http://www.geology.19thcenturyscience.org/books/1850-Lyell-Principles/README.htm

an undulation in the fluid below. Even if we grant this, says Mr. Mallet, another more serious objection presents itself, viz., the great velocity attributed to the transit of the wave in the subterranean sea of lava. We are called upon to admit that the speed of the wave below equals that of the true earthquake shock at the surface, which is so immense, that it is not inferior to the velocity of sound in the same solids. But the undulation in the fluid below must follow the laws of a tidal wave, or of the great sea-wave already spoken of. "Its velocity, like that of the tidal wave of our seas, will be a function of its length and of the depth of the fluid, diminished in this case by certain considerations as to the density and degree of viscidity of the liquid; and, although it would be at present impossible, for want of data, to calculate the exact velocity with which this subterraneous lava-wave could move, it may be certainly affirmed that its velocity would be immeasurably short of the observed or theoretic velocity of the great earth-wave, or true shock, in earthquakes." *

Liquid gases. — The rending and upheaving of continental masses are operations which are not difficult to explain, when we are once convinced that heat, of sufficient power, not only to melt, but to reduce to a gaseous form a great variety of substances, is accumulated in certain parts of the interior. We see that elastic fluids are capable of projecting solid masses to immense heights in the air; and the volcano of Cotopaxi has been known to throw out, to the distance of eight or nine miles, a mass of rock about one hundred cubic yards in volume. When we observe these aëriform fluids rushing out from particular vents for months, or even years, continuously, what power may we not expect them to exert in other places, where they happen to be confined under an enormous weight of rock?

The experiments of Faraday and others have shown, within the last twelve years, that many of the gases, including all those which are most copiously disengaged from volcanic vents, as the carbonic, sulphurous, and muriatic acids, may be condensed into liquids by pressure. At temperatures of from 30° to 50° F., the pressure required for this purpose varies from fifteen to fifty atmospheres; and this amount of pressure we may regard as very insignificant in the operations of nature. A column of Vesuvian lava that would reach from the lip of the crater to the level of the sea, must be equal to about three hundred atmospheres; so that, at depths which may be termed moderate in the interior of the crust of the earth, the gases may be condensed into liquids, even at very high temperatures. The method employed to reduce some of these gases to a liquid state is, to confine the materials, from the mutual action of which they are evolved, in tubes hermetically sealed, so that the accumulated pressure of the vapour, as it rises and expands, may force some part of it to assume the liquid state. A similar process may, and indeed must, frequently take place in subterranean caverns and fissures, or even in

* Mallet, p. 39.