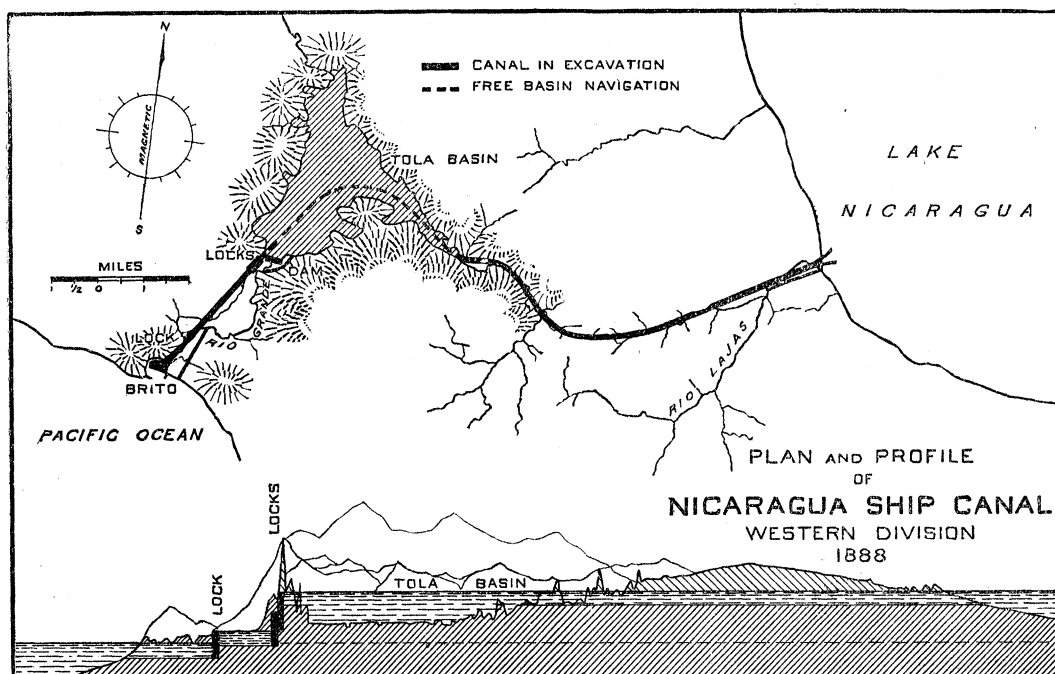


the practicability of important improvements, which were only suggested as possibilities after the previous, more preliminary survey, and which will materially contribute to reduce the cost of the work by increasing the length of free navigation through basins, and proportionally increasing the capacity of the canal with a marked reduction of the working-expenses.

Agassiz, Dana, Gray, Henry, Torrey, Guyot, and Cooke. Several important bequests made the institute financially strong, and its public hall was a favorite place of social gathering, aside from its main purpose of public instruction.

As time advanced and Brooklyn grew in size, the Academy of Music and other public buildings were erected, and the institute



The route extends from Greytown, on the Atlantic, to Brito, on the Pacific, a distance of 169.67 miles, divided as follows:—

	Free Navigation.	Canal in Excavation.
From Greytown to the Deseado basin.....	—	12.37
Deseado basin.....	4.00	—
From Deseado basin to San Francisco basin..	—	3.07
San Francisco and Machado basins.....	11.00	1.73
River San Juan	64.00	—
Lake Nicaragua.....	56.50	—
From Lake Nicaragua to Tola basin.....	—	8.22
Tola basin.....	5.28	—
From Tola basin to Brito.....	—	3.50
Total miles.....	140.78	28.89

The Deseado and Tola basins are new features brought out by the last location, as well as an increase of 2.13 miles in the length of free navigation in the San Francisco and Machado basins; in other words, the last location has reduced the length of canal in excavation from 40.3 to 28.89 miles, or 11.41 miles, and has increased the free navigation by that same distance; while the summit level has been extended from 144.8 miles to 153.8 miles.

It will require some time to complete the estimates of cost on the new location; but it may be safely stated that at least ten per cent will be gained in the total cost based on the survey of 1885, which is \$64,036,197, including twenty-five per cent for contingencies.

THE BROOKLYN INSTITUTE.

RATHER more than fifty years ago a library association was formed in the city of Brooklyn, which grew in scope and usefulness, until in 1843 its charter was amended, and the name changed to that of the Brooklyn Institute. Courses of lectures were delivered from time to time, including in the list of speakers such men as

building waned in popularity. In 1867 the directors found it advisable to remodel the interior at an expense of thirty thousand dollars, which necessitated a mortgage on the building. Since that time, until quite recently, the entire income from its endowment fund has been absorbed in payment of the interest and principal of this debt. Final payment on the mortgage was made early in 1887.

The property now consists of the institute building and land, near the entrance to the great bridge, a library of fifteen thousand volumes, and endowment funds to the value of forty-six thousand dollars. The income from this is now applied to the purpose for which it was originally intended, and about a year ago the institute began upon a new era of activity.

One part of the endowment fund, bequeathed in 1851 by Augustus Graham, is devoted to the support of a limited course of Sunday-evening lectures on 'The Power, Wisdom, and Goodness of God as manifested in his Works.' In accordance with this requirement, lectures were delivered last winter by Sir J. William Dawson of Montreal, and by Dr. Alexander Winchell of the University of Michigan. Another part of the Graham fund is for the support of lectures on scientific subjects on other evenings of the week, and without specific restriction of topic. An introductory course of six lectures on astronomy was given last autumn by Prof. C. A. Young of Princeton. This was followed during the winter by another course, including topics in physics, geology, astronomy, and architecture. The lecturers were Messrs. George W. Plympton, W. LeConte Stevens, William C. Peckham, Franklin W. Hooper, and Garrett P. Serviss, of Brooklyn, and Dr. J. S. Newberry of New York.

Meanwhile steps had been taken with a view to the organization of a scientific society, with the Brooklyn Institute as its home. A meeting for this purpose was held in February, 1888, resulting in the adoption of by-laws and the formation of a council. Of this, Dr. Charles E. West was elected president, and W. LeConte Stevens secretary. Soon afterward the Brooklyn Microscopical Society and the American Astronomical Society became merged in the Brooklyn Institute as special departments of that body. The by-laws provide for departments in every branch of science, including anthropology, architecture, astronomy, botany, chemistry, en-

gineering, entomology, fine art, geography, geology, microscopy, mineralogy, photography, physics, and zoölogy. The associate members of the institute thus constitute a federation of independent departments; but a single admission-fee being required for associate membership, while each member has the privilege of joining as many departments as may be suggested by his individual tastes. For the origination of this plan, as well as for the burden of the work of organization, the credit is due chiefly to Mr. F. W. Hooper, of the Adelphi Academy, Brooklyn.

Aside from the meetings of departments, general meetings of the associate members are periodically held in connection with a course of public lectures. The opening lecture of the first course was given last April by Mr. W. LeConte Stevens, who was followed in successive weeks by Messrs. Robert Spice, George M. Hopkins, and Garrett P. Serviss. The season was closed with an exhibition by the department of microscopy, which was largely attended and in every way successful. The attendance at the public lectures was at first about three hundred, but grew to more than five hundred with the progress of the season.

Departments of entomology and of physics have been organized in addition to those already incorporated in the institute, and others will soon be started in chemistry, mineralogy, and botany. The department of physics held its first meeting on the evening of Sept. 26, when Mr. G. M. Hopkins exhibited a variety of apparatus, largely of his own device, illustrating centrifugal motion and the gyroscope. This was followed by a discussion of the latter instrument introduced by Mr. W. LeConte Stevens and participated in by various other members of the department.

The public lecture course for the coming winter has been already arranged, the opening lecture, on the 11th of October, being by Mr. Bradford of New York, the well-known artist and arctic explorer. Harvard, Yale, Columbia, and the scientific departments at Washington are well represented in the list of lecturers.

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THE AGASSIZ SEASIDE ASSEMBLY.

AT the May meeting of the New Jersey Assembly of the Agassiz Association, held at Rutgers College, New Brunswick, N.J., it was decided to hold a seaside assembly, open not only to members of the Agassiz Association generally, but to all persons interested in the study of natural science. A committee was appointed, with power to make all necessary arrangements. Asbury Park was selected as the place, and the week beginning with Aug. 6 as the time, for the meeting; and Educational Hall was secured for the purpose. Circulars were sent to all the chapters in New England and the Middle States, and also to many persons interested in scientific studies, who were not members of the association. The assembly met on the day appointed, in Educational Hall, Asbury Park. The opening lecture was delivered by Harlan H. Ballard, president of the Agassiz Association, and it was a most inspiring introduction to a week of very successful and delightful work. The mornings of the remaining days of the week were devoted to field-excursions in botany and entomology, the former under the guidance of the Rev. L. H. Lighthipe, and the latter under the Rev. G. D. Hulst, the State entomologist of New Jersey. Tuesday afternoon was devoted to the examination and analysis of plants, many of which, belonging to the 'pine-barrens,' were quite new to most of those present. A paper upon the 'Flora of New Jersey' was contributed by the Rev. L. H. Lighthipe of Woodbridge, N.J., the president of the New Jersey Assembly. On Wednesday afternoon a *conversazione* on 'How to use the Microscope' was held by Prof. F. C. Van Dyck of Rutgers College. Remarks upon the subject were also made by Prof. George Macloskie of Princeton, who also exhibited a most convenient apparatus for the dissection of flowers and insects. In the evening a most interesting lecture upon diatoms was given by Prof. Samuel Lockwood of Freehold, N.J., illustrated by means of the stereopticon. Professor Lockwood has made these interesting microscopical plants the study of his lifetime, and consequently spoke from his own personal observations. His lecture was enjoyed by all; and the fact that his audience could see before them objects which are only visible by means of the microscope, magnified many thousand times,—we might almost say millions,—added very much to its interest. Thursday

was an entomological day. The excursion in the morning was conducted by the Rev. G. D. Hulst, and the afternoon was devoted to the examination of insects collected, and to remarks by the same gentleman upon the collection, preservation, and classification of entomological specimens. In the evening a lecture upon seaweeds was given by Isaac Holden of Bridgeport, Conn. This, like the lecture on diatoms, was made doubly interesting by means of the stereopticon. Mr. Holden also exhibited a large number of beautifully mounted specimens collected by him in the vicinity of his home at Bridgeport. On Friday afternoon, after the examination of the plants collected in the morning, a very instructive lecture was given by Prof. T. O'C. Sloane of the *Scientific American*, and author of 'Home Experiments in Science,' on 'How to make Scientific Experiments with Simple Apparatus.' This was illustrated by actual experiments in physics, made with very simple and inexpensive apparatus. It was a surprise to every one that so much could be accomplished, and so many experiments performed, at so trifling a cost.

The Seaside Assembly adjourned at the close of this lecture, every one present feeling that a very profitable week had been spent. The attendance was not so large as expected, but those who were present felt fully repaid for their coming. A universal desire was expressed that the assembly be held again next summer, and the committee of arrangements were requested to do what they could to accomplish this result. Should this be done, it is hoped that a large number of the chapters will take an active interest in the assembly. Rev. L. H. Lighthipe, Woodbridge, N.J., is chairman of the committee of arrangements, and as such he will be most happy to receive any suggestions that may be offered.

SCIENTIFIC NEWS IN WASHINGTON.

The Library of the Geological Survey: Strong in its Special Fields. — Light and Tree-Growth: Influences of Site and Atmospheric Conditions.

The National Geological Survey Library.

ONE of the most important and practically useful adjuncts of the National Geological Survey is its excellent library. The collection was begun in 1881, almost simultaneously with the establishment of the survey; and in the seven years that have elapsed, about twenty-five thousand bound volumes and more than forty thousand pamphlets have been accumulated. The first important acquisition of the library was in the fall of 1882, when Mr. Darwin, the librarian, negotiated the purchase of the Robert Clarke geological library in Cincinnati. It comprised about two thousand volumes, consisting principally of the reports of State geological surveys. This was the nucleus of what has become the most complete collection of State, United States, and foreign official reports of geological surveys now in existence. There are probably between four thousand and five thousand volumes in this department of the library, including many reports that are rare, and sets that it would be very difficult to duplicate. Of course, even this part of the library is not complete; but it is more nearly so than any other similar collection, and additions are frequently being made to it. It is in constant use by members of the survey preparatory to field-work.

The division of official reports is arranged in the following order: in the first sections are the reports of State surveys classified geographically. This portion of the department comprises a larger number of books than either of the others; and its practical value to the National Survey, as evidenced by its constant use, can hardly be overestimated. The careful study of its volumes prevents the duplication by the National Survey of work already done, and available. It may be interesting to note, in passing, that the first geological report authorized by a State legislature in the United States was ordered by the legislature of North Carolina, and published as a 'memoir' in 1819. It is a thin volume, treating of other topics in addition to the brief and very vague chapters on the geology of the State.

A succeeding portion of this same division contains a very full collection of reports of early United States Government surveys, reconnaissances, etc. Most of these were made under the direction