ness whenever the supply of air was not sufficiently rapid. On examining the air at the end of the experiment, no alteration had taken place either in the total volume of air, or in the proportion of azote which it contained; the only perceptible change being the substitution of a certain quantity of carbonic acid for an equal volume of oxygen gas, amounting to about half a cubic inch per minute, and being equivalent to the addition of 96 grains of carbon in 24 hours.

Two experiments were made on the respiration of oxygen gas, obtained from chlorate of potash, and containing in the one case two, and in the other only one per cent. of azote. Under these circumstances it was found that the volume of the gas was unaltered, and that a similar quantity of oxygen gas had been abstracted, but that a much smaller quantity of carbonic acid had been formed than in the last experiment, the remaining portion being made up by azotic gas which had been given out from the lungs of the bird, and the volume of which was just equal to that of the oxygen absorbed. The bird was somewhat distressed during the experiment, but recovered immediately and perfectly on being released from its confinement.

In the fourth experiment, in which a pigeon was made to respire a mixture of oxygen and hydrogen, with a small proportion of azote, (the oxygen being in the same proportion as in common air,) it was found that there was no loss of oxygen; but that a quantity of hydrogen disappeared, and was replaced by an equal volume of azote. The authors observe that birds have a quicker circulation of blood than other animals; and also that they are more sensible to the stimulating effects of oxygen.

On the spontaneous Purification of Thames Water. *By* John Bostock, *M.D. F.R.S. &c.* Read April 30, 1829. [*Phil. Trans.* 1829, *p.* 287.]

In the report which the author made of the result of his examination of Thames water to the Commissioners appointed by His Majesty to inquire into the supply of water in the metropolis, one of the specimens, taken near the King's Scholars' pond-sewer, was described as in a state of extreme impurity. The water had remained in the laboratory unattended to; but after an interval of some weeks it was observed to have become clear, while nearly the whole of the former sediment had risen to the surface, forming a stratum of half an inch in thickness, and still emitting a very offensive odour. In process of time this scum separated into large masses or flakes, with minute air-bubbles attached to them. At the end of two months longer these masses again subsided, leaving the fluid almost totally free from any visible extraneous matter. On analysis the water was found to contain lime, sulphuric and muriatic acids, and magnesia, in much larger quantities than in the specimens of Thames water previously examined, the proportion of saline matter being increased four-fold. The proportion of the muriates is nearly twelve times greater; that of carbonate of lime between two and three times, and that of sulphate of lime five and a half times greater. The water

in its foul state had given very obvious indications of both sulphur and ammonia; but neither of these substances could be detected after its spontaneous depuration.

The source of these new saline bodies is referrible to the organic substances, chiefly of an animal nature, which are so copiously deposited in the Thames. The depurating process may be denominated a species of fermentation, in which the softer and more soluble animal compounds act as the ferment, and are themselves destroyed, while the salts that were attached to them are left behind. Hence, the more foul the water the more complete the depuration; and it is on this principle that the popular opinion of the peculiar fitness of Thames water for being used at sea may be explained; its extreme impurity inducing a sufficient degree of fermentation to effect the removal of all those substances which might induce any future renewal of that process.

On the Composition of Chloride of Barium. *By* Edward Turner, *M.D. Professor of Chemistry in the University of London. Communicated by Dr.* Dionysius Lardner, *F.R.S.* Read May 14, 1829. [*Phil. Trans.* 1829, *p.* 291.]

The frequent employment of chloride of barium in delicate chemical investigations, renders an exact knowledge of its composition peculiarly desirable; and this has become a more important object of inquiry since it has been made by Dr. Thomson the basis of his calculations of the chemical equivalents of sulphuric acid, and of thirteen metals and their protoxides. He has deduced from his experiments with the chloride of barium the number 36 as the equivalent of chlorine; 70 as that of barium; and 78 as that of baryta; whence the equivalent of the chloride of barium would be 106; and accordingly, on mixing this quantity of the chloride with 88 parts of sulphate of potash, each being previously dissolved in separate portions of distilled water, he finds a complete double decomposition has taken place; the resulting sulphate of baryta, reduced to dryness, weighing 118 parts, and the muriate of potash yielding 76 parts of chloride of potassium. Hence he infers that 40 is the equivalent number for sulphuric acid, and 48 that for potash. Berzelius, however, maintained that this experiment, as well as the deductions from it, are not exact. Dr. Thomson having, in consequence of Berzelius's objections, repeated his experiments, still asserts their accuracy. The author of the present paper investigated the subject with the greatest care, employing materials in a state of perfect purity, and obtained results which coincided with those of Berzelius. He details the precautions he took for ensuring the conditions of perfect purity in the substances with which his experiments were made, and to the neglect of which he traces some of the errors which he imputes to Dr. Thomson's analysis. But there exists also a more radical cause of error in the method employed by that chemist; for Dr. Turner finds that when solutions of muriate of baryta and of sulphate of potash