

mitigated in force because of the absence of air to retard and buoy up the drops of liquid. If rain could be formed and fall in a vacuum with unimpeded force, the moving drops would be almost as destructive as a shower of bullets.

It is a remarkable property of every gas that it occupies the entire space within which it is confined, no matter how large the space, or how small the quantity of gas. I hold here a rubber bag, about one third full of air, and tightly closed. This I suspend in a large receiver from which the air is now to be withdrawn. As the exhaustion continues, the contents of the bag expand, and soon threaten to burst the walls, though no portion of air has been added. We will now place under the receiver a glass flask, the neck of which has been sealed by fusion. The air is now exhausted, and—there, as you see, the flask is shattered outwardly by the bursting pressure or tension of the confined gas.

Animal life could not be sustained in a vacuum because respiration would be stopped. Here is a lively little mouse; it was caught in a trap, and the captor was about to kill it. I interfered and saved the creature's life so as to confer upon it the distinction of a scientific demise. We place the mouse in this small receiver on the pump plate. Two or three strokes of the lever and the air is practically exhausted; the mouse immediately falls, gasps once or twice and is dead.

A word now in regard to water pumps. They operate also in obedience to the laws of atmospheric pressure. Here (Figure 14) is a glass

model of a lifting pump; B is the barrel in which works the tightly-fitting piston P; and in this is a valve, arranged so as to open only upward. Another valve is seen in the barrel. The handle H is the termination of the piston rod, and S is the spout. The pipe, leading from the barrel, we now place in water; then as the piston is raised, the downward pressure of the air on

the liquid in the well forces the liquid to follow the piston in its ascent. In the down stroke, as you see, the barrel valve is closed, and the piston valve opens so as to allow the water to rise above the piston; then with another upstroke it is lifted to the spout, while more is drawn up from below. As this lifting pump is dependent on the

pressure of the air, water could not be raised beyond the height at which the liquid would stand in a tube, arranged as in our barometer experiments, viz., 34 feet at the sea level. Practically, however, the working distance to which water can be so raised is far below the theoretical height. In this altitude, lifting pumps seldom operate beyond 16 or 18 feet. If water has to be brought from a greater depth than a lifting pump is able to bring it, a force pump may be employed (Figure 15). The essential difference between this and the lifting

pump, is that the force pump piston rod is solid. In the down strokes, the piston exerts pressure on the water and drives through the exit pipe V, past the valves F and out at the delivery pipe H. In this kind of pump there is no limit to the working distance, except as dependent upon the stability of the pump and the

Figure 15. power employed.

The pump models were operated with striking success; by means of the force pump model, a stream of water was driven with great force across the room.

By such simple means as these can we be made conversant with the properties of the air we breathe. Surely it is worth our time to study the things about us, of more worth indeed than to lose ourselves in hypotheses as to the condition of distant planets. The day will surely come when:—

"By experience taught the mind shall learn,  
That not to know at large of things  
Renote from use, obscure and subtle,  
But that which, before us lies  
In daily life,  
Is the prime wisdom."

#### MEETING HOUSE OR SCHOOL-HOUSE.

In the District Court of the First Judicial District, Territory of Utah, County of Weber.

S. V. Frazier, for the benefit of himself and all the inhabitants of School District Number 2, of Woodruff, Rich County, plaintiff, vs. The Corporation of the Members of the Church of Jesus Christ of Latter-day Saints, residing in the Woodruff Ecclesiastical Ward of the Bear Lake Stake of Zion, a corporation, Anson C. Call and Parley W. Brown, Trustees of School District Number 2 of Woodruff, Rich County, and W. H. Lee and Arbury E. Eastman, defendants.

#### OPINION OF THE COURT.

This is a bill in equity, brought to

obtain a conveyance of a certain piece of land, upon which there is a schoolhouse, from the defendant corporation to the Trustees and their successors in office of School District No. 2, of Woodruff, Rich County.

The bill avers that the complainant is a resident and taxpayer of said school district; that in 1873 the inhabitants of said district, desiring the erection of a schoolhouse for school purposes, concluded to build the same for said district by contribution from the inhabitants and taxpayers thereof; that, accordingly, subscriptions were obtained from such residents and taxpayers, and among others the complainant, to build a schoolhouse. The defendant Eastman then owned the land upon which the house now stands, but did not have a legal title to it; but that the inhabitants of said district selected that as the location of the schoolhouse, and that said defendant Eastman stated, that if they would build the schoolhouse thereon, that he would convey the land to the district.

The bill further alleges that said contributions were paid and the school house built, but that instead of conveying the land to the trustees and their successors in office as agreed, that he conveyed it, with the school house thereon, to defendant Lee, in trust for the inhabitants of Woodruff Ward, and that said Lee deeded the land to the defendant corporation. And the bill further avers that the said defendants combined and confederated together to cheat and defraud the district out of its property, and had said property conveyed to defendant corporation to effectuate that fraud, and take it and use it as a place of worship for said defendant corporation and its members, and to deprive the district of it. It avers that the property in good faith belongs to the district. It further avers that the plaintiff had made application to the trustees of said school district to take steps to compel a conveyance thereof. That Walter J. Frazier, one of said trustees, was ready and willing to take such steps to enforce a conveyance, but that Anson C. Call and Parley W. Brown, the two other members of said school board are members of defendant corporation and refused to take any steps whatever to that end, and that they are acting in concert with the other defendants to cheat the district out of said property; and that, therefore, the plaintiff, on his own behalf, and in behalf of all other defendants and taxpayers in said district, files this bill asking that a conveyance be decreed.

The answer admits the building of the house; admits that it was built by donation, but denies all the other material allegations of the bill. It further alleges by way of affirmative defense that the members of said defendant corporation residing at Woodruff determined to build a house of worship, and for that purpose they contributed money and means, and that the same was built by them as and for a house of worship; and that upon its completion it was conveyed