

a finely-balanced system of tremendous forces nothing but the Divine power could command them, or perpetuate their indispensable equality; and nothing but the Divine will can dissolve what it is upholding. We may again repeat, on high human authority, that it is impossible that this can be the meaningless result of unmeaning chance; for it is La Place who has said, 'One of the most remarkable phenomena of the solar system is the rigorous equality which is observed to subsist between the angular motions of rotation and revolution of each satellite. It is INFINITY TO UNITY that this is not the effect of hazard.'

CONDUCTION AND VELOCITY OF SOUND.

AIR is the ordinary but not the only conductor of sound. In a perfect vacuum no sound would be produced, and it has been found by experiment, that in proportion to the rarefaction of the air, sound becomes less audible. We might therefore expect that as we rise from the surface of the earth, sound would be less powerful, and this result has been frequently noticed.

Saussure states, that a pistol fired on the summit of Mount Blanc, made less noise than would have been produced by the report of a small cracker at the level of the sea. The diminution of the intensity of sound in mountainous regions is a well-ascertained fact, but has not been attributed to its proper cause. The peculiar silence has been sometimes thought to arise from the solitary character of the district, and the absence of animal life, but there is evidently a physical reason for the phenomenon.

But although rarified air is a bad conductor of sound, our atmosphere is capable of transmitting it at a height far beyond that which can be attained by man. The great meteor of 1719 was sixty-nine miles above the surface of the earth when it exploded, but the report was like that of a large cannon. The meteor of 1783, which was half a mile in diameter, and moved at a rate of twenty miles in a second, was at an elevation of fifty miles when it exploded, producing a distinct rumbling sound.

But air is not the only conductor of sound; many of the elastic fluids possess the same property, some in a greater and some in a less degree. Priestley, Berollet, and Lesslie, have made experiments upon the intensity of sound in the gases. This subject, however, has not received an adequate degree of attention. In hydrogen gas the sound is scarcely louder than in vacuum; in oxygen and nitrous gas, the sound is greater than in atmospheric air; in carbonic acid, less.

Fluids are conductors of sound. That water has this property is certain, for fishes hear, and divers have an acute sensation of any motion around them, as also of the sounds produced in the air above, although they are enfeebled by their passage into a new medium.

All elastic solid bodies, such as glass, steel, and the metallic alloys, are good conductors of sound. It is however necessary, for the transference of sound, that the conducting body should be homogeneous, or the sound is interrupted, and the same happens if the parts be imperfectly joined. If we take a glass and fill it with any effervescing liquid, no clear or distinct sound can be produced while the effervescence continues, because the air bubbles create an irregular density. For the same reason sound is more readily propagated at night than during the day, for there are fewer currents of cold and heated air.

Sound is not instantaneously conveyed from the sounding body to the ear.—Every one must have noticed that the flash of a cannon is seen before the report