

but perfectly equal in every other respect, and both moved by an equal quantity of water, the wheel nearest the canal moves quicker than the one more remote, and to which the water cannot arrive till after it has run over a certain space in the particular runner that terminates in this wheel. It is well known, that the friction of water on the sides of a canal diminishes its celerity. But this circumstance is not sufficient to account for the considerable difference in the motion of these two wheels. It is owing, in the *first* place, to the water in this canal not being pressed laterally, as it is when it enters by the trough of the canal, and to its striking immediately the ladles of the wheel. *Secondly*, This inequality of motion, depending on the distance of the wheels from the canal, is likewise owing to the water, which passes through a trough, not being a column of equal dimensions with the trough; for the water, in its passage, forms an irregular cone, which is depressed on the sides in proportion to the breadth of the volume of water in the canal. If the ladles of the wheel are very near the trough, the water acts very near as high as the aperture of the trough: But, if the wheel is more distant from the canal, the water sinks in the runner, and strikes not the ladles of the wheel at the same height, nor with equal celerity, as in the first case. The union of these two causes produces

that

that diminution of celerity in wheels which are distant from the canal.

II.

Of the Saltness of the Sea, p. 275.

ON this subject there are two opinions, and both of them are partly true. Halley attributes the saltness of the sea solely to the salts of the earth carried down by the rivers; and even supposes that the antiquity of the world may be discovered by the degree of saltness in the waters of the ocean. Leibnitz, on the contrary, believes, that the globe having been liquified by fire, the salts and other empyreumatic substances produced with the aqueous vapours a salt lixivium, and, consequently, that the sea received its saltness from the beginning. The opinions of these two great philosophers, though opposite, should be united, and may even coincide with my own. It is extremely probable, that, at the beginning, the action of fire combined with that of water dissolved all the saline substances on the surface of the earth; and, of course, that the first degree of saltness in the sea proceeded from the cause assigned by Leibnitz; but this prevents not the second cause assigned by Halley from having considerable

considerable influence upon the actual degree of saltness in the sea, which must always augment, because the rivers incessantly carry down great quantities of fixed salts, which cannot be abstracted by evaporation. They remain, therefore, mixed with the general mass of waters, which are, in general, more salt in proportion to their distance from the mouths of rivers, and where the heat of the climate produces the greatest evaporation. That the second cause acts more powerfully than perhaps the first, is proved by this circumstance, that all lakes from which rivers issue are not salt, but almost all those which receive rivers and discharge none, are impregnated with salt. The Caspian Sea, Lake Aral, the Dead Sea, &c. owe their saltness solely to the salts transported thither by the rivers, and which cannot be carried off by evaporation.

III.

Of perpendicular Cataracts.

IN p. 279, I remarked, that the cataract of Niagara in Canada was the most famous, and that it fell from a perpendicular height of 156 feet. I have since been informed*, that there is a cataract in Europe, which falls from a

* Note communicated to M. de Buffon by M. Freinoye.

height

height of 300 feet. It is that of *Terni*, a small village on the road from Rome to Bologna. It is formed by the river Velino, which derives its source from the mountains of Abbruzzo. After passing by *Riette*, a village on the frontier of the kingdom of Naples, it falls into the Lac de Luco, which seems to be supplied by abundant sources; for the river runs out of it with more force than it enters, and proceeds to the foot of the mountain *del Marmore*, from which it is precipitated by a fall of 300 feet. It is received by a kind of abyss, from which it escapes with great tumultuousness. The celerity of its fall breaks the water with such force against the rocks and the bottom of the abyss, that a humid vapour arises, in which many rainbows of various sizes are formed by the rays of the sun; and, when the south wind blows, and drives this mist against the mountain, instead of several small rainbows, the whole cascade is crowned with a very large one.