till the 31st of December for those of Calabria. If the contract be for time, that is, from one year to another, the oil is usually placed at the purchaser's command on the 1st of March. Purchases for time are effected by means of a contract, wherein the vendor undertakes to deliver the oil by the end of January, on receiving payment of the money; but the oil, as observed above, is not really at the purchaser's disposal before the beginning of March. Hence, in time bargains, the payment of the money precedes the delivery of the oil more than a month; scarce an instance is on record of an engagement of this sort having been broken, and the order is as readily negociable as any other security.

In purchases of oil at command, payment likewise precedes the delivery of the article; but in this case, the advance is confined to the five days necessary to transmit the order to the *caricatore* where the oil is kept for delivery.

The oil remains in the *caricatore*, under the care and responsibility of the vendor, to be delivered, on demand, to the bearer of the order, free of all costs and charges whatever for the first year; but for every successive year, from twenty-five to thirty grains per salma are charged for keeping, and for renewal of warranty.

[*McCulloch's Dict.*

Notice of an easy Method of filling long Syphon Tubes, in a Note addressed (by request) to the Editor. By WILLIAM FOSTER, Esq.

New Haven, Nov. 26, 1834.

Sir,—Agreeably to your request, at the conclusion of your very interesting lecture, I will now put on paper a brief statement of the application of the syphon upon a large scale, for the purpose of drawing water from distant places. This application may not be new; but I do not remember to have seen it in this, or any other country, before I tried the experiment. The ancients, we know, brought water for the supply of their cities, by means of costly aqueducts, over hills and vallies, without ever using the fountain principle.

About twenty years ago, I suggested to some gentlemen in Boston the feasibility of conducting water from one good well to dry reservoirs in the neighbourhood, in consequence of hearing that certain wells in the city had copious springs of good water, which became bad for want of sufficient use. The idea of carrying water through a syphon several hundred feet in length, and drawing water from one well into another, was discussed by these gentlemen, and treated with ridicule. But some years after, Mr. Chapman, proprietor of a distillery in Charlestown, requested me to describe the process; and with that instruction, he employed a plumber to lay a leaden tube of three quarter inch bore, from a well twenty-five feet deep, several hundred feet distant from the well of his distillery, which was about thirty feet deep, and where he wanted a greater supply of water.

The operation failed. He then came to me, and told me that I had led him into an expensive error. I told him that, had he com-

municated to me his intentions, I would, with great pleasure, have superintended the work ; but now, not knowing what defects there might be in the tube, I could not answer for his success. However, I consented to assist him, but my first essay was unsuccessful.

I need not inform you, sir, as to the principles of the syphon, or that its power to overcome an eminence is limited to about thirty-two feet, answering to the column of water which the pressure of the atmosphere can raise; or that any defect in the syphon, or any air confined in it, would be fatal to its operation. The usual mode of charging a syphon, you know, is by exhausting it partially by inspiration at the longer end. But this was not possible with a tube several hundred feet long, and the expense of a pneumatic apparatus, to procure a vacuum, would have been too great ; therefore, I had determined to put it in operation by filling it with water, both ends being stopped ; this was done by a small branch at the summit of the tube ; and, when filled, this branch was well corked, and the cork pressed down hard on the water, so as to exclude all the air at the surface. It was to be apprehended that some undulations might exist in the horizontal part of the tube, and afford a receptacle for air, which would there be confined without a possibility of escaping, and also prove fatal to the success of the experiment; but of this I could know nothing, as I had not seen the tube laid.

In this state of uncertainty, I began the operation, and filled the syphon ; but, as I said before, it failed. On the second trial, I observed that, when the syphon was full, the water in the filling branch rose and fell alternately, and so much, that as water has but little elasticity, I concluded that there was air in the tube, and it was, therefore, emptied. Then, to charge it anew, and, at the same time, to exclude the air, it was proposed to perforate the lower end of the long branch, at the bottom of the receiving well, with a fork, just above the cork which closed it. These small holes allowed the air to escape as it was driven before the water, without losing enough water to prevent the filling the tube with ease. Thus was the air excluded, and the syphon put into operation, and continued for a long time, with some occasional obstruction, arising from the smallness of the tube, and the want of water at the source.

I should suppose that there were many situations where water might be brought from one valley to another, over any hill not exceeding thirty-two feet, or which could, without too much expense, be reduced to that point, for the purposes of irrigation, or manufacturing. Large quantities of water, as well as small, may be raised by means of iron mains, of large dimensions ; and the cutting down hills to procure levels, or surrounding them, and thus increasing the length of aqueducts, at a great expense, and loss of water by percolation and evaporation, may be avoided. Mountain swamps may be drained, or any swamps, where a lower level is not too far distant for the place of issue, or even in a level country, provided some vein of loose gravel can be found, into which a place of discharge may be dug below the surface of the swamp. The ingenuity of our country-

men, will, I am confident, yet find many other useful purposes to which the principle may be applied.

P. S. Have you any knowledge of the process whereby the Chinese convert rice into a substance resembling pearl? If it were not expensive, many useful articles might be made of it.

[*Silliman's Am. Jour.*

¶ *Experiments to ascertain the Existence of Lead in the Atmosphere of a White Lead Manufactory.* By Mr. ARTHUR DUNN.

Having witnessed at my manufactory, the frightful effects of white lead on the workmen employed, I was anxious to determine if it was possible for lead to exist in the atmosphere, and, through that medium, be absorbed into the system by the action of the lungs. For this purpose I made the following experiment, which certainly is important to the manufacturer, as it points out a serious evil to be guarded against. I shall now merely confine myself to the results obtained, and leave to some of your more scientific friends, any theoretical reasoning, or practical hints, the experiment may suggest, provided you consider it worthy to occupy a space in your valuable magazine, and remain,

Yours, &c.

ARTHUR DUNN.

An evaporating dish, containing about twenty-eight pounds of moist carbonate of lead, was placed in a sand bath, and heated to about the same temperature as the drying stove commonly used, never exceeding 150° Fahr.; over this was fixed, at the distance of from eight to twelve inches, a pair of common bellows, with a glass tube attached to the pipe, which pipe was introduced into a green glass bottle containing twelve ounces of distilled water, acidulated with two drachms of nitric acid. The apparatus being thus arranged, the bellows were set in action, by which means the atmosphere, loaded with the moisture from the lead, was made to pass in a continued current through the liquid; this was continued for six hours. The whole was then transferred into a platina dish, and evaporated to perfect dryness. The residue was dissolved in one ounce of distilled water, with two drops of nitric acid, to insure the solution of the lead, should any be present. A current of sulphuretted hydrogen was next passed through the solution, which immediately gave a minute dark precipitate; this being collected on a filter, and washed, was transferred to a watch-glass, and treated in the usual manner with nitric acid to decompose the sulphuret, which gave, on the application of hydriodate of potash, the most unequivocal proof of the presence of lead.

Another experiment was conducted at the same time, with similar vessels, in the same room, but the current of air was not passed through the liquid. This, on the application of sulphuretted hydrogen, gave not the least indication of lead, but, on evaporating the whole to dryness, and treating the residue, in the manner

before described, with hydriodate of potash, the slightest possible trace of the yellow iodine of lead was perceptible. The nitric acid and distilled water were separately tested with great care, but were found perfectly free from lead, so that, no doubt, the trace of lead must have been absorbed from the atmosphere, as the bottle containing it stood beside the one through which the current of air was passed. I ought to have mentioned before, that the temperature of the laboratory during the experiment was from 70° to 80° Fahr., and that the door was kept closely shut, that the air might be loaded as much as possible with the vapour.

[*Lon. and Ed. Phil. Mag.*

¶ *Self-acting Mules.*

“Mules have been constructed which do not require the manual aid of the spinner, the mechanism being so contrived as to roll the spindle carriage out and in at the proper speed, without a hand touching it; and the only manual labour employed in these machines, which are called self-acting mules, is that of the children who join the broken threads. The first machine of this kind was invented by the ingenious Mr. Strutt, F. R. S., of Derby, the son of Mr. Jedediah Strutt, the partner of Arkwright; and the following mention is made of it in a memoir of that gentleman, written by his son, Mr. Edward Strutt, at present member for Derby. Mr. Strutt died on the 29th of December, 1830, and the memoir appeared shortly after in a periodical journal: ‘Among his other inventions and improvements, we may mention a self-acting mule for the spinning of cotton, invented more than forty years ago, [therefore before 1790;] but we believe the inferior workmanship of that day prevented the success of an invention, which all the skill and improvement in the construction of machinery of the present day has barely accomplished.’”

But the self-acting mule which has met with most success, is that invented by Mr. Roberts, of the firm of Messrs. Sharp, Roberts, & Co., of Manchester. For all the finer qualities of yarn, it is the only machine now employed.

“By this machine, for which the first patent was taken out in 1825, and the second, for a further improvement, in 1830, a very close approach to perfection seems to be made. It produces a considerably greater quantity of yarn, of more uniform twist, and less liable to break, and it winds on the cop more evenly and closely, so that the yarn is more desirable for the weaver. Roberts’ self-acting mule is coming rapidly into use throughout the spinning district. In March, 1834, the patentees informed me that they had made 520 self-acting mules, containing upwards of 200,000 spindles, and that the number was likely to be more than doubled in the course of the year. One of the recommendations of this machine to the spinners, is, that it renders them independent of the working spinners, whose combinations and stoppages of work have often been extremely annoying to the masters.”

[*Review of Baines’ Hist. of the Cotton Manufactures.*