have been relatively passive, while the made ground in their immediate vicinity was profoundly disturbed. Thoroughly bonded and well cemented brick structures, on similarly deep and solid foundations, seem to have been equally competent to withstand the shock, except for occasional pier-like walls not well tied to the rest of the building. The weak points in wooden frame structures were in general the faulty underpinning and lack of bracing, and chimneys entirely unadapted to resist such shocks. With these faults corrected, frame buildings of honest construction would suffer little damage beyond cracking of plaster in such a shock as the eighteenth of April, save on the made ground, where deep foundations and large mass appear to be essential for the necessary degree of passivity.

Pipe lines and bridges crossing the rift line present a peculiar, if not quite unique, engineering problem which will doubtless be solved in the near future. Pipe lines on low swampy ground or in made ground are in much greater danger of destruction from earthquake shocks than those on high ground underlaid by rock, except in the immediate vicinity of the rift, where nothing could be constructed which would withstand the violence of the earth movement.

One of the lessons of the earthquake which seems peculiarly impressive is the necessity for studying carefully the site of proposed costly public buildings where large numbers of people are likely to be congregated. In so far as possible such sites should be selected on slopes upon which sound rock foundation can be reached. It is probably in large measure due to the fact of their having such a rock foundation that the buildings of the State University, at Berkeley, escaped practically uninjured. The construction of such buildings as our public schools demands the most earnest attention of the people and of the authorities charged with their construction. A great many of our schools proved to be of flimsy construction and ill adapted to meet the emergency of an earthquake shock of even less severity than that of the eighteenth of April.

The commission in presenting this brief report has had in mind the demand on the part of the people of the state and of the world at large for reliable information as to the essential facts of the earthquake. It has, therefore, not presumed to engage in any discussion of the more abstruse geological questions which the event naturally raises. It leaves such discussion for a more exhaustive report which can only be prepared after the campaign of data collection is complete, and that may be some months hence.

Very respectfully submitted in behalf of the commission.

ANDREW C. LAWSON,
Chairman.
A. O. LEUSCHNER,
Secretary.

THE ROYAL SOCIETY OF CANADA.

THE twenty-fifth annual meeting of the Royal Society of Canada was held in Ottawa, Ontario, from Tuesday to Thursday evening, May 22–24, under the presidency of Dr. Alexander Johnson, M.A., LL.D., D.C.L., emeritus professor of mathematics in McGill University, Montreal. There was a large attendance of fellows. This society, which is of a distinctive national character, comprises four sections, each numbering thirty members or fellows selected and elected from any of the provinces of the Dominion of Canada. Section I. and Section II. are more distinctively literary and historical and comprise French and English writers, while Section III. and Section IV., devoted to the mathematical, physical and chemical sciences, as well as to the geological and biological sciences,

furnish material more within the scope of the readers of SCIENCE. In Sections I. and II., however, it may not be out of place to note that there were several papers presented that are of special interest from the exploratory side of historical researches, *e. g.*, 'The Successors of de la Vérendrye under the French Régime: 1743–1755,' by the Hon. L. A. Prud'Homme, in which the successors of the first discoverer of the Rocky Mountains and their enterprises are described, and Dr. Sulte's 'General Index' to the twenty-four volumes of the Royal Society of Canada already published, will form a most valuable contribution.

Amongst sociological studies of a high order may be ranked Mons. Léon Gérin's monographs on the French Canadian habitant—two types from the southern plain of the St. Lawrence. Gérin's descriptions of the three types from the north shore of the same river are too well known to be commented upon.

Monsieur Errol Bouchette discusses the relation between social progress and primary education.

Dr. N. E. Dionne gives a chronological list of the volumes, pamphlets, newspapers and reviews published in the English tongue in the Province of Quebec from the first introduction of printing in 1764 to 1906. In a previous volume of the *Proceedings and Transactions of the Royal Society of Canada* Dionne prepared a similar and very exhaustive work for all similar writings in the French language.

In Section II. R. W. McLachlan gave a sketch of the life of Joseph Fleury Mesplet, who first introduced printing in Canada, whilst Professor W. F. Ganong, corresponding member of the society, gives further contributions to his invaluable monographs on the province of New Brunswick. Dr. S. E. Dawson has a paper 'On the Birds met with by Cartier on the North-eastern Coast of America and especially of the Great Auk, now Extinct.'

SECTION III. MATHEMATICS, PHYSICAL AND CHEMICAL SCIENCES.

Then come the papers and addresses delivered before the third section, with Professor Alfred Baker, of Toronto University, president of the section.

The following papers of scientific interest were presented and discussed:

Dr. E. Deville's paper, entitled 'Abacus of the Altitude and Azimuth of the Pole Star,' explains the theory and constitution of a diagram for finding, without calculation, the altitude and azimuth of the pole star when the sidereal time is known. The diagram was prepared for the use of the surveyors who have to subdivide townships in the northwest territories.

'Notes sur la Mécanique céleste, les Mathématiques, le calcul différential et l'Algèbre,' by Docteur Arthur Duval.

'On the Metallic Currency of the British Empire,' by Thomas Macfarlane, M.E., F.R.S.C., F.C.S., Dominion analyst.

'On the Analysis of Wheaten Flour' and 'On the Conservation of Nitrogen in Manure,' by Thomas Macfarlane, M.E., F.R.S.C., F.C.S., Dominion analyst.

Professor R. B. Owens, of McGill University, Montreal, contributed a paper 'On a New Form of Frequency Indicator.'

Mons. C. Baillargé, of Quebec, contributed no less than six papers on varied topics, including (*a*) 'The Simplification of Geometrical Teaching'; (*b*) 'The Incommensurability of the Bushel and Gallon Measures as Used in Canada'; (*c*) 'The Duration of the World Rationally Considered'; (*d*) 'The Humanitarian Question of how to Prevent Accidents to Children or Persons Taking Fire from Becoming Fatalities'; (*e*) 'On the Spontaneous Origin of Forest Fires'; (*f*) 'A Retro-

spective View—Twenty-fifth Anniversary of the Foundation of the Royal Society.'

Professor C. H. McLeod and Dr. Howard T. Barnes, both of McGill University, Montreal, contribute a joint paper entitled 'Differential Temperature Records in Meteorological Work.' This paper contains further results obtained with the electric recorder and thermometers at different levels, an account of which was presented two years ago before Section III. of the Royal Society. Much evidence has been obtained to show that the traces may be used to advantage in temperature forecasting.

'An Aluminum and Magnesium Cell,' by Mr. G. H. Cole and Dr. H. T. Barnes (McGill), describes a cell which has proved to be of some interest in its behavior on short circuit. It illustrates very well the effect of dissolved gases on metal surfaces.

'Nocturnal Radiation' was then discussed by Dr. H. T. Barnes himself, in which the following two points of special import are given: (*a*) Differential temperature traces have been obtained of the radiation at night from the surface of a specially prepared thermometer; (*b*) the effect of a clear or cloudy atmosphere is shown, and the absorption of the heat rays in some materials is given. This paper is followed by another one by Dr. Barnes on 'Radiation as the Cause of Anchor Ice Formation.' Further evidence is given in support of the view that radiation is the main cause of anchor ice formation. It is shown that water and ice are apparently transparent to the long heat rays beyond 80μ.

Mr. R. W. Boyle's two papers, namely, (*a*) 'The Effect of Tensile Stress on Specific Resistance' and 'Effect of an Electric Current on the Modulus of Elasticity,' introduced by Professor Barnes, reveal interesting results with the new resistance alloys, manganin, constantin and rheotin. A few of the pure metals are also studied in comparison.

Then follow a series of further contributions to physics, entitled:

'On Deficient Humidity of the Atmosphere,' by Dr. T. A. Starkey and Dr. H. T. Barnes.

It is shown by accurate hygrometric tests that the air in an ordinary building, heated by the hot-water system, may be almost devoid of water vapor in the winter time. The ill effects of this on the respiratory tract are discussed. A comparison of various hygrometers is given.

'Mass of the α Particles expelled from Radium,' by Professor E. Rutherford, F.R.S.

'Some Peculiar Effects resulting from the Distribution of the Intensity of the Radiation from Radioactive Sources,' by Professor E. Rutherford, F.R.S.

'A New Product of Actinium,' by O. Hahn, Ph.D., presented by Professor Rutherford.

'The Origin of the β Rays from Radioactive Substances,' by W. Levin, Ph.D., presented by Professor Rutherford.

Then follow a series of researches in physical chemistry carried out in the University of Toronto during the academic year, 1905–06, communicated by Professor W. Lash Miller.

'The Detection and Estimation of Certain of the Oxidation Products of Naphthalene,' by M. C. Boswell; 'The Mechanism of the Oxidation of Naphthalene by Nitric Acid and by Chromic Acid,' by M. C. Boswell; 'The Intermediate Compound Theory in Chemical Kinetics: the Reaction between Bromic, Hydriodic and Arsenious Acids,' by Fred. C. Bowman; 'Tautomeric Forms of the Keto-esters,' by R. H. Clark; 'The Mechanism of the Aceto-acetic-ester Synthesis,' by R. H. Clark; 'Analysis of the Reactions leading to the Formation of Phthalonic Acid from Naphthalene,' by R.

A. Daly; ''The 'Method of Effective Averages' for Dealing with the Equations of Chemical Kinetics,' by R. E. DeLury; 'Induction of the Reaction between Arsenious Acid and Chromic Acid by Hydrogen Iodide,' by R. E. DeLury; 'The Formation of Acetic Acid by the Action of Chromic Acid on Alcohol,' by C. F. Marshall; 'The Mechanics of the Reaction between Iodine and Starch,' R. B. Stewart.

And the papers of Section III. close with the following:

'Isomorphism as Illustrated by Certain Varieties of Magnetite,' by Dr. B. J. Harrington.

'An Investigation on the Value of the Indentation Test for Steel Rails,' by H. K. Dutcher, and introduced by Professor Henry T. Bovey.

SECTION IV. GEOLOGICAL AND BIOLOGICAL SCIENCES.

Not less than twenty-nine papers or contributions were recorded on the work of this section last week. They include the following:

'Illustrations of the Fossil Fishes of the Devonian Rocks of Canada, Part III.,' by Dr. J. F. Whiteaves.

This paper is mainly a revision of the author's previous well-known papers on the Upper and Lower Devonian fishes of Scaumence Bay, Quebec, and of Campbellton, New Brunswick.

'The Form and Structure of Lamp-organs in Certain Fishes,' by Professor Edward E. Prince.

The author describes the minute microscopic structure of certain phosphorescents, notably those of *Maurolicus,* and is unable to support von Lendenfeld's view that clavate cells are an essential feature in them. The emission of light observed by the author, and the lamp-like arrangement of the parts of these organs (including phosphorescent adenoid material, a silvery reflector, and a clear bull's-eye lens), all indicate the purpose of these curious structures in the deep-sea fishes referred to in the paper.

'New Points in the Structure and Development of the Pharyngeal Teeth in Fishes,' by Professor Edward E. Prince.

The author finds, from the study of sections of the pharyngeal teeth of fishes, in early stages of development, that their structure is more complex than is usually admitted. Goodsir, Tomes and other eminent authorities have described involutions of the buccal epithelium to form the external and internal enamel organ, but Balfour's surmise is correct that the whole dental sac is endodermic, at any rate in pharyngeal teeth in fishes. In each sac may be distinguished: a delicate external stratified layer or sac-well; a layer of cubical epithelial cells (the external enamel organ) which are infolded to form the internal enamel organ; and a papilla or central dental pulp. A cone of clear dentine, which is readily stained with carmine, is developed from the papilla; while the large palisade epithelium forming the inner enamel organ secretes the clear bright matter, which is determined to be enamel. Dr. J. Beard found, even in the teeth of low fishes, like *Myxine* and *Bdellostoma,* all the features referred to, recalling the details given by O. Hertwig, in Amphibian teeth. The distinctness of the inner dentine and the outer or enamel layer is so marked that Owen's view can not be accepted that all dental tissues in fishes are modifications of dentine only, and Hertwig's statement that enamel is a secretion, and not as Tomes held, transformed epithelium cells, is confirmed.

'On *Amyzon brevipinne* Cope, from the Amyzin Beds of the Southern Interior of British Columbia,' by Lawrence M. Lambe.

In this paper a description of *Amyzon brevipinne* Cope is given, based on a sec-

ond specimen of this species that the writer recognized in a small collection of fishes from the Tertiary deposits of Horsefly River, B. C. This second specimen is much more perfect than the hitherto only known specimen and type from the north fork of the Similkameen River. The other specimens from Horsefly River, found in association with the second specimen of *Amyzon brevipinne,* are referred to *A. commune* Cope, the characteristic fish of the Amyzon beds of Colorado. With the discovery of a scale from the Similkameen beds, referable to *A. commune,* a fish fauna of two species common to the Similkameen and Horsefly beds is completed. The assignment of an equal age to the Horsefly and Similkameen deposits follows, and Cope's correlation of the latter beds with the Amyzon beds of Colorado and Nevada is strengthened. The beds near Tranquille, Kamloops Lake, holding remains of *A. commune* are also regarded as belonging to the same horizon.

'Observations on and Criticisms of Microchemical Methods,' by Dr. A. B. Macallum.

'The Structure of the Mesoglœa in the Medusæ, *Aurelia flavidula* and *Cyanea arctica,*' by Dr. A. B. Macallum.

'On the Structure of an Abnormal Chick Embryo,' by Professor R. Ramsay Wright.

The case discussed is an interesting one of *Duplicitas anterior,* which supplements those previously recorded. It shows no indication of a second primitive streak, but otherwise resembles most closely those described by Hoffman and Kaestner.

'A Chapter in Comparative Physiology and Psychology,' by Dr. T. Wesley Mills.

The paper treats of the habits of a hawk and a crow as observed in confinement in the laboratory, together with an account of some physiological experiments made with a view to throw light upon the nature of the brain and the psychic organization of the bird.

'South African Iron Formations,' by Professor A. P. Coleman.

During the visit of the British Association to South Africa, rocks formed of iron ore interbanded with jasper or granular silica were studied at Johannesburg and Salisbury, while similar specimens were obtained from other parts of the subcontinent, all very like rocks of the iron formation of northern Ontario and the Lake Superior region. In South Africa these iron-bearing rocks are in general not so ancient as in America, though lower than the lowest known fossiliferous rocks. The conditions under which they were deposited in these two regions, so widely separated, seem to have been much the same; and conditions of the same kind have apparently not been repeated in later ages.

'Some Experimental Investigations into the Flow of Rocks,' by Professor Frank D. Adams.

The paper gives a brief account of some experimental work bearing upon the behavior of rocks when submitted to great pressure and under conditions similar to those which exist in the deeper parts of the earth's crust.

'Gypsum Deposits of New Brunswick, with Special Reference to their Origin,' by Professor L. W. Bailey.

The gypsum deposits of New Brunswick are among the most important to be found in Canada, and have long been the basis of large and profitable industries, the annual export from a single locality, that of Hillsboro, in Albert County, to the United States, having been, for some years, not less than 20,000 barrels of manfactured plaster, in addition to from 25,000 to 50,000 tons of crude gypsum, besides a large amount used for Canadian consumption. The very extensive operations here referred to, carried on below as well as

upon the surface, afford unusual facilities for the study of rock plaster in all its varied forms, and for the consideration of the theories which have been proposed to account for the origin of the latter. One of these theories, strongly advocated by Sir William Dawson, supposed the gypsum to result from the reaction of sulphuric acid, an indirect product of volcanic action, upon limestone; while a second supposes the same product to have resulted from direct precipitation from sea water in shallow land-locked basins, under conditions of high temperature and aridity. While the latter view, based on observations of inland salt sea, like those of Utah, is now generally accepted, much diversity of opinion still exists as to the separate origination of gypsum and anhydrite, some maintaining the former and some the latter to have been the original and antecedent rock, while still others suppose that either or both may be deposited from the same solution, according to varying conditions of temperature, depth of water, presence of saline salts, etc. It is the purpose of the present paper to consider some of these views, and especially such as relate to the occurrence and origin of gypsum and anhydrite (soft and hard plaster) in the light of observations recently made by the author in the Hillsboro quarries, with incidental references to those found elsewhere in the province.

'Features of the Continental Shelf off Nova Scotia,' by Dr. H. S. Poole.

This paper treats of the preglacial drainage when the country was much elevated, where the mouth of the ancient St. Lawrence River was one hundred miles eastward of Cape Breton, theorizes on the origin of the Strait of Canseau, and suggests that the ice sheet extended well beyond the present shore line.

'Notes on Tertiary and Cretaceous Plants,' by Professor D. P. Penhallow.

The basis of the present paper is found in several collections of plants from localities in British Columbia, placed in the author's hands by the geological survey for determination in the spring of 1905. Only the names of the identified species have so far been reported, and as it seems desirable that some of them should be dealt with more in detail, and the correlation of geological horizons indicated, they are now described at length. It is shown in connection with more recent studies that both the Tertiary and the Cretaceous forms may be definitely correlated with previously known floras, and that they are chiefly of Oligocene and Shasta-Chico age, respectively.

The author also directs attention to some recently studied material from the Pleistocene of Elmira, New York. This material consists of two specimens of the common white elm, and one specimen of a maple which can not be correlated with any existing species. It is, therefore, designated as *Acer newtownianum* in reference to the Newtown Creek, in the gravel banks of which the woods were found. Attention is directed to the occurrence of leaves of *Acer pleistocenicum* Penh., in the Pleistocene clays of the Don Valley, and the possible connection between the extinct species represented by wood, and the one now represented wholly by leaves, is pointed out.

'Review of the Flora of the Little River Group, Part I., the Calamariæ,' by Dr. G. F. Matthew.

The writer will give in this paper and later ones, the result of the revision of the plant remains, studied and described by the late Sir William J. Dawson, that were found in plant-bearing strata in and near St. John, N. B., Canada. In this examination will be embodied the revision of the types of this flora returned by Sir William to the Natural History Society of New

Brunswick, as well as the study of new material collected later by Messrs. Wilson, Stead, McIntosh, Leavitt and others. This new material, it is hoped, will give more completeness to the results.

The need of a reexamination of these plants is forced upon us not only by the changes in nomenclature that have been accepted since Sir William wrote his classic essays on this subject, but also by the fact that eminent paleobotanists have questioned the reference of these plants to the Devonian age, and have asserted that they were Carboniferous.

The writer does not propose to take up at present the stratigraphical evidence upon which is based the reference of the terrane which holds these plants to the Devonian age, but only to study the plants themselves and note the beds from which they have come; the stratigraphy may be left to a later occasion. It was in connection with the labeling of the types of Sir William's species, in the Museum of the Natural History Society of New Brunswick, that such revision was found to be necessary.

Since Sir William's work was performed new species have been found in these beds, including some novel types of the calamariæ and the ferns (as well as insects and myriapods). These will be described and figured in this series of articles and the writer hopes may prove of interest to paleobotanists.

The terrane in which the plants are found is thought to cover a considerable interval of time and not to be confined to the Middle Devonian as Sir William Dawson's determination of the flora has led many to suppose. While there is a group of species of wide range of time (*e. g., Calamites Suckovii*) in these beds, there are others that are confined to special portions of the terrane and it is these species which give character to the fauna.

'On some Fossils from Northern Canada, collected by Commander Low, during the Expedition of 1903–04, together with Notes on the Geological Horizons to which they Belong,' by Dr. H. M. Ami.

This paper contains descriptions of the species of fossil organic remains supposed to be new from Beechy Island, Cape Chidley, and from Southampton Island, collected by Commander A. P. Low, during the cruise of the steamer *Neptune* in 1903 and 1904, in the Arctic regions and other portions of northern Canada, together with notes on other forms occurring in that portion of the Dominion. The geological formations to which the fossils known to occur in that portion of Canada belong will also be discussed and an attempt made to correlate them with geological horizons elsewhere in the Dominion.

'Note sur les Bassins Hydrographiques des Rivières Montmorency et Ste. Anne,' by Abbé J. C. K. Laflamme.

A rather remarkable anomaly exists regarding the quantity of water in the valleys of the Ste. Anne and Montmorency Rivers. The two hydrographic basins appear to be about equal as regards areas drained, and, moreover, they are side by side. They both receive the same quantity of precipitation. The paper deals with the probable reasons for the differences in the amount of water each carries.

'Notes on the Mineral Fuels of Canada,' by Dr. R. W. Ells.

This paper discusses the various kinds of mineral fuels found in Canada, including the various kinds of coals, from anthracite to the newest lignite, anthraxolite, albertite bituminous shales, petroleum, natural gas, peat, etc., with their distribution in so far as at present known in all the provinces of the Dominion, mode of occurrence, extent and economic value.

'A Remarkable Outgrowth from the Trunk of a White Birch,' by Professor D. P. Penhallow.

At the time of the recent forestry convention at Ottawa, my attention was directed to a remarkable growth said to have been found in New Brunswick. Subsequently a specimen was submitted to me for examination by the Hon. T. G. Loggie, of the crown lands department, in whose museum the original specimen was deposited.

The specimen, described as being twenty feet in length, was found to consist of a flattened cord of tissue, with a perfectly normal outer bark like that of the white birch, and within it was composed of cork tissue which had resulted from the rapid transformation of living bark structure. The fact that this cord was attached to the tree by the upper end only, and that it therefore hung altogether free for its entire length, presented a problem of an unusual character with respect to the growth of trees in this latitude; but it is shown that the phenomenon may be accounted for on the supposition that an injury to the bark had given rise to an outgrowth presenting extraordinary rapidity of development, and that the growing tissue was converted into cork as fast as projected.

'Critical Notes on the Geometridæ of British Columbia, with Descriptions of Fourteen Species,' by Rev. G. W. Taylor.

Introductory observations on the present state of our knowledge of the group, and review of the work of previous writers. List of the species known to occur in British Columbia, with critical notes on the nomenclature, distribution and life history of each species. Description of forms new to science. Bibliography.

'Distribution of Bacteria in Canadian Cheddar Cheese,' by Professor F. C. Harrison, presented by Dr. Fletcher.

'Legume Bacteria,' by Professor F. C. Harrison, presented by Dr. Fletcher.

'Studies in Canadian Fungi.'

(1) 'The Imperfect Fungi,' by John Dearness, communicated by Dr. G. U. Hay.

(2) 'The Hydnums and their Allies,' by Dr. G. U. Hay.

'Some Unsolved Problems in Immunity,' by Dr. A. G. Nicholls, presented by Professor Wesley Mills.

A short historical *résumé* of the development of our modern ideas as to the nature of immunity. The two opposing schools and their explanation of the phenomena of the healing of infectious disease. An account of the recent experimental work tending to reconcile their divergent views. Methods by which the resisting power of the animal organism may be increased. Natural and artificial immunity. An attempted rational explanation of the processes of healing.

'On the Sleeping Sickness; with Microscopic Illustrations,' by Sir James Grant.

The recent discovery during the past year of protozoal parasites in the blood of different animals, in addition to many new species of *Trypanosoma,* is of much interest, owing to the close affinity of these discoveries with sleeping sickness, the epidemic area of which is confined to parts of equatorial Africa.

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'Bibliography of Canadian Geology and Paleontology for the Year 1905,' by Dr. H. M. Ami.

'Bibliography of Canadian Zoology, Exclusive of Entomology, for the Year 1905,' by Dr. J. F. Whiteaves.

'Bibliography of Canadian Entomology for 1905,' by Rev. Dr. C. J. S. Bethune.

'Bibliography of Canadian Botany for the Year 1905,' by Dr. A. H. MacKay.

The presidential address was delivered on the evening of Tuesday, May 22, in the assembly hall of the Provincial Normal School, where all the sessions also were held. Besides giving an excellent review of the

progress and advancement made in physics, Dr. Johnson referred to the semi-jubilee celebration of the Royal Society. A public and popular evening lecture, one of the features of the society meetings, was delivered on the following evening, by Professor C. C. James, of Toronto, on the subject, 'The Downfall of the Huron Nation.' The lecture was illustrated throughout with numerous views projected on the screen.

Some interesting functions were held—notably a dinner at the Russell House, Ottawa, and a reception and garden party at the observatory, where the public and the society had an excellent opportunity of visiting the beautiful building recently erected by the Canadian government, in charge of the Dominion astronomer, Dr. W. F. King.

H. M. AMI.

OTTAWA, May 31, 1906.

THE INTERNATIONAL METEOROLOGICAL CONFERENCE AT INNSBRUCK.

ALTHOUGH several months have elapsed since this meeting, the fact that no account of it has appeared in America prompts the writer, who was the English-speaking secretary, to give a brief statement of its nature and proceedings.

The directors of the various meteorological services and observatories of the world, to the number of fifty, met last September at Innsbruck, Austria, for the purpose of discussing questions of common interest, but without authority to pledge their respective governments to any action.

The chief of the United States Weather Bureau and Professor Bigelow were unable to attend, and, in their absence, Father Algué, of Manila, and the undersigned represented the United States. Similar conferences had been held at Munich in 1891 and at Paris in 1896, but the meeting there during the exposition of 1900 was open to all meteorologists. These reunions are arranged by the International Meteorological Committee, a permanent organization, composed of seventeen persons, who are generally the heads of meteorological services in their respective countries. At the present time the president of the committee is M. Mascart, director of the Central Meteorological Bureau of France, and the secretary is Professor Hildebrandsson, director of the meteorological observatory at Upsala. The members are chosen at meetings of the directors, and although vacancies or resignations may be filled by the committee itself, the fact that the committee had been in office during nine years made it advisable to convoke this meeting of directors in order to elect a new committee. Since 1896 the permanent committee has met three times and has received the reports of four subcommittees, appointed mostly from outside its own body to further special investigations.

The conference at Innsbruck was organized by choosing Professor Hann, of Vienna, its honorary president, and Professor Pernter, also of Vienna, its president, in place of M. Mascart, who was prevented from coming to Innsbruck. Professor Hildebrandsson, of Upsala, and General Rykatchef, of St. Petersburg, were elected vice-presidents. In his opening address Professor Hann reviewed the great progress which meteorology had made since the first conference at Leipzig in 1872, chiefly through the exploration of the upper air, which, by the erection of mountain observatories, and especially through the use of kites and balloons during the last decade, has led to new and unexpected results. At the present time meteorology is facing such important problems as the connection between weather periods of long duration and solar conditions, a considera-