WATER SUPPLIES IN LAKE COUNTY, ILLINOIS

BY

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ABSTRACT

Water supplies in Lake County are obtained from two general sources, lakes and wells. Lake Michigan, with a hardness of about 130 p.p.m., furnishes raw water for the cities of Waukegan, Lake Forest, Highland Park, the Great Lakes Naval Station and the Army Post at Fort Sheridan. At each of these communities the raw water is filtered and sterilized before distribution to the consumer.

The communities of Highwood and Deerfield purchase filtered water from Highland Park, but all other municipalities, except those above named, depend upon wells for their supply.

Well waters may be divided into four groups, each named from the source of the water supply.

Sand and gravel well waters.—The bedrock is covered with a mantle of drift that ranges in thickness from 90 feet at or near the lake shore to 300 feet or more in the west part of the county. Much of this drift is comprised of sand and gravel deposits, particularly in the west half or lake region of the County, and it is in this general area and in the buried valleys developed in the limestone bedrock that the sand and gravel well is most efficient as a source of ground water supply.

In the main, water from sand and gravel is considerably harder than that from Lake Michigan. The minimum and maximum extremes found from analyses were 53 p.p.m. and 977 p.p.m., respectively. The softer waters are found in the northeasterly portion of the county with a progressive increase in hardness to the south and west. Most gravel well waters contain some iron though in many instances not in sufficient amounts to cause staining. Sulfur odor and taste were found in but a few wells, notably in the vicinity of Half Day.

Limestone well waters.—The limestone well as a water supply is more prevalent in the eastern half of the county than in the western. The study and comparison of the logs of wells into this formation developed three notable valleys filled with sand and gravel from which copious supplies of water are being obtained.

From the many analyses of limestone well waters it was observed that the hardness varied from 7 p.p.m. to 865 p.p.m. In general, it may be said that waters having a hardness of 100 p.p.m., or less, may be found in Benton, Newport, and Antioch, the north half of Lake Villa, the north third of Warren, and the north half of Waukegan townships. A progressive increase in hardness is found to the south and west.

A majority of the waters analyzed contained iron, some having highly objectionable amounts. Some of the low hardness waters were high in sodium salts which imparted a marked flavor to the water.

Many wells into the limestone yield a water strong in sulfuretted hydrogen, and some 30 wells yield gas and small particles of oil. This latter material, of course, makes the water objectionable for domestic use.

St. Peter sandstone wells.—Of the 59 deep wells studied, 29 are classified as St. Peter sandstone wells since the water from them is drawn from the St. Peter sandstone.

The hardness of these waters varies from 200 p.p.m. to 450 p.p.m. Here again the distribution of hardness is similar to the waters previously discussed, that is, the softer waters being noted in the northeasterly portion of the county, with an increase in hardness to the south and west.

Most of the St. Peter well waters contain iron, about a third of the total having a concentration to an objectionable degree. As a rule, the St. Peter sandstone waters do not contain H_2S, though several that did were found. Oil and gas are not generally associated with the St. Peter sandstone water.

The yield from this sandstone has diminished to a point where 75 p.p.m. is generally considered a good one.

Cambrian system wells.—There are two sandstones embraced under this general title: the upper is called the Dresbach sandstone and the lower the Mt. Simon sandstone.

These aquifers generally have high yields, particularly the Mt. Simon, since they have not been drawn upon as long or as hard as some others.

The hardness of the Dresbach sandstone water has an average of about 250 p.p.m. while that of the Mt. Simon sandstone is 335 p.p.m. Heavy pumping frequently has produced an increase in mineral content and hardness.

Many of the deep well waters contained iron, but it was difficult to determine whether this mineral came from the aquifer, or from the metal parts of the pumping equipment. Of the 30 deep wells studied, 16 contained H_2S, while only one indicated gas. It is likely that the H_2S and gas may come from uncased portions of the top limestone.