boſom of its native earth; and its firſt crater would be compoſed of the fragments of the ſame earth.

Thus, according to our author, the foundations of the burning mountain would be laid in the bottom of the ſea ; and even then it would have an hollow cup or crater on the top ſimilar to that which is to be found on all volcanoes at preſent. But the queſtion now very naturally occurs, by what means was the internal fire preſerved from extinction by the waters or the ocean, which muſt thus have been in­cumbent upon it ? To this he replies, that “ The fire, ha­ving diſpoſed the ſubſtances in fusion to make an eruption, next laid open the earth, and emitted as much matter as it could diſcharge, with force ſufficient to overcome the reſiſtance of the column of water which would oppoſe its aſcent; but as the ſtrength of the fire diminiſhed, the matter diſcharged was no longer expelled beyond the mouth ; but, by accumulating there, ſoon cloſed up the orifice. Thus only ſmall orifices would be left ſufficient for giving vent to the vapours of the volcano, and from which only ſmall bubbles of air could aſcend to the ſurface of the water, until new circumſtances, ſuch as originally gave occaſion to the erup­tion of the volcano, again took place in the bowels of the earth, and produced new eruptions either through the ſame or other mouths. The appearance of the ſea over the new formed volcano, in its ſtate of tranquillity, would then be ſimilar to what it is betwixt the iſlands of Baſilizzo and Pariaria. Columns of air-bubbles are there aſcending at the depth of more than 30 feet, and burſt on their arriving at the ſurface. This air would continue to diſengage itſelf with little diſturbance as long as it issues forth only in ſmall quantity, until, at the very inſtant of explosion, when prodigious quan­tities, generated in the burning focus, would make their way all at once, and the same phenomena which originally took place would again make their appearance.”

A volcano, while under water, cannot act preciſely as it does in the open air. Its eruptions, though equally ſtrong, cannot extend to ſo great a diſtance. The lava accumulates in greater quantity round the crater ; the ſands, aſhes, and pozzolano are not carried away by the winds, but are depoſited around its edges, and prevent the marine ſubſtances which are driven that way by the waters from entering. Thus they agglomerate with theſe bodies, and thus a pyra­midal mount is formed of all the materials together.

In this manner Mr Houel ſuppoſes that the mountain was gradually raiſed out of the ſea by the accumulation of lava, &c. at every eruption, and that the cavern of the vol­cano was gradually enlarged, being driven down into the bottom of the cavern by the continued action of the ſtones which the volcano is conſtantly throwing up ; that it was there fuſed, and at laſt thrown out at the top of the moun­tain to accumulate on its ſides. Mr Houel’s opinion about the volcanic fire we ſhall give in his own words.

“ We cannot form any idea of fire ſubſiſting alone, with­out any pabulum, and unconnected with any other principle. We never behold it but in conjunction with ſome other bo­dy, which nouriſhes and is confirmed by it. The matter in fuſion, which issues from the focus, is but the incombuſtible part of that which nouriſhes the fire, and into the boſom of which that active principle penetrates in ſearch of pabulum. But as the fire acts only in proportion to the facility with which it can dissolve and evaporate, I am of opinion, that it is only the bottom of the volcano on which it acts ; and that its action extends no farther than to keep theſe ſub­ſtances which it has melted in a conſtant ſtate of ebullition. That fuſible matter being diſcharged from the mouth of the volcano, and hardening as it is gradually cooled by the ac­tion of the air, produces that ſpecies of ſtones which are distinguiſhed by the name of *lavas.* This lava, even when in the focus, and in a ſtate of fluidity, muſt alſo possess a cer­tain degree of solidity, on account of the gravity and density of its particles. It therefore oppoſes the fire with a de­gree of resiſtance which irritates it, and requires, to put it into a ſtate of ebullition, a power proportioned to the bulk of the maſs.

“ That quantity of matter, when dissolved by the action of the fire, muſt conſtantly reſemble any other thick ſubſtance in a ſtate of ebullition. Small exploſions are produ­ced in various parts over the ſurface of every ſuch ſubſtance while in a ſtate of ebullition ; and, by the burſting of theſe bubbles, a great number of ſmall particles are ſcattered around. This is the very proceſs carried on in the focus of a volcano, though on a ſcale immenſely more large ; and the vaſt exploſions there produced expel every body which lies in their way with the utmoſt violence ; nor is there any piece of lava which falls down from the upper part of the arch of weight ſufficient to refill this violent centrifugal force.

“ No eſtimate can be made of the power of theſe explosions, but by obſerving the obſtacles they overcome, and what enormous bodies are raiſed up and thrown to an immenſe height and diſtance. Such vaſt pieces of lava are to be ſeen on the top of Veſuvius and Lipari, that the projec­tile force by which they have been thrown out appears al­together incredible. No perſon can harbour the leaſt ſuſpicion of their having been laid there by any human power ; and the appearance of them demonſtrates that they have been ejected from the bottom of the volcano, not in a ſtate of fu­ſion, but coherent and ſolid. A piece of lava lies on the top of Ætna of more than a cubic fathom in bulk, and whoſe weight therefore cannot be leſs than 16 tons. What an amazing force then muſt it have required, not only to raiſe this enormous maſs from the volcanic focus, but to make it deſcribe a parabola of about a league in diameter after it had come out of the crater ?

“ When we conſider how much the volcanic focus is sunk below the baſe of the mountain, that the mountain itſelf is 10,000 feet high, and that conſequently there muſt have been a power ſufficient to raiſe ſuch a mass 12,000 feet perpendicular, the boldeſt imagination muſt be loſt in amaze­ment.—This may ſerve to give us ſome idea of the nature of that power which operates in the foci of volcanoes ; a power which is unknown and inconceivable, and may juſtly be reckoned among the myſteries of nature.”

The pabulum by which the internal fire is ſupported, Mr Houel thinks to be ſubſtances contained in the mountain itſelf, together with bitumen, ſulphur, and other inflamma­ble materials which may from time to time flow into the fo­cus of the volcano in a melted ſtate through ſubterraneous ducts, and the exploſions he aſcribes to water making its way in the ſame manner. The water is converted into ſteam, which fills the cavern and puſhes the melted lava out at the crater ; this opinion is corroborated by the co­pious ſmoke which always precedes an eruption. But, com­bined with the water, there is always a quantity of other ſubſtances, whoſe effects precede, accompany, or follow the eruptions, and produce all the various phenomena which they display. The eruption of water from Ætna in the year 1775 proceeded undoubtedly from this cauſe. The ſea, or ſome of the reſervoirs in Ætna or the adjacent mountains, by ſome means diſcharged a vaſt quantity of wa­ter into the focus of the volcano. That water was inſtantly reſolved into vapour, which inſtantly filled the whole cavern, and issued from the mouth of the crater. As ſoon as it made its way into the open atmosphere, it was condenſed again into water, which ſtreamed down the ſides of the mountain in a dreadful and deſtructive torrent.