

hydrant. The population in 1880 was 2,667; it is now said to be 6,000.

The works have cost \$125,000. The capital stock of the company is \$100,000. Its bonded debt is \$100,000 at 6 per cent for 20 years. M. D. Mather is President, and J. S. Drake, Secretary and Treasurer of the company.

DCLXXXVI. LANSDALE, PA.

Lansdale, Pennsylvania, is in lat. 40° 10' N., long. 75° 8' W.

Water works were built in 1883 by a private company after plans of A. K. Calhoun, the supply being taken from an artesian well, driven to a depth of 300 feet which has yielded 100,000 gallons daily without showing any signs of exhaustion. During the construction a delay of 3 months was caused by the caving in of the well which necessitated the casing of 100 feet and entailed an extra expense of \$800. The water is pumped by a Deane steam pump of 5½ inch water cylinder, to a stand-pipe 8 feet in diameter and 102 feet high. Distribution is by one mile of cast iron pipe of 8 to 4 in. in diameter, with 5 fire hydrants, 3 gates, and 35 taps. Service pipes are of lead.

The town has not yet taken any action for fire protection and the hydrants are not paid for.

The population in 1890 was 798, it is now given as 1,300. The capital stock of the company is \$15,000. The works have cost \$15,800, and have been in operation since Dec. 1, 1883. It is expected that the works will soon be enlarged and that a bonded debt of \$5,000 at 5 per cent. for that purpose will be contracted.

Wm. D. Heebner is President of the company, and John C. Booise Secretary.

DCLXXXVII. NORTH CONWAY, N. H.

North Conway, Carroll Co., New Hampshire, in lat. 44° N., long. 71° 10' W., is on a small stream called Artist's Brook.

Water works were built in 1883 by a private company after plans of Nathan Whitaker and Lycurgus Pitman, the supply being taken from mountain springs. The water is collected in a reservoir, formed by building a stone dam 35 feet long, 8 feet high, 8 feet wide at the base, and 4 feet wide on top, having a capacity of 200,000 gallons, and an elevation of 172 feet above the village.

Distribution is by 3½ miles of cast iron pipe of 10 to 3 inches diameter with 6 fire hydrants, 8 gates and 40 taps. The hydrants are owned by private individuals. Service pipes are of tarred wrought-iron.

The population in 1880 was 553, it is now said to be 700. The capital stock of the company is \$10,000. The works have cost \$10,000. There is no debt. W. M. Pitman is President of the company, and Lycurgus Pitman Secretary and Treasurer.

DCLXXXVIII. ST. CLOUD, MINN.

St. Cloud, Minnesota, in lat. 45° 33' N., long. 94° 1' W., the county seat of Stearns County, is on the West bank of the Missouri River in a heavily timbered and rich farming district.

Settled in 1853 it was incorporated a city in 1868. Water-works were built in 1883 by the city, after plans and under the direction of Pike & Sturtevant, Civil Engineers, the supply being taken from the river. A 16 inch pipe conveys the water to a pump well 14 ft. long, 4 ft. wide and 5 ft. deep, whence it is pumped by 3 Holly pumps of 12 in. steam and 9 in. water cylinder and 12 inch stroke, having a combined capacity of 1,400,000 gallons daily, directly into the mains, and is distributed by one mile of 8 and 6 in. cast iron pipe. Service pipes are of iron.

There are 14 fire hydrants and 7 gates. The works are chiefly for fire protection and have cost \$25,000.

The bonded debt is \$20,000 at 6 per cent.

The population in 1880 was 2,462, it is now given as 5,000.

Wm. Bingham is the engineer.

CORRECTION:—In our issue the numbers of the "Histories of American Water-works" (page 130) should have been as follows: DCLXXVI. RICH HILL, MO.; DCLXXVII. SANDFORD, FLA.; DCLXXVIII. SAN MARCOS, TEX.; DCLXXIX. TYLER, TEX.; DCLXXX. UNIONTOWN, PA.; DCLXXXI. YANKEON, DAT.; DCLXXXII. CLEBURNE, TEX.

The Knowles Steam Pump Works correction

of description of Council Bluff, Ia. Pumping Engines, should read *compound (not compressed) condensing duplex, etc.*

WATER.

THE SMALLEST WATER WORKS with which we have, in our researches, become acquainted is at Drewsville, N. H., about four miles from Bellows Falls, Vt. The village consists of a single line of houses built around the four sides of a small "common" of about two acres in extent. The population is 79; the school attendance is 13. It is the home of one of the present proprietors of the Fifth Avenue Hotel, New York City, and from its diminutive precincts have also come several other parties well known in religious, musical and commercial circles in Chicago and New York. Our family found it a pleasant and healthful place to spend the summer months in on account of its pure mountain air, delightful drives amid lovely scenery, agreeable neighborhood and its general healthfulness. The houses are supplied with pure and wholesome water, which is brought in wood pipes from a hillside spring a distance of half a mile. The Drewsville Water Company is 80 years in existence, some of the original log pipes being still in use. There are 10 shareholders. A small circular wooden well house, six feet in diameter, by about the same height, is the only structure belonging to the works. Inside this, a pile of stones without mortar is built up to sustain the "reservoir," a wooden box 2 feet by 3 feet and 2 feet deep, divided into compartments proportioned to the number of shares owned by individual takers, each share being represented by a small augur hole which allows the water to run from the common compartment into individual compartments and thence to the distribution pipes. If a "portion" of water is leased by any individual to a neighbor, it is gauged by the stem of a common clay pipe, which is the unit of measurement.

The little community is absolutely dependent on this water supply for domestic purposes. No other source of supply has been discovered, and if a "portion" cannot be obtained from a shareholder, there is no alternative but to move to some other place where water is more accessible. In 1876, new wood pipe for about the whole half mile was laid, and a new well house built, at a total expense of \$282.91, which represents about the cost of maintenance of the Drewsville Water Works for three quarters of a century. The treasurer and superintendent of the company is Mr. E. C. Bond, the village postmaster and storekeeper. The principal duty of the office is to provide a safe and convenient place to hang the key of the well house.

THE Fairmount street reservoir, Cleveland, O., will not be completed until next summer.

A STONE falling on an exposed water main in Boston liberated a stream of water which washed away 30 feet of the Boston and Albany track and road-bed.

DALLAS, Tex., has succeeded in finding a pure water supply at the City Park. No more water will be pumped from the river.

PLAINWELL, MICHIGAN, is to be without water supply for two weeks, while a break in the race is being prepared.

SUPERINTENDENT BELL of the Cincinnati Water-works reports the pumps badly in need of repair and the engines in a disabled state.

PETERSBURG, VA., has made an appropriation for improving its new reservoir in the effort to head off the threatening water famine. Water from the Upper Appomattox Canal is being run into the reservoir. All mills in the vicinity have stopped for lack of water.

SEVERAL artesian wells have recently been bored near the Red River, Dakota, and pure, soft water found in abundance at from 200 to 300 feet. Some of them have a moderate flow rising several feet above the surface.

MASON CITY, IOWA, is to have a system of water-works designed by Chester B. Davis, C.E., of Chicago, the estimated cost to be \$40,000 and the daily supply to be 1,000,000 gallons.

PRELIMINARY surveys are now in progress in view of establishing a system of water-works for the joint use of the towns of Laconia and Gilford, N. H. The Engineer is Almon A. Platts of Lake Village, N. H.

THE extension of the third level canal of the Holyoke Water Power Company, Holyoke, Mass., is rapidly approaching completion under the contractors, John Delaney & Sons.

NEWARK, (N. J.) has offered to sell its water bonds, 4 per cent., thirty years to run, but not yet issued, at 101; but bankers decline to give so much, as Newark corporate ss. can be bought at 116. The bids for the water bonds have ranged from 90 to 95.

CHICAGO is worried over its water supply. The figures in the case are: capacity of tunnel from crib in the lake, 150,000,000 gallons. Capacity of pumps, 134,000,000 gallons. Daily consumption from 80,000,000, to 110,000,000. With extensions at the rate of 20 miles of pipe a year this is uncomfortably near the limit of supply.

THE City Government of Aurora, Ill., has authorized the issue of 4 per cent. bonds to the amount of \$100,000, to defray the expense of putting in a system of water-works. A clause of the city charter forbidding the incurring of more than a debt of \$5,000 in any one year threatens to give trouble. The Supreme Court will probably decide whether the issue of bonds is constitutional or not.

KINGSTON, ONT., Oct. 7.—The Water Works Company has offered to sell its plant to the city for a sum to be fixed by arbitration. If the city will not buy, the company propose to erect a special fire reservoir, put in new machinery, and otherwise enlarge the works if the city will withdraw \$1,000 stock it holds, and thus allow the company to entirely own the works. The matter will be discussed at a special meeting of the Council.

THE Marshall, Mo., waterworks now under construction will be finished by January 1. They are being built by a local corporation with \$50,000 stock and a \$50,000, issue of bond under a 20 years franchise, by which they are to supply the town with at least 65 fire hydrants at \$75 per annum per hydrant. The noticeable feature of the works is the source of supply. A line of borings across the prairie showed that beneath 32 feet of earth, containing only surface water, there was a water bearing stratum of gravel resting on one of solid rock. This water bearing stratum is evidently the bed of a former river some two thirds of a mile in width, greatest depth 13 feet, and yields an inexhaustible supply of water.

A curb, in the shape of the frustrum of a cone 45° in height, 33" diameter at base and 31" diameter at top, was built of vertical strips 3"×5" nailed at intervals of an inch or two, upon horizontal rings with a cross section 6"×17". The distance between these rings is 3 feet at the bottom and increases to 5 feet at the top. Upon them is built a lining of brick with no mortar between the horizontal courses. The earth within the curb is excavated and the latter sinks like a caisson by its own weight. The brick lining is built up just fast enough to keep on a level with the earth's surface, and helps to sink the curb by its additional weight. On the bottom of the wooden curb is a large iron shoe to aid it in cutting its way down. When this reaches the bed rock, the curb will remain stationary, water will percolate through the frame work and the crevices between the courses of brick in the lining; two Blake pumps will be placed on cross beams above the surface of the water, and this combination reservoir and pumping station will be complete. There is, we believe, but one other place, Burlington, N. J., where this idea has been carried out.

NEWS OF THE WEEK.

Railroads and Canals.

WORK on the Chapala Railroad in the State of Jalisco, Mexico, was commenced Sept. 16.

THE Minnesota and Northwestern road has completed the survey of its line into St. Paul.

THE preliminary survey of the Chicago, Freeport and St. Paul line is underway.

THE bridge across the Blackfork at Shelby, Ohio, fell to pieces, October 6th.

THE Chicago, Burlington and Kansas City Road has been extended from Hale, Missouri, southward to Bogard, fifteen miles.

PHILADELPHIA will invest \$50,000 in asphalt pavement to be put down around the City Hall.

THE South San Francisco Cable-Road Company has filed articles of incorporation. The capital stock is \$500,000, with \$5,000 subscribed.

THE survey of the railroad in Mexico destined to connect Tapachula and the port of San Benito, will be commenced forthwith.

AN electric motor running on an elevated railroad all of which is the invention of Dr. W. F. Adams of St. Louis, is among the exhibits of the exposition at that city.

THE wooden coffer-dam used in repairing the leak in the Holyoke dam, contained 50,000 feet of timber and required 80 tons of stone to sink it.

THE Kansas City extension of the St. Louis, Keokuk & Northwestern road will this month be completed to a connection with the Wabash at Carrollton.

CHATTANOOGA, Oct. 2.—The Walden's Ridge railroad, a line extending 22 miles from Emory Gap, on the Cincinnati Southern, to the coal fields, was opened formally to-day.

GRADING on the Franklin and Megantic Railroad in Maine, will be completed in two weeks. It is expected that the road will be in condition for business by the end of November.