illuminating power, to that obtained from four hundred feet of ordinary gas. The mode in which the light is produced is by the combustion of lime under the great heat caused by the flame of the mixed gases. A stream of common gas, which is used instead of pure hydrogen, is conducted through one pipe, and a supply of oxygen is sent through a second one, each being attached to separate gas-holders. The pipes terminate near the lamp in one single tube, where the gases are allowed to mix in their way through a curved jet to what is called the wick of the lamp, which is simply a lump of lime, held in close proximity to the mouth of the curved tube by a piece of metal. In lighting the lamp, the first step is to direct the stream of hydrogen upon the lime; it is lighted, and gives forth a small flame of yellow color, soon succeeded by a flame of deep red. When the lime is in this state the oxygen is turned on, and instantly the bright white light is produced.—*Railway Review.*

Danger of Tinned Lead Pipes.

Dr. Frankland, F.R.S, (London) states that he has made several experiments with lead pipes tinned inside, in order to discover if the tin was a preventive of lead corrosion by the water. It was found to be a complete protective, when all the surface was perfectly coated, but the least flaw in the tin coating, if it exposed the lead to the water, was more dangerous than the use of pure lead pipe. The reason given for this is, that a galvanic action is engendered between the two metals, by which the lead is rapidly decomposed, and made to poison the water.—*Scientific American.*

Sheet Zinc for Roofing.

A report of a committee appointed by the Central Society of Architects, in Paris, recommends "that zinc, which was at first rejected, but is now so generally used should be applied with great care, as certain precautions, very simple, but never to be overlooked, are indispensable. Thus: contact with plaster, which contains a destructive salt, is to be avoided; also, contact with iron, which is very injurious, and liable to cause a rapid oxydation. Eave gutters should always be supported by galvanized brackets, and no gutter or sheet zinc should be laid on oak boards.—*Ibid.*

On the Structure of the Luminous Envelope of the Sun.

Mr. Joseph Sidebotham read a paper, being a communication to him from James Nasmyth, Esq., of Penshurst. Mr. Nasmyth has made the discovery, that the entire surface of the sun is composed of objects of the shape of a willow leaf. These objects average about 1000 miles in length and 100 in breadth, and cross each other in all directions, forming a network. The thickness of this does not appear to be very great, as through the interstices the dark or penumbral stratum is seen, and it is this which gives to the sun that peculiar mottled appearance so familiar to observers. These willow leaf-shaped objects are best seen at the edges of a solar spot, where they appear luminous, on a dark ground, and also compose the bridges which are formed across a spot when it is mending up; the only approach to symmetrical arrangement is in the filaments bordering the spot, and those composing the penumbra, which appears to be a true secondary stratum of the sun's luminous atmosphere. Here these bodies show a tendency to a radial arrangement. Although carefully watched for, no trace of a spiral or vertical arrangement has been observed in these filaments, thus setting aside the likelihood of any whirlwind-like action being an agent in the formation of the spots, as has been conjectured to be the case. The writer does not feel warranted at present in hazarding any conjectures as to the nature and functions of these remarkable willow leaf-shaped objects, but intends pursuing the investigation of the subject this summer, and hopes to lay the results before the British Association during their meeting in this city. The paper was illustrated by three beautiful drawings. No. 1 represented one of the willow leaf-shaped objects; No 2 the luminous surface of the sun as being entirely composed of these objects; and No. 3 a large drawing of a solar spot as seen on the 20th July, 1860, exhibiting the surface of the sun composed of these objects, as also the penumbra and the bridges across the dark portion of the spot in which the exact shapes of these objects were to be seen most clearly. Mr. Sidebotham stated that the image of the sun was examined by Mr. Nasmyth with a mirror of plane glass, set at an angle of 45 degrees; nearly the whole of the light and heat of the sun passed through the glass, and the rays used were those only reflected from its surface. *Manchester Literary and Philosophical Society March 5th*, 1861.

Carbonic Acid in the Soil.

Van den Broek says (*Annalen der Chem. und Pharm.* Bd. cxv. s. 87) that a solution of carbonic acid percolating through the soil, is, up to a certain limit, robbed of its carbonic acid, so that the filtrate no longer causes any turbidity with lime-water; and, if a stream of hydrogen gas be passed through a layer of earth, the carbonic acid can be displaced. The author lays stress on this property of the soil holding carbonic acid, as supporting Liebig's views on the subject of the nutrition of plants.

Test for the Sulphide of Carbon in Coal Gas.

Dr C Herzog communicates the following to *Chem. Centralblatt*, No 1, 1861, p. 1:—Prepare a saturated solution of ammonia in absolute alcohol and a perfectly saturated solution of sugar of lead. Place in a test-tube five drops of the lead solution and about a drachm of the alcoholic ammonia, and allow the gas to bubble through the solution from a narrow glass tube just dipping under the surface. If sulphide of carbon be present in the gas the solution immediately takes an orange colour, and, after a time, a deep brown precipitate falls. If carbonic acid be present as well a white precipitate also is produced, which gives a brighter tinge to the orange colour. For a controlling experiment, the gas may be passed for a short time through the alcoholic ammonia alone, and a couple of drops of the lead solution added afterwards, whereupon, if sulphide of carbon be present, the orange precipitate is produced as before. To free the gas from sulphurretted hydrogen, it may be first passed through a lead solution, which does not affect the sulphide of carbon. The author remarks that the orange precipitate obtained as above, if allowed to remain in the liquid, turns white in twenty-four hours, but if collected on a filter immediately, washed a little, and then dried, it remains of a dark brown colour. The chemical changes which take place when sulphide of carbon is passed into the alcoholic ammonia are, according to the author, rather complex and somewhat variable, but he recommends the test as very simple and practical.

Emeraldine and Azurine.

A Patent for the improvements in the Manufacture of Colouring Matters. By Frederick Crace Calvert, Charles Lowe, and Samuel Clift, Manchester.

This curious patent may be divided into two principal parts, one being the production of a green colouring matter from aniline and its homologues, and the other being the conversion of the green colour into a blue.