destroyed by the same cause as those which die from covering the body with an impervious glaze; for, in both cases, the conditions required for the access of oxidized, and the removal of deoxidized plasma, are wanting, and life necessarily ceases. The atmosphere of unhealthy tropical climates differs but little from a vapour-bath at a temperature of between 80° and 90° Fahr.; and the dew-point in those countries, as for example on the western coast of Africa, never ranges lower than three or four degrees, nay, is sometimes only a single degree, below the temperature of the air. Placed in an atmosphere so nearly saturated with water, and of such a temperature, man is on the verge of conditions that are incompatible with his existence: conditions which may easily be induced by exposure to fatigue in a humid atmosphere under a burning sun, or other causes which excite the skin while they prevent the exercise of its natural function. The terms *Miasma* and *Malaria* may, according to the author, be regarded as almost synonymous with air at the temperature of from 75° to 85° Fahr., and nearly saturated with moisture.

2. A paper was also read, entitled, "On the Cause of the reduction of Metals from solutions of their salts by the Voltaic circuit." By Alfred Smee, Esq., F.R.S., Surgeon to the Bank of England.

The reduction of a metal from its saline solution by the agency of voltaic electricity, has, the author states, been explained in three different ways. By Hisinger, by Berzelius, and by Faraday it has been ascribed to the liberation of hydrogen in this process: Davy and others considered it as resulting directly from the attraction of the metal to the negative pole: and Daniell conceives that the metal is directly electrolysed by the action of the voltaic circuit. The author found that the ends of copper wires, placed in a solution of sulphate of copper between two platina poles in the circuit, manifest electric polarity; so that while one end is dissolving, the other is receiving deposits of copper: he also found that platina was, in like manner, susceptible of polarity, although in a much less degree than copper, when placed in similar circumstances. With a view to determine the influence of nascent hydrogen in the voltaic reduction of metals, he impregnated pieces of coke and of porous charcoal with hydrogen, by placing them, while in contact with a metal, in an acid solution, when they thus constituted the negative pole of the circuit; and he found that the pieces thus charged readily reduced the metals of solutions into which they were immersed; and thence infers that the hydrogen is the agent in these reductions. From another set of experiments he concludes, that during these decompositions, water is really formed at the negative pole; a circumstance which he conceives is the chief source of the difficulties experienced in electro-metallurgic operations when they are conducted on a large scale, but which may be avoided by a particular mode of arranging the elements of the circuit so as to ensure the uniform diffusion of the salt.

The author obtained the immediate reduction of gold, platina, palladium, copper, silver and tin from their solutions by the agency

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of hydrogen contained in a tube, with a piece of platinized platina in contact with the metallic salt: nitric acid and persalts of iron, on the other hand, yielded their oxygen by the influence of the same agent.

The general conclusion which he deduces from his experiments is that, when a metallic solution is subjected to voltaic action, water is decomposed, its oxygen passing in one direction, and its hydrogen in the opposite direction; the latter element performing at the moment of its evolution at the negative pole the same part with respect to a solution of sulphate of copper, that a plate of iron or zinc would perform to the same solution.

March 16, 1843.

FRANCIS BAILY, Esq., V.P., in the Chair.

William Brooke O'Shaughnessy, M.D., was balloted for, and duly elected a Fellow of the Society.

The following papers were read, viz.—

1. "On the import and office of the Lymphatic Vessels." By Robert Willis, M.D. Communicated by John Bostock, M.D., F.R.S.

That absorption is the special office of the lymphatic vessels was, until very lately, a universally received doctrine in physiology: but it is now admitted that if they exercise this faculty, it can be only to an inconsiderable extent; and physiologists of high authority have even denied that they possess any absorbing power at all. This last is the opinion of Magendie, in which the author concurs. So lately as 1841, Rudolph Wagner asserted that "neither anatomical nor physiological considerations render any satisfactory account of the import and office of the lymphatics," which thus, shorn of their ancient office, were repudiated as a superfluous apparatus in the animal mechanism. The grand organs of absorption the author believes to be the veins; and a principal object of his paper is to point out the mode in which they acquire this remarkable faculty. The principal condition which this faculty of imbibition implies, is a difference in density between the contents of the vessels which are to absorb, and the contents of those which furnish the matter to be absorbed. If the several constituent materials of the body, both fluid and solid, were to remain in the same unaltered state, both chemically and physically, there could be no interchange among them: in order that mutual penetration may take place between two elements, the one must differ from the other: that which is designed to absorb must be, with relation to that which is to be absorbed, more dense; that is, must contain a smaller quantity of water in proportion to its solid ingredients. For the continuance of the delicate processes concerned in the access and removal of the nutrient fluids, it is necessary that a difference should be established between the arterial and the venous blood in respect of density. This purpose the author conceives is accomplished by the abstraction from