appliances are kept going to provide the workings with fresh air, and once was within five minutes' time of losing my life for the want of air, having wandered into an old working void of air currents, but I never felt the air of a coal mine to be so fresh, so sweet, and so much of it as there was in each of the caves I visited, yet no artificial means was used to supply it. Each cave gave a lasting and high-class object lesson showing how spring water was secured and why it is generally so wholesome to drink. A few weeks after I visited the cave I went to the foot of the same mountain at the east end, and witnessed a large volume of water gushing from an opening between two rocks. This volume of water forms the head of that noble river called the Aire in England. Might not the water be a portion of the broad river which I saw in the cave. When a town is fortunate enough to possess a good spring of water it may be accounted rich, because it will form a constant supply even in the driest seasons. It is a storage reservoir, a filtering plant, and an aerating apparatus all combined, that cannot possibly be injured or tampered with. If a spring can be secured, say about 300 feet above the level of the town, the water may be piped direct to the consumers, because the pressure will be about right for working, viz., about 140 lbs. to the square inch; if the level be higher then the pressure would need reducing, and the water might be conveyed to a small well or reservoir situated at the proper level, to create the pressure of water called for by the council of the town, to be placed in the mains, and arrangements could be made so that as the water travels from the spring to the well head (or reservoir placed at the head of the distributing mains) to break up the stream of water, and give it another and further aeration before it enters the closed pipes.

The pressure of water should not be less than 100 lbs. to the square inch, and need not be over 150 lbs. A town having a working pressure of 150 lbs. to the square inch, and possessing a plentiful supply, may run all the small machinery, such as hoists, turning lathes, sewing machines, washing machines, the bellows of organs, and any machine not requiring more than 10-horse power, with their water supply at a nominal cost. The chief difficulty with towns' water supplies is to arrange and manage them so that they are not damaged by frost. We have often read items stating that during the past winter large fires occurred because the hydrants were frozen, which delayed the firemen and prevented them from extinguishing the fire while it was confined to limited area. Then several of our cities and towns have provided steam boilers on wheels that have gone from street to street thawing out house services that would become hard frozen again immediately if the water was not allowed to run during the time the cold snap continued, thereby wasting more value of water than would be paid for, for the whole year's supply. This is certainly a ridiculous state of things that can be avoided by using practical judgment and paying proper attention to the small details during the installation, and intelligent management after the works are completed. Few men, however clever, can correct errors of construction. Our present pattern of hydrants could be improved, because they are heavy and clumsy, often so given to leaking that they keep the earth which surrounds the vertical column always wet, and many of them leak enough to keep the interior of the column filled with water to the street line, and when that is the case the slightest frost affects them and they become useless. The valve arrangement at the bottom should be improved. But if the hydrants were always perfect and tight they would be subject to freeze if the vertical columns were surrounded with wet earth and there were no drain at the foot to remove the surplus water.

It is almost idle to believe that any town or village, wherever situated, cannot have a good supply of water at a reasonable cost. If the waters of lakes, rivers or springs supplying wholesome water are not to be secured at a reasonable cost, then take advantage of the water-bearing strata under the earth, they exist in abundance, and mechanical skill has provided reliable means at a trifling cost to bring the water to the surface. Some fifteen years ago I got a 4-inch hole bored down through the earth's crust to a depth of thirty yards, when water of the very best quality for domestic use rushed up through the bore hole to a height of twenty feet into the air, and it cost me quite as much to bring that stream under control and provide a drain to remove the surplus as it did to bore the hole through the earth. I lowered a 3-inch galvanized iron pipe through the earth to the depth the drill had cut then puddled round the outside and fixed a turnover bend on the top that I could attach a fire hose to, and a grated gully underneath to carry off the water, which completed the expense, and from that time to the present the flow continues the same. But a force of water similar to that can be met with but very seldom. There are persons that have the gift of pointing out the exact place where suitable water can be found, and if the bore hole is cut down as little as five yards from the place pointed out perhaps not a drop of water could be secured. Persons used to visiting mines and caves deep down in the earth can easily understand why.

THE LIQUEFACTION OF AIR.

A great deal of attention has recently been attracted to C. E. Tripler's experiments with liquid air. These have been extensively described in more or less popular magazines and yellow journals. We have not yet, however, been given any clear statement of the case by Mr. Tripler himself, nor has his process of liquefaction been made public to any degree. We have been pleased to receive from Norman W. Henley & Co., New York, a new volume on liquid air and the liquefaction of gases, by T. O. Sloane, Ph.D., which contains a great deal of interesting information on the subject. A general discussion of the physics and chemistry of air, etc., together with an outline of previous experiments in liquefaction, take up the first 300 pages of the book, and these chapters are a most interesting resume of progress in this direction. A very full description, with illustrations of Mr. Tripler's experiments with liquid air, is given and they are very varied and most interesting, but chiefly from the spectacular standpoint. A description of the laboratory in which the air is liquefied is given, and while complete details of the air compressor, which is a Norwalk straight-line compressor, are to be obtained, there is no information practically as to the construction of the liquefiers, which, as the author remarks, "has not been fully divulged." We quote that, "they appeared as long felt-covered cylinders. Inside the felt wrappings are cylindrical cases containing coils of copper pipe. At the bottom of the coil of pipe is a special valve, the invention of Mr. Tripler. The compressed air escapes from the valve, and, expanding suddenly, experiences a drop in temperature. Some of the cooled air works its way up through the chamber and cools the coil of pipe. Thus there is established an intensive or accumulating action. The air entering the liquefier at a normal temperature is cooled by the reverse flow of expanded air. It escapes from the valve at the bottom at a temperature which constantly grows lower until air begins to liquefy