dalhousie Univ., Halifax, N. S.(Read April 9, 1934). This paper describes four rings which appeared around the moon on the night of Feb. 25, 1934, three of which are considered to be very unusual.

NOTE ON THE LOCATION OF ORE-SHOOTS IN MINERAL DEPOSITS. G. V. Douglas and C. K. Howse, Dept. of Geology, Dalhousie Univ.,Halifax, N. S. (Read April 9, 1934) Ore-shoots can be defined as those portions of a mineralized zone which have sufficient concentrations of the valuable minerals to make them workable. Ore-deposits of hypogene hydrothermal origin can be classified in terms of ore-shoots: A. deposits in which the whole of the mineralized zone is ore; B. deposits in which the ore-shoots are governed

by geological structure; C. deposits in which the chemical character of the wall rock control mineralization; D. deposits in which there is no visible structural or chemical control. The experiments are based on two tentative assumptions: (1) the zoning of minerals represents the precipitation from a more or less continuous solution which is carrying away from the cooling magma various solutes which have been given off in this order; (2) ore-shoots represent the channelways which are open at the time when these solutions are given off from the magma. (The full paper appears in the Bull. Can. Inst. Min. & Met., 1934).

AN IMPROVED BRIDGE FOR THE MEASUREMENT OF SMALL CAPACITIES AND SOME PRELIMINARY MEASUREMENTS OF THE VARIATION OF DIELECTRIC CONSTANT OF RUTILE WITH TEMPERATURE. J. R. Longard and J. H. L. Johnstone, Dept of Physics, Dalhousie Univ., Halifax, N. S. (Read May 7, 1934). To measure the temperature variations of the dielectric constant of rutile at a ferquency of 1,000 cycles per second, a Hartshorn-Schering bridge was used, modified (1), by having a standard variable air condenser connected in parallel with a large fixed condenser as the variable and (2), by the addition of a Wagner ground system. By this method an amplification factor of 400 was obtained, i.e., a change in capacity of 1 micromicrofarad in the test condenser was represented by a change of 400 micromicrofarads in the standard condenser, so that differences in capacity up to 3 micromicrofarads could be measured to a relative accuracy of .001 micromicrofarad. To obtain the required signal strength from the microphone hummer for settings of this accuracy, a four stage audio amplifier was connected to the output of the bridge. In the parallel plate test condenser used the distance between the plates was found from the differences in capacity when the separation of the plates was changed by a measured distance. Some preliminary values of the change in dielectric constant from room temperature to 115° C. of rutile, cut perpendicular and parallel to the optical axis, are given.

THE RELATION OF ARGININE AND HISTIDINE TO THE SYNTHESIS OF PURINES IN THE DOG. W. A. Crandall, Dept. of Biochemistry, Dalhousie Univ., Halifax, N. S. (Read May 7, 1934). The effects on purine metabolism of diets high in histidine and high in arginine are compared by their effects on the excretion of uric acid and allantoin. Diets high in histidine gave increased uric acid varying from 36% to 267%, and allantoin varying from 22.8% to 105% over the control diet. Diets high in arginine but low in histidine gave decreased excretion of uric acid and allantoin varying from 2 to 95% and 0 to 56% respectively. That these changes are not due to changes into the endogenous metabolism generally is shown by a study of the amounts of creatonine excreted. The results are interpreted to indicate an increased synthesis of purines on the high-histidine diet, pointing to histidine as the precursor of the purine nucleus.