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Winfield's waterworks system was installed in 1914. The supply of water was from a drilled well about sixty-five feet in depth. Its purpose was fire protection. Its installation was just in time to cut short several fires which, uncontrolled, would have been very destructive. Its cost was saved several times in this manner during the next few years.

Winfield had suffered very little from fire until the 28th of December, 1909, when several large brick buildings, comprising the largest brick block in the town, were completely destroyed by fire. A few years later, the people voted on the proposition of issuing bonds for water works, but the proposition was defeated, chiefly for the reason that the amount was considered larger than necessary and that the firm that would probably install the plant was outside of the state and practically unknown to our people. In 1914 the proposition was again submitted to a vote of the people for a smaller amount, and carried. The work was done by the Des Moines Iron and Bridge Company of Des Moines, and the plant has given very satisfactory service during the seven years since its installation.

As the number of users of town water increased, and the people began to use the water in cleaning their automobiles and on their lawns, etc., it became difficult to keep a sufficient quantity of water in the supply tank for protecting the town from fire. To meet this increased demand for water, another well was put down in 1919 to a depth of sixty-five or seventy feet. But this proved inadequate. In order to secure an abundant supply of water, it became apparent that we must have a deep well.

On the 9th day of February, 1921, the McCarthy Well Company of St. Paul, Minnesota, began to drill a deep well within a few feet of our other wells, completing the drilling work on the 23rd of April, reaching a depth of 1268 feet, in sixty-three days of 24 hours each, Sundays excluded and one day on account of a break of machinery, making an average of twenty feet a day.

The log of the well, as given by Eric J. Hoff of St. Paul, is as follows:

The first three feet measured the depth of loam or black soil.

3 to 80 feet; — 77 feet of clay which took the well down to 80 feet where rock was first found.

80 to 190 feet; — this space was occupied by hard lime rock; there were many horizontal layers or seams in this lime rock.

190 to 510 feet; — this space was occupied by 320 feet of shale; shale is a soft slate rock like soapstone.

510 to 618 feet; — this space of 108 feet was occupied by lime rock; this rock was more of a solid layer than the upper stratum of lime rock before-mentioned, and a little lighter in color.

618 to 808 feet; — this space of 190 feet was occupied by shale; this shale was more in streaks of color, running from green to brown; all shales found in this well were disposed to be sticky. In other regions where the McCarthy Well Company had worked, mostly north of this, the shales were less inclined to be sticky.

808 to 818 feet; — this was more of a hard slate than anything else.

818 to 828 feet; — a dark brown shale.

828 to 1114 feet; — this space was occupied by a lime rock of 286 feet in thickness; this lime rock was brownish in color at times; at one time in this rock, some shells were drilled up, pieces big enough that they were recognized as shells resembling clam shells.

1114 to 1128 feet; — a white sand rock, very hard and fine-grained.

1128 to 1143 feet; — a greenish colored shale, which drilled the same as the other shales.

1143 to 1180 feet; — this was another sandrock, 37 feet in thickness, white in color, coarser grained than the above mentioned white sand, and water-bearing. This was the St. Peter sandstone, which is always white and coarse, one of the water-bearing strata of the earth in this region, and considered by drillers as the source of a never-failing supply of water.

1180 to 1268 feet; — this was a lime rock which was penetrated to a depth of 88 feet. Here the drilling ceased. The depth of the well is 1268 feet. This rock has very hard layers alternating with softer layers. There were quite a number of these layers. There seemed to be more water in this rock than in any other encountered in the drilling of this well.

The drilling of the well ceased on April 23. The test of the supply of water was begun on Friday, April 29, by pumping at

the rate of 150 gallons per minute, continuing from eleven o'clock forenoon to eleven o'clock the following day, discharging over 200,000 gallons of water within the 24 hours. At the beginning of the test the water was within 73 feet of the surface of the ground. After pumping 24 hours, the water had fallen to 157 feet, a drop of 84 feet. This was considered a very satisfactory test, showing an abundant supply of water, and far in excess of our daily needs.

The first casing or pipe was put down 83 feet. The second pipe was down 829 feet. The first two shales were "cavy," so the pipes prevented caving. Below this it was solid enough.

Our water tank holds 50,000 gallons, and the new pump keeps it full by only three or four hours pumping in every 24 hours. The pump is operated by electric power.

In referring to the deep wells of some of our neighbors, it is noticed that the St. Peter sandstone was reached at a depth of a little over 1100 feet in the wells at the State Hospital for the Insane at Mt. Pleasant, distant about seventeen miles from Winfield; at about the same depth at Washington; and at nearly 1000 feet at Burlington. This famous sandstone was reached at Winfield at 1143 feet, but it is not as thick here as in these other localities. Its thickness at Winfield is 37 feet, at Burlington 120 feet, at Mt. Pleasant 136 feet, and at Washington 128 feet.

The depth of these wells is 1268 feet at Winfield; at Washington, City well No. 1 is 1611 feet, Well No. 2 is 1217 feet, and Well No. 3 is 1808 feet; the two wells at the State Hospital at Mt. Pleasant are 1267 and 1203 feet each.

To the reader who may not be versed in geology, it may be explained, in the language of one our state geologists, that, "The hard, regularly-bedded rocks of Iowa were formed almost exclusively under water. They were originally loose, soft sediments spread out where they now lie, in regular sheets or layers, on the bottom of ancient seas. The present sandstones were originally submarine sand banks, the shales were beds of mud, the limestones were the products of coral reefs or marine shells of various kinds, broken and ground into fragments, and the coal seams were first masses of vegetable matter accumulated in swamps or marshes, something as similar matter accumulates in modern peat bogs."

WINFIELD