natural composition of pure carbonate of lime and of bitumen or mineral tar. It is found in abundant quantities at Seyssel (Ain) in France, and at Val-de-Travers, in the canton Neuchâtel, in Switzerland. In the first-named locality the layers of bituminous limestone are from four to seven yards deep, and of very uniform composition, containing about sixty-six per cent of bitumen and thirty-four per cent carbonate of lime. The natural stone is crushed into powder by machinery, and afterward heated to a temperature of about 140° Cent. It then remains in the state of a dry, fine powder, somewhat similar in its consistency to moulders' sand, and in this form it is employed The roads to be paved are first in the streets. covered with a layer of concrete made of gravel and cement, and this layer is carefully dried before the application of the asphalt cover. The asphaltpowder is then reheated and spread over the surface of the concrete in an even layer of about four centimetres, or 13 inches, in thickness throughout.

After this the powder is rammed and compressed by means of heated cast-iron rams worked by hand.

This being done, a heated roller is passed over the surface. The roller weighs about four hundred weight, and is repeatedly traversed over each short length of pavement newly rammed id. Two larger rollers, one of sixteen hundred weight and one of about two tons weight, are afterward employed for flattening down the surface of the whole.

The pavement is finished and ready for use immediately after cooling, say two or three hours after the first roller has completed its work. The asphalt pavement has now had an extensive and complete trial, and its advantages are very numerous. There is neither dust nor mud produced by it, and its surface wears no more than one millimetre, or one twenty-fifth of an inch in thickness per annum in streets having a lively traffic. At the beginning there is a compression caused by the weight of the vehicles rolling over the pavement, but the whole gets soon into a state of uniform density, and the street then remains in a perfect state for a long time, requiring very little repair.

There is no noise whatever from the wheels of carriages in asphalt-paved streets, so that there is a certain danger caused by this to pedestrians from the want of warning of the approaching carriages.

This, however, disappears by degrees, as the public become more and more acquainted with this kind of pavement. The tractive force required by the carriages passing over asphalted streets is very considerab.y reduced, and still more important is the reduction of the wear and tear of carriage wheels, springs, and axles, a reduction which is due to the absence of all concussion and vibration in the rolling of the carriage wheels over the smooth and uniform surface of the street.—Engineering.

The amount of nutriment contained in beer is generally greatly over estimated. Liebig asserts that in 1,460 quarts of the best Bavarian beer, there is exactly the nourishment of an ordinary two and a half pound loaf of brend. This beer is about on a par with our best American beer. Instead of being a condensation of the nutriment contained in the grain, in just so far as the liquid has undergone fermentation, the nourishment has disappeared. Machinery and Manufactures.

## The Uchatius Process of Steel Manufacture.

Many of our readers will still recollect an interesting invention made by M. Uchatius, an officer in the Austrian service, and which was first brought under public notice at the Paris Exhlbition of 1855. It is a direct method of steel manufacture by mixing granulated cast iron and iron ore, in proper proportions, in a crucible, and by these means forming the exact combination required for any given quality of steel. In 1856, at the same time when Mr. Bessemer's invention had been pronounced to be a failure, this process was at the hight of its renown, and experiments were made in France and in England on a more or less large scale, although not in anything like commercial practice, to test its value. A company was formed in France, and, we believe, under the auspices of the Government, for the working of M. Uchatius's patents, and everything then believed to be necessary for steel manufacture on a large scale was provided. The causes of failure in this instance are now perfectly intelligible, since the advancement of what may be called the science of steel manufacture has, since that date, enabled us to judge of the importance and value of certain details which were then unknown or overlooked, and the absence of which caused the practical failure of a process which in principle was perfectly correct, and would have in time become of considerable importance, had it not been surpassed by the progress of a still more glorious and revolutioniz-ing invention, viz., the Bessemer process. The Uchatius process, however, has been commercially introduced at one place, and the steel works has continued its operations now for about ten years, and so far as can be judged from the excellent quality of its products, and from the continuance of this mode of manufacture, with perfect success. The steel works referred to is at Wykmanshyttan, in Sweden. In 1862, this concern sent Uchatius steel to London, which was remarkable for its tenacity and uniformity of grain, and now in the Paris Exhibition we find the same works represented by another excellent collection of the Uchatius steel. We understand that the Uchatius steel of Wykmanshyttan is used exclusively by the royal mint at Stockholm for dies of coining presses, polished rolls, and other similar articles requiring steel of great strength and closeness and uniformity of grain. The reason why this process succeeded. in Sweden and failed in France and in England is the same which made the Bessemer process first succeed in that country, viz., the purity of the The ore employed for the Uchatius Swedish ores. process at Wykmanshyttan is that of the Bisberg mines, which can be seen in its natural state at the Paris Exhibition, forming part of the large trophy of ironstone and iron erected in the Swedish machinery gallery. It ranks among the purest and richest magnetic ores to be found anywhere. From this ore and from granulated pig iron made of the same ore, probably mixed with iron containing manganese, if the original granulated iron does not contain a sufficient dose of this latter