

cumstances, retain that volume. But air is one of those bodies that have both these properties. If we take a syringe, closed at the end which is usually open, the piston may be driven down to a considerable distance by the exertion of a little force. The air, therefore, in the tube or syringe suffers compression; but as soon as the pressure on the piston is removed, the air recovers its former volume, and the piston is forced back into its first position, from which fact we learn that air is possessed of the property of elasticity.

EXPANSIBILITY OF AIR.

Expansibility, or the capacity of occupying, under particular circumstances, a much larger space than it does under ordinary pressure, is another property of atmospheric air. Dr. Ure has calculated that the gases disengaged by firing gunpowder are so rarefied by heat that they occupy more than two thousand times the space of the powder itself; and Mr. Boyle caused atmospheric air to dilate until it had attained nearly fourteen thousand times its ordinary bulk.

There are two agencies which are especially active in expanding air,—heat and a diminution of pressure. If a bladder containing only a small portion of air be exposed for a short time to the heat of a fire, or if boiling water be poured upon it, the air will expand, and the bladder appear as though it were fully distended by air in the ordinary state of density. So also, if it be placed under the receiver of an airpump, and a part of the air that presses upon it be abstracted, the remainder will expand and entirely fill the bladder.

From these statements it follows that air may have various densities, according to the circumstances under which it is placed. In the instance of condensation that has been mentioned, its density was great; in that of rarefaction, its density was small: and the same is true of the atmosphere; for its density at any height is just in proportion to the pressure that is exerted by the superincumbent mass of air. As the air is very elastic, it suffers, in the lower regions, where it bears a great pressure, considerable condensation, and extends itself as much in the higher regions, where there is no force to neutralize its elasticity. It therefore follows that the stratum of air immediately in contact with the surface of the earth is more dense than any above it, because it sustains a greater pressure, and its particles are consequently brought