

The rays, when reflected from an imperfect parabolic metallic mirror in a lantern, and collected into a focus by a glass lens, readily burned a hole in a paper at a distance of many feet from their source. The heat was quite intolerable to the hand held near the lantern. Paper steeped in nitrate of silver and afterwards dried, was speedily turned brown by this light: and when a piece of fine wire-gauze was held before it, the pattern of the latter appeared in white lines, corresponding to the parts which it protected. The phenomenon of the transfer of the charcoal from one electrode to the other, first observed by Dr. Hare, was abundantly apparent; taking place from the *zincode* (or positive pole,) to the *platinode*, (or negative pole). The arch of flame between the electrodes was attracted or repelled by the poles of a magnet, according as the one or the other pole was held above or below it: and the repulsion was at times so great as to extinguish the flame. When the flame was drawn from the pole of the magnet itself, included in the circuit, it rotated in a beautiful manner.

The heating power of this battery was so great as to fuse, with the utmost readiness, a bar of platinum, one-eighth of an inch square: and the most infusible metals, such as pure rhodium, iridium, titanium, the native alloy of iridium and osmium, and the native ore of platinum, placed in a cavity scooped out of hard carbon, freely melted in considerable quantities.

In conclusion, the author briefly describes the results of some experiments on the evolution of the mixed gases from water in a confined space, and consequently under high pressure; with a view to ascertain, first, in what manner conduction would be carried on, supposing that the tube in which the electrodes were introduced were quite filled with the electrolyte, and there were no space for the accumulation of the gases; secondly, whether, decomposition having been effected, recombination would take place at any given pressure; and lastly, whether any reaction on the current-force of the battery would arise from the additional mechanical force which it would have to overcome. These experiments he purposes pursuing at some future time.

A paper was also read, entitled, "An experimental inquiry into the influence of nitrogen in promoting vegetable decomposition, and the connexion of this process with the growth of plants." By Robert Rigg, Esq. Communicated by the Rev. J. B. Reade, A.M., F.R.S.

The author considers it as a general fact, to which there are very few if any exceptions, that vegetable bodies in the state in which they are produced in nature, undergo spontaneous decomposition when kept under circumstances favouring such an action; and that, from the decomposition of each, compound products peculiar to that substance result. A variety of experiments are detailed and tabulated; the first series of which contains those made on solutions of compounds, such as sugar, honey and extract of malt, showing that in each the amount of spontaneous decomposition is in proportion

to the quantity of nitrogen it contains. This law is found to extend to those parts of plants which are not in solution in water, but which remain in their natural state of elaboration, only having their texture broken down.

The author is led to infer from his experiments that the chemical action to which any vegetable matter is naturally disposed, may, to a certain extent, be changed into some other, differing both in its kind and in its products; and that in order to effect such a change nothing more is required than to excite in other vegetable matter mixed with the former, some action which shall preponderate over the rest, so that the whole mass may obey this new and predominant influence. The vapour which is disengaged during the rapid decomposition of vegetable matter he finds to be highly noxious; and thence draws the inference that the Author of the universe has wisely ordained, that, when young plants, containing large quantities of nitrogen, are by any means checked in their growth, they shall be consumed by certain insects; which insects may be conceived to form one of the links of that harmonious chain which binds together all the parts of the universe.

The relation between the decomposition of vegetable matter and the growth of plants is apparent from the similarity of the influence of nitrogen on both these processes: this double function which nitrogen performs in favouring chemical decomposition by the roots of plants at the same time that it assimilates the matter thus formed in their other parts, is regarded by the author as another link in the same chain. In support of this view, he adduces the different chemical constitutions of the roots of the same plants when very young, and when fully grown. He finds that when plants have to perform the important offices of providing nourishment for the rapid growth of their young and tender shoots, they contain a quantity of nitrogen two or three times greater than that which they possess when fully grown; and he concludes by showing that, in accordance with these views, the seeds, roots and plants when placed in highly decomposing or decomposed matter, cease to grow, and under these circumstances, their germinating or vegetating power being superseded by the chemical action established in the matter which surrounds them, the whole becomes one mass of contaminated and infectious matter.

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June 6, 1839.

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

George Barker, Esq., was balloted for, and duly elected into the Society.

A paper was read, entitled, "Experiments on the chemical constitution of several bodies which undergo the vinous fermentation, and on certain results of the chemical action." By Robert Rigg, Esq., F.R.S.