

The Newtown Bee

Newtown, Friday, August 14, 1908.

NEW MILFORD POWER CO.'S
PLANT AT BULL'S BRIDGEONE OF THE GREATEST POWER
PLANTS IN NEW ENGLAND.

The Canal.—From the dam to the forebay, measured on the line of the canal, is a total distance of 10,000 feet. Of this 8,000 feet is canal proper, the balance being in the reservoirs. With the exception of the lower 2,000 feet, the canal is largely excavated in rock.

Starting from the dam, the flaring entrance of the canal is separated from the east end of the dam by some 90 feet of solid rock ledge, the line of canal at this point being a continuation of the easterly shore line of the river. From here to the waste gates, some 550 feet below, the canal runs through solid rock from 18 to 40 feet deep, cutting off a bend of the river and encircling the river gorge. At the waste gates the river is but a short distance away the waste gates discharging below Bull's Falls and directly into the river, bed the gates themselves being placed on a solid rock ledge with a steep pitch into the river below their outlet. The canal in the upper section has a bottom width of 25 feet and the side is more or less flaring on account of the nature of the rock. A slope of one foot from the dam to the waste gates was given the bottom to accelerate the discharge of the river through the waste gates during construction, which at the lower end places it 2.3 feet below the true bottom of the canal, the change from one elevation to the other being made on a gradual slope.

For a distance of 200 feet above the waste gates the river bank of the canal was at a slightly lower elevation than the flowage line. This was taken advantage of to form a spillway. A masonry wall constructed with Portland cement mortar was laid on the river edge through this 200 feet with its top at the elevation of the crest of the dam creating an automatic safety valve for the canal and aiding in the reduction of the flood level of the pond itself.

A natural depression in the rock for maton at the site of the waste gates was taken advantage of to form the real entrance to the canal. An entrance chamber was excavated in front of the waste gates and for a short distance below to receive the entrance gates. Between the entrance gates and the waste gates on the river side is an opening 16 feet long in which travels a sliding gate whose top can be raised to the same elevation as the dam and which can be lowered some 2½ feet, thus forming a flush gate for the purpose of getting rid of ice and debris which may collect in front of the entrance gates. The canal from above the waste gates to the entrance gates is widened on gentle curves from 25 feet to 33 feet 2½ inches making an easy flow for the current without loss of head.

From the entrance gates south a distance of some 300 feet standard rock section of the canal is constructed being 27.4 feet in width by 13.7 in depth. Through nearly this entire distance another spillway one foot higher than the dam was built as an additional precaution. At the lower end of this the canal crosses Bull's Bridge road and immediately below widens out into a section 40 feet in width with a corresponding reduction in depth. From here for the next 400 feet the canal contains this wide section with an earth bank on the river side and with but comparatively small rock excavation. Thence into the first reservoir some 500 feet, a thorough cut is made through a hill, part earth and part rock, where the canal is changed again to normal rock section, its entrance into the pond being flared to avoid loss of head.

The reservoir is practically divided into two ponds by an earth fill constructed to carry the main wagon road, the connection between the two ponds being under a bridge 110 feet long with a section area of about 1000 square feet. The canal leaves the reservoir at its southeast corner, the entrance being flared as in the preceding cases. The standard section is then used for some 300 feet where the canal again widens with corresponding reduction in depth. Thence for the next 1,700 feet the construction is substantially as last stated. Through this portion the canal being on the side hill, the lower side is formed by a heavy earth embankment backed by the rock taken from the bottom of the excavation, it being necessary, to get section area, to excavate more or less rock which was utilized to strengthen the banks.

From here to the next reservoir, some 3,000 feet, the canal is substantially rock cutting all the way, a small bank being necessary on the down hill side. The entrance into the second reservoir is flared as before. The further continuation of the canal leaves the second reservoir at its southeast corner with a flared entrance and thence for the next 1,100 feet goes along a steep hillside, partly in rock and partly in earth, the canal, however, below the water line, being made entirely in excavation. A bank four feet in height is placed on the lower side heavily

backed with rock taken from the excavation. The canal at this point is narrowed to a bottom width of 35 feet and a depth of 18 feet. From here to the forebay the canal runs entirely in earth and along a side hill, being so located as to make the cut and fill balance. At its lower end it very gradually widens into the forebay. The slopes were carefully calculated through each particular section, Kutter's formula being applied and the sectional area increased to correspond with the loss in surface slope. In the rock sections 0.085 was assumed for the degree of roughness and in the earth sections 0.025 was assumed. This substantially gives a loss in head of 0.3 per thousand feet in the rock sections and 0.2 per thousand in the earth sections.

In all cases where a junction was made between the bank and the rock ledge, a puddle trench was excavated and carefully filled with puddle to prevent the water flowing between the earth and rock. The rock surface being rough and irregular made this admissible. The puddle was formed of 25 per cent of clay and 75 per cent of a natural mixture of coarse sand and gravel. This was in layers of one inch in thickness, then rolled by wheelbarrows and platforms constructed on wheelbarrow wheels with handles at each end and weighted with rock or earth. This proved very effective, making a puddle compact and exceedingly watertight as constant tests demonstrated. The clay and gravel were thoroughly mixed so as to fill the interstices of the gravel with the clay. The whole was slightly dampened while being rolled.

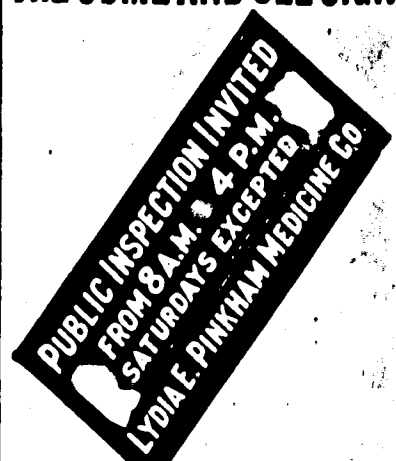
The earth banks were given a top width equal to their height plus two feet. Thus a 13-foot bank has a top width of 15 feet, a 10-foot bank 12 feet. This is in excess of the usual top width given embankments. Trautwine recommends two feet plus twice the square root of the height and Turneaure and Russell one-fifth the height plus five feet. By the former a 10-foot bank would have a top width of 8.3 feet and the latter a 7-foot top. The banks generally have a slope of 1½ to 1. In certain portions the slope was made 2 to 1. The forebay banks, some 12 feet high, have a top width of 16 feet. The minimum canal radius adopted was 250 feet. At one place a right angle turn was necessary. At this point the canal was enlarged into a basin to decrease the velocity, thus avoiding any loss in head. At several points vertical, masonry walls, laid in Portland cement, were constructed and given a strong backing of rocks taken from the cuts.

The earth banks were built up in horizontal layers. The material was spread out very thin, from one to two inches in thickness, and well rolled by carts and wagons and tramped by horses. The packing, by using such very thin layers, showed excellent results. The material in general was a gravelly clay or earth and some sandy clay. The ground under all banks was first carefully stripped of sod and lightly plowed to insure a good bond between the ground and the new material, when near rock a trench being first constructed under the toe to rock and refilled with puddle material. Wheel and drag scrapers, wagons and carts and wheelbarrows were used in building the earth banks, wheelbarrows and drag scrapers preferably in the side work, wheelers in the medium hauls and wagons in the extreme hauls. The rock work in the shallow cuttings was done with teams and stoneboats, but for the vast majority of rock excavation, guy derricks with double drum steam hoists were used. When the rock had to be moved any distance the derricks dumped directly into three yard dump carts, run on 16-pound rails, or into a hopper discharging directly into carts. Steam drill were used throughout, boiler capacity being supplied sufficient to run both derricks and drills. Portable derricks were used to some extent, but the guy derricks with the large booms (40 to 45 feet), proved more efficient. The rock throughout the entire line of canal was largely limestone of varying degrees of hardness. The canal was filled with water on December 10 and 11, and was practically watertight, no leaks showing of any moment.

Forebay and Penstocks.—The forebay entrance chamber containing the racks, gates and entrance to the penstocks, is large and substantial, the foundations running down to solid rock. The racks are placed some distance in front of the head gates, 2½ feet, to insure a more uniform velocity of water through the racks. The sides are all built on reverse curves so as to give an easy entrance to the penstocks. The wing walls to make junctions with the earth banks are of concrete as well as the chamber walls themselves. The walls are given a top width of 7½ feet, the base at the bottom of the pipe being 18 feet. The wall around the 18-foot pipe is carried six feet farther down the hill in order to increase the anchorage of the large steel pipe.

The penstock, 18 feet in diameter with a bell entrance 15 feet in diameter, is made of steel three-eighths, seven-sixteenths and one-half inch, double riveted and supported on concrete piers, closely following in its incline the rock surface down the hill. The turn at the bottom to a line parallel with the power-house is at an an-

THE COME AND SEE SIGN



This sign is permanently attached to the front of the main building of the Lydia E. Pinkham Medicine Company, Lynn, Mass.

What Does This Sign Mean? It means that public inspection of the Laboratory and methods of doing business is honestly desired. It means that there is nothing about the business which is not "open and above-board."

It means that a permanent invitation is extended to anyone to come and verify any and all statements made in the advertisements of Lydia E. Pinkham's Vegetable Compound. Is it a purely vegetable compound made from roots and herbs—without drugs? Come and See.

Do the women of America continually use as much of it as we are told? Come and See.

Was there ever such a person as Lydia E. Pinkham, and is there any Mrs. Pinkham now to whom sick women are asked to write? Come and See.

Is the vast private correspondence with sick women conducted by women only, and are the letters kept strictly confidential? Come and See.

Have they really got letters from over one million, one hundred thousand women correspondents? Come and See.

Have they proof that Lydia E. Pinkham's Vegetable Compound has cured thousands of these women? Come and See.

This advertisement is only for doubters. The great army of women who know from their own personal experience that no medicine in the world equals Lydia E. Pinkham's Vegetable Compound for female ills will still go on using and being benefited by it; but the poor doubting, suffering woman must, for her own sake, be taught confidence, for she also might just as well regain her health.

gle of 50 degrees. It reduces in size as the feelers lead to the wheels. The work was well constructed and showed no appreciable leakage under pressure.

Power-House.—The power-house is formed into one main building, 15 feet long by 48 feet wide, and an annex in the back and at the center, 44 x 48 feet. In the main building are placed the wheel cases, hydraulic valves, governors, generators and exciters, while in the annex, forming a part of the main building, is found the switch-board, oil switches and electrical connections. In the rear of the annex and separated by a concrete partition wall a space 18 x 48 feet is devoted to the transformers and lightning arresters. The walls are 30 feet high above the foundation.

The power house is built entirely of concrete and steel. The foundation, in all cases carried to solid rock, is built of concrete, the sides and partition wall of the same material. The main building has its roof and the traveling crane supported on steel, the ends of the purlins resting on concrete gables. The draft tubs discharge through arched openings, the generators resting on solid concrete piers. The switch board is placed on a raised platform in the center annex, the platform being of concrete, granolithic flooring with expanded metal, resting on steel supports. The flooring of the power house is formed of 10-inch concrete with a granolithic top two inches thick. A concrete retaining wall separates the draft tube chambers from the rest of the building.

The wheels used, 31 inches in diameter, are the most recent high-head type produced by the Stillwell-Bierce & Smith-Vaile Company. They are placed tandem and directly connected to the generators and governed by Lombard governors. Each pair of the wheels has a capacity of 1,750 horsepower, making a total for the six units of 10,500 horse-power. The generators are rated at 1,150 volts, 503 amperes with three-phase current at 60 cycles and have a capacity of 1,000 kilowatts. They can be overloaded 50 per cent for a short time and are guaranteed for 25 per cent overload for several hours. The voltage is stepped up in six oil transformers in banks of three to 33,500 volts for transmission on a double-pole line, each carrying three seven-strand aluminum wires. Six complete wires are installed. The lightning arresters are in two sets, one for each line.

The hydraulic machinery and that portion of the penstock in front of the power-house were furnished by the Stillwell-Bierce & Smith-Vaile Company, which also furnished the plans for the power-house above the foundation walls, the plans for the foundation walls being made by the writer. They also designed the steel structure at the entrance gates. The electrical

machinery was designed by the General Electric Company in collaboration with H. R. Layden, the electrical engineer of the New Milford Power Company, formerly manager of the Hamilton Electric Light & Cataract Power Co., the machinery itself being built and installed by the General Electric Co. The penstock from the forebay to the power-house was built and erected by the Ritter-Conley Manufacturing Company, of Pittsburg. The Berlin Construction Company, of Berlin, Conn., furnished and built the steel work for the power-house and entrance gates. The dams, waste gates, etc., forming the rest of the work, were designed by the writer.

The contractor for the entire work exclusive of the installation of the machinery and steel work was D. L. Emanuel, of Pennsylvania, who was represented by L. I. Fletcher, of the same State. Some 1,100 men were employed and 15 derricks and hoists, a cableway, 15 steam rock-drills in addition to the regular contractor's plant.

The assistant engineers were Messrs W. A. Thompson, Eugene Underwood, W. G. Fox, A. Gideon, W. S. Thompson, F. E. Toquet, J. T. Harrington, F. N. Fowler, Jr., and C. H. Beach, graduates of Yale, Harvard, Rensselaer, Cornell and Massachusetts Institute of Technology.

In addition to Mr King, before mentioned, were associated in the company, Charles SooySmith, of New York, M. Am. Soc. C. E., an engineer of high standing, also J. W. Ogden, a leading financier of New York City. —[The Engineering Record.

Oxford.

CHARMING SUMMER RESORT.

Without any organized attempt on the part of residents to boom their home town, Oxford is beginning to attract attention as an ideal country town in which to pass a summer vacation. The scenery in and about the Pomperaug valley cannot be equalled in Connecticut and in few places in New England. The sunsets as viewed from the hills remind tourists of the views to be had far out on the western prairies and in the dun colored mountain sections of Colorado. In addition to the glorious climate, there is an added charm in association with the residents of this old Connecticut town. One cannot help but notice that warm hearty cordiality which exists and the hearty greeting extended to strangers makes the visitor to Oxford forget that he is in the east, a section of the country which is not noted for its hospitality because the old timer residents are so engrossed in business. There is a touch of southern hospitality here combined with the democratic simplicity of the west which makes a stranger feel at home and when leaving to express a wish to soon return to the ideal home spot of grand old Connecticut. A little effort upon the part of the citizens in the center of the town would attract many persons to the place in another year and among those so attracted would be some who might be willing to invest money in building homes and manufacturing industries. A board of trade or a hustling citizen's committee could work wonders for Oxford.

AN ENERGETIC CITIZEN.

The report that John B. Pope, first selectman of Oxford, had sold his home farm, Woodlawn, situated in the fertile valley of the town, was a surprise to many readers of The Bee, last week, and later, when it was intimated that Mr Pope might remove to another town there was general regret. For many years Mr Pope has been recognized as one of the leading business men of Oxford and of New Haven county. He has conducted his farm upon business principles and is now the largest employer of labor in the town. He has been the leading man in political affairs receiving the support of all citizens irrespective of party affiliations because he has been honest, upright, industrious and always working for the interests of his home town. In the social side of life Mr Pope has been ably assisted by his cultured family and it is the hope of all residents of Oxford that he will decide to build another home within the limits of the town and continue in his active business life. Mr Pope owns many hundreds of acres of land and there are many charming places among his possessions where it is possible to build an attractive home.

IN THE PEACH ORCHARD.

Lee Armstrong has had wonderful success with his peach crop, this year, and has just completed the last shipment of over 1000 baskets of the luscious fruit from one of his orchards. The fruit was in prime condition when ready for delivery to the commission dealers and when placed upon the market was quickly disposed of. Care was exercised in the sorting and packing of the product and honesty seemed to be the key note of Mr Armstrong's methods. The peach on the bottom of the basket was as attractive in appearance as its mate on top and merchants have come to the conclusion that the name "Armstrong" stamped on the side of the basket is a guarantee of the "square deal" in buying peaches. Mr Armstrong will harvest the crop

from 1000 trees in another orchard during the latter part of August or the first week in September. Next year, with favorable conditions, Mr Armstrong will more than double his output.

AT MEADOW VIEW FARM.

The little social colony at Meadow View farm, the home of Mrs Martha F. G. Hawley, is being rapidly augmented. Summer guests are constantly arriving and the homelike quarters in the cozy little farmhouse are taxed to capacity. There is always a demand for quarters at Meadow View and the motherly treatment administered by Mrs Hawley, (she is always "Aunt Martha" to the guests), is appreciated like that of a prodigal son returning to the home roof from which he has been absent for many years. It is never dull at Meadow View, because the diversions are many and varied enough to suit the most exacting bon vivant of the city. Among the guests there at present are Mrs E. M. Vail, Miss Elvira Vail, Miss Reta Card, Miss Elfreda Withey and Miss Stella Tyler, all of Waterbury; John Kulp of Trenton, N. J., and the Morton children of New York.

STRUCK BY LIGHTNING.

The electrical storms of Thursday and Friday of last week played havoc with the roads in many sections of the town. Incidentally, two houses were struck, the homes of David and William Wheeler being shattered by bolts

of lightning. The damage in both cases was light, but the scare was severe. At the home of William Wheeler, the telephone instrument was put out of commission and the same state of affairs is reported from the home of Philip Rowland. The houses have been repaired, but the telephones, property of the Waterbury Automatic Co., are still in a state of silence, a custom which seems to be a characteristic trait with this particular independent telephone company. The service is almost as rapid as the rural free delivery and will be an excellent example of the service rendered by independent telephone lines when the subject comes up for discussion at the next session of the legislature.

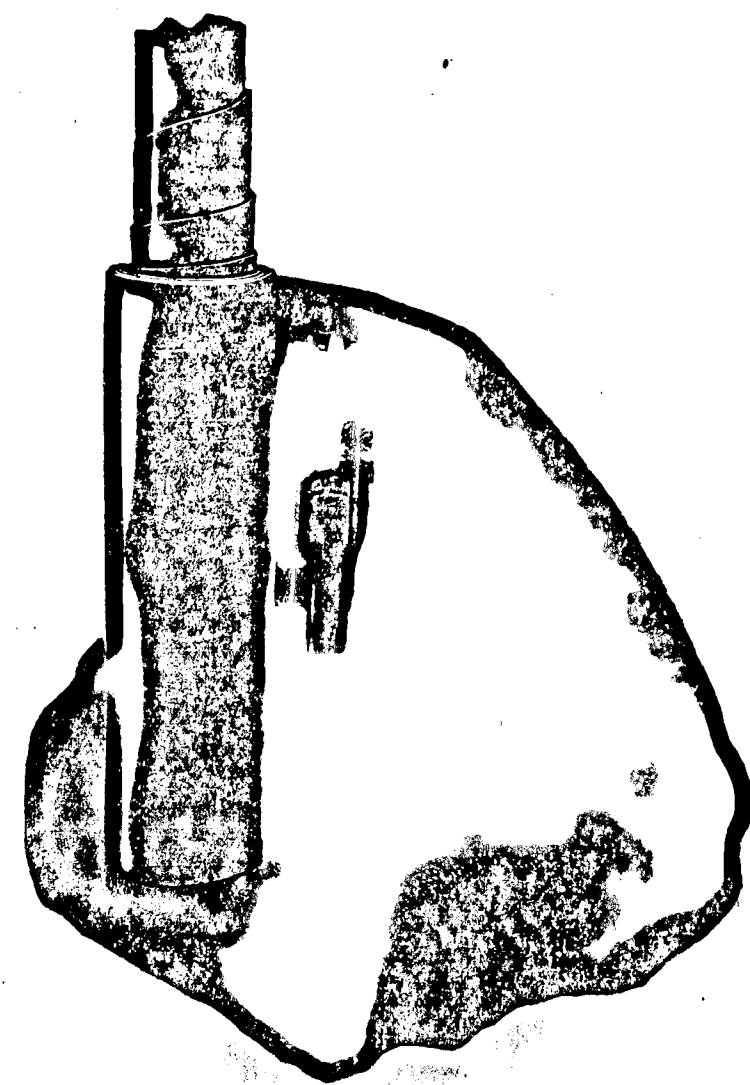
A CARD.

Mr and Mrs Frank Collins wish to thank their neighbors for their kindness during the sickness and death of their baby daughter, Lillian.

An up-to-date cleaner for the hands and household uses. Quick-Kleen is the greatest modern dirt and grease remover yet discovered for machinists, printers, electricians, engineers, railroad men, foundry men, etc., and all who have stained and soiled hands. For cleaning windows, floors, walls, kettles, enamel ware, sinks, marble, bath tubs and rust from iron or steel, it stands unrivalled. Every can is guaranteed to do all it is claimed for, or the money refunded. —[Quick-Kleen Soap Co., 835 Myrtle avenue, Brooklyn, N. Y.] Get a can from your grocer.

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