exhibited to our senses; and the facts themselves do not raise the idea of a limit, which Dalton really borrowed from philosophy. The apparent simplicity of chemical union we do not profess to explain, but to be waiting for any experimental interpretation that may arise. The atomists, in bringing forward their theory, are bound to establish it, and with them lies the *onus probandi*.

The above are a few broad outlines of the existing aspect of atomic controversy, and may somewhat assist in forming an estimate of it. The general theoretical tone of the discussion last Thursday must have surprised most who were present. Our own position is necessarily an impartial one; but it will probably be agreed that between the contending parties there is a gulf, deeper and wider than at first appears, and perhaps unprovided with a bridge.

## Preparation and Constitution of Hyoscyamine.*

The author, M. Thorey, divides this paper into three sections, respectively headed—On the preparation of hyoscyamine; the constitution of that substance; and its relation to the quantity of nitre the plant which yields it contains. The preparation of this alkaloid is described by the author with full details, as given by the very large number of chemists and pharmaceutists who have worked on this subject. Among the various methods of preparation of this alkaloid devised by the author, we notice the following:—50 grms. of *Semina hyoscyami nigri* (common henbane) are ground to powder, exhausted with 150 grms. of alcohol (85 per cent. strength), and the alcoholic tincture concentrated by distillation, one-half of the bulk of the alcohol being distilled off. The residue left in the retort is next mixed with water, filtered, reduced, by evaporation, to about 30 grms., and then again filtered. The filtrate is mixed with a solution of caustic potassa, after having been previously heated to 40°, next treated with chloroform, the chloroformic solution washed with water, until that fluid runs off quite clear, and the solution thus obtained evaporated to dryness, leaving 0·835 grm. of yellowish mass smelling like tobacco. This mass is re-dissolved in weak hydro-chloric acid, filtered, carefully saturated with caustic potassa, again treated with chloroform, this solution again washed with water, and, at last, left to spontaneous evaporation over sulphuric acid, yields well-crystallized hyoscyamine. The alkaloid thus obtained is a quite pure, colorless substance, of bitter taste, readily soluble in dilute alcohol, in ether and chloroform, in benzine and amylic alcohol, and dilute acids. Among its characteristic chemical reactions, belongs a red amorphous precipitate, with the double iodide of bismuth and potassium; a yellow precipitate, gradually verging on blue, when left standing with phospho-molybdate of soda; a flucculent yellow precipitate with chloride of gold, which, after a time, becomes crystalline; a deep kermes red coloration with aqueous solution of iodine; and an amorphous yellowish gray precipitate with tannic acid. During his researches on this subject, the author has discovered that henbane contains, in addition to hyoscyamine and saltpetre, a peculiar resinous substance, and an acid. The resinous material is remarkable, since it contains nitrogen, its percentical composition being C, 67·67; H, 8·772; N, 3·508; O, 20·05. As regards the constitution of hyoscyamine, the author says it is, at present, not easily possible to control the statement made by M. Kletzinsky, that this alkaloid should be the nitrile of santonate of ammonia. The question, What relation the hyoscyamine bears to the quantity of saltpetre contained in the plant which yields it? is treated at great length; but it is difficult to give any brief *résumé* of these researches, which are recorded in several tabulated forms full of figures. All parts of the henbane contain a considerable quantity of nitrate of potassa; and it appears, that, while that quantity varies at various periods of the growth of the plant, so, also, varies the quantity of hyoscyamine contained in the various parts of the plant. The quantity of hyoscyamine contained in the leaves of the plant dried at 110°, and taken before the blooming period, varies from 0·023 to 0·208 per cent. The seeds contain from 0·048 to 0·160 per cent. of hyoscyamine.—*Pharm. Zeitsch. f. Russ.*, in *Chem. News*.

* Pharm. Zeitsch. f. Russ. in Chemical News.

## How to Make a Cheap Microscope.

The *Scientific American*, in describing a newly-invented simple microscope, gives the following directions for the manufacture of globule magnifiers:—

Globules of high power were first made and used by Robert Hooke, an English microscopist of the seventeenth century. These when well made show objects remarkably well. They may be made to give enormous powers, and that, too, at a cost of only a few cents. It is not a difficult matter to obtain with those a power of 1,000 diameters, or even more. The field of view is rather small and its extent is the same for all powers. This is because it is limited by the pupil of the eye, as may be readily proved by a simple experiment. Looking through a globule lens, arrange the mirror so that just sufficient light is given to make the field visible. Then suddenly turn the mirror so as to illuminate the field with a strong light, when it will be seen to contract. With the larger globules the light given by the flat mirror is sufficient, but when globules having a focus less than 1-40th or 1-50th of an inch are used a concave mirror will be necessary. Any person may, after a little practice, be able to make and mount his own globules.

The globules should be made of French plate or other very pure and clear glass. The glass must be cut into a narrow strip, carefully cleaned, and then drawn out into threads in the flame of a spirit lamp. The threads should be made of different thicknesses and carefully kept on a clean plate. The wick of the lamp should then be pushed down until the flame is not more than half an inch long. One end of a thread is now to be held in the flame, when it will melt and run up into a globule. When the globule is seen to be perfectly spherical it must be withdrawn, held a little while to cool, broken from the thread, and put aside until wanted for mounting. The larger globules are the most difficult to make, the fine threads melt and run up into perfect globules almost as soon as thrust in the flame. The hole in the disk for the globules must be burnt in and then cleaned by rubbing it with a piece of wood. Care must be taken that the inside of the hole is made dark in order to prevent all reflection of light. A needle will be convenient for burning in the smaller holes. The globule is then to be carefully placed in a hole with the broken end of the thread to one side, and may then be fastened securely by pressing it in a little. If desired, other forms of magnifiers, such as ordinary double convex lenses, Wollaston doublets, triplets, and Coddington lenses may be used.

For the examination of infusoria and vegetable tissues, and such other objects as are or can be made transparent, these globules have been found to answer very well indeed. It is for the use of globules in such examinations that the microscope here described was devised. It was not intended for, and cannot conveniently be used as a dissecting microscope. By means of a globule magnifying over 500 diameters the writer has been able to perceive clearly the hexagonal markings on the most common diatoms found in the "Richmond earth." He has examined live diatoms and animalcules whose movements he has been able to follow, though not without difficulty when they were rapid. The reader will thus get some idea of what may be accomplished by such simple things as globules of glass.

## Preparation of Court Plaster.

Bruise a sufficient quantity of isinglass, and let it soak in a little warm water for four-and-twenty hours; expose it to heat over the fire till the greater part of the water is dissipated, and supply its place by proof spirits of wine, which will combine with the isinglass. Strain the whole through a piece of open linen, taking care that the consistence of the mixture shall be such that, when cool, it may form a trembling jelly.

Extend the piece of black silk, of which you propose making your plaster, on a wooden frame, and fix it in that position by means of tacks or pack-thread. Then apply the isinglass (after it has been rendered liquid by a gentle heat) to the silk with a brush of fine hair (badger's is the best). As soon as this first coating is dried, which will not be long, apply a second; and afterwards, if you wish the article to be very superior, a third. When the whole is dry, cover it with two or three coatings of the balsam of Peru.

This is the genuine court plaster. It is pliable, and never breaks, which is far from being the case with many of the spurious articles which are sold under the name. Indeed, this commodity is very frequently adulterated. A kind of plaster, with a very thick and brittle covering, is often sold for it. The manufacturers of this, instead of isinglass, use common glue which is much cheaper; and cover the whole with spirit varnish, instead of balsam of Peru. This plaster cracks, and has none of the balsamic smell by which the genuine court plaster is distinguished. Another method of detecting the adulteration is to moisten it with your tongue *on the side opposite to that which is varnished*; and, if the plaster be genuine, it will adhere exceedingly well. The adulterated plaster is too hard for this; it will not stick, unless you moisten it on the varnished side.