

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

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NEW YORK, SATURDAY, MAY 11, 1889.

Contents.

(Illustrated articles are marked with an asterisk.)

Acrophobia.....	286	Massasauga*.....	286
Appendage, caudal, in man.....	286	Milk, preserv. by freezing.....	287
Appliances, railway.....	286	Mirror for opera glasses, Janzon's.....	287
Barnard, President.....	286	Moccasin, water*.....	287
Baths, turpentine.....	287	Mt. Hood, ascent of*.....	287
Brush, fountain, Thompson's.....	287	Mt. Hood, summit of*.....	287
Business and personal.....	288	Notes and queries.....	288
Canal, Nicaragua, rock cuttings.....	288	Notes, natural history.....	288
Cat-astrrophe, recent.....	288	Oklahoma the new Eden.....	288
Centennial, Washington.....	288	Oregon, scenery of*.....	287
Cultivator, Stag's*.....	289	Padlock, Brambel's*.....	289
Dyestuffs, artificial organic.....	287	Petroleum for manuf. purposes*.....	287
Engine, triple expansion*.....	284	Rattlesnake, Eastern*.....	286
Exhibitions, industrial, floating.....	289	Serpents, venom, of U. S.*.....	286
Explosion of gas cylinder.....	288	Sharpener, pencil, Gem*.....	286
Gas, natural in Ky. and Ind.....	288	Sled, steam, Conniff's*.....	282
Growth, industrial, century of.....	288	Snake, harlequin*.....	286
Heat, laws of.....	286	Spool, ribbon, typewriter, Ray's*.....	280
Hotel-keeper, scientific.....	286	Stamp, ticket, and punch, Duna-way's*.....	280
Inventions, engineering.....	288	Step, vehicle, Marshall*.....	289
Inventions, half a century of.....	289	Strap trousers, Carter's*.....	289
Inventions, index of.....	289	Subways, elec. wires in.....	282
Inventions, mechanical.....	288	Tail, man with a*.....	286
Inventions, miscellaneous.....	288	Well, gas, remarkable.....	281
Lubricants, semi-solid.....	282	Wrecks, floating.....	289
Lumber supply of Puget Sound.....	289		
Magnet for experimentation.....	281		

TABLE OF CONTENTS OF SCIENTIFIC AMERICAN SUPPLEMENT

No. 697.

For the Week Ending May 11, 1889.

Price 10 cents. For sale by all newsdealers.

	PAGE
I. CIVIL ENGINEERING.—Brake Trials in Germany.—Interesting trials of brakes by the Baden State Railways applying Kapteyn's automatic time, pressure, speed, and distance recorder in order to obtain accurate results, with elaborate tables.—2 illustrations. Hudson's Bay Railroad.—The question of the construction of the new railroad as now before the legislature of Manitoba; the financial aspects of the case. The Water Supply for New York City.—By R. D. A. PARROTT.—An elaborate review of the water supply areas accessible to New York, with an exact statement of their population and consequent availability for a pure supply.....	11120
II. ELECTRICITY.—Resistance of Peanut Oil.—A curious experiment by Mr. J. P. BRUCE WARREN, suggesting the possibility of the construction of an electric thermometer depending upon the variations in the resistance of peanut oil, due to variations in its temperature. The Silvertown Dynamo.—A dynamo recently built in England to satisfy the requirement of the Admiralty with regard to heating exact details of the resistance of the different coils of the machine.....	11132
III. HYGIENE.—Science at Breakfast.—By JOHN MICHELS.—A review of the effects of tea and coffee upon the system, with statement of the proper method to be employed in preparing the latter beverage, and other general considerations appertaining to the subject. Note on a Cure for Intoxication.....	11137
IV. METEOROLOGY.—How Rain is Formed.—By H. P. BLANFORD, F.R.S.—An interesting lecture by Prof. Blanford delivered before the Hythe School of Musketry; a very practical paper with illustrations drawn from common life.....	11141
V. MISCELLANEOUS.—A Nectarine Tree Changing into a Peach Tree.—A curious instance of the production of peaches from a nectarine tree, with other examples of a similar change. Lepidochromy.—A most interesting description of a very elegant form of decorative art, which may be termed the decalcomania of butterflies' wings.—Treating of the fixing of the colors upon paper, porcelain, and glass.—7 illustrations.....	11141
VI. NAVAL ENGINEERING.—H. M. S. Edinburgh.—A description of the dimensions and armament of a new accession to the British navy; her hydraulic loading gear, and other features.—3 illustrations.....	11127
VII. PHYSICS.—Principle of Force and Demonstration of the Existence of the Atom.—By HUDSON MAXIM.—An interesting statement of the elementary conceptions of physics and the form of arguments based on 17 axioms, with answers to arguments against the existence of the physical atom.....	11136
VIII. TECHNOLOGY.—Canes and Sticks Used in the Manufacture of Walking Sticks, Umbrella Handles, etc.—By J. R. JACKSON.—A very curious contribution to technological science, describing in detail the great variety of woods used for the purpose stated, their treatment in the factory, and statistics of export. On Wool and Fur.—Their Origin, Structure, Chemical and Physical Properties, and Composition.—By WATSON SMITH.—First installment of a very exhaustive paper on the typical subject, giving a full review of the chemistry of wool, its action under different reagents, and microscopic views of the fibers as affected by different reagents. 14 illustrations. Pencil-Lithographic Transfers.—By T. WILKINSON.—The general principles of lithographic transfers, with details of manipulation and precautions to be taken to get good results.....	11138

THE CENTENNIAL OF THE INAUGURATION OF GEORGE WASHINGTON AS PRESIDENT OF THE UNITED STATES.

On April 23, 1789, George Washington, duly elected President of the United States, reached Elizabethtown, N. J., on his way to New York, then the Federal capital, where he was to be inaugurated first president of the new nation. A splendid barge manned by thirteen masters of ships, commanded by Capt. James Nicholson, received him and brought him through the kills and across the harbor to the foot of Wall Street. Gov. George Clinton of New York received the President-elect and escorted him to the Franklin House in the square of that name. Six days elapsed, days of great excitement for the city, then of small proportions and giving no promise of its future growth. On April 30 all the churches in the city were opened at 9 o'clock in the morning, and prayers were offered up in all for the safety of the President. About midday the procession escorting him started from Franklin Square and proceeded to the Federal State House, on the corner of Wall and Broad Streets, occupying the site of the present sub-treasury. Washington was drawn in a coach by four horses. The procession as it neared its destination halted, and the military formed a line on both sides of the street. Washington alighted and walked through the lines and entered the building. In the senate chamber he was received by Vice-President Adams. The party went out upon the balcony, and the oath of office was administered by Chancellor Livingston.

The celebration of the hundredth anniversary of this event has been brought to a most successful end in this city. The ceremonies were arranged with reference to the occurrences of one hundred years ago. The President of the United States, Benjamin Harrison, was the central figure among the participants. He came from the city of Washington by rail to Elizabeth, where he was received on the morning of April 29th by a distinguished body of representatives of the literary and official circles of New York and New Jersey. At Elizabethtown he embarked on the United States steamer Despatch, and accompanied by an escort of other steamers proceeded toward New York. The bay of New York was fairly alive with vessels of all descriptions. Ships of war, revenue cutters, steam yachts, passenger steamers, ferryboats and tug boats profusely decorated with flags lay in lines from Robins Reef light to Bedlows Island, overlooked by the great statue of Liberty. Through the passage the Despatch covered with flags slowly proceeded, while every whistle blew as she passed, and the ships of war with yards manned fired the presidential salute. Off the foot of Wall Street the Despatch anchored, and the President was rowed ashore in a barge manned by a crew of ship masters from the Marine Society of the City of New York, with Capt. Ambrose Snow as coxswain. The crew that rowed General Washington to the same spot one hundred years ago were members of the same society.

On landing, the President was received by Mr. William G. Hamilton, the grandson of Alexander Hamilton, and was introduced to the Governor of the State of New York and to the mayor of the city. The fleet of naval ships meanwhile proceeded up the Hudson River to an anchorage near 50th Street, and the other vessels formed in order for the naval parade. They steamed up the East River to a floating derrick near the southern end of Blackwell's Island, rounded it, and returning went up the Hudson River and around the ships of war and thence back to the Battery and then dispersed. A ball at the Metropolitan Opera House wound up the events of the first day.

On April 30, the proceedings began by a special service attended by the President and party in St. Paul's Church at 9 A. M., conducted by the Rt. Rev. Henry C. Potter, Bishop of New York. At 10 A. M. literary exercises were held on the platform over the steps of the sub-treasury in Wall Street, including an opening prayer by the Rev. Richard S. Storrs, a poem by John Greenleaf Whittier, an oration by Chauncey S. Depew, a short address by the President, and the benediction by the Most Reverend Michael A. Corrigan, Archbishop of New York. Then the great event of the day began. The military parade formed immediately after the conclusion of these exercises, and marched up Broadway and Fifth Avenue, under triumphal arches, to be reviewed by the President at 23d Street. It comprised upward of 46,000 men, representatives of the Federal army and navy and of volunteer militia from almost all parts of the Union. A number of State governors were present. They headed in each case the troops of their own State, preceding them, generally on horse back. General Schofield, of the U. S. army, was in command, and showed wonderful powers of organization in effecting the regulation of the army of men without the least disorder. The view of this parade as seen from the windows of the SCIENTIFIC AMERICAN office, which were arranged especially for the accommodation of the staff of the office and their friends, was a magnificent and inspiring one. No other country could now show, or ever could have shown, such an assemblage, consisting of the representatives of States thousands of miles distant from each other, in the

guise of purely volunteer soldiery ready for the defense of their country in any possible emergency. Another feature of the day was the profuse decoration of the city. Not only the line of march, but every portion of New York, was decorated with flags and bunting. To the east and west, and for miles north of the line of procession, nearly every house displayed flags and other emblems and drapings. On the evening of April 30, a grand dinner took place at the Metropolitan Opera House. This was the great day of the celebration, as being the anniversary of Washington's inauguration.

On May 1, the civic and industrial parade took place. It comprised about 41,000 participants, representatives of the various trades of the city, leading societies, and a large array of public school children. This was also reviewed by the President, bringing the three days' pageant to a close.

Nothing was neglected by the great metropolis to enhance the meaning of the occasion. In the public schools special attention was given to instructing the scholars in the events commemorated. In selecting participants in the ceremonies, the descendants of the old time families of New York and of personages of historical fame were chosen. Grand stands were erected for the accommodation of spectators. Taken from all points of view, it may be questioned if New York will again see the equal of this display for another century. It is strange to read the printed account of the escort of Washington, taking up about 21 lines in its enumeration, with the list of participants in the centennial parades, that was enough to fill a book of many pages. The lessons of unity, patriotism, and peace taught by the three day's ceremonies cannot be without effect.

A Century of Industrial Growth.

Among the incidents of the recent celebration in New York of the one hundredth anniversary of the inauguration of Washington, the first President, perhaps the most remarkable was the civic or industrial parade, which took place May 1, when, it is estimated, over forty thousand persons, representing the various modern industries, fell into line and formed a gigantic procession. The spectators were numbered at over one million. Under the above heading the *New York Tribune* gives the following interesting article:

"The industrial parade, marvelous as it has seemed to the men of this generation, needs for a full appreciation a different point of view. How would it have appeared to George Washington and his Revolutionary associates? What incomprehensible and incredible marvels would they have seen in its machines and inventions, its arts and tools, its princely expenditure by voluntary societies of workingmen, its mighty array of well clad, well paid, and comfortable workers? If it were possible to contrast the industries of 1789, when the world had lived and learned at least fifty-eight centuries, with those of 1889, when only one century more has been added, what a startling contrast!

"It is not possible. A new world has been created. The methods, tools, products, and artisans of a century ago in many departments have vanished as completely as if they belonged to another planet. What has become of the spinning wheel or the wooden clock? The suit of woolen cloth worn by President Washington at his address to Congress in 1789 was presented by a woolen factory only established in the preceding year, and cloth then cost \$5 a yard. The people were clothed in the homespun made in every family. The power loom for knit goods was not invented until 1830. In 1789 two citizens of Norwich asked exemption from poll tax for themselves and their apprentices because they had set up eight stocking frames, which required two men for each. A century ago wool carding had been done by hand, but Whittemore invented machinery to make cards. The first carpet factory in the country was established a little later. A century ago the cotton gin had not been invented, the spinning jenny was yet an experiment, and the first shipment of cotton to England, only eight bags, was made in 1784. Now the country has raised more than 7,000,000 bales of cotton in a year, and worked up more than one thousand million pounds of cotton and four hundred million pounds of wool.

"A century ago only charcoal iron was produced, and not as much of that probably as 30,000 tons yearly; for twenty years later the product was but 53,000 tons. Even Great Britain, in 1788, produced only 68,300 tons, not as much as either one of several furnaces in this country now turns out yearly. The manufacture of steel was just beginning here; twenty years later only 917 tons were produced in the country. The coarsest pig iron then cost about as much as steel rails do now. A single railroad now buys yearly more iron than both Great Britain and this country then made; but there were neither railroads then nor iron bridges nor buildings; no petroleum pipes, for there was no petroleum; no gas pipes, for there was no gas lighting even in Europe until later. Washington lived in an age of darkness; instead of the electric light the millions had candles, costing about two cents apiece. In all the departments and applications of chemistry the century

has simply created a new world. American pressed glass, which has completely revolutionized the supply of table and house ware, is an invention of the last sixty years. The silk manufacture has not existed in this country half a century; the paper made a hundred years ago would hardly be thought fit for use since modern methods have been invented; the only use discovered for India rubber then was to erase pencil marks; and while the town of Lynn made 100,000 pairs of boots and shoes in 1788, they were not the shoes of to-day, and the manufacture by machinery is wholly due to inventions since 1800. Sewing machines for any purpose were unknown, and salt was made by boiling sea water, though in 1787 it was first made from the springs near Syracuse at the rate of about ten bushels per day, and the cost soon fell to 50 cents per bushel.

"Farming in Washington's day knew nothing of machinery; even the first iron plow, patented in 1797, was a failure, for New Jersey farmers thought it poisoned the soil. Mowers, reapers, and harvesters began to be invented about the same time, and even the ordinary implements were such as it would not now be thought possible to use. The steamboat was practically unknown, and the railroad entirely until forty years later, and the cost of transportation by wagon confined the area of possible production with profit, as to most crops, to the margin of navigable waters. The whole nation could not produce in Washington's day as much wheat as single Territories not yet States now export each year, and when the accounts of a century ago tell of "vast quantities" exported, they really mean less in a year than the country has since moved in a single week.

"Volumes could be filled, and yet but a small part of the change in industry within the century could be mentioned. But the revolution in the condition of the laboring population has been the crowning result of all this progress. Of wages, it is enough to say that masons a century ago earned 67 cents a day in Massachusetts, carpenters 52 cents, blacksmiths 70 cents, and ordinary labor 30 cents. Food near the farms was cheap, but pork is quoted in Massachusetts at 16 cents per pound, flour at \$3.16 per barrel, corn at 76 cents per bushel, and ham at 20 cents per pound. Calico cost 58 cents per yard, broadcloth \$2.70, buckram 22 cents, cotton cloth 88 cents, and tow cloth 30 cents; hose cost \$1.35 per pair, and "corded Nankeen breeches" \$5.50; buttons from 1 to 5 shillings per dozen, shoes of lasting 84 cents per pair, and sugar from 15 to 22 cents per pound. One does not need to study such figures as these very long to discover that the world and the living of to-day were simply impossible for the working people a century ago. The whole world has changed, but nowhere has the marvelous advance been greater or for the working millions more beneficent than in these United States."

FLOATING WRECKS.

The International Maritime Conference, which will assemble at Washington in October next, among other important matters pertaining to the saving of life on the ocean, will be called upon to consider the wisdom of dividing the Atlantic Ocean into districts and assigning them severally to the great naval powers, who will be expected to remove derelicts or wrecks which may be considered in any wise dangerous to commerce. For the past three years the Hydrographic Office of the Navy Department has been of great service to mariners by collecting information regarding derelicts, their movements, changes in character or position, by the action of the elements or other causes, and publishing the same on the first of each month in the form of a pilot chart, which also contains a large amount of other information of the greatest value to the navigator.

Subsidiary to the work of the Hydrographic Office in locating dangerous wrecks and reporting the movements of derelicts have been the operations of the naval vessels to which has been assigned the work of blowing up such of these obstructions to commerce as may be considered of a specially dangerous character. Most derelicts are lumber-laden and come from Southern ports of the United States. The Gulf Stream flowing strongly in a north-northeasterly direction, they are apt to be carried along with it until they strike the Labrador current flowing south, and then their course is reversed.

The American schooner W. L. White, abandoned off Cape Hatteras in the blizzard storm of March 13, 1888, is a case in point. She floated north with the Gulf Stream until she got into the Labrador current off the Grand Banks in the following May. Here she remained floating to and fro in the very track of many ocean steamers during the entire summer of 1888 and until October 30, when she took an easterly and then northeasterly course, and finally went ashore on the Hebrides January 25, 1889. During the cruise of this derelict, covering ten months and ten days, she must have covered a distance of at least five thousand miles.

Naval vessels frequently receive orders to look out for certain derelicts and to blow them up when found. The United States steamer Despatch, Lieutenant W. S. Cowles, though not specially adapted for this work, has done a considerable amount of it. After the great

storm of March, 1888, a number of wrecks demanded immediate attention, and one of these was the bark Brimega, which had capsized off Cape May and lay bottom up inside the cape and grounded. The course pursued in blowing it up was as follows: Men from the Despatch, under command of Lieutenant McLean, got upon the hull, and with augers and axes penetrated through twenty inches of oak, and made four holes large enough to admit the torpedoes. These torpedoes consist of a cast iron shell cylindrical in form, three feet long and about a foot in diameter. There are handles on the sides, and from the head projects an iron tube, into which the electric wire passes. The tube is fitted with a plug to keep out the water, and the wire then passes through a papier-mache cylinder nearly to the nether end of the torpedo, where it is connected with a very thin platinum wire, and this again is surrounded with guncotton. Fine gunpowder is placed next to the guncotton, and above that the coarser grain, a hundred pounds of powder comprising the whole charge. When all was ready for the explosion, the men took to their boats and withdrew to a distance of from 150 to 200 feet. The officer in command of the operations paid out a wire from a reel which he held in his hand, and when the proper distance was reached he connected one end of it with a hand dynamo, which is known as the government torpedo station machine. The electric current is instantly sent into the torpedo, the platinum wire is heated to a white heat, the guncotton ignited, and the torpedoes, weighing about 325 pounds each, are instantly exploded. The wreck was broken in pieces, though subsequent explosions had to be made before the destruction was complete.

The masts of sunken vessels which extend above the surface of the water or terminate just below it are extremely dangerous to navigation, and the steamer Despatch has been frequently called upon to remove such obstructions. After proceeding to the locality indicated on the pilot chart issued by the Hydrographic Office or in special orders from the Navy Department, a survey is made and the position of the wreck determined upon as nearly as it can be from the deck of the steamer. Two boats then put out for the wreck. One carries the torpedo, with five men to handle it and six men at the oars. The other boat contains the officer in charge of the work, with a competent crew, and the apparatus for exploding the torpedoes. The steamship Eureka, which was wrecked off the Maryland capes, was found resting on the bottom. Two of her masts, which were of iron, extended above the water line, and two terminated just below it. To remove these obstructions a torpedo was let down by a guide rope to the deck of the vessel, placed against the masts, and exploded in the same manner as previously described. A conical column of water was thrown up to a distance of nearly 75 feet, and the masts were completely destroyed.

Sometimes wooden masts are found sticking out of the water and held in position by sunken wreckage. When the torpedo is set off, large pieces of the wood rise to a considerable distance in the air, seemingly whole, but as they descend they separate into a thousand pieces. On attaching the torpedo to the object to be destroyed, care has to be taken that it comes in direct contact with the object, for if any considerable amount of water is allowed to intervene, it acts as a cushion and a great deal of the force of the explosion will be lost. When sunken hulls are found, soundings are made, and if it appears that they are not covered with a sufficient depth of water to render them free from danger, torpedoes are let down with guide ropes and exploded in such a way as to destroy the hulls. This kind of work is slow and tedious, and can only be successfully carried on in a vessel like the Despatch, during fair weather and with a smooth sea. The area covered by the steamer Despatch in her cruises for derelicts is from seventy-five to a hundred miles and extends from Chesapeake Bay to Boston Harbor. The explosives used are not considered the most effective by the naval officers in charge of these operations, and they hope that guncotton or dynamite in time will be substituted for them.

Lieutenant Geo. P. Blow, now in charge of the New York branch of the Hydrographic Office, was in May, 1885, on board the United States man-of-war Pensacola, Captain Geo. Dewey. When six days out from Norfolk the floating derelict Bertha Balruhs was sighted. Upon examination she appeared to have been abandoned a long time. Her deck was level with the water, the sea was making clean breaches over her, and her sails were hanging in shreds and festoons from the yards. A guncotton torpedo was placed under the floor of the cabin, which blew off the deck house and did other damage. Another torpedo was exploded amidships, which shot the main mast up into the air like a rocket, but it settled back into its old place again, and the derelict continued to float along as before. Then the explosives were lashed to the keel of the vessel, and they shattered her so completely that in a short time she went to pieces.

The United States man-of-war Yantic has recently received orders to search out and destroy the derelict Vizenzo Perotta, which was wrecked off the capes of

Virginia on September 18, 1887, and has been floating about the ocean ever since. She is loaded with lumber, has been reported eighteen times between the scene of the wreck and the coast of Cuba, and is considered a very dangerous derelict. There are nine derelicts now known to the Hydrographic Office, including the steamer Danmark, recently reported, and fifteen the names of which are not known.

Some derelicts are destroyed by collisions and others by the action of the elements, while others float a long time bottom upward, the air keeping the water from coming in and working their destruction. They are a constant menace to passing vessels, and there can be no doubt that some at least of the vessels which have gone out from port and have never been heard from were the victims of some derelict.

Information regarding the movements of derelicts and the position of various obstructions to navigation are reported to the several branch hydrographic offices which are now located at New York, Boston, Philadelphia, Baltimore, Norfolk, New Orleans, Portland, Oregon, and San Francisco, Cal. This information is sent to Washington, where the main hydrographic office is located, in charge of Lieutenant Geo. L. Dyer as hydrographer to the Bureau of Navigation. Here the information is classified and published on the first of every month in the form of a chart, upon which is also indicated the latest positions of derelicts, location of icebergs, course of ocean currents, fogs, probabilities of whirlwinds, waterspouts, and tornadoes, as well as other information. Every vessel, of whatever nationality, leaving the principal American ports is supplied with a set of charts, corrected to date, without charge.

Recently the co-operation of Captain Carbonell, the director of the newly established Marine Observatory at Havana, Cuba, has been secured, by which the Hydrographic Office will receive telegraphic information of tornadoes which may be approaching our coasts.

President Barnard, of Columbia College, N. Y.

On Saturday, April 27, at 4:15 P.M., President Barnard, of Columbia College, died. In his death a loss is inflicted not only on his college and city, but on the country at large. He ranked with the most advanced thinkers of the day, and did much to enhance the scientific standing of the United States.

Frederick Augustus Porter Barnard was born May 5, 1809, at Sheffield, Berkshire Co., Mass. He was of English ancestry. In 1828 he graduated at Yale and at once began his life work as an educator by accepting a position in the Hartford grammar school, and in 1830 became a tutor at Yale. It was soon proposed to make him professor of pure mathematics, but he was forced to decline on account of his health. In 1831 he taught in the Deaf and Dumb Asylum in Hartford, and 1832 in the corresponding institution in New York. From 1837 to 1848 he filled chairs of the natural sciences in the University of Alabama in Tuscaloosa, and after this in the University of Mississippi in Oxford. In 1856 he became president of this university. There he had as fellow professor Jefferson Davis, afterward President of the Southern Confederation. In 1854 Prof. Barnard had been admitted to the ministry of the Protestant Episcopal Church. During the war he did excellent service on the U. S. coast survey. He then became an applicant for the chair of physics in Columbia College, but was appointed president instead, succeeding Dr. Charles King. This position he accepted in May, 1864. About a year ago he resigned, but the trustees, anxious to have him complete a term of twenty-five years, delayed the acceptance of the resignation. It will be noticed that but a few days remained to complete a quarter century of devoted service to the college when he died.

His mind, of strongly scientific bent, found many outlets. In microscopy and astronomy he did excellent work. He accompanied the U. S. coast survey expedition to Labrador to witness the total eclipse of the sun in 1860. Much of his work on the coast survey was in astronomical science. He was also president of the American Microscopical Society. He was one of the original incorporators of the National Academy of Sciences, has been president of the American Association for the Advancement of Science and of the Board of Experts of the American Bureau of Mines. He was one of the U. S. commissioners to the Paris exposition of 1867, and his elaborate report on Machinery, Processes, and Products of the Industrial Arts and Exact Sciences is, at the present day, excellent reading and a standard reference. He, with Professor Guyot, was a chief editor of Johnson's Cyclopaedia. He was an ardent advocate of the metric system of weights and measures, and to the above cyclopaedia, among other matter, contributed a most elaborate article on the weights and measures of all countries.

He was the recipient of honorary degrees from many universities, and his life work covered so extended a field that space will not permit even a full recapitulation of it here. In the great scientific development of Columbia College through the School of Mines the predominant bent of his mind found most congenial work. His funeral took place on May 2, and was attended by a numerous and representative assemblage.