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THE BOSTON ELECTRIC SUBWAY.

Many years ago it became apparent that Boston required additional facilities for the transportation of street car passengers through the lower parts of the city. The problem of rapid transit was for a time somewhat unsatisfactorily solved by the introduction of a very complete system of overhead trolley covering the city and immediate suburbs. From the æsthetic and sentimental standpoints, to say the least, this wholesale introduction of the overhead trolley was not acceptable.and as the population increased, the electric roads have proved entirely inadequate to deal with the problem in the congested portions of the city. This applies to the region about Boston Common, where, especially on Tremont Street, bordering its eastern side, blockades are of very frequent occurrence, and where hundreds of feet of the street at a time are filled with trolley cars, working their way along as best they can. We have in a preceding issue spoken of the new electric subway road then and now in process of construction in Boston. Much work has been done upon it since that period, and the aspects of the work at different periods are the subjects of our illustrations.

In June, 1891, the Rapid transit Commission of the city of Boston had been appointed to consider the question of passenger traffic as affecting the city. The commission gave fifty-one public hearings and expended

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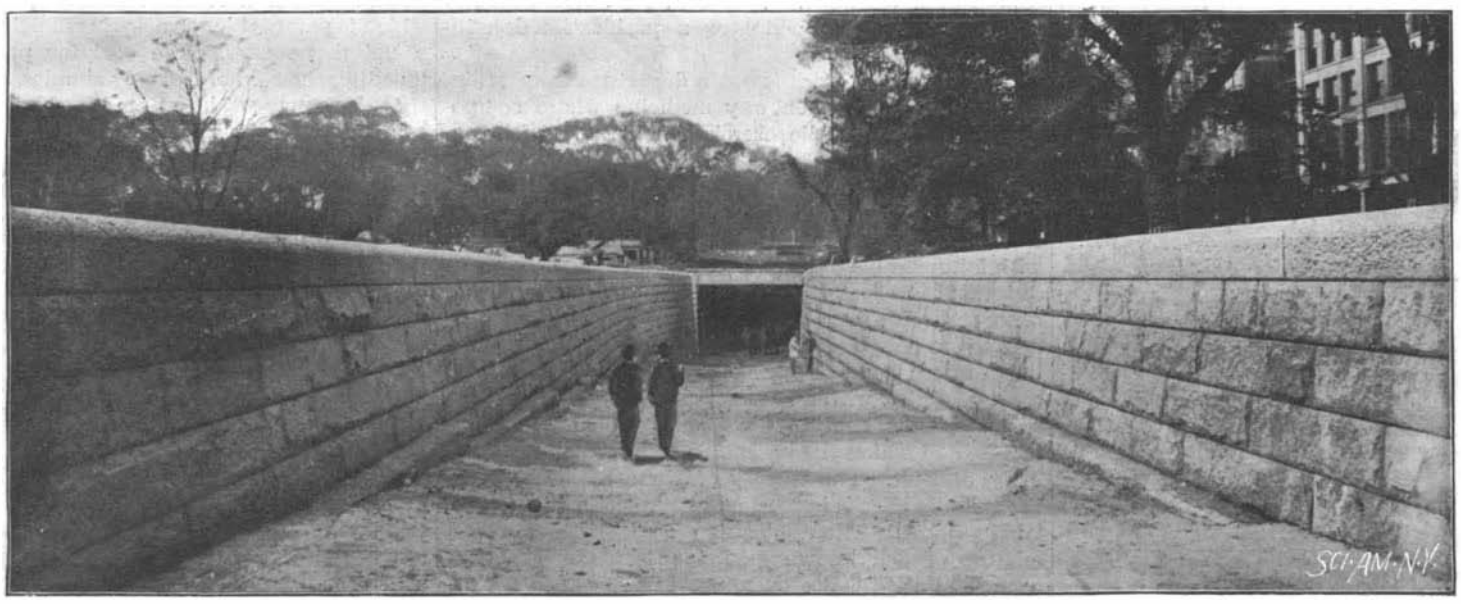
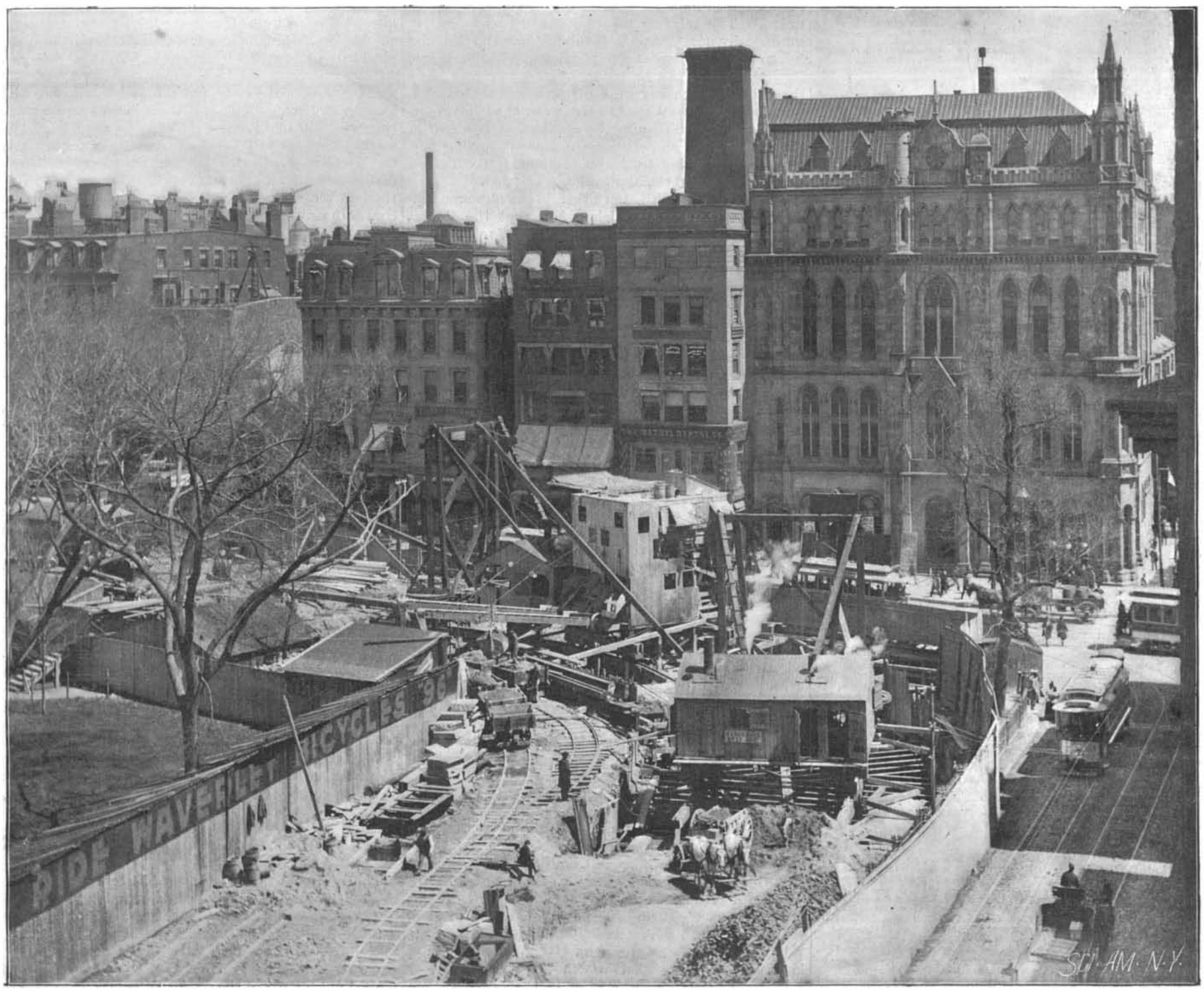


ENTRANCE TO THE SUBWAY BY THE PUBLIC GARDEN INCLINE.



THE EXCAVATING OPERATIONS ON THE BOSTON SUBWAY NEAR THE COMMON.

THE BOSTON ELECTRIC SUBWAY.

(Continued from first page.)

about $50,000 upon its work. In April, 1892, it made a report, containing various recommendations. The matter went over and a special committee was appointed by the Legislature of 1893. The new committee gave forty hearings and two acts were passed, one for the creation of a Metropolitan Transit Commission, another for a Board of Subway Commissioners. Without going into the details of the legislation, it is enough to say that, after various hearings by the committees, a composite act was passed by the Legislature providing for the incorporation of the Boston Elevated Railway Company and for the creation of the Boston Transit Commission.

Extensive powers were given the commission. They were authorized to build a subway or subways in the vicinity of the Common, to build a tunnel under Beacon Hill, to build a tunnel from the vicinity of Scolley Square, and to lay out a new way from a point near the southeast corner of the Common to Franklin Park. Seven million dollars was the limit of expenditure fixed by the act. The construction of a bridge over Charles River was also provided for in the act.

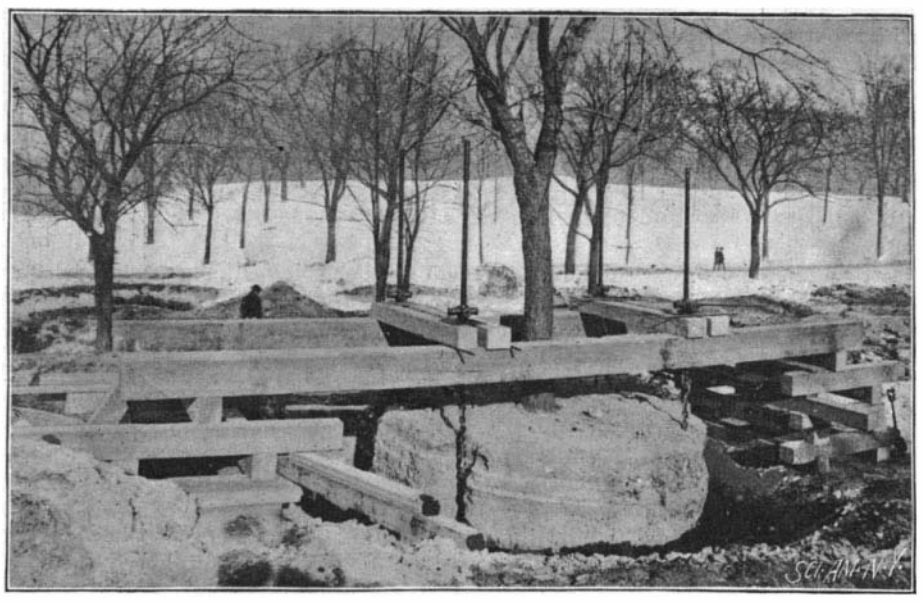
The commission at once began its work. By surface and subsurface surveys, the exact nature of the ground was determined, and these preliminary investigations included studies with regard to the disposition of underground sewers, pipes and conduits, that might be met with on the line selected.

It is interesting to note that an "alley" route was proposed. A twenty-five foot alley was proposed for construction in the space between Washington and Tremont Streets, in which it was proposed to concentrate all the street car traffic of the adjoining districts. There were various defects incident to this plan, such as the frequent grade crossings of the streets crossing the line, and the general inadequacy of a street of that width for the traffic of many lines of cars; besides which, the expense would have been very great. The plan, however, was submitted to the citizens of Boston in the election of 1893 and was rejected by them. The widening of Tremont Street, the placing of street car tracks on the Common and the use of a shuttle line in the more congested portion of the district were all discussed and considered only to be rejected, and the subway was finally and definitely chosen.

In our issue of August 31, 1895, we described in some detail the route to be followed and the general features of the construction. In order to have the tunnel near the surface, and in order to avoid lateral pressure, the arch type of construction is not used and the tunnel has been given a flat roof, supported by brick arches turned between heavy I beams. The sides are of similar construction, the I beams in the sides standing vertically. This establishes a number of arches both vertical and horizontal, each one of 6 feet chord, and of versed sine of about 9 inches. Diagonal struts connect the vertical and horizontal beams across the upper corners.

One of our cuts shows the Boylston Street entrance to the tunnel, near the Public Gardens, and its interior is the subject of another view. In excavating the ground at this point the contractors employed an advanced type of excavating machinery and conveyors. The aspect of the excavation work is illustrated in the large view.

PREPARING TO RAISE A TREE.



THE TREE RAISED TO ITS NEW LEVEL.

In excavating the line along the edge of the Common, the old graveyard was disturbed, and one of our illustrations shows the removal of the bones, which were consigned to caskets before reinterment. It is estimated that the bones of 910 persons, after their long rest close to Boston's busiest spot, were removed. Three ancient gravestones, giving a clew to the particulars of some of the old interments, were found, and views of them are reproduced. The remains are reinterred in another portion of the old burial ground, three small stones and a memorial tablet marking the site of their new resting place.

On Saturday before Christmas, 1894, a count was taken of the people taking the cars in the congested district, which shows that the maximum number leaving the cars at any one hour was nearly 3,500. This is used as the basis for determining the size of the station platforms.

The manipulation of trees on the line of the road presented many features of interest, and two of our cuts show the operation of raising a large elm tree. In this case it was merely a question of change of level, no transfer being required. The cuts are self-explanatory. A trench was dug around the tree, and the earth was then undercut, so as to form a great earth ball. Chains were passed beneath it and carried to four screw jacks, by means of which it was raised to the new level. The operation being done in winter enabled the engineers to secure a solid earth ball under the influence of frost, thereby greatly facilitating the work.

Our cuts illustrate a two-track subway. Part of it, however, will be wide enough for four tracks, side by side. The two-track subway is 24 feet wide, and the four-track one is 48 feet wide. The latter will have a line of steel posts along its center to take the strain off the roof. It is proposed to have the top of the rail about 17 feet below the street surface, so that less up and down stairs work will be involved on the part of passengers by it than in the use of the New York Elevated road.

The ventilation problem has been much simplified by the determination to use electric traction. It is proposed also to have a fan for every 600 feet section of the subway, of capacity sufficient to completely exhaust a section in seven to ten minutes. This gives a range of air current of from sixty to eighty-six feet a minute. The fans will work by exhaustion.

The cost of the two-track subway is put at $122 per linear foot; of the four-track subway at $132 per linear foot.

THE BOSTON SUBWAY—INTERIOR OF THE TWO-TRACK SUBWAY.

AN International Exposition of Precious Metals and Machinery used in mining and working them will be held in Brisbane, Queensland, in June, July, and August, 1897.

Dr. Nansen.

The English newspapers have printed particulars of the strange circumstances under which Mr. Jackson accidentally met Dr. Nansen when traversing the ice pack on the southwest coast of Franz Josef Land. Jackson wrote:

"On June 17 I met Dr. Nansen three miles out on the floe to the south-southeast of Cape Flora, under most extraordinary circumstances. He had wintered in a rough hut within a mile or two of our northern limit in 1895, and this spring we unknowingly came to within a few miles of his winter quarters. It has been a great pleasure to me to be the first person to congratulate him on his great success.

"Our meeting was all the more remarkable as Nansen, owing to the great discrepancies in Payer's map, and to the fact that his two watches had stopped, was entirely uncertain of his whereabouts. He, on the other hand, was quite unaware of our presence in Franz Josef Land, and expressed the greatest surprise and the liveliest satisfaction in meeting with us. He and Scott-Hansen are both in thoroughly good health, and are rejoiced at the early prospects of their return home afforded by the presence of the gallant little Windward."

Nansen had actually started westward over the ice pack for Spitzbergen when Jackson met him. His project was not only highly dangerous, but was probably impossible of achievement, and it was his great good fortune that Europeans were there ready to succor him in bleak Franz Josef Land, where he had taken refuge.

Dr. Nansen went to Christiania on board Sir George Baden-Powell's steam yacht Otaria. A grand fête was held at Tromsoe before Dr. Nansen's departure in honor of himself and his comrades. Great enthusiasm was shown by the people, and Dr. Nansen and his comrades were carried in chairs into the hall where the fete was held and where a number of speeches were made lauding Dr. Nansen and his companions for their work. King Oscar II of Sweden and Norway will attend the reception to be given at Christiania to Dr. Nansen.

An invitation was telegraphed to Dr. Nansen asking him to address the annual meeting of the British Association, which will be held at Liverpool on September 16. A response has been received which justifies the hope that he will accept the invitation. His exploration resulted in many interesting scientific discoveries, and an account of his voyage is eagerly awaited.

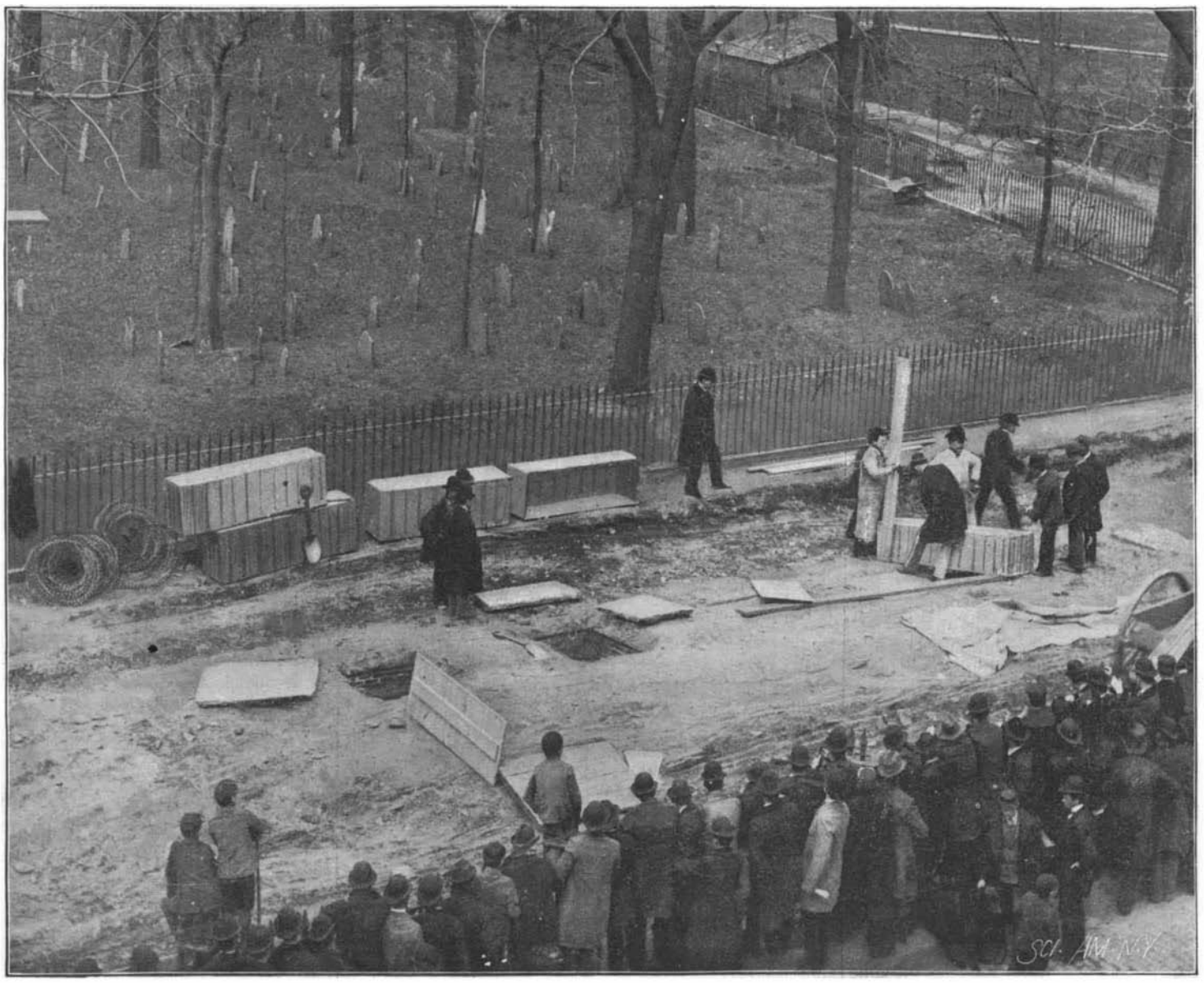
The London Chronicle of August 27 publishes an account of the voyage of the Arctic exploring vessel Fram, after Dr. Nansen left her. The account is given by Capt. Sverdrup, commander of the Fram, and was sent to the Chronicle from Tromsoe by Dr. Nansen himself. The dispatch says:

"The ice pressure was never as severe as upon several occasions before Dr. Nansen left us. We were regularly exposed, however, to violent pressures, caused by the changing spring tides. The Fram was once or twice daily lifted from six to nine feet. Her bottom became visible as it rested on the ice. So little effect did this have on the Fram's timbers that the men slept undisturbed.

"An easier Arctic exploring expedition one could hardly imagine. The principal work was to take regular observations, sleep and eat. The health of the men was perfect during the entire expedition. There was not a sign of scurvy among any of the men. When all efforts to advance the boat through the ice by the force of steam or a process of warping failed, it was found that guncotton mines proved the best means of shattering the ice.

"As a rule there were very high ice floes, so extensive that their termination could not be descried even by the use of telescopes. Often it looked like a hopeless task breaking our way out of the ice foot by foot, but with the liberal use of explosives, and owing to the peculiar construction of our boat, we finally succeeded."

THE BOSTON SUBWAY—OLD GRAVESTONES FOUND ON LINE OF EXCAVATION.



THE BOSTON SUBWAY—INCLOSING HUMAN REMAINS PREVIOUS TO REINTERMENT.

Firing Big Guns.

Seven representative war vessels of the new United States navy arrived at New York, August 23, after twenty-two days of severe squadron sea service, which also included battery practice on a larger scale than had ever before been attempted on this side of the Atlantic. The squadron included the battleships Indiana and Massachusetts and the cruisers Columbia, New York, Cincinnati, Raleigh and Newark. It is said that the concussion from firing the thirteen inch guns on the battleships Indiana and Massachusetts was something terrific, and the shock on board the Indiana was such as to throw a 2,000 pound anchor several feet into the air and into the sea from her port bow. The target was about twenty-five feet high and fifteen feet wide at the base. The vessels of the squadron passed and repassed it at a distance of 2,000 yards, running about eleven knots. A spirited account of this practice is thus given in the New York Sun: "The New York led the column, and, as she got in range, she blazed away with her forward battery, following it up with a cannonade from her waist, and finally from the guns of her after division. Some of the projectiles from the big and little rifles pierced the wings of the canvas target. Any one of them would have hit the hull of an ordinary ship. The Indiana followed the New York, and the sea seemed to tremble with the vibration when her main battery let its ponderous missiles loose. Every gun on the port side barked or roared or thundered at the target. It was a new sensation to all hands this firing of many guns from the decks of the greatest of our war vessels. The awful concussion made the men at the great rifles temporarily deaf; the niter from the powder blistered their faces, and powder grains more than an inch in thickness dropped on the decks, freckling them with holes more than half an inch deep. The 2,000 pound anchor flew from the bow as from a catapult with the thunder of the first gun. Capt. Bob Evans was too busy to stop to investigate the loss of the anchor; besides, the cruiser Raleigh was steaming at an eleven knot rate just astern, and, naturally, Capt. Bob kept right on, shooting off more gunpowder and steel as if nothing out of the ordinary had happened. Every vessel was cleared for action before she passed the target. That was the signal that fluttered in bunting from the flagship just before the seven white fighters formed in column to shoot at the canvas target. They were in the same condition they would be in if engaged in actual battle. Most of the shots of the Indiana struck so near the target that if it had been even a 200 foot ship there wouldn't have been a vestige of the ship afloat. The Raleigh, which followed the Indiana, holds the record for gunnery, not only in our own navy, but among all the war ships of the world. She maintained her glory by demolishing the target almost at the first fire, and the ships astern of her fired at a wreck. Rear Admiral Bunce signaled the Raleigh to put out a new target, which she did. Four times the ships of the squad-

ron passed the target and four times they belched tons of steel that made the sea around the bobbing triangle look like an angry lot of breakers on a rocky coast. The Raleigh won the honors. Several times the signal, 'Well done, Raleigh!' was displayed from the flagship. Naturally Capt. Miller and Lieut.-Com. William J. Barnette, the executive officer of the Raleigh, were elated. From the Raleigh's main battery 207 shots were fired within eight minutes."

Subsequently the squadron indulged in torpedo practice. Buoys were placed a short ship's length apart, and at a speed of six, nine and eleven knots, each ship banged away with her torpedoes. The target was 400 yards from the ships, and each ship had three shots at it. Every torpedo didn't strike between the buoys, but every one would have hit an ordinary war vessel.

The American Chemical Society.

Buffalo Meeting, August 21-22, 1896.—The American Chemical Society, one of the societies affiliated with the American Association for the Advancement of Science, met at Buffalo, August 21 and 22, with an attendance of members nearly equal to the combined attendance of all the other affiliated societies, and with a long programme of papers, which included several of much importance. Dr. Charles B. Dudley, of Altoona, Pa., presided. The opening address of welcome was by Dr. Roswell Park, of Buffalo, as president of the Buffalo Society of Natural History, in which he said that that society now greeted the American Chemical Society for the first time, but hoped to meet them again in 1906, as they had met the American Association for the Advancement of Science in 1866, 1876, 1886, and were now to meet them in 1896. He said that it is not generally known outside of Buffalo that Buffalo is the sixth commercial city of the world, and in tonnage of freight entering and leaving the port it is surpassed only by Liverpool. He urged the chemists to devote their best energies to discover that great desideratum of therapeutics, some chemical compound which shall be toxic to pathogenic germs, but innocuous to the tissues of the human body.

President Dudley responded briefly on behalf of the society.

Dr. Park's address aptly introduced a very important paper in its sanitary bearing by Cass L. Kennicott on the "Inspection and Sanitary Analysis of Ice." Abstracts of other papers follow.

ALUMINUM ANALYSIS.

By James Otis Handy.

Although the aluminum industry is not a large one in the sense that the iron industry is, it is growing very rapidly. The output of the United States in 1894 was 550,000 pounds, and in 1895 it was about 850,000 pounds. The Pittsburg Reduction Company, with works at New Kensington, near Pittsburg, Pa., and at Niagara Falls, N. Y., is a representative American producer of aluminum. The material is made by electrolysis, in carbon-lined pots of alumina, the material being dissolved in a fused bath of fluorides. The product of each pot is ladled out at intervals, and is graded according to analyses. Some of the aluminum is sold as it is made and some is alloyed. The aluminum at present produced with the best ores available contains from 99 to 99·9 per cent of aluminum, 0·3 to 0·05 of silicon, 0·50 to 0·0 per cent of copper, 0·20 to 0·0 of iron. Carbon is sometimes present.

Second grade aluminum contains 96 to 98 per cent aluminum, silicon and iron making up the remainder. Aside from analyses of metallic aluminum, there are required in the pursuit of the aluminum industry analyses of aluminum alloys of copper, nickel, manganese, chromium, tungsten, zinc and titanium; of aluminum solders, containing tin, zinc and phosphorus; of aluminum hydrate, bauxite and electrode carbons; of hydrofluoric acid and fluorides. The method of these analyses was described in detail.

THE DEVELOPMENT OF SMOKELESS POWDER.

By C. E. Monroe.

Dr. Monroe gave an elaborate history of the work of other investigators and then described his own powder, called "indurite." To manufacture this powder he began by purifying his dried military gun cotton, which was done by extracting it with hot methyl alcohol in a continuous extractor, and when this was completed the insoluble, nitrated cellulose was again exposed in the drying room. The highly nitrated cellulose was then mixed with a quantity of mono-nitro-benzene, which scarcely affected its appearance and did not alter its powdered form. The powder was then incorporated in a grinder by which it was colloidized, and converted into a dark translucent sheet or mass resembling India rubber.

The sheet was now stripped off and cut up into flat grains or strips, or it was pressed through a spaghetti machine and formed into cords, either solid or perforated, of the desired dimensions, which were cut into grains. Then the granulated explosive was immersed in water boiling under the atmospheric pressure, by which the nitro-benzene was carried off and the cellulose nitrate was indurated, so that the mass became light yellow to gray, and as dense and hard as ivory, and it was by this physical change in state, which could be varied within limits, that he modified the material from a brisant rupturing explosive to a slow-burning propellant.

The indurite thus formed stood severe tests. The chief of the bureau informed Dr. Monroe, before the firing began, that a powder giving 2,000 feet initial velocity would be a complete success. In two successive rounds of a six inch rapid fire gun using twenty-six pounds of this powder, and a 100 pound projectile, the pressures were 13·96 and 13·93 tons, and the velocities 2,469 and 2,456 feet per second respectively.

Dr. Monroe sums up the desiderata of smokeless powder thus:

1. That it shall be physically and chemically uniform in composition.
2. That it shall be stable and permanent under the varying conditions of temperature and humidity incident to service storage and use for all time.
3. That it shall be sufficiently rigid to resist deformation in transportation and handling.
4. That it shall produce a higher or as high a velocity with as low a pressure as the service charge of black powder for a given piece.
5. That it shall be incapable of undergoing a detonating explosion.
6. That the products of its combustion shall be nearly if not quite gaseous, so that there shall be no residue, and little or no smoke.
7. That it shall produce no noxious or irrespirable gases or vapors.
8. That it shall not unduly erode the piece by developing an excessive temperature.
9. That it shall be as safe as gunpowder in handling and loading.
10. That it shall be no more than ordinarily dangerous to manufacture.

Indurite wrapped in felt in an iron vessel was exposed to a temperature of 208° Fah. for six hours without undergoing change, and again at a temperature of 212° Fah. for twenty-four hours before any change was observed, and again to 5° Fah. without being affected.

Edward Hart presented some notes on the preparation of glucinum, reporting progress in the investigation for which the A. A. A. S. some time ago appropriated a fund. He finds it better to handle large quantities, and has reduced beryl in quantities of 100 pounds at a time. The presence of silicon in crucibles first used impaired the purity of the product, and he substituted crucibles made of pure glucina, following the analogy of the reduction of aluminum, which is now made in crucibles of pure alumina. He described other details of his work, which is still in progress.

L. M. Dennis, in presenting a paper on "Some New Compounds of Thallium," mentioned incidentally that in the progress of investigating these compounds, he had discovered that potassium platino-cyanid, $K_2P+(CN)_4$, is by far the most efficient substance yet discovered to cause fluorescence of the X rays; hence is better adapted to paint fluorescent screens than any of the salts generally used. Prof. Dennis also read a paper on "Separation of Thorium from the Other Rare Earths."

Other papers read were: "Composition of Certain Mineral Waters in Northwestern Pennsylvania," A. E. Robinson and Charles F. Mabery; "Mercuric Chlor-thio-cyanate," Charles H. Herty and J. G. Smith; "Zirconium Oxalates," F. P. Venable and Charles Baskerville; "Rutheno-cyanides," James L. Howe; "The Reduction of Concentrated Sulphuric Acid by Copper," Charles Baskerville; "Some Analytical Methods Involving the Use of Hydrogen Dioxide," B. B. Ross; "An Analytical Investigation of the Hydrolysis of Starch by Acids," George W. Rolfe and George Defren; "The Effect of an Excess of Reagent in the Precipitation of Barium Sulphate," C. W. Foulk; "Estimation of Thoria, Chemical Analysis of Monazite Sand," Charles Glazer; "Determination of Reducing Sugars in Terms of Cupric Oxide," George Defren; "Acidity of Milk Increased by Boracic Acid," E. H. Farrington; "Accuracy of Chemical Analysis," Frederic P. Dewey; "Some Extensions of the Plaster of Paris Method in Blowpipe Analysis," W. W. Andrews; "Device for Rapidly Measuring and Discharging a Definite Amount of Liquid," Edward L. Smith; "Table of Factors," E. H. Miller; "A Modified Form of the Ebullioscope," H. W. Wiley; "A New Form of Potash Bulb," M. Gomberg, communicated by A. B. Prescott; "Morphine in Putrefactive Tissue," H. T. Smith, communicated by A. B. Prescott; "The Signification of Soil Analysis," H. W. Wiley; "A Complete Analysis of Phytolacca Decandra," G. B. Frankforter and Francis Romaley; "The Crystallized Salts of Phytolacca Decandra," by same; "The By-products Formed in the Conversion of Narcoline in Narceine," G. B. Frankforter; "Notes on the Determination of Phosphorus in Steel and Cast Iron," George Auchy.

On Friday afternoon the members of the society visited Lang's brewery and the city reservoir, and then separated into three parties, to visit (1) the Milson Rendering and Reduction Works and the Garbage Reduction Works, (2) the Aniline Works, (3) the Buffalo Reduction Company's Works (copper smelters).

On Saturday an excursion was made to Niagara Falls by boat and to Lewiston by the Gorge road. The Calcium Carbide Works, power house of Cataract Construction Company, and Cliff Paper Mill were visited.

RECENT PATENT AND TRADE MARK DECISIONS.

Loewer Sole Rounder Company v. Gibbon (U. S. C. C. Penn.) 74 Fed. Rep. 555.

Effect of Decision of Another Court Sustaining the Patent.—The decision of a Circuit Court sustaining a patent will be followed by another court unless new evidence is produced, which, if it had been introduced in the other court, would have resulted in invalidating the patent.

Sole Cutting Machine Patents.—The Loewer & Blair patent No. 407,735 has been held valid and infringed as to claims 1, 4, 5, 6, 9 and 14.

National Sewing Machine Company v. Willcox, Gibbs & Company (U. S. C. C. A. 3d Cir.) 74 Fed. Rep. 557.

Construction of a Royalty Contract.—The Willcox & Gibbs Sewing Machine Company agree to pay the National Sewing Machine Company a royalty of 40 per cent on its receipts from sales or leases of machines covered by the latter's patents, provided, however, that if the defendant "shall sell or lease or cause to be sold or leased" in any foreign country the machine at less rates than those in this country, "then the royalty rate to be paid shall be 45 per cent in lieu of 40 per cent as herein before provided." After operating several years in the home market, the defendant began selling and leasing in a foreign country at a less rate. Plaintiff claims that the provision was retroactive, giving it a right, on the happening of the condition provided for, to 45 per cent of all previous sales and leases from the commencement of the contract. The Court held that the plaintiff was entitled to only 40 per cent of sales and leases prior to such operation in a foreign country at a less rate and 45 per cent of all subsequent sales and leases, both at home and abroad.

Kilmer Manufacturing Company v. Griswold (U. S. C. C. A. 2d Cir.) 74 Fed. Rep. 561.

Bale Ties.—The Kilmer patent No. 282,991 for bale ties of wire, where a bent wire is clutched in a V shaped clasp made of heavier wire, is void as to claims 1 and 2 in view of the patent of Smith, No. 159,463.

Codman v. Amia (U. S. C. C. A. 1st Cir.) 74 Fed. Rep. 634.

Atomizers.—The Shurtleff patent No. 447,064 is void as to claims 1 and 2 for want of novelty and invention, as there is no patentable novelty in securing directly to the cap or stopper of an atomizer a nozzle adapted to be applied to the nostrils, or in so constructing the cap or stopper that its top shall form a seat for the nozzle.

Campbell v. H. T. Conde Imp. Company (U. S. C. C. Ind.) 74 Fed. Rep. 745.

The Elements of a Combination Presumed to be Old.—A failure to separately claim any of the elements composing a patented combination raises a presumption that each of such elements is old.

Corn Planters.—The Campbell patent No. 324,983 for the combination of a planter and fertilizer distributer, consisting of a hopper having the rear portion inwardly curved in circular form and extending across both disks through which the corn and fertilizer pass, geared together for simultaneously dropping the corn and fertilizer, is void as being simply for a new collocation of old elements producing no new function, operation or result.

French v. Alter & Julian Company (U. S. C. C. Ohio) 74 Fed. Rep. 788.

Trademark.—A preliminary injunction forbidding the use of a trademark which has not been established by adjudication will not be granted if affidavits are filed that indicate a prior use.

Kite Photographs of Boston.

William A. Eddy, of Bayonne, N. J., has succeeded in making several distinct photographic views of Boston from a great height, by means of a camera supported from kites. The kites were of the tailless type used at the Blue Hill Observatory, where an altitude of 7,441 feet was obtained, and were six and seven feet in diameter. Four to eight of these kites were required to support the camera, depending upon the strength of the wind. Distinct views were obtained of the Common, Beacon Street, Commonwealth Avenue, Charles River, and the outlying suburbs, and Mr. Eddy estimates that in one of the views the camera was, at the moment of exposure, 1,500 feet above the pavement.

Andree Home Again.

Mr. Andree has arrived at Tromsoe, Norway, from Danes Island, Spitzbergen, on board the Virgo. He has abandoned, for this year, his idea of crossing the Arctic regions in a balloon, the season having become too far advanced to justify an ascension.

The Polar Snow of Mars.

A dispatch of August 24, from Lowell Observatory, Flagstaff, Arizona, to John Ritchie, Jr., of Boston, announces that the polar snow of Mars has been observed in latitude 75, longitude 36, about two degrees in diameter.