

rature of 32° of Fahrenheit's thermometer; and boils in the open air at 212° ; but in vacuo at 70° ; while in Papin's digester, where it is strongly and closely confined, it will nearly bear a red heat without boiling. At a high temperature it is converted into steam: and it is owing to a knowledge of its elasticity and expansive power while in the shape of steam, that steam-engines are formed; thus enlisting the very elements into the service, and rendering them subservient to the wants of man, and enabling him to achieve those wonders which science has brought to such perfection within the last century: for I consider the steam-engine, in its varied forms, as one of the highest achievements of mind over matter; its structure requiring such a combination of chemical and mechanical knowledge, and of nice calculations to balance the powers of its different component parts, that man may well rejoice in his triumph.

As I have just pointed out the expansion of water by heat, it will be right to notice that it also expands by cold.—This was first observed by the Florentine Academicians, and published in the Philosophical Transactions for 1670.—A glass ball terminating in a narrow neck was filled with water and plunged into a freezing mixture of snow and salt; the water suddenly started up into the neck, in consequence of the construction of the vessel, and slowly subsided again as the cold affected it. After a certain interval it began to rise again, and continued to ascend slowly and equably, till some portion of it shot into ice, when it sprang up at once with the greatest velocity. The experiment was also varied about this time by filling a small cavity in an iron bomb-shell, and filling the aperture either with a plug of wood tightly driven in, or an iron screw nicely fitted; when,