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PROCEEDINGS

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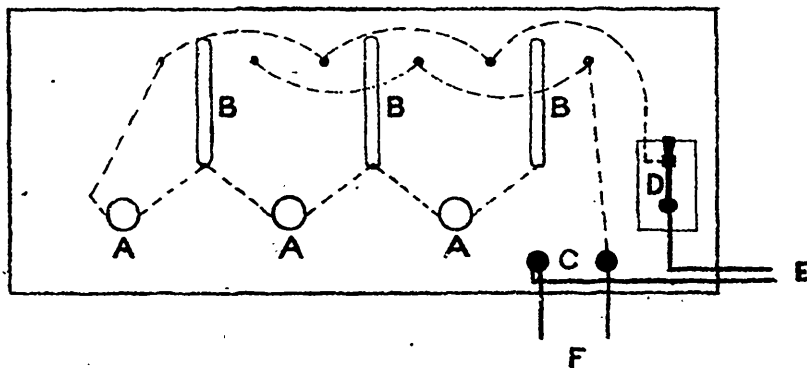
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A CONVENIENT RESISTANCE FOR ELECTROLYTIC ANALYSIS. BY J. WATSON
 BAIN, B.A. Sc.

(Read 10th February, 1900.

CHEMISTS, who employ electrolytic methods, are often annoyed by difficulties in obtaining a suitable current. Primary batteries are most unsatisfactory in many ways, requiring constant attention, and being subject to considerable variation in their current. Storage cells are very much more convenient, but the necessity of charging is a drawback, and detracts somewhat from their value.

By means of a suitable resistance, the direct current of the ordinary incandescent circuit may be used with great comfort; the variations which occur



are so slight as to be negligible, there are no cells to be kept in order, and the current is always ready for use. A convenient resistance for this purpose has been employed in the chemical laboratory of the School of Practical Science for more than a year, and a brief description of the apparatus, may be of value to those, who have not had time to experiment for themselves.

The arrangement is represented in the accompanying diagram in which *AAA* represent three sixteen-candle power incandescent lamps, with their sockets; *D* is a single throw switch; at *C* are two binding posts, to which are connected the wires *F* leading to electrodes in the solution under analysis;

BBB are strips of brass, pivoted at the lower end, each of which can make contact with two of the studs, represented by heavy dots in the diagram; *E* are feed wires from the incandescent circuit; and the dotted lines represent the invisible connections.

These various parts may be conveniently mounted on a board eighteen by eight inches.

By combining the lamps in different ways, currents varying from 0.2 to 2 amperes may be obtained, a range which is ample for the usual electrolytical work.

NOTES ON SKULLS TAKEN FROM A PRE-HISTORIC FORT IN KENT COUNTY.

By MR. ARCHIBALD BLUE.

(Read 21st April, 1900.)

THE Indian Fort on lot 59 north of Talbot Road, in the Township of Orford, is situated at the springs which are the source of Clear Creek, two-and-a-half miles from the shore of Lake Erie and a mile from the decayed hamlet of Clearville. Until twenty years ago the Fort stood in the midst of a dense forest of beech and maple, white oak and black walnut, and there were trees of large size growing on the walls and within the enclosure. The site was known to the early settlers, but none among them were archaeologically inclined, and the ground was not disturbed by them. It used to be said, however, and I think it is true, that one of my old schoolmasters, Galbraith the Phrenologist, was a frequent visitor there, and that he dug up some skulls to help in his studies. It was while he was employed as teacher in our school, in the years 1848-49-50, that he applied his spare hours to acquiring a knowledge of Phrenology, and from our school he went out on his long career of lecturer on the subject in this Province and elsewhere.

But the first serious attempt to explore the Fort was made eleven years ago by Mr. David Boyle, our archaeologist, who succeeded in getting six skulls which are now in the Museum of the Education Department. Mr. Boyle made measurements of the Fort, and a sketch and description of it together with an account of his exploration was printed in the Proceedings of this Institute for 1888-89.* In Mr. Boyle's opinion the graves exhumed by him did not probably belong to the people who built the walls, but to subsequent possessors of the ground who had lost all knowledge of its former occupancy.† He suspects, indeed, that there were three successive occupations by different tribes separated by wide periods of time. The skulls secured by him were discovered in an ossuary on the highest plane within the walls, and had been interred with the limb bones only.

These Notes lend confirmation to Mr. Boyle's views, and being mainly a transcription of the entry in my notebook made upon the ground I can vouch for their accuracy.

It was on the 14th of August, 1889, about a month after the explorations made by Mr. Boyle, that I first saw the Fort, although I had known of it from childhood. I was accompanied by Dr. P. H. Bryce of this city and my brother, the late John Blue, jr., of Orford. The trees had been cut down and the timber removed at that time, but most of the stumps were yet fresh and showed that a number of the trees were of large size. In all other respects the site was practically unchanged. The walls or embankments of the Fort were in an excellent state of preservation, and oblong or nearly oval in form. As originally constructed they appear to have followed upon the north, west and south sides the edge of the bank of the creek and one of its small tributaries, and there are cross-walls from north to south which divide the enclosure into three unequal areas, two of which occupy benches of the creek, while the third is on the tableland of the country. Where intact, the walls are about ten feet wide at the base, three to four feet high, and about five hundred yards in the outer circumference. At the north-east angle there is a breach in the wall about twenty-five feet long, which may have been an opening to the midden-heap, and at the north-west angle is a low bit of wall about seventy-five feet long. There is a third opening midway in the

* Annual Report of the Can. Inst., Session 1888-9, pp. 15-18.

† Notes on Primitive Man in Ontario, 1895, p. 20.

west wall, which no doubt was the water-gate of the Fort, as some of the springs which feed the creek are not more than thirty feet distant from it. The north wall like the west one extends parallel with the ravine, but is at a higher level and overlooks a steeper slope. As already stated, the enclosure occupies three distinct levels, separated by cross walls, the lowest one on the first bench of small extent, and the upper ones which rise by successive steps embrace about 7,000 square yards each.

Numerous openings had recently been made on the upper level and also upon the enclosing walls, at almost every one of which we found ashes, bones and pieces of pottery. Along the northern side of the second bench we were attracted by a small but distinct depression, about six feet in width and lying 5° west of north. As it seemed to be a likely spot for exploration we made an opening along the middle of it, at a point twenty-five feet from the base of the north wall. At a depth of eighteen inches the spade struck and broke what proved to be a thigh bone, and the limb was carefully uncovered down to the foot. We then opened towards the head, measuring about six feet from the heel, and struck upon a skull in such a position as led us to suppose it must be part of the same skeleton as that of the thigh and leg bones already uncovered. Extending the work from the head downward we found the position to be such as would suggest that the pelvis had been bent from the general line of the body: but further digging showed that we were upon a second skeleton, lying upon the east side of the first. Having removed the earth from a space seven feet long by four wide, the true situation was apparent. The bodies had been laid side by side on a north and south line, but with the heads inclining towards each other at an angle of about 15° .

The bones had the usual yellowish brown color peculiar to extremely old bones, and were so fragile as to crumble almost at a touch. The sutures however indicated that the age of the persons at the time of death would not exceed 40 years.

The skeleton lying upon the right or westerly side was obviously that of a male person, as it measured five feet nine inches in length and was relatively narrow across the pelvis region. It was equally obvious that the other was a female, the length of which was five feet five inches with a relatively broad pelvis. The head of the male was thrown forward, with the lower jaw fallen down upon the vertebrae of the neck, the cause of which was discovered in the root of a walnut tree which had entered at the right ear, and, passing through to the left side, pushed the sub-maxillary bone out of position. The skull may be described as rather brachycephalic, but with retreating frontal bones, broad occiput and dome-shaped vertex. It was completely filled with a fine black mould, upon removal of which the parts separated and fell to pieces. A curious find in the base of the skull was the under-jaw of a chipmunk. There were twelve teeth in the lower jaw of this skull, well preserved, but the two left incisors were blackened and worn down about one-twelfth of an inch below the level of the other teeth. The two bicuspid teeth on each side were missing, but the molars were sound. The bones of the vertebrae and all the lower parts of the body were in position. Those of the feet were lying outwards. The bones of the left side were throughout more fragile than those of the right, except in the skull, which was injured by the root that had penetrated it. The arms lay alongside the body, extending two-thirds of the way down the thigh bones, but with the fingers of the right hand underlying the thigh.

The female skeleton was in a better state of preservation than the male, except as they were injured by the root, which, extending under the skull and spinal column, had destroyed the occipital bone and portions of the spine. The head was very nearly within the brachycephalic limit, with high and rather broad frontal bone, wide occiput and large eye sockets. The teeth were in good condition, and only three were missing—two bicuspids in the lower and one in the upper jaw. The front lower teeth were slightly worn.

There is no doubt from the color and condition of these skeletons that they had lain a long time in the earth; but additional evidence of time is afforded by the root which had disturbed them. This root, which was two-and-a-half

inches in diameter, belonged to a walnut tree which grew within the walls of the Fort, at a distance of fifteen feet to the north-west of the bodies. From the appearance of the stump, the tree had been cut down for at least a quarter of a century. The diameter across the cut was forty-six inches, and I counted four hundred and eighty concentric circles of growth, exclusive of two inches of decayed wood on the circumference. Assuming each circle to represent a year, the beginnings of that tree must be carried back to the dawn of the fifteenth century, or nearly a hundred years before Columbus discovered America, and the probability is that during the first period of occupation no trees stood within the walls of the Fort.

The skulls exhumed by Mr. Boyle were found in the highest plane of the enclosure, where evidently they had been re-interred. All of them are remarkably fresh and well preserved, as compared with those taken up by Dr. Bryce and myself; but one is minus a portion of the left temporal bone, so that an exact measure of its breadth cannot be secured. Measurements of the two lots for calculating the cephalic indices have been made for me by Mr. Boyle, and they are interesting in so far as they appear to prove that the older and newer skulls represent two distinct races of people who at different times occupied the same locality. The skulls collected by Mr. Boyle are given according to their catalogue numbers and with brief descriptive notes.

No. 12,480.—6 $\frac{3}{4}$ by 5 $\frac{3}{4}$ inch. Nicely formed skull of a woman. Reddish brown in color, as if caused by suffusion of blood. No Wormian bones. Age, 35 to 40 years. Cranial index, 79 $\frac{3}{4}$.

No. 12,494.—7 $\frac{1}{4}$ by 5 $\frac{1}{2}$ inch. Pronounced supra-orbital development. A strongly formed skull, with sutures prominent. Age, about 50 years. Cranial index, 68 $\frac{1}{4}$.

No. 12,499.—7 $\frac{1}{4}$ by 5 $\frac{1}{2}$ inch. Occipital bone largely developed, with very prominent process. Large Wormian bone at the fontanelles of the parietal and frontal bones and along the occipital suture. Age, 60 to 65 years. Cranial index, 76.

No. 12,500.—7 $\frac{3}{4}$ by 5 $\frac{1}{4}$ inches. Extraordinary development of supra-orbital ridges. Sutures ossified. Age, probably 80 years. Cranial index 71.

No. 12,501.—7 $\frac{1}{4}$ by 5 $\frac{3}{8}$ inch. Skull of very fine texture. Slightly unsymmetrical in occipital bone. A few Wormian bones around the occipital. Age, 40 to 45 years. Cranial index, 74 $\frac{1}{4}$.

The two old and uncatalogued skulls give the following measurements :—

Male.—7 by 5 $\frac{1}{2}$ inch. Cranial index, 78 $\frac{1}{4}$.

Female.—6 $\frac{3}{4}$ by 5 $\frac{1}{4}$ inch. Cranial index, 77 $\frac{1}{4}$.

The cephalic index is used to represent the percentage of breadth to length in the living head, and is assumed by Ripley and others to be two to three per cent. more than the cranial index or proportion according to skull measurement. When the percentage rises above 80, according to Ripley, the head is brachycephalic; when it falls below 75, it is dolichocephalic; and when the index is between 75 and 80 it is mesocephalic,—or short, long and medium formed heads respectively. Applying this rule to the skulls of the Clear Creek Fort, it is found that the two old skulls are on the border line of the brachycephalic class. Only one of the later skulls belongs to that class, two are markedly dolichocephalic, and two are mesocephalic.

There are not a sufficient number of skulls for computing an average index. As far as numbers go, however, they indicate that two widely different races are represented, and so completely are they cut off from us that even the more modern of them has hardly left an event, a record, a fact, or a tradition out of which to weave a page of human history.

THE PRESIDENT'S ADDRESS. BY JAMES BAIN, JR., ESQ.

(Read 18th November, 1900.)

IN declaring open the fifty-second session of the Canadian Institute, my first duty is to thank you for the honour you have conferred by electing me to fill a chair which has for half a century, been occupied by a succession of eminent men, the very recollection of whose names fill me with a sense of my own unworthiness. The recent semi-centennial celebration forcibly reminds us that the old generation has almost passed away and that a new generation has entered into its place, let us hope, with the same simple, earnest, unselfish desire to advance the cause of scientific research in this city and province, and to enrich ourselves with a deeper insight into the secret processes of nature. In addressing you on this occasion, it seems natural that I should consider the Institute and the work which is being carried on in it, from the standpoint of my own profession, and its library, therefore, occupies a leading position in my remarks this evening.

Private libraries, when accumulated by thoughtful men are almost always the reflex of the owner's mental pursuits, whether he gathered his books as his working tools, or indulged in what is generally called literature, for the refreshing of his mind and indulgence of his love for the beautiful. Associations of persons engaged in search for common objects or desiring a common end, must, if they accumulate books, follow the same course as private individuals, and their library becomes the reflex of their wants. The collection is more or less heterogeneous according to the number of those who have influenced the purchasing. In this way, libraries such as our own have grown up, and while special libraries for scientific use have often been collected in a brief space of time, and with a strict adherence to the definite purpose for which they were intended, most collections made by young and energetic societies have grown, as I have described. When the Natural History Museum was removed from the British Museum to South Kensington, it was resolved, to buy new working libraries for each department, rather than deplete the collection in Bloomsbury. A large sum of money was granted for this purpose to the Botanical Department, and perseverance and energy extended over a few years, created a library of books on this branch of Science, which has few equals. It is seldom however, that libraries are thus formed. During the early years of this Institute, it was the intention of the members to obtain either by purchase or donation, those books on science, history, travel or biography, which, month by month as they were published, commended themselves to the council, as being of more than ephemeral value. In looking over the remains of the early purchases, it is interesting to trace the individual tastes of the members of council of those years. The removal of the Institute twice, the change in the manner of life, carrying the homes of the members further from the centre of the city, and most important of all, want of funds, tended to diminish interest in the Society's collection of modern scientific literature. A library of current books, whether scientific or not, depends for its active existence upon a steady influx of new books, and when this ceases, the library rapidly loses its position and usefulness.

During this period however, a continuous stream of transactions, collections, proceedings, archives and other publications of learned and scientific societies poured in, so that when the present building was being completed, the council realized for the first time, that they had the nucleus of a library which might become extremely valuable from its wealth of scientific material. For some years the council devoted a considerable portion of its limited income to binding the accumulations, but finding that they were not able to overtake the arrears and keep up to the yearly additions, they asked the government of the Province to aid them in what they felt was a provincial work. This

assistance was generously and readily given for two years. A surplus in the hands of the committee for the reception of the British Association in 1897, was also handed over to the Institute, for the purpose of increasing the number and completing such sets as it was desirable either to buy or perfect. This work is now being carried on by your library committee, a number of sets have been completed during the past year, and an accurate list has been made of the balance, to obtain which persistent efforts will be made. Most of the miscellaneous books have been exchanged or sold, and all the available space devoted to the publications of Societies. The library of the Institute is therefore strictly specialized as a Science library, not limited to any one branch of Science. It contains to-day about 7,000 bound volumes, containing the annual or biennial publications of 588 societies. These societies are scattered over the civilized world, wherever men are thinking and working on scientific lines. The mere list of countries is suggestive, as I go over them in alphabetical order: Algeria, Argentine Republic, Austria-Hungary, Belgium, Brazil, British Guiana, Canada, Chili, China, Cape Colony, Costa Rica, Cochin-China, Denmark, Ecuador, Egypt, England, France, Germany, Greece, Holland, India, Ireland, Italy, Japan, Java, Mexico, New South Wales, New Zealand, Norway, Peru, Portugal, Queensland, Roumania, Russia, Scotland, Spain, Straits Settlement, Sweden, South Australia, Switzerland, Tasmania, Tunis, Turkey, United States, Uruguay, Victoria, West Indies, forty-seven in all. Some of the countries have so recently entered the field of Science, that it is difficult to realize the change which has taken place in a hundred years. That Algeria or Cochin-China, or Java, or Costa Rica should be there, is one of the features of the 19th century, which marks it off from all preceding eras. Down nearly to the middle of the 18th century, Latin was the common language of Science in Europe, and the use of a common tongue did much to extend scientific knowledge, at a time when the number of students in each country was limited. But now the vulgar tongue prevails within certain limits, for we find that though these five hundred and eighty-eight sets represent forty-seven countries, they only require fourteen languages. English has 281, French 100, German 89, Italian 42, Spanish 34, Norwegian 9, Swedish 8, Dutch 8, Russian 5, Hungarian 4, Danish 3, Portuguese 2, Latin 2, Modern Greek 1. As might be expected their subject matter is extremely varied. A large number of societies like our own, include within their publications, original papers on any subject of scientific research. The number of sets published by these general societies is two hundred and eighteen, and the remaining three hundred and seventy are divided thus:—Chemistry 5, Botany 14, Geology 29, Archaeology 25, Engineering 39, Philosophy 25, Geography 40, Philology 7, Entomology 6, Astronomy 11, Biology 6, Physics and Mathematics 12, Zoology 4, History 28, Meteorology 13, Ethnology and Anthropology 38, Agriculture 9, Medicine 8, Statistics 10, Law 8, Mineralogy 1, Microscopy 7, University Papers 21.

The yearly increase is about two hundred and fifty volumes. The number of papers or treatises in each volume may be estimated at an average of ten, which fairly represents 70,000 separate books.

Let us now compare our situation with that which prevails in older countries. In all these it may safely be said that they point to the number and quality of their libraries, and the use that is made of them as one of the evidences of their culture and intelligence. The nation without such marks of learning, is lower in rank in the scale of civilized peoples, and one of the distinguishing marks of its rise, is the number of libraries which are established. Outstanding above all others in English speaking countries, is that of the British Museum with its 2,000,000 printed books and manuscripts, and 200,000 pamphlets, with its readers from all parts of the world, and its yearly increase by purchase, donation and copyright of 27,000 volumes, and 67,000 serials and parts of books. In English books it is the richest in the world, and in the literature of France, Italy, Russia, Germany and Austria it is only second, if indeed second to the National Libraries of these countries. Its collection of American books is equal to anything on this side of the Atlantic, and its Oriental literature is not rivalled by any of the great cities of the East. The United Kingdom also possesses in addition over three hundred libraries, ranging from five thousand

to half a million volumes. The largest library in the world is that at Paris, which contains about two and a quarter million of books and 160,000 manuscripts, and France possesses in addition five hundred public libraries, containing four and three-quarter million of books. Germany has no less than ninety-seven large libraries, averaging 100,000 volumes each, the Royal Library at Munich, having something over 900,000 volumes, and the Royal library at Berlin over 700,000. We are not accustomed to think of libraries in connection with Austria-Hungary, but it stands first among all the countries of Europe for numbers, having no less than five hundred and seventy-seven public libraries, containing about 6,000,000 volumes, a number which is equal to about twenty-six books per head for the entire population. Russia, so comparatively recent in its civilization, has one library very nearly as large as the British Museum, and seven over 100,000 volumes. Even the smaller countries, like Switzerland and Denmark, have respectively eighteen libraries, ranging from 40,000 to 100,000 volumes, and four libraries containing 725,000 volumes. I might continue the list of countries, which all tell the same story, but will only mention one other,—the little Island of Iceland, poor in men and means, but exhibiting to us its love of learning, has one scientific library of 30,000 volumes in addition to several libraries of general literature. I have purposely refrained from mentioning the American libraries, because so many of them are familiar to us, and because most of us are astonished at the wealth which has been expended upon them, the rapidity of their growth and the energy with which they are conducted. But it may well be said that these are general libraries, which by the assistance of the State, or by private generosity are enabled to make immense collections for the benefit of readers of all classes. As general libraries they strive to cover the whole field of human knowledge, and do so more or less superficially. Even in the case of the British Museum, we were recently told by a very high authority, that "it did not contain more than one-half, or at least three-fifths, of the books in English which have been printed." It is not too much to say that the best library of the English speaking people, is more or less, of a makeshift. Mr. Bullen, the late keeper of the printed books in that library recognized this, when he testified before the Society of Arts, "that on few or no subjects to be investigated, could the British Museum afford the scholar half the necessary books." Let us now turn to the consideration of societies like our own and see what they have done to supply the demands of their readers. In Great Britain the Royal Society has 75,000 volumes, the Royal Institution has 50,000, the Royal Irish Academy 30,000, the Newcastle Literary Philosophical Institute 60,000, and many others with corresponding numbers of books in their libraries. But these while confining them to Science generally, evidently do not meet the wants of students in special subjects, for we find a Geological Society's library of 17,500 volumes and another of 30,000, a Geographical of 25,000, a Statistical of 27,000, and an Electrical Engineers of 100,000 volumes, and so on through every branch of the Arts and Sciences. Now think of these and then of our collection of two hundred and ninety volumes in Geology, or in Geography of four hundred, or Statistics of one hundred volumes.

The fact is, that when a student enters upon a special branch of study, he finds so little to help either in our own library or in other libraries in this city, that he is compelled to look elsewhere for the literature of his subject. Let him be engaged upon, say, botanical research, he would find that our apparently large collection contains perhaps one hundred and fifty volumes devoted to this subject, and so with every other branch of Science. The closer the student specializes, the more difficult it is for him to arrive at what is known, as a basis upon which to carry on his researches. It is evident that our library, however complacently we may admire it, is as yet, but in its infancy. We must not cease to enlarge and develop it, every opportunity must be taken to increase the number and preserve the high character of its books. The council has done wisely in fixing the limits within which it ought to grow. Other institutions in this city have their own place to fill, and should be stimulated by our example, to increase their usefulness within their own limits. We must do more to meet the wants of our own students, gaining from them such a knowledge of our shortcomings, as will aid us in building up our collection

on special subjects. The student who knows his subject is the best friend of the library, and the council would act wisely in purchasing freely, to meet his requirement, even if for a year or two, the library may become one-sided. Others follow in time on different subjects and should be treated in the same way, so that the period is not far distant, when it would become a scientific library of high standing. It is well to remember that a library is not of value according to the number of its books, but because of their character and the facility with which their contents may be known. The Encyclopedia represents the demand for systematically arranged knowledge. The information contained in it may be found in more extensive form, in more interesting shape and in close connection with its context, in a few hundred books, but the ordinary reader has no time to make the necessary search, or lacks the necessary knowledge to guide him, and therefore turns to a quarter where it is found under its proper letter of the alphabet. It is therefore better to have a library of 5,000 volumes fairly covering two or three subjects and provided with the proper apparatus for gaining a knowledge of its contents, than 20,000 which are scattered over all subjects, without such a guide. The one will attract special students from all directions, who will find within reach, their subject fairly treated, while the other will become the happy hunting ground of the dillitante, or the careless, edifying none. To make our own library worthy of the Institute, it is essential therefore, that it should increase in fixed directions, that subjects should be chosen which can be worked up, and that proceeding thus, department after department might be made so complete, as to make it of immense value to the whole Province. One of the requirements which I have pointed out as an essential in a good library, is an easy and accurate means of obtaining a knowledge of what it contains. In our case this is rendered even more necessary, as the treatises we have and hope to obtain, are contained in volumes which bear as their title the name of the society by whom they were issued. In some cases the contents are very miscellaneous ranging over many subjects. Some institutions publish at long intervals, ranging from ten to fifty years, properly arranged catalogues or indices, covering the volumes published during the interval, but the index may be only for the early volumes, while the information sought is to be found in the more recent. The expense of preparing a catalogue, month by month, as the different fasciculi arrive, is so great, that no society with limited sources of income could undertake it. Fortunately for small libraries and scientific enquiries, this difficulty is now being overcome, and what one society could not hope to do, the many in combination are about to do. About ten years ago, a conference under the auspices of the Royal Society, was held in London, to consider the possibility of a co-operative catalogue of scientific papers. The conference contained representatives from almost all civilized countries, and was favourable to the undertaking. Much time and infinite pains have been taken to arrive at a basis upon which to proceed with the work, and at the meeting held in London in June last, the conditions as amended and reconsidered, were finally adopted unanimously. The objects and nature of the catalogue are thus defined:—

1. That it is desirable to complete and publish by means of some international organization, a complete catalogue of scientific literature arranged according both to subject-matter and to author's names.

2. That in preparing such a catalogue, regard shall, in the first instance, be had to the requirements of scientific investigators, to the end that these may, by means of the catalogue, find out most easily what has been published concerning any particular subject of inquiry.

3. That in indexing according to subject-matter, regard shall be had, not only to the title (of a book or paper), but also to the nature of its contents.

4. That the catalogue shall comprise all published original contributions to the branches of science hereinafter mentioned, whether appearing in periodicals, or in the publications of societies, or as independent pamphlets, memoirs or books.

5. That a contribution to science for the purposes of the catalogue, be considered to mean, a contribution to the mathematical, physical or natural sciences, such as, for example, mathematics, astronomy, physics, chemistry.

mineralogy, geology, botany, mathematical and physical geography, zoology, anatomy, physiology, general and experimental pathology, experimental psychology, and anthropology, to the exclusion of what are sometimes called the applied sciences.

The convention conferred power upon an International Council to carry out the details of the work on the lines laid down, during each ten years' interval of the meeting of the convention. The central Bureau for the actual work, is located in London, and Regional Bureaus "have been established in all countries, who will be responsible for the preparation of the slips requisite for indexing all the scientific literature of the region, whatever may be the language in which that literature may appear." The Regional Bureau also sends one member each to the International Council. The catalogue is to be issued for the present, in book form only, at least one annual volume for each science, the first group to be published in July 1901, and continued regularly at quarterly intervals. Each annual volume will contain an author's and subject catalogue, and the first literature to be included in the catalogue, is that of January, 1901. This enormous undertaking, which has been carried out under the inspiration of the Royal Society, will prove of infinite value to scientific labourers, and to the library it not only means perfection of cataloguing of the books it possesses, but an absolute guide to what it has not and what it requires.

At the first conference held in London, in 1890, invitations to send delegates, were extended to all countries. Canada was represented on that occasion by Lord Strathcona, who freely expressed the good wishes of the Canadian Government. At the last conference, it was resolved to ask all the countries represented at any of the conferences, to assume a certain amount of financial responsibility. A sum was to be agreed upon as the approximate yearly cost of each year's volumes, until some years of experience permitted more accurate calculations. Each country was asked to guarantee a fixed number of sets for five years. The United States for example were apportioned forty-five sets and have already subscribed fifty-eight. Canada as yet has done nothing, and is now asked to bear her share. Our national honour demands that she should not hold back from this work of the community of nations. I trust that this Institute will not be backward in its efforts to induce the Government of Canada, to do, what is being done by other colonies of the Empire, and by Denmark, and the smaller countries of Europe, and that at least a sufficient number of copies shall be subscribed for, to supply the eight or nine Universities of the Dominion.

A successful library on the lines I have indicated, would create such a standard as would naturally influence the other libraries of the Province. The demand for a Provincial Central Library, commensurate with the importance of its interests would follow in due course. The Economic Arts would demand the same attention, the Fine Arts in the various forms of painting, sculpture and decorative art, would present their claim, and the Province of Ontario would awaken to a sense of its poverty in all that tends to develop a sense of the beautiful, of its inability to compete with foreign nations in those industrial pursuits, which demand the employment of artistic taste, and in those higher qualifications, without which, no nation has risen to eminence. Such a Central Library, working in connection with the smaller specialized libraries, would become a centre of light for the Province. Its books with some exceptions, should be placed at the service of every student within its limits, so that a graduate from any of our Universities might be enabled to continue his studies wherever his home is fixed, and the self-taught scholar, however humble his surroundings, brought within reach of the master-minds of the century. Is it among the impossibilities of the future, that the post-office department could be induced to grant a one cent per pound rate for books going and coming from the library to a resident in the Province?

I have from this platform urged the claims of those who are far removed from the centres of education; whose little reading matter is poor and tawdry, except what is obtained from the weekly newspaper, and I wish in conclusion, to say a few words on their behalf. The population of the older portion of this Province is largely agricultural; the new Ontario promises to be a land

of miners. This means that homes are isolated and self-dependent. Our winters forbid the carrying on of farm operations during three months of the year, and the farmer is necessarily driven into his home for much of this time. Would it not be profitable to teach him in his hours of leisure? We have insisted that the children should be educated, and have at great expense planted schools in every portion of the land. Have we no responsibility beyond that? Does education cease with learning the three "R's" or does it not then begin? If so, are we to employ teachers to follow to their homes the young people and there carry on the work we have begun? and what better teachers can we give them than good books? Let them be interesting, well chosen, and they will be read. Once establish the reading habit, even in one member of the household, and you work a revolution in the daily thoughts and daily practice of every member.

Little money is required to start a movement for supplying this want, but much careful organization. Solitary examples of those who see the want and are making efforts to meet it, are already to be found in different parts of the Province, and whether it be to provide printed matter to awaken interest in, or stir the imagination of the members of a lumber or mining camp, or to give to the boys and girls in the solitary log house, some faint idea of the wonders of the world beyond the surrounding circle of woods, all praise should be given for their efforts, however humble. And their example should stimulate us who enjoy so much, to use our influence and experience to systematically carrying out the work they have attempted.

It is probably a dream, which ought to have no place in a building set apart for pure science, but I could look forward to a time when the student in the city or country, would be able to put his hands speedily on the records of the experience of other students, whether of time past or present, on every branch of human knowledge; when every village or town in the Province would look to their public library as their greatest treasure; when in every collection of homes, there would be found those who regularly gathered together for consecutive and careful study of great thinkers, obtaining all the necessary literature required for his elucidation, from some central library, and when every household throughout the length and breadth of the province, would look forward with pleasure to the day which brought the weekly or monthly package of books from the great library. Then indeed, would the Northland be more famous for its learning than for the extent of its domain.

In addressing you upon the shortcomings and deficiencies of our library, I have been led to speak of the wants of our country in the same direction. My predecessor in this chair, upon a similar occasion, forcibly presented the claims of public museums, as scientific aids and popular educators. He recognized, as I have done, the influence which this Institute wields both corporately and individually, and I have no doubt felt as I do, that that influence will be exerted to awaken the citizens of the Province and of the Dominion, to the value of these libraries and museums, and that the result will be, to add to the number of public benefits which the members of the Canadian Institute have been privileged to confer upon their fellow citizens.