thus justifying its use as a suspended joint. Again the strength of the joint is materially

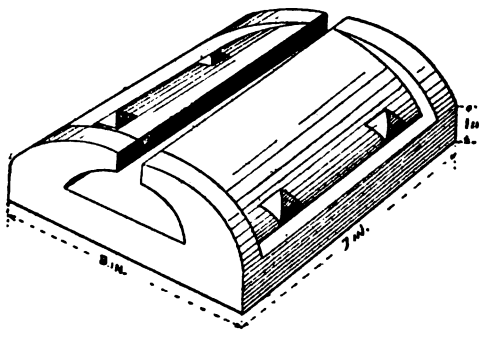

FIG. 36—CAST-IRON CHAIR.

increased laterally, for rails have not only to resist vertical but lateral strains as well and on a curve, unless they are carefully bent

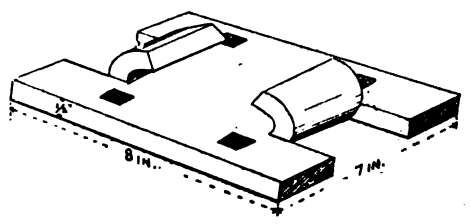

FIG. 37—WROUGHT-IRON CHAIR.

previously, they tend to straighten and obtain the amount of curvature by deflecting at the joints. This tendency is counteracted by the lateral stiffness of the angle bar.

(TO BE CONTINUED.)

CORRESPONDENCE.

The Potomac Falls and Neighborhood.

GREAT FALLS, MD., JAN. 12, 1885.

EDITOR ENGINEERING NEWS:—While employed at this place I have made some notes which may be of interest to other readers of ENGINEERING NEWS.

The past year has been one of unusual activity. Chittenden Bros. have been at work on the new dam across the Potomac for the Washington Aqueduct Extension, of which they have built about 1,200 ft. in length. The total length of dam, new and old, when completed will be 2,900 ft. the greatest height 18 ft. The bed of the river is blue gneiss which gives an excellent foundation. The specifications declare:

"The dam will be 8 ft. wide at top, with a vertical face down stream, the up stream face having a slope of two vertical to one horizontal.

The down stream facing, and the up stream facing for a depth of two courses below the coping, will be laid in regular courses not less than 12 in. in thickness. The stone will be not less than 4 ft. long and 3 ft. wide; they will be dressed to give mortar joints of not more than ¾ of an inch, beds horizontal, and vertical joints perpendicular to beds and face; they will be quarry faced, with a draft of 1 in. along the face edges."

And for the coping: "Each stone will be 8 ft. 3 in. long, 15 in. thick, and not less than 4 ft. wide; they will be laid entirely as through headers, each stone covering the entire width of dam and projecting 3 in. beyond the down stream face." The body of the dam is of concrete. The old dam will be repaired and a coping course placed upon it. The stone is a hard sand stone from the government quarries at Seneca, Md. These quarries supplied the stone for the bridges of the Washington Aqueduct, with the exception of the granite ring of the Cabin John Bridge.

Without devoting any time to this already well described bridge, I would however call attention to a beautiful elliptical arch of 75 ft. span, somewhat more than a mile further up the conduit, known as Bridge No. 3. This little bridge should not be forgotten when one is visiting the big one.

On the Maryland side, about three miles from the dam is a gold mine worked on a small scale. Here you can see a "long-tom," a stamp-mill, a roasting furnace, a number of shafts full of water and an old miner, who never lets a drop of water pass till it has washed the precious sands for him. It pays. There is a deserted mine and several prospects in this neighborhood.

On the Virginia side and within three miles of the dam are two soap-stone quarries, one of them, which is but partly opened, has a 6 in. vein of asbestos crossing it; a serpentine quarry also partly opened, a deserted iron mine (magnetic ore,) the Falls, and an old canal.

This old canal is the one particular thing I intended to describe when I began, and now I will make my description as brief as possible. Rumor says Gen. Washington made the survey before the Revolutionary War, and built the canal just after that war; also that no boat has passed its locks in the last sixty years. It was about one mile long and had six locks. Four of these locks overcame a fall of 50 ft.; I could not get to the other two locks to measure them on the day I visited the canal. The lower four were blasted out of the solid rock and had only one gate apiece, each lock discharging directly into the one below it. The masonry of the upper two is nearly all in place, and an oak center post of one of the lower gates is still standing erect. A number of trees are growing in the masonry, some of them more than 1 ft. in circumference.

S. B. MERRILL.

THE HISTORY AND STATISTICS OF AMERICAN WATER-WORKS.

BY J. JAMES R. CROES, M. AM. SOC. C. E. : M. INST. C. E.

Continued from page, 28.

DCCVII. CATSKILL, N. Y.

Catskill, Greene County, New York, in lat 42° 20′ N. long. 73° 40′ W., is on hilly ground on the west bank of the Hudson River at the mouth of Catskill Creek. Water-works were built by the village in 1884 after plans and under the superintendence of W. S. Parker, C. E. taking the supply from the Hudson River about a mile above the village and pumping by two Davidson compound condensing steam pumps, steam cylinders of 16 and 30 inches diameter and water cylinders 12 inches diameter, all of 24 inches stroke, into a reservior 250 feet above the river, constructed in excavation and embankment, 256 × 146 feet at water surface and 20 feet deep. One side of the reservoir and part of the bottom is in rock excavation. When the reservoir was filled, in August 1884, the water passed through or under the embankments and saturated the gravelly soil south of the reservoir for several hundred feet, coming to the surface in springs at every depression. No remedy for this has yet been adopted.

Distribution is by 8½ miles of cast iron pipe of from 10 to 4 inches diameter, with 87 fire hydrants and 72 taps.

The works have cost $135,000, which is the bonded debt at 4 per cent. interest. The population in 1880 was 4,320.

The works are managed by the village trustees. E. Lampmann is President.

DCCVIII. CORTLAND, N. Y.

Cortland, New York, in lat. 42° 35′ N., long, 76°15′ W., the County Seat of Cortland Co., is on the Teoughnioga River.

Water-works were built in 1884, by a private company.

The supply is taken from a sphinx which yields 1,000,000 gallons daily in the dryest seasons, and is pumped through a 10 inch cast iron pipe for 1700 feet by a Worthington Compound duplex condensing pump of 14 and 20 inch steam and 12-inch water cylinders, and 15 inch stroke to a plate iron tank 40 feet in diameter and 40 feet high, 125 feet above and ½ mile distant from the main street of the town. When necessary the water can be pumped direct into the mains.

The works went into operation in September, 1884, and one month later the distribution was by 7 miles of cast iron pipe of 12 to 4 in. diameter, with 40 fire hydrants and 225 taps. Wrought-iron is used for services.

The cost of the works has been $115,000. The bonded debt is $55,000 at 6 per cent. The town pays $50 yearly for each hydrant. The population in 1880 was 4,050, and is now said to be 6,000.

The officers of the company are J. E. Eggleston, President, E. Keaton, Treasurer, and J. S. Bull, Secretary and Superintendent.

DCCIX. ELDORA, IOWA.

Eldora, Iowa in lat. 42° 20′ N., long, 93° 5′ W., is on the Iowa River.

Settled in 1852 it was incorporated a city in 1868.

Water-works were built by the city in 1883, after plans of W. H. Burnham taking the supply from a well 10 ft. in diameter and 40 ft. deep, in the bottom of which a 6 inch tube is driven to a depth of 100 ft., yielding 4,000 gallons daily. A double acting pump of 4 in. bore and 12 in. stroke made by W. S. Wind Engine and Pump Co., driven by a Halladay wind-mill 22 ft. in diameter, lifts the water to a wooden tank 30 ft. in diameter and 20 ft. high, raised 40 feet above the surface of the ground on a timber trestle.

Distribution is by 3,000 feet of cast iron pipe of 6 to 4 in. diameter with 6 fire hydrants and 8 taps. Service pipes are of wrought-iron. The works have cost $800. The bonded debt is $6,000 at 7 per cent. The population in 1880, was 1,584 and is now given as 2,000.

Up to this time the yearly cost of maintenance has been nominal and the receipts $100.

T. G. Alvord is Chairman of the Water-works Committee and J. S. Hadley is Superintendent.

WATER.

A 1,500,000 iron pipe tank is to be erected, at Charleston, S. C., by the Charleston Water Company.

THE Lorain, Ohio, water-works were satisfactorily tested on Jan. 8. They were tried up to 150 lbs. pressure.

PULASKI, TENN., is to have a new water-works. A much needed improvement.

EUSTIS, FLA., will try artesian wells for a water supply. The boring will be done by the Eustis Artesian Well Company.

WHILE boring an artesian well on the Rosecrans tract, near Los Angelos, the workmen discovered a deposit of conch shells at a depth of 160 feet.

A PRESS report from Pittsburgh says that cast-iron pipes will not convey natural gas. It is in order to state why and give further facts, if they exist.

THE New York City Water Co., has been incorporated; capital stock, $500,000; purpose "to bore and dig for and accumulate" water for power and fire purposes.

THE new Croton Aqueduct Commission have directed the Comptroller to issue $1,500,000 additional water bonds to meet the in-coming estimates for work done in the next six months.

IT is stated that the secretary of the New Orleans Water Company has succeeded in obtaining a solution of iron, one pound of which will perfectly clarify 4,000 gallons of Mississippi river water in twelve hours, at a cost of 25 cents.

CHIEF LUDLOW, of the Philadelphia Water Department is cramped for room for his clerical force and wants the city to rent a church building near by until the quarters in the new City Hall are completed.

DURING December the average daily consumption of water in Duluth, was 239,856 gallons, a monthly consumption of 7,373,552 gallons. During the year 1884 the pumps ran 3,946 hours, consumed 579 tons of coal and pumped 105,580,208 gallons.

THE Holly Manufacturing Company of Lockport, N. Y. have secured the contract for a Gaskill Compound Condensing Pumping Engine for Leavenworth, Kan. Water-works of 4,000,000 gallons per 24 hours capacity, with a guarantee of 90,000,000 foot pounds duty.

NEWARK, OHIO, will submit to its citizens the question of water-works at an election to be held Jan. 31. The question to be decided is the voting of $150,000 in bonds for a reservoir system of water-works. The citizens have twice before voted against it.

THE Silverton Water Co. of Silverton, Colorado, filed articles of incorporation last week. The capital stock is $100,000; incorporators, T. C. Henry, H. J. Aldrich, and A. B. Coulson. The principal office is in Denver, Colorado.

AT a recent irrigation convention held in Fresno, Cal., the delegates represented irrigation works and interests dependent upon them valued at $55,000,000, all of which interests are in Southern California and all developed during the past fifteen years.

PIPES for the conveyance of water under high pressure are now being made in England from steel plates. These are coated with lead on both sides, by immersion or otherwise, then rolled into form, riveted, soldered the whole length and covered with pitch.

A MR. HANNAHS has submitted to the Chicago City Councils a proposition for disposing of the city sewage. His idea is to construct an open conduit from the city south to a point twelve miles distant; terminating in a reservoir from which it is to be lifted by pumps into the Desplaines River. By this plan he agrees to empty the Chicago River, which now receives the sewage, once in 24 hours. The work is to cost $1,400,000.

THE LEXINGTON KY. WATER-WORKS were completed and satisfactorily tested on the 1st instant. Preparations for a grand display of fire streams with inauguration ceremonies to occur at an early day, are in progress. The water is taken from storage reservoirs two miles from the city of about 90,000,000 gallons capacity, which are supplied from water-shed and springs, and pumped direct to the city.