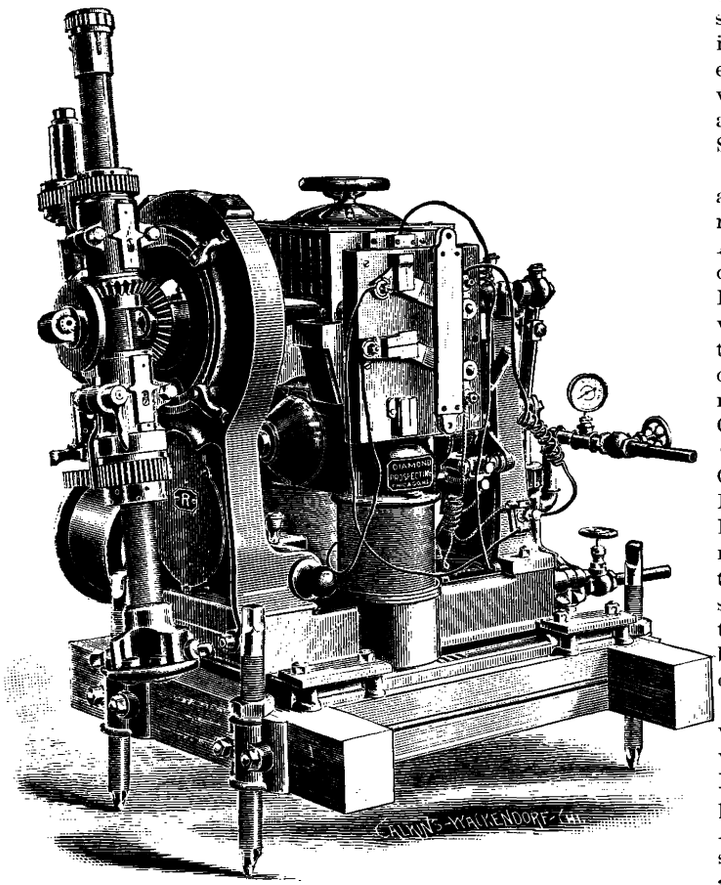
our dwelling-houses will be entirely done away with. Already, within a few months past, companies have been formed, for the purpose of introducing this important and necessary invention, in Washington, D.C., Boston, Mass., and Portland, Me ; and others are in process of organization in Providence, R.I., New York City, and Hartford, Conn. Parties wishing information on the subject can address the secretary of the New England Heating and Ventilating Company, 85 Water Street, Boston, Mass.

AN ELECTRICAL DIAMOND-DRILL.

THE electric motor is rapidly winning an important place for itself in mining operations. Already there are electric coal-cutting machines, electric hoists, electric mine locomotives, and electric drills, some of which have been described and illustrated in these columns. One of the latest devices in this



AN ELECTRICAL DIAMOND-DRILL.

line, the Sullivan electric diamond-drill, operated by a Thomson-Houston motor, is shown in the accompanying illustration. In the form shown, the drill is intended mainly for prospecting, though of course it is equally well adapted to underground work. One of the difficulties heretofore encountered in using diamond-drills in underground work, as well as in prospecting where the ground is rough or mountainous, has been that of getting power to operate the machine. By the use of electric power, however, this difficulty is entirely overcome. The dynamo may be located at any convenient point, and the current transmitted to the drill by insulated wire in the usual manner.

This machine is compact, occupies but little space, and may be operated by any intelligent workman. It will drill a hole to a depth of three hundred feet, and in any direction, the drill being fed forward by a friction feeding device at a speed proportioned to the hardness of the material operated upon. The machine is manufactured by the Diamond Prospecting Company of Chicago.

THE ELECTRIC-LIGHT CONVENTION.

THE eleventh convention of the National Electric-Light Association was held at Kansas City, Mo., on Feb. 11 to 14, the sessions being held in the Coates Opera House. When the convention was called to order by the president, E. R. Weeks, there were about one hundred and fifty members and guests present, the attendance increasing to three hundred before the convention ended. After an address of welcome by the mayor of Kansas City, President Weeks briefly reviewed the growth of the association, and outlined the programme arranged by the executive committee. The rest of the session was taken up by routine business.

On the 12th the committee on the abolition of duty on copper presented its report, and recommended that all members place themselves in communication with their respective members of Congress, with the view of securing the removal of the duty on copper. The committee on standardizing potentials on electric street-railways and that on harmonizing insurance and electrical interests presented reports, which were full of interest, and evoked considerable discussion. The papers read at this session were one on central-station construction, by C. J. H. Woodbury, and one on the history and theory of the steam-engine, by F. E. Sickel.

On Thursday the 13th, after the reading of communications and action thereon, George E. Palmer read a paper on the economic generation of steam, written by George H. Babcock. After this and the papers of the previous session had been discussed and commented on by the members, a paper entitled "A Recent Edison Central Station and the Results thus far obtained" was read by C. J. Field. This paper brought out a long and interesting discussion. T. Carpenter Smith followed with a paper on a universal system of central-station accounts. At the afternoon session the following papers were read and discussed: "The Cost of the Products of Central Stations," by A. J. DeCamp; "Nine Years with the Arc-Lamp," by M. D. Laws; "Arc-Light Carbons," by E. F. Peck; "How our Paths may be Paths of Peace," by H. W. Pope; and "Safety and Safety Devices in Electrical Installations," by Professor Elihu Thomson. The report of the committee on data was then received, and a resolution adopted petitioning Congress to authorize and direct the superintendent of the census to collect certain data in relation to the electrical industry in addition to that already provided for by law, and asking for a special appropriation of fifty thousand dollars to carry on the work.

On Friday, the last day of the convention, the following papers were read and discussed: "Electricity as applied to Street-Railways," by F. J. Sprague: "Prodigality in Economy," by C. C. Haskins: "Line Insulation from the Standpoint of Practical Experience," by C. A. Harber: and "How to locate Grounds on Arc-Light Circuits," by J. E. Lockwood. At the afternoon session, after an exhibition of and address upon the phonograph and graphophone, by E. H. Johnson, committees were appointed on the revise of the by-laws and constitution of the association, on underground conduits and conductors, and on the relations between parent companies and sub-companies.

The officers for the ensuing year are as follows: president, M. J. Perry of Providence, R.I.; first vice-president, E. A. Maher, Albany, N.Y.; second vice-president, C. L. Edgar, Boston; executive committee, C. R. Huntly (Buffalo, N.Y.), chairman, E. R. Weeks (Kansas City), James E. English (New Haven, Conn.), J. J. Burleigh (Camden, N.J.), M. D. Law (Philadelphia), M. J. Francisco (Rutland, Vt.), A. F. Mason (Boston), J. A. Seely (New York), H. K. Thurber (New York). The semi-annual meeting next August will be held at Cape May, N.J.

During the four days of the convention there was an extensive collection of electric apparatus on exhibition in Casino Hall, near the headquarters of the association. The hall was brilliantly illuminated by both arc and incandescent lights, and the attendance was good. Electric motors of various sizes were exhibited by the Sprague, the Crocker-Wheeler, and the C. & C. motor companies of this city, the Elektron Company of Brooklyn, the Detroit Motor Company of Detroit, the Baxter Company of Bal-

timore, the Eddy Company of Windsor, Conn., the Jenney Company of Indianapolis, and the Rockford Electric Company. Wires for electrical uses were shown by the New York Insulated Wire Company, the Edison Machine Company, the Electrical Supply Company of Chicago, the India-Rubber and Gutta-Percha Company and the Bishop Gutta-Percha Company, the Ansonia Brass and Copper Company, and the Okonite Company. There was also a fine display of Grimshaw wire. Carbons were exhibited by the Standard and the National carbon companies of Cleveland, conduits for inside electric wiring were shown by the Interior Conduit and Insulation Company of this city, and an interesting exhibit of the new Edison-Lalande batteries was made by the Edison Manufacturing Company of Newark. The elements of this new battery are zinc, a caustic-potash solution, and oxide of copper, the latter being made up in the form of a plate and clamped in a copper frame. The zinc plates are suspended from a binding-post resting on the cover and hanging on either side of the oxide plate. The caustic potash is furnished in shape of sticks, two sticks accompanying each cell. These sticks are placed on either side of the zinc, and the cell is filled with water within an inch of the top, a thin layer of oil being then poured over the top of the water in order to prevent formation of creeping salts. The internal resistance of the cell is only .025 of an ohm. The electro-motive force on open circuit is about one volt, .8 of a volt on light closed-circuit work, and about .7 of a volt on heavy closed-circuit work.

THE FISHERIES OF NEW ZEALAND.

THE colony of New Zealand is now celebrating its jubilee—the jubilee of its separation from the parent colony of New South Wales — by a series of demonstrations at Auckland, its chief northern town, and by an intercolonial exhibition at Dunedin, the southern metropolis. The latter town is barely forty-two years old, its first settlers having landed from Scotland in March, 1848. It is therefore all the more remarkable to find it now holding an exhibition which, alike by its size, excellence of character, and the illustrative nature of its exhibits, is attracting attention throughout Australasia and Polynesia.

The island colony has hitherto developed only two of her natural sources of wealth; namely, her mines and her agriculture (including pastoral resources under this head). Both, but especially the former, are still capable of great extension and improvement. The third great source to which we desire to draw attention at present is that of her fisheries. These are still almost totally undeveloped, but in time to come they will certainly occupy a very important position. In the Dunedin exhibition there is a very fine display of the mineral, agricultural, and pastoral wealth of the colony, while the fisheries are almost unrepresented. There are no doubt many hundreds of individuals dependent on the industry for their daily bread; but, while the amount of capital invested in agriculture and mines amounts to millions of dollars, that engaged in the fisheries can only be counted by thousands. The promoters of the exhibition obtained almost no response from those occupied in the fishing industry, few of them being able, or finding it to their advantage, to figure as exhibiters. As population increases and means of transit are improved, this state of affairs gives promise of being altered.

A glance at a map of Australasia shows, that while Australia has a great area of land as compared to her coast-line, New Zealand, on the other hand, reverses these conditions. Her coast-line extends to about 5,300 miles, and is indented by numerous deep bays, fiords, and estuaries. At all seasons of the year the seas round her coasts literally swarm with fish, most of them of excellent quality, and many very suitable for canning or curing. In past days New Zealand was noted for her whale and seal fisheries, and American vessels reaped a very considerable share of the maritime harvest; but indiscriminate fishing has nearly exterminated these animals in the local waters, and the enterprise now rarely proves remunerative.

Hitherto very little organized effort has been put forth to develop the fishing industry; but very recently the freezing of fish for the Melbourne and Sydney markets, and the sending over of fresh fish in ice, are both being tried with great promise of success. The appliances in use are still very primitive, small open boats with seine fishing-nets being used in most parts. Only in a few localities are there trawlers or well-boats. Therefore the fishing is limited to inshore work, and is largely conditioned by the weather. Very little is known of the ocean-currents and of their variations of temperature; yet, from what little has hitherto been learned of the distribution of the various species of fish, the latter seems to depend to a considerable extent upon the former. Still less is known as to the development and life-history of the fish themselves. When it is remembered that important questions of this nature have only of very late years received attention from the scientific men and the governments of the oldest and wealthiest countries, it is not to be wondered at if the government of one of the youngest communities of the world has not yet found time or means to do any thing in this direction. The Marine Department has done a little, by way of commencement, in obtaining regular records from the lighthouse-keepers round the coast; but as none of these men are trained observers, and many of them are totally ignorant of the subject, the results, except in a few instances, have not been satisfactory.

The trade returns of the colony give no information as to the value of the fish taken for home consumption, but the export and import returns show that the local supply is still barely equal to the demand. During the six years ending 1885, the colony imported fish (dried, pickled, salted, potted, and preserved) to the value of £252,000, on which the government levied £31,887 as duty. During the same period the export only reached £3,031. In 1888 the imports were as follows: dried, pickled, and salted fish, to the value of £6,006, chiefly from Great Britain; and potted and preserved fish, to the value of £22,361, from Great Britain and the west coast of the United States. On these two items the government realized a duty of £6,062. The value of fish exported during 1888 was £7,450. This is exclusive of the oyster-fishery returns. The export of these mollusks in 1888 was valued at £11,927. These figures show that the outside trade in fish is still in its infancy, and is capable of immense extension. The number of species of marine fish already described as occurring in the coastal waters of New Zealand is close on two hundred; and of this number, over thirty are used as food, and appear in the markets. Many are locally called by names familiar to the settlers who emigrated from Britain, as, for example, cod, haddock, perch, etc.; and the general facies of the fishes of New Zealand is similar to that of the northern hemisphere. More than one-half of the described species are peculiar to the New Zealand seas, but a large percentage, including many pelagic forms, are common to Australasian waters.

One of the most valuable and abundant food-fishes of the colony is the hapuka or groper (*Oligorus gigas*), which is taken with bait all round the coast in from twenty to fifty fathoms. It is a big heavy fish, sometimes nearly six feet long, and varying in weight from forty to one hundred and twenty pounds. Its flesh is very solid and rather coarse, but admirably adapted for curing.

The kahawai (*Arripis salar*) is another abundant fish, especially in the northern portion of the colony. It appears to be migratory, swarming in the warmer seas during the summer months, but avoiding the cold southerly current which washes the southern and south-eastern coasts of the South Island. It is a handsome fish, somewhat resembling a small salmon in appearance, and running from two to seven pounds in weight. It is a capital fish for sport, and takes the fly or spoon-bait readily. The Maoris used to catch it by a bit of pawa-shell (*Haliotis iris*), the bright iridescent hues of which, when drawn rapidly through the water, gave the appearance of a fish swimming quickly. The writer has caught it in the Bay of Islands with such a bait, towing behind a yacht which was scudding along in a half-gale at twelve knots an hour. The