

into a red hot crucible is converted into cyanide of potassium and free iron, Liebig has made the apparently correct conclusion, that when azotized carbon, potash and iron are heated together, cyanide of potassium is alone produced, and that the ferrocyanide is produced during solution of the mass in water, as then the iron is acted on by the cyanide.

This may be the case in small experiments, but on the large scale it is not. The powdered mass produced by the fusion of 400 lbs. potash, 400 lbs. carbonized horn, and 10 lbs. iron, cannot be separated, as Liebig states, by washing with spirit into two parts, the liquid (containing the cyanide of potassium in solution) and the residual iron, so that ferrocyanide is first obtained on mixing and heating the two together.

If the finely pounded mass is put into a funnel, and spirit (equal parts water and strong alcohol) poured on it as long as it dissolves anything, two liquids are obtained, one heavier than the other. The heavier one is a solution of potash, the lighter contains cyanide of potassium. The black residue when boiled with water gives ferrocyanide in the same quantity as it is obtained from the whole mass. Hence it follows that ferrocyanide of potassium, which is insoluble in spirit, exists ready formed in the fused mass; and is not generated during the solution of the cyanide of potassium.—*Translated from Poggendorff's Annals by H. C.*

### NEW EARTHS IN ZIRCONS.

By L. SWANBERG.

It appears that zirconia is no simple earth, but consists of several, as has been shown to be the case, with other oxides, viz., those of cerium, yttrium, and tantalic acid, and it appears that those new earths occur in different quantities in the zircons and hyacinths from different localities. That such earths, containing various proportions of oxygen, are contained in zirconia, was proved by a quantitative determination of the sulphuric acid contained in sulphates prepared in different ways.

Supposing that the formula for these earths is  $R^2 + O^3$  similar to zirconia, their atomic weights determined by the above method vary between 938 and 1320, and for some between 1100 and 1140. Swanberg has not succeeded in discovering such differences in the earths as to enable him to separate them accurately from zirconia, but it appears there are certainly two, if not more. Norium is the name proposed for the earth accompanying zirconia in the zircons of Norway.

During the course of his experiments, Swanberg was induced to examine the zirconia contained in other minerals besides zircons and hyacinths, and for this purpose he chose the Eudialyte of Greenland. The zirconia contained in this rare mineral appeared at first to be identical with that prepared from zircons; but it afterwards appeared that it contains a number of substances mixed with it, some of which have been lately discovered, but others seem to be new.

Some of the earths are very similar to yttria, but not identical with it, nor with the other earths, Erbium and Terbia, lately found in it by Mosander.—*Translated from Poggendorff's Annals, vol. 66, H. C.*

### RESEARCHES ON THE RELATIONS OF LIGHT AND MAGNETISM.

By M. FARADAY, Royal Institution, Jan. 23.

(*Athenæum*, No. 953, Jan. 31, 1846, p. 126.)

We shall confine ourselves to the method by which Professor Faraday exhibited the great fact of his researches—the rotation of a ray of light by magnetic force. The well known oxy-hydrogen light of Drummond supplied the ray. This light was so directed by an arrangement furnished by Mr. Darker, as to make distinctly visible, over the whole theatre, all the phenomena of circular polarization which were required to illustrate Professor Faraday's newly discovered principle. A beam of common light was shown to be separable into two distinct rays of polarized light; and the properties of these, and their relation to each other, were repeatedly demonstrated to the spectators. Such being the subject of his operations, Prof. Faraday next exhibited the nature and extent of the force employed to accomplish his results. That force is magnetism derived from an electro-magnet of immense size and power. The magnet used was a half link of the former East India moorings, surrounded by several coils of thick copper wire, and the source of electric power was Grove's battery, about twenty cells of which were employed on this night. To give an idea of the force of this electro-magnet, Prof. Faraday mentioned that once, while he was at work in the laboratory, an iron candlestick which happened to be standing on the table near its poles, instantly flew to them, attracted with such violence as to displace or break every thing in its way. The great experiment of the evening was then successfully tried. A prism of heavy glass was so adjusted between the poles of the magnet, as to receive the oxy-hydrogen light after it had been polarized, and before it was depolarized by Nicholl's eye-piece. The following facts, demonstrating the magnetism of light, were then exhibited:—

1. As to the rotation of the ray.—A polarized ray, having been extinguished by the depolarizing plate, was instantaneously restored when the magnetic current was sent through the prism through which the ray was transmitted; and conversely, the polarized ray, when, by the common adjustments of the plate, it had been made visible, was extinguished by the force of the current.

2. As to the relations of this electro-magnetic power to other laws of polarized light.—The rotation having been established, it was shown, (a.) That the direction of the rotation was absolutely dependent on that of the magnetic force. (b.) That, while in common circular polarization, the ray of light always rotates in the same direction with regard to the observer, (to whatever part of the medium his view may be directed,) it is very different in the state of the ray induced by this new force. When brought under the influence of the magnetic current, polarized rays always rotate in a constant direction with respect, not to the observer, but to the plane of the magnetic curves.

Prof. Faraday concludes, by throwing out some general notions as to the possible development of these researches in the line of future investigations. It did not seem impossible to him, that the sun's rays might be found to originate the magnetic force of the earth, and the air and water of our planet might be proved to be the diamagnetic media in which this condition of the force was eliminated.

M. Pouillet has repeated the experiments of Faraday, and communicated a report to the Academy of Sciences of Paris, (*L'Institut*, No. 630.) He is of the opinion that the phenomena are due to action on the transparent medium, or upon the forces which govern its molecules, and not on the luminous ray itself.—*American Journal of Science and Arts.*

## THE British American Journal.

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LICENTIATES OF THE MEDICAL BOARDS OF  
CANADA EAST.

We commence in this number the publication of the names of the various Licentiates of the Medical Boards of the Eastern part of this Province, commencing from