

many more revolutions have happened in the latter than in the former hemisphere, and that the quantity of water has always been, and still is, much greater there than in our hemisphere. Every thing concurs in proving, that the greatest inequalities of the globe exist in the southern regions, and that the general direction of the primitive mountains is from north to south, rather than from east to west, through the whole extent of the earth's surface.

III.

Of the Formation of Mountains.

ALL the vallies and dales on the surface of the globe, as well as all the mountains and hills, have originated from two causes, namely, fire and water. When the earth first assumed its consistence, a number of inequalities took place on its surface; swellings and blisters arose, as happens in a block of glass or of melted metal. Hence this first cause produced the original and the highest mountains, which rest on the interior rock of the earth as their base, and below which, as every where else, there must have been vast caverns, which sunk in at different periods. But, without considering this second event,

event, the falling in of the caverns, it is certain, that, when the earth first consolidated, it was every where furrowed with depths and eminences, which were produced solely by the action of cooling. Afterwards, when the waters were precipitated from the atmosphere, which happened when the earth cooled so much as to be unable to repel the vapours, these waters covered the whole surface of the globe to the height of two thousand fathoms; and, during their long abode upon our continents, the motion of the tides and that of the currents changed the disposition of the primitive mountains and valleys. These movements would form hills in the valleys, and would cover the bottoms and knaps of the mountains with new beds of earth; and the currents would produce furrows or valleys with corresponding angles. It is to these two causes, of which the one is much more ancient than the other, that the present external form of the surface of the earth is to be referred. Afterwards, when the seas sunk down, they produced those steep precipices on the west, where they ran with the greatest rapidity, and left gentle declivities on the east.

The structure of those eminences which were formed by the sediments of the ocean, is very different from that of those which owe their origin to the primitive fire. The first are disposed in horizontal beds, and contain an infinite

nite number of marine productions. The second, on the contrary, are less regular in their structure, and include no marks of sea-bodies. These mountains of the first and second formation have nothing in common but the perpendicular fissures; but these fissures are effected by two different causes. The vitrescent matters, in cooling, diminished in size, and, of course, they split, and receded to different distances. But these composed of calcarious matters transported by the waters, split into fissures solely by drying.

I have often remarked, that, in detached hills, the first effect of the rains is gradually to carry down from the summit the earth and other bodies, which form at the foot a pretty thick stratum of good soil, while the top is left entirely bare. This effect is, and necessarily must be, produced by the rains. But a previous cause disposed these and similar matters round all hills, not excepting those which are detached; for, on one side, the earth is uniformly better than on the other: The hills are always steep and precipitant on one side, and have a gentle declivity on the other; which proves clearly, that the action, as well as the direction of the motion of the waters, were greater on one side than on the other.

IV.

Of the Density which certain Matters acquire by Fire, as well as by Water.

IN p. 246, I said, *that the hard points found in free-stone consisted of metallic matter, which appeared to have been melted by a strong fire.* This assertion seems to insinuate that the great masses of free-stone have originated from the action of the primitive fire. I at first imagined that this matter owed its density and the adhesion of its particles solely to the intervention of water. But I have since learned that the action of fire produces the same effect; and I shall relate some experiments which at first surprised me, but which I have repeated so often as to remove every doubt upon this subject.

EXPERIMENTS.

I pounded free-stones of different degrees of hardness, till they were reduced to a powder more or less fine. These powders I employed to cover the cements I used in converting iron into steel. This powder of free-stone was strewed over the cement, and heaped up, in the