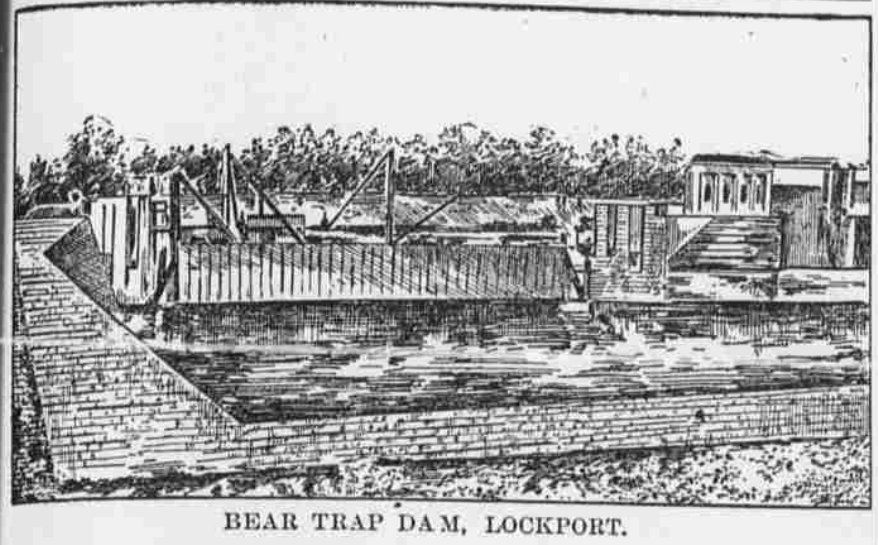
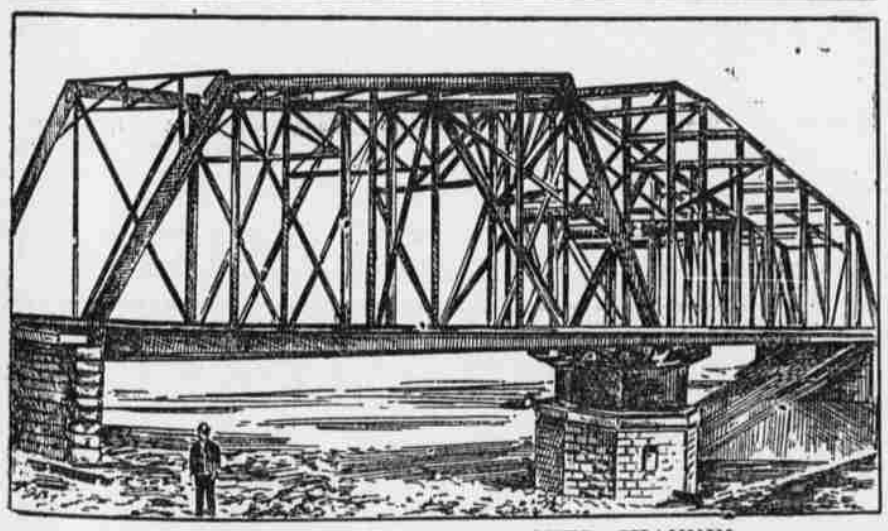
CHICAGO'S $45,000,000 DRAINAGE CHANNEL

WITH the completion of the great drainage canal, the taxpayers of Chicago can reckon up the enormous sum of $33,000,000 that they have put into this big ditch, with a possible incidental expense of ten or fifteen millions farther along. This work is a monument to the endeavors of the people to secure pure water, and yet it is estimated that out of the 2,000,000 people residing in Chicago 1,800,000 have never seen the channel, of whom a large proportion cannot tell where it starts or where it ends. It almost passes understanding—the gigantic work that has been accomplished—and the labor done shows that it is possible to construct the Nicaragua Canal 50 per cent. cheaper than was anticipated. It was a little something for the engineers to dig a ditch through sand for the construction of the Suez Canal, it was heroic for the workers to face fever and miasma at Panama, the Erie Canal was quite a bit of work, but in cost, in magnitude, in difficulties to overcome, the drainage channel of Chicago is not rivaled by these.



BEAR TRAP DAM, LOCKPORT.

The channel is divided into two great classes of work—the earth secretions, where all the excavations have been made in the dirt, and the rock sections. In constructing the water course it was found necessary to literally take up a river, move it to one side, give it a new course, and run the channel through the old course. When the final route of the channel was determined it was found by the engineers that it would be necessary to divert the Desplaines River from its then course—the same channel through which it was coursing when La Salle, Hennepin and Joliet came and thought it so great a body of water that they could not indicate on their maps where its western banks were. In summer the stream is at points a mere brook, but in the springtime, when the freshets come, it is one of the most powerful bodies of water in the State. Taking into account, then, that a portion of the channel is now in what was once the bed of the Desplaines, its entire route is: Mouth of Chicago River through its south branch to the town of Summit; by earth excavation to Willow Springs; through the old bed of the Desplaines to Lemont, partly by solid rock; cutting to Lockport by the same process; through the controlling works, past Romeo, to Joliet; to Lake Joliet; thence to the Illinois River, and through that to the mighty Mississippi. The entire length of the channel, including that portion of the Chicago River used, is about forty miles, formed at a cost per mile of about $825,000.



CALUMET TERMINAL BRIDGE OVER CHANNEL.

If Chicago did not stand at the summit of the watershed between the basins of the Mississippi and the St. Lawrence Rivers, the drainage channel might not have been constructed, and filtered or boiled water might have been good enough for the millions. But, standing on the crest, an engineer could readily see that if the water supply of the city lay on the St. Lawrence side of the slope, it was absolutely necessary that the sewage should not be deposited there. This being decided, the remaining question was how to cross the divide and start the sewage west and south. Hence the drainage channel, and that is all there is to the problem taken up in 1889. In its natural state the water of Lake Michigan is unpolluted and healthful. The carrying away of the sewage means the doing away with costly aqueducts and great artificial storage basins. New York goes fifty miles for its water supply, and the aqueducts which convey it have cost over $30,000,000. Boston journeys twenty miles, and has paid $15,000,000 for a brick conduit and storage basins. Philadelphia is spending $20,000,000 in an effort to find pure water. Chicago by paying $33,000,000 for the drainage canal has pure water at its lake front, free of cost, save pumping through the mains. The supply comes from a natural basin 840 feet deep, with an area of 26,000 square miles—320 miles long and 80 miles broad.

The channel of the canal is 38 feet deep, has a capacity for thirty-five feet of water, and a current speed of one mile and one-fifth per hour. Either 300,000 or 600,00 cubic feet of water can be carried through it per minute. If the water covering this forty miles could be taken out and land-locked, it would make a larger lake than any in Illinois, and fully the equal of Minnetonka or White Bear in Minnesota.

If an effort could be made to drink it up at one gulp, it would take considerably more than 100,000,000,000,000 people to consume it. It it were spread flat over the surface of the earth to the depth of one inch, it would cover Illinois, Minnesota, Wisconsin, Iowa, Missouri and a good portion of Nebraska. Could it be attenuated to a depth of three and a half feet, a row boat could travel over it for more than 800 miles. If a fire engine, throwing 1,200 gallons of water per minute, were to attempt to pump the channel dry, it would be occupied over 800 days in doing so. In continuous depth it is the largest channel in the world constructed by man, over 40,000,000 cubic yards of material having been taken out of it, of which over 12,000,000 cubic yards is rock. More than 100,000 men have been employed in its construction, the largest number of men at work at one time being 8,000. The possibility exists of developing along the channel a water power equal to 24,000 horse power. Public sentiment at present is against utilization for mechanical purposes, but the power which can be developed would be sufficient to illuminate every street and alley in Chicago with electric light. Less than two score of lives have been lost in the construction work, and no wages have been paid of less than $1.50 per day for labor. Between $6,000,000 and $7,000,000 worth of land was purchased by condemnation or otherwise for the right of way.

The history of the construction of the canal is interesting. After years of preliminary surveys and figuring, precedent necessarily to such a gigantic undertaking, earth was first broken in the great waterway on Sept. 3, 1892, on the Lemont rock cut, and the day has since been celebrated as "school day" on each succeeding anniversary. Since then the contractors have cut through twenty-eight miles of solid earth and rock, making a canal approximately 160 feet wide. If the earth, loose stone, top soil ("glacial drift") excavated were dumped into Lake Michigan, into forty feet of water, it would make an island a mile square, rising eight feet above the surface of the water.

In order to arrange for "river diversion," and control the stream at all times, so that it could not overflow and back up the Chicago River into the lake again, a channel was cut, changing the course of the Desplaines, at Lockport. Thirteen miles of channel 200 feet wide was dug parallel to the main drainage channel, and a levee nineteen miles long was constructed to keep the Desplaines from flowing into the main drainage channel in "flood tides." At the head of the diversion a spillway was also built, which is aptly termed a safety valve. It consists of a great dam of concrete and stone, 397 feet long, and having a crest sixteen feet above the surface of Lake Michigan.

Many contractors underestimated, to their cost, the work necessary in excavation. Finally the bulked effort was to accomplish the maximum of work with a minimum of men, and the great cantilever crane, steam shovels and other devices were a result. Incline railway carrying cars were used, vast steel pans employed. A half-ton blast of dynamite on the rock sections was but an ordinary charge, fired several times a day. Millions of pounds of giant powder were used. The boring was done by pneumatic power drills. When a signal whistle announced the firing of the holes, the men scurried to shelter sheds. Tremendous explosions followed. At one time eight tons of dynamite were used in a single day.

The controlling works at Lockport constitute the most important part of the drainage system. These provide against the water ever diverting the current. They consist of seven immense sluice gates, through which waters can proceed to the "tail race," and thence to the Desplaines and a "tail trap dam." This dam is in itself a wonder, and has been studied and admired by engineers from all over the world.

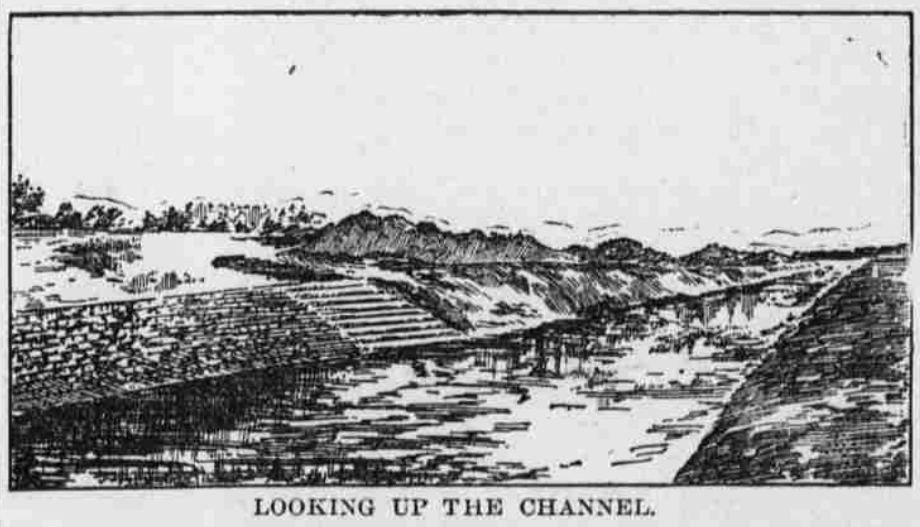
Not only are the sluice gates and the big dam effective in case of floods in the Desplaines, but are necessary at all times, for the sanitary district must by law control absolutely the amount of water flowing through the channel, and must not let it exceed 300,000 cubic feet a minute.

This dam and these gates can be so manipulated that only a pint of water, or no water at all, can be allowed to flow into the Desplaines, and again they can be so arranged that the capacity of the channel can be doubled. The main channel ends at Lockport abruptly in a wall six feet thick, made of stone, and backed up by thousands of tons of stone dumped in from the "spoil banks." There the channel widens from 160 feet—the regulation width of the cut—to a "windage basin" 600 feet wide, in which the largest ships can be turned around. This basin, of course, is locked on three sides by stone walls extending 17 feet above the surface of the water when the channel is filled. On the north wall stands the controlling works. Where the river waters encounter the stone walls, they pass through the sluice gates and over the dam. The small gates can be lowered, cutting off the flow of the water, and the dam can be raised, cutting off some more, when it is necessary. The gates can be shut down altogether, presenting an impenetrable front, and the rear drop dam can be raised until it is as high as the level of Lake Michigan. Then the water will stand still. It cannot flow uphill.

Each gate weighs 20 tons, but so nicely are they counterbalanced that but few men are required to work the machinery to raise or lower them. They are built in solid masonry, which suggests the frowning front of a fort, but this is necessary, as the pressure against them is tremendous. The heavy granite and brick wall contains seven other spaces for additional sluice gates, which are now bricked in solidly, awaiting the time when Chicago's population has so greatly increased that the capacity of the channel can be doubled. Then these gates will be put in to permit an increased flow into the Desplaines. But the gates, while massive pieces of engineering work, are not enough without the bear-trap dam. It is called a bear trap because its shape suggests the old deadfall bear traps which were once in use by early settlers. It consists of two hinged metal leaves which present an inclined face 160 feet in width to the waters. The place of joining, known as the crest of the dam, can be raised by hydraulic power, the turning of valves allowing water from upstream to flow into chambers under the dam and easily raise its million pounds of weight. It has a total oscillation of seventeen feet—that is, it can be raised that much from its lowest point if necessary. To lower it other valves are turned and the water from the chambers under the dam are released to flow out into the tail race and the great metal barrier settles slowly down to the required level. Over the top of the dam the trees, sticks, barrels and ice floating on the surface will be allowed to pass which would never get through the sluice gates for the reason that the water will pass under the gates, leaving the surface almost placid and immovable, holding all floating objects, and in the course of time the windage basin at the end of the channel would be filled with floating debris from the twenty-eight miles of canal all hurried down against the end wall. These things will easily pass over the dam.

The great intercepting sewer system which Chicago has inaugurated is, of course, part of the plan for keeping the lake free from sewage and directing the flow of the sewers toward the river and thence to the drainage canal and away from the lake, into which they have heretofore emptied. All of the city sewers are part of the system to deposit contents in the drainage canal, to be carried away to the Mississippi. So thoroughly will the sewage be diluted by the time it reaches the great river it will make the Illinois far cleaner in appearance than the Mississippi is now, and so far as the fears of residents of St. Louis and towns in Central Illinois that the drainage channel will bring disease and death to them are concerned, eminent scientists have declared that fish will live in the drainage canal throughout its entire length. With the lake pouring into the Chicago river channel at a speed of one and one-fourth miles per hour fishermen may cast their lines from any of the docks along the river, which will be filled with pure, clean lake water.

COMPLETED CHANNEL IN JOLIET.



LOOKING UP THE CHANNEL.

The channel offers a pleasure way for light water craft from the lake to Lockport that can be equaled nowhere so far as safety is concerned. The journey down the stream through the beautiful Valley of the Desplaines is extremely picturesque. With water practically odorless, none of the foul features of the old State canal are present. Engineers claim that for the first time in nearly forty years fish can live in the Chicago River. Some people do not know that fish cannot live in the river at present. This is true. The river is so nasty, so filled with sewage poison that even the toughest of fish will not approach it.

Some, however, say also that it will be possible to see the bottom of the Chicago River, something the present generation of citizens has been deprived of. From the Illinois Central's

HOAXING A BRITISH FLEET.

How a Stupid Irishman Baffled the English Sailors.

An amusing story is told of the hoaxing of a British fleet by "a stupid Irishman" during the recent naval maneuvers. It appears that during an attack on Bere Island by some of the vessels of the "B" fleet the officer at the Hut received instructions from Castletown coast-guard station to gather up all telegrams and secret plans, send a man away with the same to hide in a cave, and on no account to let them fall into the enemy's hands. With the remainder of his crew he was then to show fight until the last. In the meantime an attacking force of eighteen men and an officer had been landed, which marched to the Hut and secured its surrender. All search for the secret papers, however, proved useless, and the men at the Hut maintained a profound silence to all interrogations. During the afternoon one of the men of the Castletown coast-guard station had been sent to Bere Island with the pay of the men. Upon arrival there he proceeded at once to the Hut (having previously disguised himself) and found himself surrounded by the invaders, who wanted to know his business. He posed as an old naval pensioner, stating that he was a native, and was trying, with the help of his small pension, to make a living on the island by cutting and selling turf. He had provided himself with a turf-cutting spade in order to give color to his story.

The sailors of the invading party were very sympathetic, and advised him to go to England, where he would be sure of getting work in one of the royal dockyards. After getting the invaders into a good humor he immediately went in search of the man with the secret documents in his possession. With the aid of some of the islanders he found the man he was in search of, took from him all the documents, which he hid in two baskets of turf, and returned to the Hut. This time the sub-lieutenant in charge of the invaders took him in hand and closely questioned him with a view to obtain some reliable information regarding the defenders, but all to no purpose. At last the sub-lieutenant dismissed the man, with the remark that he was the most stupid Irishman that he had ever met. Little did the officer imagine that the supposed stupid Irishman was the very man they wanted, as at the time he had in his possession all the documents the invaders were searching for.

During the night the enemy's flotilla left Berehaven, going west, disconnecting the telephone at the Hut before leaving.—Westminster Gazette.

PLEASANT SUMMER HOUSE.

Something that the Children Will Thoroughly Enjoy.

A nice little summer house may be constructed from an old umbrella and the stump of a tree. Sometimes this stump is planted full of vines and flowers and then it is a thing of beauty, but oftener it is left unadorned and ugly. Some little girls made a nice playhouse for themselves this summer by boring a hole in the middle of the stump in their yard and putting down into the hole the handle of an old red umbrella, whose best days had gone by. Stout twine had been tied on each point of the umbrella and fastened to a peg driven in the ground near the stump. Then vines were planted, which crept up these pillars of twine, making just the nicest little retreat imaginable for a hot day.

A COZY LITTLE SPOT.

A Chivalrous Urchin.

The first specimen of true manly chivalry—the very pattern of a small knight who holds the rights of his lady love sacred—was encountered the other day in a Cambridge kindergarten. The teacher discovered that a very small boy, not more than 5 years old, was chewing gum, and she ordered him out and bade him disgorge it.

"I can't," he said.

"You can't?" she answered in surprise. "Why, yes, you can, and you must."

"No, I can't," he persisted, and kept the gum in his mouth.

"Now, why can't you give me that gum, Johnny?" the teacher asked.

"Because," said Johnny, stoutly, "it belongs to a little girl in Somerville."—Life.

"Don't leave the table," said the landlady, as her new boarder rose from his scanty breakfast. "I must, madam; it's hard wood, and my teeth are not what they used to be."—Tit-Bits.