Observations on the Functions of the Brain. *By Sir* Everard Home, *Bart. F.R.S.* Read May 26, 1814. [*Phil. Trans.* 1814, *p.* 469.]

The observations comprised in this paper, are selected from those cases of injury to the brain which have occurred to the author in the course of his professional pursuits. The facts thus accidentally forced upon his notice, may be regarded as so many experiments made on different portions of the living brain; and the remarks upon them relate to those effects which tend to elucidate their several functions.

The collection of observations here given, are classed under different heads; and with respect to the first set, which relate to the pressure of water on the brain, the subject is again subdivided according to the parts in which the water may be collected, whether in any of the ventricles, or between the membranes. In the next place, the consequences of concussion of the brain generally, are also considered.

The effects of extravasation of blood, in various situations, are separately described. The consequences that ensue from formation of matter, and immediate relief of the symptoms by its removal, are noticed.

The symptoms that occur from depression, or from thickening of different parts of the skull, are next distinguished, as well as those which arise from pressure of soft tumours in different situations.

In addition to the preceding, which are all instances of pressure variously modified, the author adds his observations relating to wounds, inflammation, and suppuration of the cerebrum in different parts; and his remarks upon injuries done to the medulla spinalis, which form the concluding section of his classification.

Further Experiments and Observations on Iodine. *By Sir* Humphry Davy, *LL.D. F.R.S. V.P.R.I.* Read June 16, 1814. [*Phil. Trans.* 1814, *p.* 487.]

The present set of experiments are, in part, a continuation of the author's experiments on compounds of iodine and fixed alkalies, which he treats of under the head of triple compounds, because they contain iodine, oxygen, and potassium, or sodium. But he also treats of various compound salts, which this substance forms in conjunction with other acids, and of the effects produced upon iodine by the action of some compound gases.

When the triple compound of iodine, oxygen, and potassium, is dissolved in nitric acid, the acid may be distilled without any decomposition of the salt; but when it is dissolved in sulphuric acid or phosphoric acid, the heat which these acids will bear is sufficient to decompose the salt, which then yields oxygen and iodine, and leaves sulphate or phosphate of potash.

When a solution of this salt, in strong muriatic acid, is heated, there is a smell of chlorine, the fluid becomes yellow, and yields, by distillation, chloriodic acid.

A solution of the triple compound, in sulphurous acid, when distilled, yields iodine, and leaves sulphate of potash; but the phenomena are variously modified, by a greater or less proportion of either ingredient.

From such experiments as the author has made on the proportional weights of the constituents of this salt, he considers it perfectly analogous to hyperoxymuriate of potash; and its constitution will be represented by one of potassium 75, six of oxygen 90, and one of iodine 165.

The author also made triple compounds with iodine and alkaline earths, which, like oxyiode of potash, contain a redundance of oxygen, separable by heat, and gave hopes that a compound of iodine and oxygen, similar to euchlorine, might be obtained from some of them; but these salts are not decomposable by acids; for even the oxyiode of barytes is not decomposed by sulphuric acid, and hence no compound of iodine and oxygen has yet been obtained in a separate state.

From hydriodic gas, or from the acid formed by union of this gas with water, iodine may be obtained by union with oxygen, by nitric acid, by hyperoxymuriate of potash, or even by absorption of oxygen from the atmosphere.

This acid unites with the alkalies and common earths into compounds very analogous to the corresponding compounds with muriatic acid, but decomposable, in a certain degree, by heat when oxygen is present, which occasions most of these compounds to become alkaline when long heated.

Although chlorine and iodine unite in all proportions, there is one compound nearly colourless that appears to be definite, having strongly acid properties, and the author terms this chloriodic acid. When any of these compounds are mixed with alkaline solutions, the tendency appears to be, in the first instance, to form oxyiodes with the alkali or earth present; but the phenomena necessarily vary according to the proportion of the several ingredients present.

In the next set of experiments, which the author made with gases, the results appear to be regulated by the presence of hydrogen, forming hydriodic acid with the iodine, as in the instances of olefiant gas and sulphuretted hydrogen.

No change was produced in nitrous gas, nor in carbonic oxide, to which iodine was exposed in common day-light, nor even when it was sublimed in it; but it appeared doubtful whether there might not be some tendency to combine when the violet vapour was formed by heat in full sunshine.

In conclusion, the author reports various unsuccessful attempts to obtain iodine from different species of sea-weeds, and from sea-water, on the shores of the Mediterranean; and he recommends silver as a test of its presence, since water containing only $\frac{1}{100}$th part of its weight of any salt of iodine tarnishes polished silver, even after boiling with muriatic acid, although this property is destroyed in sulphurets by similar treatment.

The sea-weeds tried by the author amount to six species.

Fucus cartilagineus,	*Fucus filamentosus,*
—— *membranaceus,*	*Ulva pavonia,*
—— *rubens,*	—— *linza.*

But he could discover no traces of it in any of these, nor in certain corallines and sponges which he also tried.

Observations respecting the natural production of Saltpetre on the walls of subterraneous and other Buildings. By John Kidd, *M.D. Professor of Chemistry at Oxford. Communicated by* William Hyde Wollaston, *M.D. Sec. R.S.* Read June 16, 1814. [*Phil. Trans.* 1814, *p.* 508.]

The intention of the present paper is to state the result of a series of observations on the connection of production of nitre with the state of the atmosphere; and the account begins with a description of the situation of the laboratory of the Ashmolean Museum, where these observations were principally made; the pavement being nine feet below the level of the street in which the museum stands, and seventeen below the highest part of its ceiling, which is arched, and, as well as the side walls, consists of a calcareous freestone.

The saline efflorescence takes place principally on three sides that are surrounded by high ground, and but little on the fourth side, where the ground without is on a level with the pavement.

It is observed, that even in the midst of those parts that abound most in nitre, there are certain places which always produce much less than others; and even insulated patches, which are always and entirely free from any appearance of efflorescence, showing that these gradations depend on some difference in the texture or composition of the stone. It is also remarked, that such differences are often not by gradual transitions, but occur abruptly at the passage of a line, on one side of which there appears an abundant crop, and on the other never the slightest efflorescence; but this does not depend on the joints of the masonry, but takes place indifferently on the surface of the stones composing the wall, and of the mortar by which they are cemented.

With regard to the influence of different states of the atmosphere on the production of nitre, Dr. Kidd observes, that it is most abundant in clear frosty weather, and that in a moist state of the atmosphere the formation either does not take place, or goes on very slowly. Sometimes also, that which has already formed disappears, as if the moisture occasioned it to be re-absorbed into the substance of the wall: but the author was not able to detect it in a portion of the stone taken from near the surface, and lixiviated for that purpose; and he also observes, that it occasionally disappears in dry frosty weather, when no absorption could be supposed to take place.

Wishing to ascertain whether the presence of atmospherical air was necessary to the production, the author coated a productive part