The Water Supply of Indiana.

By H. E. Barnard.

In my discussion of the water supplies of Indiana I shall refer only to the waters used for drinking and domestic purposes, and for my data draw upon the thousands of analyses made at the Laboratory of Hygiene of the State Board of Health during the last seven years. The information we have collected far exceeds all other available data on the subject.

In the period the laboratories have been in operation we have analyzed 6,127 samples of water collected from every part of the State, and from all kinds of sources. Of the total number of examinations made 3,051 were from shallow wells, 1,908 from deep wells, 289 springs, 267 streams, 166 ponds and lakes, 196 cisterns, 201 miscellaneous and 49 sewage. Of all the supplies examined 3,537 have been potable, that is, free from sewage and chemically suitable for drinking and domestic purposes, 1,837 bad and 753 doubtful.

One thousand two hundred and forty samples have been sent to us from public supplies. Of this number 137 were derived from shallow wells, 593 deep wells, 251 streams, 61 springs, 140 ponds and lakes and 55 miscellaneous.

Four thousand, eight hundred and eight-seven samples were private supplies, that is, supplies used by a single family. A large number of these samples were collected in the district by local health officers, but many samples were sent in by the owners themselves and in the aggregate no small number represents private well supplies from city lots. Of the private supplies examined 3,029 samples were taken from shallow wells, 1,354 deeps wells, 246 springs, 205 cisterns, 37 sewage and 16 miscellaneous.

Of the 614 public water supplies classed in another tabulation as deep wells 518 were of good quality, 31 bad and 66 doubtful.

Of the 136 shallow wells used as public supplies, 82 were good, 33 bad and 21 doubtful—that is, while about 15 per cent. of the deep well public supplies were either bad or doubtful, 40 per cent. of the shallow wells were either bad or doubtful.

Two hundred and forty samples represented stream waters used as public supplies. Of this number 146 were classed as good, 46 as bad and 48 as doubtful.

Of the 94 public springs 59 were of good quality, 18 were bad and 17 doubtful.

Of the 147 pond supplies, 94 were good, 23 bad and 30 doubtful.

One thousand, three hundred and seventy-seven samples of private water supplies were taken from deep wells. Of this number 1,091 were good, 160 were unqualifiedly bad and 126 were doubtful, in other words, about 20 per cent. of the deep well waters were either of bad or doubtful quality.

Of the 3,057 shallow wells examined, 1,331 were good, 1,391 were bad and 335 were doubtful or rather more than 56 per cent. of all the shallow well waters examined were unfit for drinking and domestic purposes.

Out of the mass of data collected, we are now able to determine with such a degree of accuracy that our statement is not a hypothesis but a fact that the well supply of the cities and towns of Indiana is not only to be viewed with suspicion, but in rather more than 50 per cent. of the cases, pronounced polluted.

If such a statement had been made the first or second year of our work, it would have undoubtedly been pointed out that the waters analyzed did not represent average conditions and that the samples sent in were from wells suspected of being impure, and that while many of these samples did prove to be polluted, by far the greater number of wells were pure and safe. But as year after year we have tabulated the results of our work, we have noticed the very singular fact that our results varied very little indeed. In fact the percentage of bad and doubtful well waters in the year 1912 is almost exactly the percentage reported the first year of our work in 1906. It is impossible to believe that the health officers after studying the well supplies in their community for many years, are still sending in only the worst waters, or that the individual owner is not asking for an analysis save when he suspects the purity of his supply. I am convinced that of the two million wells furnishing water to the citizens of Indiana, at least one million are not furnishing pure water, but a water contaminated by the wastes of the home and community. Of 4,959 wells examined in the last few years, 3,051 have been classified as shallow wells, and 1,968 as deep wells. This classification is not perfect for it is frequently impossible to get data sufficiently adequate to place a well in its proper class. We classify all dug wells as shallow wells, and all driven wells as shallow wells when it is evident that the well

does not pass through an impervious starta. In some parts of the State a layer of clay or hard pan may lie so close to the surface that a driven well not more than ten feet deep may in fact reach second water and so entitle it to be classed as a deep well. In other parts of the State, especially where sand and gravel deposits are deep, a well may be seventy-five or one hundred feet in depth and still tap only surface water. Obviously, when we do not know all the facts, our classification is subject to some inaccuracies.

The difference in the quality of the deep and shallow well is strikingly shown. If the actual facts were at hand, I have no doubt but what the proportion of deep wells of satisfactory character would be greatly increased. There is no real reason why every properly cased well which passes through an impervious strata should not furnish pure water, save in the isolated instances where sewage is poured through sink holes or abandoned gas wells into the lower levels. Such conditions do obtain in the cavernous regions in the southern part of the State, and they are not unknown in the so-called gas belt.

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