Water Supply.

The impurities found in water are either mineral or organic, and effect the value of water for its various uses according to their nature, ultimate origin and quantities, all of which points should be duly considered and properly weighed. Water will ordinarly dissolve most gases to a limited extent, dependent largely on the temperature of the water and the pressure under which it is found. The amount of gas held in solution varies inversely with the temperature, although not in direct ratio, and also directly with the pressure.

Hence, water from subteranean sources, delivered under pressure, such as a flowing artesian well and spring, often contains a percentage of those gases encountered in their flow much above the normal. In most of the waters which are liable to be considered as sources of supply, the ordinary gases of the atmosphere, oxygen, nitrogen and carbonic anhydride will be found. The relative amounts of these gases normally found in solution are not in proportion to their occurrence in the atmosphere, but nearer in the proportion to the solubility of the gases. The approximate amount of gases contained in one gallon of rain-water is about four cubic inches of oxygen, two cubic inches of nitrogen, and one cubic inch of carbonic anhydride. In deep and artesian waters oxygen is seldom present, and most springs and ground waters are also deficient in oxygen.

The inorganic solids commonly contained in waters are lime and magnesia, together with other soluable mineral constituents of the rocks and deposits with which the water comes in contact. The presence of a moderate amount of mineral matter is not objectionable for drinking purposes, and to many waters quite highly mineralized are attributed medicinal properties of considerable value. Poisonous mineral substances are seldom found in waters in the natural state, and when found should cause the prompt rejection of the water as a source of supply for domestic use, even when in small quantities, as conditions might arise by which the quantity would be so increased as to prove harmful. Such substances may occur in water polluted by the drainage of mines or of dye works. When mineral matter is present in quantities great enough to be injurious when taken into the system their presence is almost without exception readily recognized by the taste.

For laundry and culinary purposes and for manufacturing uses the presence of mineral salts giving the water the quality of hardness constitutes the source of serious annoyance and loss. As the earthy salts only create the quality of hardness, the presence of a large amount of total solids does not always render a water hard. The alkaline salts, such as carbonates and chlorides of potash and soda, may be present in considerable quantities without seriously affecting the quality of the water for boiler use. Salts of lime, magnesia and iron and carbonic anhydride make a curd with soap, and prevent the formation of lather until enough soap has been added to combine with all the substances existing in the water. These salts are the ones which have the most injurious effect on the value of water for domestic and manufacturing uses, and their presence constitutes a continued expense in the use of water, in which they occur for laundry purposes. Their action on soap as above mentioned is utilized as a test or measure for the degree of hardness of a water.

The organic impurities contained in water are the impurities which interest us most largely from a sanitary standpoint, for it is these impurities which interest us and most directly influence the health of consumer. This organic matter may exist as the product of organic life, and the resulting products of decomposed organic matter. There can be no doubt but that undecomposed organic matter, if harmless in itself, may exist in small quantities in water without detrimental effects on the health of those drinking it. Decomposed organic matter when in appreciable quantities, whether of animal or vegetable origin, gives rise to headache, and malaria fevers. The most important of the organic impurities are, however, the living organisms which may consist of algea, infusoria, etc., and bacteria.

The presence of organic matter is also determined, and its character and quantity estimated by the action of heat on the total solids found on evaporation. The loss of weight by heat is not in itself indicative of the presence of organic matter, as the same result might be due to the loss of volatile salts. Loss of weight would indicate, however, the need of further investigation to determine the character of the volatilized matter. As an indication of the presence of organic matter, the blackening of the solid residue under the action of heat is a most important phenomena, as it indicates the presence or organic carbon.

Sir John Macdonald, the first Prime Minister of Canada, was fond of relating this story to illustrate the need of the Upper House:

"Of what use is the Senate?" asked Jefferson, as he stood before the fire with a cup of tea in his hand, pouring the tea into the saucer.

"You have answered your own question," replied Washington.

"What do you mean?"

"Why do you pour that tea into the saucer?"

"To cool it."

"Even so," said Washington, "the Senate is the saucer into which we pour legislation to cool."

Good Roads.

The Springfield, Mass., *Union* notices that the subject of good roads is receiving more and more attention, and in an address recently delivered at Union College, Colonel Francis Vinton Greene gave some figures which should prove of special interest to farmers and manufacturers who pay for hauling heavy loads. Colonel Greene said: "It has been proved, not only by mechanical experiment, but by actual test, that the same force which draws one ton on a muddy earth road will draw four tons on a hard macadam road. On the improved roads of New Jersey loads of four or five tons are habitually drawn by a two-horse team. This effects a saving of fully three-fourths of the cost of hauling to the station, and reduces the cost of road transportation from 30 to 7½ cents per ton per mile. What this saving amounts to may be imagined when it is known that the New York Central Railroad carries nearly 20,000,000 tons of way freight in a year. If this is hauled only two miles by road, to or from the station, and a saving of 22½ cents per ton per mile could be effected, it would mean a total saving of $9,000,000."

Harper's Weekly, commenting on this statement, says that "in other words, the question of roads in many of our agricultural communities is a question of farming at a loss or at a profit." The wheelmen have done much to secure the betterment of our highways and the policy of doing permanent work, which is in force wherever the views of intelligent road builders prevail is approved by the taxpayers, who know that in the end such construction is the cheapest.

Good Roads Parliament.

WHAT OUR NEIGHBORS ARE DOING TO PROMOTE THE NATIONAL MOVEMENT.

A Washington despatch says: "The Secretary of Agriculture is charged by Act of Congress to collect and disseminate information concerning the public roads. To this end, and under authority of that law, Secretary Morton to-day issued a call for a "road parliament," to be held in the hall of the House of Representatives at Atlanta on October 17, 18 and 19, under the auspices of the Cotton States and International Exposition. The invitation is urged upon all State highway commissions, State and local road improvement associations, and open commercial bodies and boards of trade and transportation, agricultural societies and farmers' organizations, universities, agricultural colleges, and engineering schools, societies of civil engineers, humane societies, the League of American Wheelmen, and carriage and bicycle builders. Associations and all other organization or individuals especially concerned or experienced in the improvement of highways, are likewise cordially solicited to be represented.