

The contents of the Earth

June 10th 1805

Having given you a view of the surface of the earth; of its Mountains, of its Rivers w. ~~with~~ ^{it} water, and of their great origin in the Ocean, and of the vegetables w. are enlivened by this wide spreading element, order leads us to speak next of the contents of the Earth. But before we leave the subject of water & of air, we would observe to you that water is not strictly speaking an element; if by an element we understand a first or constituent principle. Recent discoveries have led to the decomposition of water; and they find that water is formed by the union of hydrogen and oxygen. Vegetables appear to derive their chief nourishment from water, w. on its reception into the plant is reduced to its first principles hydrogen & oxygen; the hydrogen becoming an essential principle of the vegetable, constituting its mucilage, oil & resin; while the oxygen, ~~which~~ is employed in producing the vegetable acids & giving the colour to the plant. The oxygen transpires or pervades the vegetable and this transpiration is accelerated by the action of light. Light ^{seems to act} serves as a stimulus to keep up the vegetative life, and is a powerful agent in decomposing the various nutritive principles; & particularly in separating the oxygen gas from the substances imbibed, while their bases become fixed in the plant. Air is a vehicle for water, caloric & light, It is light that gives the green colour to plants. In the dark they are white, pale & sickly. Water can be converted into air; and air into water.

We must now break ground, and ~~pass~~ from viewing the surface of the Earth ^{we pass} to give you some account of its contents. But this is not a very easy task. — a musquito attempting to penetrate with his feeble proboscis the huge body of an Elephant! Whiston is no unapt simile of little man boring with all his might into the body of this globe. For he can scarcely penetrate the hide or crust of it, if by that name we may call these strata or layers, ^{which} composed ^{of} ^{the} vegetable mould, sand & clay.

The deepest mine we have any account of, is at Cattlburgh in Hungary. It is about 3,000 feet deep; which bears but a small proportion to the centre of the earth, w.^{ch} is, you know, about 4,000 miles. All that is deeper than 3,000 feet is dark conjecture. We may suppose with father Kircher, that there is there one dreadful Volcano; or with Burnet that there is one vast abyss of waters; or with Whiston, that there is a great sphere of hot iron; — or with Buffon that there is at the centre a huge globe of glass; or we may suppose with some others there is an enormous Magnet or Load stone; or we may suppose almost any thing, for, we have little intelligence from these lower regions, but what is brought us by Volcanoes
Instead

Instead of conjecture let us listen to Nat. History. — The most common disposition of the earth is this. — Ab. 7 feet of black or garden mould; next a layer of gravel, or sand; then clay or marl; then chalk or coal. Below this marbles, ores, then sand & gravel again, alternately, each growing more dense & heavy as it is deeper. The deeper we go, these layers grow ^{thicker} deeper & deeper thicker.

There are several things in the bowels of the earth beside the metals serviceable to man. There is Coal, Salt, Sulphur, Vitriol, & antimony; not to mention stones, marbles, lime, paints &c &c.

These articles, & many more, might, some may say, have been better placed on the surface of the earth, to be near at hand, and ready for the use of man, without the labor of digging into the earth for them. But then the vast quantity of them would almost cover the face of the earth: whereas now our land is happily disincumbered from such troublesome furniture; and the surface of the earth disengaged from those embarrassments, which w^d. otherwise have obstructed all husbandry, & impeded the progress of vegetation, with^{out} a great supply of which, man & beast could not subsist.

Metals: and a thousand other articles, w^d. were designed for a never failing treasure for the service of all succeeding ages, are carefully locked up in a vast storehouse, under our feet, where we are sure to find them in all cases of great necessity. Providence

Providence: has so ordered it, that they are not buried at such a depth as to be inaccessible to civilized man; but has placed them at such convenient distances below the surface, as that the coat of earth above them, should have a sufficient depth of soil as is suitable to produce vegetables, and yet not to be of such a thickness as to prevent his digging into those subterraneous magazines of, where immense riches are deposited for his use.

By this piece of natural economy, we enjoy a double advantage, & the same spot of ground yields us vegetables for food, coal for fuel, metals for instruments, marble for building, vitriol, antimony &c for medicines, and salt for every thing. (See Spectacle de la Nature) ^{industrially} from its birth to its perfection.

We may observe here, that the history of iron, is the history of human civilization. Those Nations, or tribes who cannot obtain & refine iron from the ore are in a state of barbarism. But those who can smelt iron & form it into instruments have emerged from that state & risen to civilization. As soon as a nation know how to make swords, ³ nails, & hammers & ploughs, they, by defending & helping themselves, put themselves directly in the rank of civilized nations. The Peruvians & Mexicans were found by the Spaniards half civilized, they manufactured gold & ^{silver} copper, but not iron.