

proved that this is not the case, and that the ample supply the town now obtains is derived from the rainfall of an area eight or nine miles distant, which previously to these artesian wells being sunk was passing beneath the town to waste on its way to the sea bed. This fact has four important bearings, viz.:

1. That a large number of towns situated on suprapervious strata can be supplied with pure water which was running to waste.

2. That the water so running to waste can be directly obtained by sinking wells in the area of absorption without affecting that proportion of the rainfall that maintains the dry-weather flow of the streams, providing always that the quantity artificially abstracted does not exceed the quantity that would have naturally run to waste.

3. That any water authority, or even private owner of land in a "suprapervious area," can by sinking, under the common law of the country, not only obtain the quantity of water that would naturally pass to waste under the site, but might by artificial pumping obtain water that would naturally otherwise have passed down the stream in the area where the rainfall was absorbed, and this abstraction will be practically without limit as regards the distance between the point of the rainfall and the point at which the well is situated.

4. The abstraction of water on a large scale by a public authority from under a suprapervious stratum may materially affect the riparian rights, advantages, and water supply derived from a distant stream without the owners and users of the same either knowing the cause of the depletion, or, if they did, having any mode of redress either from the law courts or from Parliament, or from the Local Government Board.

By common law* underground water, like game, is free to all who have a legal right to hold it. It is not like water flowing in a defined channel which must be passed on, after the rights of using it have been exercised. With the one proviso, that though you may use every gallon you can get, if you do not use it you must not spoil it,† for those around you can draw upon what you do not require; but though you may not spoil the water under your neighbor's house, you may pump it all out, and let his foundations down, destroy his house, or subside an adjacent railway, there being no right "of support in water."‡ All these matters, though the law of the land, appear to be contrary to equity, and to demand careful consideration with the other points to which attention has been drawn as regards future legislation. Equity demands that changes should be made in the common law, and again and again thoughtful and important schemes of water supply for the public good are thrown out because it is thought that if damage should occur no legal remedy exists for the damage done. For the most part such would not have occurred, and the public health would have benefited by the scheme being carried out.

The legal decision referred to restrains objectionable matter being conveyed to a well for the purpose of disposal, as it will necessarily pollute the water of those who have to use it, but no law exists to prevent a well being made, or works to be constructed over porous rocks, to allow sewage to either flow or percolate into the same; this should be rendered impossible by Parliament. Instances of such works are known to the writer—of county council lunatic asylums and of city

and county borough corporations. These are operations that might well come before a water board of the district of damage from pollution, for the complexity of the conditions point to the necessity of the possibilities of damage from all these causes being prevented by giving greater powers to the Local Government Board. It is obviously impossible that that department, already heavily overworked, can send inspectors on roving commissions all over the country to find out dangerous proposals, many of which can be carried out without recourse to the board or to parliament. But if each district had its own water board, it could communicate direct to the department, formulate its wishes, and point out the necessity of their advice or of a local enquiry.

If the common law should be altered, the matter of subsidence for the removal of material in chemical solution by pumping should obtain attention. As regards brine pumping, in which the contact of an imperial gallon of water causes it to take and hold in solution over 3 lbs. of common salt, special legislation has been recently passed overriding "the common law" as regards underground water, but unfortunately has absolutely failed to discriminate between the damage caused by "natural brine," i.e., artesian water resting on the upper surface of the top bed of rock salt in the Cheshire district—to that caused by the abstraction of "mined brine"—i.e., water derived from streams that flow through old shafts, from time to time silted up, into the large excavations in the lower rock salt bed, in which the principal mines occur, and which at the present time is alone mined. This injustice is a matter which requires further legislation.

In the Burton-on-Trent Brewery district, water impregnated with gypsum extracts from the area around 250 lbs. of sulphate of lime for each 1,000 barrels of ale brewed. Very large quantities of gypsum are thus removed from beneath the Needwood Forest district.

In the chalk area, every million gallons of water pumped abstracts from the chalk $1\frac{1}{2}$ tons of that material through which it has percolated, giving an additional storage for 110 gallons of water.

In the case of water rising at artesian pressure to the surface, and overflowing into a water-tight receptacle, there is no possibility of surface contamination, no matter how dangerous the surroundings, provided always that no pumping takes place allowing a cone of exhaustion to take place. Supposing the strata to be thoroughly porous from the surface to the point at which water enters the tubed portion of the borehole, and the tubes are carried up to the surface, or above it, on the principle that a gallon jar, when full, cannot hold more than that quantity, but if half-a-gallon be removed a similar quantity can be replaced, then if a void be produced in the surface rock and the artesian water removed, a conical space is left for the percolation of surface water with any impurity in solution that may be present. In many cases the borehole pipe terminates in the bottom of a well, which should always be made thoroughly water-tight by iron cylinders securely connected, and the bottom of the well should be carefully cemented, and annular space at the back of the cylinders made thoroughly water-tight. Cases are known to the writer where the well is simply excavated in the rock, the artesian water allowed to rise into it, and is pumped down below surface level, and percolation from the surface is left to its course. This points to the necessity, from a health point of view, of every waterworks,

* *Chasemore v. Richards*.

† *Ballard v. Tomlinson*.

‡ *Popplewell v. Hodgkinson*, vol. iv., *Exchequer Cases*; and *Acton v. Blundell*, and *Elliott v. the North-Eastern Railway*.