

basis depending on the elevation or non-elevation of well mouth above surrounding soil, and second basis on the protection of well mouth including curbing, cleanliness of soil just about well, the well covering, etc., the wells being divided into three groups, viz., apparently well protected, poorly protected and unprotected. I think we must recognize that the most common sources of pollution of rural wells is from the immediate surroundings of the well itself; poor covering allowing the drip from pump to run back carrying its load of dust, dirt and stable matter from boots of those using pump; or the entrance of rain water with a similar load; poor protection by improper curbing allowing similar material to enter from sides of well near surface. The custom of watering animals about well mouth and letting their droppings lie about to be washed in assists very materially in this pollution. Lack of elevation of well mouth allows direct entrance in poorly protected well of surface run-off water with its load of waste matter. It is such conditions that most frequently give rise to pollution, while entrance into shallow wells of polluted subsoil water by seepage from stables, manure piles, privies, accumulated slop waters, etc., plays a much less conspicuous part in ordinary farm wells. In village wells I do not think this statement is justified, as my experience with village wells has been that subsoil water pollution is at least as prevalent as is immediate pollution from surface surroundings of well.

To proceed to a review of results of inspection and analysis of samples; of 311 samples examined, 245 were well waters classed as 149 shallow wells and 66 deep wells. I cannot claim that the inspectors were justified in classifying certain wells as deep wells, as they included all drilled

wells in this class, even those in fissured limestone. However, of the waters so classed 69.2 per cent. of the surface wells and 53.5 per cent. of deep wells were more or less infected with intestinal bacteria. Of the waters from springs there were 42 samples and of these 57.1 per cent. were similarly infected. While the balance, some 24 samples, were from small rivers or creeks or from lakes open to shore pollution, the water being drawn as a rule close to shore and of these samples 75 per cent. were infected. I have grouped in tabular form the results of these analyses and have arbitrarily divided the waters into five classes, viz., good, passable, slightly contaminated, quite contaminated and grossly contaminated. I will now state the basis of this classification. Good waters are such as had a comparatively low bacterial count and were free from colon and colonoid bacteria or putrefactive species. Passable waters were such as were free from colon bacilli or typical putrefactive bacteria such as *B. vulgaris*, but might contain some dextrose fermenting bacteria and count be fairly high (lactose and dextrose broth media and agar plates were employed for primary culture). Slightly contaminated were samples showing colon or colonoid bacilli or typical putrefactive bacteria in 1 c. c. lots, not in 1-10 c. c. and bacterial count at same time moderately low. Quite contaminated samples were such as showed colon or colonoid bacilli at least 10 per c.c.; while grossly contaminated samples were ones showing these bacteria along with a general high bacterial count. As will be noted, the division is arbitrary and some difficulty at times arose as to which class to put sample in. However, especially in contaminated class the physical characters of sample and the chlorine estimation assisted in the determination.

Table I.

Bacterial Characters of Well Waters	No. 1		No. 2		No. 3		No. 4		No. 5		No. 6	No. 7	Total
	Surface	Deep	Surface										
Good	15	16	2	1	0	0	2	2	0	0	0	1	39
Passable	10	16	4	2	1	0	6	8	2	1	2	0	52
Slightly Contaminated	4	3	12	12	0	0	1	0	3	1	2	1	39
Quite Contaminated	4	4	18	18	2	1	3	1	13	9	11	2	86
Grossly Contaminated	0	2	11	1	6	1	0	0	2	0	5	1	29
Total	33	41	47	34	9	2	12	11	20	11	20	5	245

166 Samples { No. 1. Mouth of well elevated, properly protected = 77% safe waters (good or passable).  
 No. 2. Mouth of well elevated, poorly protected = 11% safe waters.  
 No. 3. Mouth of well elevated, not protected (uncovered) = 9% safe water.  
 74 Samples { No. 4. Mouth of well not elevated but properly protected = 78.2% safe water.  
 No. 5. Mouth of well not elevated, poorly protected = 10% safe water.  
 5 Samples { No. 6. Mouth of well not elevated, not protected = 10% safe water.  
 No. 7. No data on which to base conclusions.