A SIMPLE EXPERIMENT ON THE COOLING OF AIR BY EXPANSION.

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The teaching value of an experiment in physics is much greater if the experiment is so simple and direct as to need no apparatus for its performance, and especially if it be one which the student can easily repeat for himself. The commonest method of illustrating the fall in temperature of a gas during adiabatic expansion, i. e., change of volume without addition or extraction of heat, is that in which the mist is shown which forms in moist air under the receiver of an air pump with the first few strokes of the piston. This cooling effect is now used on such a large scale to produce artificial refrigeration in cold storage warehouses and elsewhere, that a simpler experiment illustrating the fact should be welcome.

Such an experiment is the following: Holding the lips tightly shut, bring the root of the tongue into contact with the palate so as to enclose in the mouth as large a volume of air as is practicable. This air should now be compressed as much as possible by muscular action of the tongue and cheeks. The mouth is then to be opened and the air gently forced out. As the moist air in the mouth passes out, expanding as it does so, it is sufficiently chilled by this expansion to form a quite dense mist, which the experimenter can readily see himself, and which is easily seen by every one in the class room if the experimenter stands between the pupils and a window. It will probably be found easier to compress the air to the required degree if the fingers are held tightly pressed against the lips. It should be understood that the compression is to be carried out entirely in the mouth, the connection to the lungs being cut off by the tongue, for the pressure which can be produced by the muscles of the cheeks is much greater than that which can be obtained by a contraction of the chest.

Some people find difficulty in succeeding with this experiment; to such the following modification is recommended: Pour a few cubic centimeters of water into a large glass flask, and shake it about in the flask so as to thoroughly saturate the enclosed air with vapor. Now place the mouth of the flask tightly against the lips and alternately compress and rarefy the air in the flask by

aid of the muscles of the cheeks and tongue. If this is done with sufficient vigor a fog will form in the flask at each exhaustion. In this form the experiment is quite easy, but the addition of even so simple a piece of apparatus as a flask causes it to lose some of the charm of simplicity.

THE TRUE FIELD OF PREVENTIVE MEDICINE.

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The most powerful factor of modern civilization is public opinion. It determines legislation, blocks reform, directs economic movements. And nowhere is its influence more evident than in movements affecting public health. Desirable measures in this direction are prevented and existing laws made inoperative through it.

Popular ideas of medical facts, therefore, constitute the greatest factor in the world-fight against disease. And popular ideas are often wrong. The literary woman who "does not believe in germs," the teacher who denies the very existence of disease, the preacher who thinks vaccination "against the Gospels," the merchant whose strength is in his "electric" belt, and the lawyer whose ten-drops-before-meals controls a cancer, are typical. What can be expected of such a society but opposition to measures requiring honest and intelligent coöperation?

The preventive medicine of the future must therefore concern itself with popular knowledge. It must determine what medical facts will be of greatest value to the people, and how these facts can be gotten before them.

The most valuable facts are the fundamental facts regarding the nature of disease. Given these, and measures to combat disease follow logically. While hygienic laws, taught without these facts, are often open to doubt and misinterpretation.

The main agencies for the diffusion of such knowledge are the public press, the public lecture and the public school. Of these, the press is of least value. It is filled with pseudo-science, superstition and deception. People are not trained to separate its truths from its falsehoods, and are equally credulous and skeptical of both.