

A paper was also read, entitled, "On the Law which connects the various Magneto-electric Phenomena lately discovered by Dr. Faraday." By the Rev. William Ritchie, LL.D. F.R.S. Professor of Natural and Experimental Philosophy in the Royal Institution of Great Britain, and Professor of Natural Philosophy and Astronomy in the University of London.

The general principle from which the author deduces the law in question, is that of the equality of action and reaction. The application of this principle to électro-magnetism, he thinks, may be thus expressed :—since a current of voltaic electricity can, in certain circumstances, induce magnetism, magnets will, in similar circumstances, induce similar voltaic currents. He gives an account of several experiments in confirmation of the universality of this law.

A paper was then read, entitled, "An Account of an extraordinary Meteor seen at Malvern, November 12, 1832." By W. Addison, Esq. F.L.S. Communicated by W. G. Maton, M.D. V.P.R.S.

The author beheld, from the Malvern Hills, a constant succession of meteors, of various degrees of magnitude and brilliancy. The smaller ones were like those commonly called shooting stars, and left behind them, for a moment, a train of pale yellowish light. Others were much more brilliant ; and notwithstanding the bright moonshine threw a strong glare upon every object, they always commenced as a small luminous point, rapidly increasing in size and splendour, shooting with great swiftness over a considerable arc, and then, suddenly disappearing, left behind them a long train of very vivid white light, which slowly changed into a pale yellow. The author witnessed this scene for upwards of an hour, although it was still going on when he left it. At one time he counted forty-eight of these meteors during the interval of five minutes.

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December 20, 1832.

FRANCIS BAILY, Esq., Vice-President, in the Chair.

A paper was read, entitled, "On certain properties of Vapour." By the Rev. Dionysius Lardner, LL.D. F.R.S.

It has been generally supposed, that if a certain volume of aqueous vapour, contained in a vessel that was incapable of transmitting heat, were compressed by an exterior force into a space sufficiently small, a part of it would be restored to the liquid state. The author considers this assumption to be at variance with the doctrine of latent heat, and inconsistent with the results deduced from the experiments which have established that the absolute quantities of heat necessary to convert a given weight of water into steam, under all pressures, are sensibly equal. It follows, from this principle, that steam raised from water, under any pressure whatever, admits of indefinite compression and expansion, without returning to the liquid state. The effect of its compression will be to evolve heat and raise the temperature ; that of its expansion, to absorb heat and lower the temperature : but in every state of density it will have exactly that tempera-

ture which it would have were it immediately raised from water under the pressure which it has acquired by compression or expansion. The only cause of the restoration of vapour to the liquid form is the abstraction of heat from it ; and this cause will be equally operative, whatever may be the state of the vapour with respect to density : but compression alone, without such abstraction of redundant heat, can never convert any portion of vapour into a liquid. In accordance with these views, the author regards the permanent gases as vapours, containing a large quantity of redundant heat.

A paper was also read, entitled, " On the Secretion and Uses of the Bile." By B. Phillips, Esq. Communicated by W. G. Maton, M.D. V.P.R.S.

The object of the author of this paper is to establish the three following propositions ; viz.

1°. That the principles of the bile pre-exist in the blood, and that the function of the liver is to separate from the blood a certain proportion of this material.

2°. That bile may be secreted as well from arterial as from venous blood.

3°. That chyle may be formed in the absence of bile.

In support of the first proposition the author adduces the analogy of other secretions, the suppression of which is followed by the appearance in the blood of the peculiar animal product which characterizes that secretion, as has been proved in the case of the urine by Prévost and Dumas, and afterwards by Vauquelin, Serullas, and Magendie. The author has confirmed the conclusion to which these physiologists have arrived, by some experiments of his own, in which, instead of extirpating the kidneys, he contented himself with tying the venal vessels. He relates two cases in which the vena portæ and hepatic artery were tied, and bile was found both in the urine and the blood.

The author, after quoting several authorities in support of his second proposition, that the liver can secrete bile, although the vena portæ be obstructed, relates two experiments which he made on dogs, by tying the vena portæ at the part before it arrives at the transverse fissure of the liver : in both cases that organ continued to secrete bile, though the quantity was small. In another dog, he tied the hepatic artery, with the effect of producing fatal peritonitis, but without any apparent change in the biliary secretion.

The arguments adduced by the author in favour of the opinion that chyle may be formed when no bile is present in the intestine, are derived from the accounts given by various authors of cases in which the ductus communis had been rendered impervious by the pressure of neighbouring tumours. In confirmation of this result, he made experiments on four dogs, and found chyle in the thoracic duct after he had tied the ductus communis close to the duodenum.

The author concludes, from these and other facts, that the secretion of bile is intended to serve some other purpose than that of contributing to the formation of chyle.