On the Rectification of the Hyperbola by Means of Two Ellipses; proving that Method to be circuitous, and such as requires much more Calculation than is requisite by an appropriate Theorem: in which Process a new Theorem for the Rectification of that Curve is discovered.

To which are added some further Observations on the Rectification of the Hyperbola: among which the great Advantage of descending Series over ascending Series, in many cases, is clearly shown; and several Methods are given for computing the constant Quantity by which those Series differ from each other. By the Rev. John Hellins, *B.D. F.R.S. and Vicar of Potter's-Pury, in Northamptonshire. Being an Appendix to his former Paper on the Rectification of the Hyperbola, inserted in the Philosophical Transactions for the Year* 1802. *Communicated by* Nevil Maskelyne, *D.D. F.R.S. Astronomer Royal.* Read January 10, 1811. [*Phil. Trans.* 1811, *p.* 110.]

The present communication is designed by the author as an appendix to his former paper on the same subject, printed in our Transactions for 1802.

Although he acknowledges the ingenuity of Mr. John Landen, who devised the rectification of the hyperbola by means of two ellipses, and adds his tribute of applause to that which has been bestowed upon it by the most eminent mathematicians of the Continent, as well as of our own country, Mr. Hellins is nevertheless of opinion, that it is more to be admired as curious than practically useful; since it is circuitous, and requires much more calculation than will be found requisite by the theorem, which is the primary subject of this paper.

Mr. Hellins also adds some further observations on the rectification of the hyperbola, and shows the great advantage of descending series over ascending series, in many cases, and gives several methods of computing the constant quantity by which those series differ from each other.

On a Combination of Oxymuriatic Gas and Oxygen Gas. By Humphry Davy, *Esq. LL.D. Sec. R.S. Prof. Chem. R.I.* Read February 21, 1811. [*Phil. Trans.* 1811, *p.* 155.]

The author, having observed the properties of oxymuriatic gas to be different in consequence of its being prepared in different modes, was endeavouring to determine the nature of these differences, and the causes on which they depend, when he discovered the very singular compound which is the subject of the present paper. For the formation of this compound, he pours a small quantity of dilute muriatic acid upon a large quantity of hyperoxymuriate of potash. A gas is then disengaged, which is capable of being absorbed by water, but may be collected over mercury. It is of a bright yellow colour, approaching to orange, and has nearly the specific gravity of oxymuriatic gas.

It often explodes while collecting, in consequence of heat gene-

rated; and it may always be made to explode by the heat of the hand, with instantaneous extrication of heat and light. After explosion the gas is found to occupy about one sixth part more bulk than before. From the gas so exploded, oxymuriatic gas may be absorbed by water, and there remains about one third part of oxygen.

When copper, or antimony, or mercury, or iron, are exposed to this gas, it has no action upon them till heat is applied; but then they burn with a very brilliant light, and generally with explosion. But charcoal, which has no affinity with oxymuriatic gas, burns only with a dull red light, by union with the diluted oxygen.

Arsenic was acted upon without the application of heat. After a short time it caused an explosion, and united with the oxymuriatic gas. Sulphur caused instant explosion, but was not burned.

Phosphorus caused explosion with brilliant light; and uniting with both constituents, formed phosphoric acid, and solid oxymuriate of phosphorus.

When the gas was mixed with muriatic gas, a gradual diminution of volume took place; oxymuriatic gas was formed, and dew deposited on the sides of the vessel.

These experiments, says Mr. Davy, enable us to explain the contradictory accounts that have been given of the properties of oxymuriatic gas, which have been confounded with those of the explosive compound. That the latter has not been collected before, is principally owing to its being absorbed by water, which has generally been used for receiving the products from hyperoxymuriate of potash; aud since water absorbs about ten times its bulk of this gas, nothing could be received in the form of gas but the oxymuriatic, till the water became completely saturated.

The violent explosion, accompanied with heat and light, which is in this instance produced during the separation and expansion of two gases, says Mr. Davy, is a perfectly novel circumstance in chemical philosophy; but he sees nothing in the properties of this gas which is at variance with the conclusions he has before drawn, as to the undecompounded nature of oxymuriatic gas. The weakness of the affinity, with which the constituents are united in it, is, on the contrary, perfectly conformable to the supposition of their belonging to the same class of bodies, and to the idea of their being distinct, though analogous species of matter.

Experiments to prove that Fluids pass directly from the Stomach to the Circulation of the Blood, and from thence into the Cells of the Spleen, the Gall Bladder, and Urinary Bladder, without going through the Thoracic Duct. By Everard Home, *Esq. F.R.S.* Read January 31, 1811. [*Phil. Trans.* 1811, *p.* 163.]

Mr. Home having formerly found that fluids pass from the stomach into the circulation of the blood without going through the thoracic duct, had maintained the spleen to be the channel by which they are