

the joints being filled in carefully with smaller rock and cement. The rock is blasted from a neighboring quarry and brought to the dam by a railroad which runs across the north end of the dam below the wall of the temporary channel (see Fig. 2). Here the skips are picked up by a cableway, which stretches across the valley, carried over to the desired spot and lowered. The rock is then picked up and placed in position by derricks, of which a great number are scattered over the work. Some idea of the magnitude of the work may be gained when it is stated that the booms of the derricks, shown on the foundations in Fig. 7, are 50 feet long. In this general view of the foundations the level of the crest of the finished dam is indicated by a cross on the side of the hill.

The general appearance and cross section of the finished dam is shown in Fig. 6. It consists of three distinct portions. The first 400 feet on the south side of the valley is an earth dam, with an interior masonry core wall. Next to this is the masonry dam, 650 feet in length, which extends to within 200 feet of the north side of the valley. Here it bends sharply to the right and runs back up the valley parallel to the contours of the hillside for about 1,000 feet, finally turning into a junction with the hill. This last portion is the spillway or overflow. At the upper end the latter is comparatively narrow and shallow, but it widens and grows deeper toward the dam proper, of which it is really a prolongation. Its downstream face is formed in a series of large steps as shown in Fig. 6. The spillway is given these generous proportions with a view to accommodate any possible flood that might descend upon the lake. The Croton Lake will be only one of a series of smaller reservoirs scattered higher up in the hills. If any one of these should break, the Croton spillway could safely accommodate the sudden rush of water.

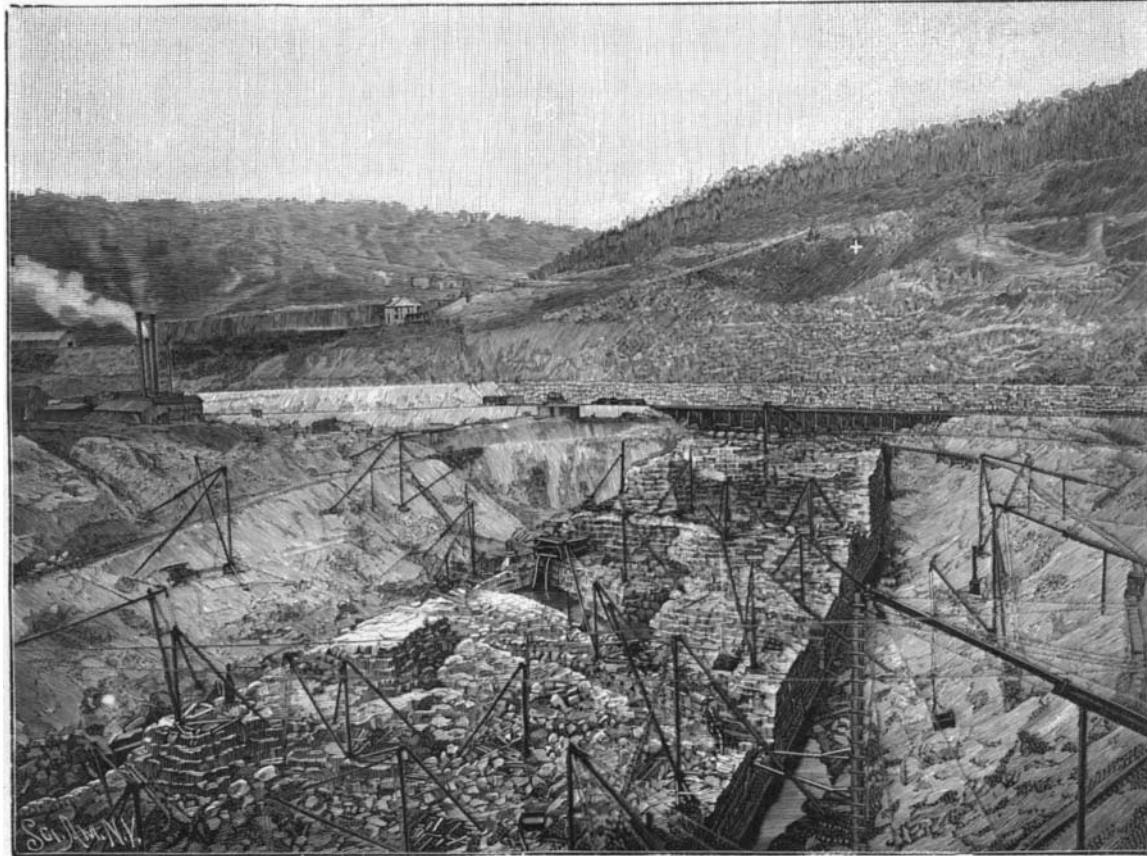
The upstream face of the masonry dam will be approximately vertical, but the other face will run back with a sharp inclination, rounding up to the perpendicular at the coping. The excavated material on the up and down stream sides will be filled in against the dam up to the original level of the river bed, and the two faces of the dam above this level will be finished in facing stone masonry in horizontal courses, laid everywhere at right angles to the face of the dam. It is interesting to note that the pressure of this great wall of masonry on the foundations is 18 tons per square foot.

The earth dam is laid in 6 inch layers, from which all large stones are removed. Each layer is rolled with a grooved roller and watered. The water forms a bond and the roller packs the whole mass firmly together. The dead weight of the earth backing affords the necessary stability to resist the thrust of the water, the center core of masonry serving merely to render the dam watertight. This masonry core extends from the great masonry dam to the south side of the valley, and like it extends to solid rock both below the bed of the river and at the side of the hill. It is 18 feet thick at the bottom, 6 feet thick at the top, and its greatest height is about 230 feet. The downstream slope of the earth dam is sodded and the upstream slope is paved.

Along the crest of the dam extends an ornamental driveway which is carried across the spillway by a handsome steel bridge. The driveway is 18 feet wide, with a margin on each side for the necessary railing

and coping, and the architectural appearance of the masonry dam is improved by an ornamental line of arches at the coping.

At the extreme north end of the dam will be built a blow-off gate house, for emptying the reservoir, should occasion necessitate it. It will be built out from the dam on the upstream side (see Fig. 6), its dimensions at



7.—GENERAL VIEW OF DAM FOUNDATIONS, SHOWING TEMPORARY CHANNEL AROUND NORTH END OF DAM.

Cross on hillside marks level of crest of dam.

the top being 35½ by 37 feet. The water will be blown off through three 48-inch pipes, which will lead through the masonry of the dam and discharge into the bed of the river. When the new aqueduct, which runs in a direct line and chiefly in tunnel from the old reservoir to New York, was built, it was provided with a gate house which is arranged so that it can take water from the new reservoir and lead it direct to New York by the new aqueduct. The old aqueduct runs down the south side of the valley from the old Croton dam and intersects the earth dam. At the point of intersection a gate house will be built whose intake will lead water from the lake at various elevations.

The crest of the Croton dam, ¾ miles upstream, is 30 feet lower than the crest of the new dam. Hence, when the new reservoir is filled, the level of the lake will be 30 feet above the crest of the old structure. The total water area will be about 8 square miles and

HON. CHARLES H. DUELL, COMMISSIONER OF PATENTS.

The United States Patent Office has been again favored with a Commissioner of known ability and probity. There is hardly a public man in the official life of Washington who is charged with more responsibility than the Commissioner, on whom rests the conservation of great interests. It is requisite that the incumbent of this office shall have a competent knowledge of practice before the Patent Office and be a lawyer as well. Mr. Charles H. Duell, of Syracuse, New York, who has been appointed by the President, admirably fulfills both of these qualifications. He has long ranked high as a practitioner in patent cases before the courts and he probably has few equals in this specialty. His practice has been extensive and has covered a great number of cases. He has attained a large degree of success, having had many cases where the interests involved were of large import. These he has handled with skill and prudence.

The appointment will probably mean a considerable financial sacrifice, as it will interrupt a lucrative practice and the position of honor to which he has been appointed is inadequately paid. Mr. Duell's appointment will be received with general public favor and it is considered one of the most fortunate of President McKinley's nominations. The new Commissioner was a candidate at the beginning of President McKinley's administration, but the latter wished to appoint his old personal friend, Congressman Butterworth. The death of Mr. Butterworth gave the President the opportunity of recognizing Mr. Duell's candidacy by nominating him.

Mr. Duell was born at Cortland, N. Y., in 1850; his father, R. Holland Duell, was four times sent to Congress, and in 1875 he was appointed Commissioner of Patents, which office he held for two years. Mr. C. H. Duell received a preliminary education in the Cortland Normal School; he then entered Hamilton College, from which he graduated in 1871. He was an honor man in his class and took several prizes. He has held some political offices honorably and acceptably to his constituents.

The inventors of the United States may feel sure that their interests will be looked after in a conscientious manner both in Congress and in the administration of the Patent Office.

JUDGE ARTHUR P. GREELEY.

The duties of the Commissioner of Patents are severe, and each new incumbent of the office must spend a considerable length of time in mastering the detail of the office. The manifold duties of the position render it essential that the Assistant Commissioner shall be thoroughly conversant with the administrative and judicial features of so great an establishment, so that he will be properly equipped to assist the Commissioner and take his place in the absence of his chief. In these respects the present incumbent, Judge Arthur P. Greeley, is well equipped for the responsible position of Assistant Commissioner of Patents.

Mr. Greeley is a graduate of Dartmouth College, in the class of 1883. He is a lawyer by profession, hav-

ing been graduated from the law school of the Columbian University of Washington in the class of 1887, taking the post-graduate course at the same school the following year. The next year, 1888, he was admitted to practice in the District of Columbia.

In July, 1884, he entered the Patent Office as a fourth assistant examiner, as a result of his standing in the



HON. CHARLES H. DUELL, COMMISSIONER OF PATENTS.



JUDGE A. P. GREELEY, ASSISTANT COMMISSIONER OF PATENTS.

the lake will extend as far as Croton Falls, fifteen miles up the valley.

The plans of this great work were drawn up by Chief Engineer Fteley, the recently elected President of the American Society of Civil Engineers, and the construction is being carried out under the immediate supervision of Divisional Engineer C. S. Gowan.