law, or some police ordinance, rendering it obligatory on the inhabitants to trap their sinks and water closets. I thought the opportunity for effecting this object had then arrived, as Mr. Doulton, the drain pipe manufacturer, was then in high favor with the municipal authorities of Brussels, and I further advised the town council that the contemplated improvements by the covering in of the river Senne, of which speculation Mr. Doulton was one of the chief promoters, would effect no real sanitary improvement unless the gully holes of the city were trapped, and that I was quite satisfied that Doulton's earthenware traps would, while being the cheapest that could be employed, answer all the desired objects. I had some years previously made a similar suggestion to Dr. Letheby, the medical officer of London; but though he fully approved of such a step in the right course, he felt that, on the ground of cost, it would meet with substantial opposition, and this was probably the view taken by the Burgomaster of Brussels. I will now refer to more recent discoveries which have created a serious feeling of alarm and apprehension in the minds of many of the learned and eminently scientific members of the faculty, in the event of the adoption in this country of any general system of sewage irrigation, or even its application on a large scale. One of the most eminent members of the faculty of medicine, Dr. Spencer Cobbold, after devoting many years of his life to the study of Entozoology, has discovered that a species of parasite, so small as to escape detection by the naked eye, has been introduced into thesewage of London, and, of course, of other towns, by our colonists from certain parts of Africa, the Mauritius, etc., etc. Irrespectively of his great work on 'Entozoa,' in the pure cause of humanity Dr. Cobbold has also published, through Messrs. Groombridge & Sons, of Paternoster Row, a sixpenny pamphlet, in order to warn the British public against the horrible dangers they must inevitably encounter should any of the contemplated systems of sewage irrigation be carried into operation; in it he graphically describes the miserably insignificant insect to whom thousands, and hundreds of thousands, may yet be indebted for long years of acute suffering and death—all the reasoning and conclusions of inductive science leading to the conviction that sewage irrigation will introduce into this country a more horrible disease than any to which the British flesh is heir. These—apart from their enmity to man—most contemptible insects in creation, have been found in the states of ova, larvæ, or the fully developed insect, in every portion of the London sewage which has hitherto been analyzed by him and his colleagues in the examination of this important question; he describes their passage from the body of the patient into the water closet, from thence to the sewers, and finally to the river and the sea; there, he observes, let them remain, they can do no harm to any one; but once let them reach our fields, then the misery and sufferings of humanity will be terribly avgmented. According to his statement, this insect is of precisely the same species as that which is found from the overflowing of the Nile, where his friend, Dr. Grunnenstein, in the post-mortem examination of 300 peasants, found that the deaths of upwards of 100, or more than one third, had been occasioned solely by the ravages of this little insect. They are swallowed in the food, either animal or vegetable, when not sufficiently exposed to the action of fire to destroy them in their several states, for which reason he earnestly recommends our abstinence from underdone meat and raw vegetables.

PLASTER OF PARIS MANUFACTURE.

The quarrying of gypsum and the manufacture of plaster are important industries in Paris, and we (*Engineering*) have recently taken the opportunity of visiting one of the establishments of this kind, the best arranged—that of M. Morel, at Montreuil. The plaster of Paris, or gypsum, consists, as is well known, of hydrated sulphate of lime. The water being removed by roasting, the stone is ground into powder. When this is afterwards mixed with water it combines itself again, and forms a solid mass, which is employed in an infinite variety of ways. The abundance of gypsum at Montmartre, Pantin, Menilmontant, Belleville, Charonne, Montreuil, &c., all close to Paris, even within the city limits, the good quality of, and the large demand for, the plaster, and the ease with which it is employed, have caused the development of this great industry in the capital. The plaster of Paris has a European, and even a still more extended reputation. It is employed everywhere, and is put to the most varied uses. It is molded into hollow bricks, and tubular blocks, in building up partitions and walls, for paving slabs, and for smoke conduits to chimneys. One sees, even in the neighborhood of the quarries, houses of three and four stories, which are built in molded stones of plaster, or made in plaster in such a manner that they form a monolith.

The bed of gypsum worked at Pantin is horizontal: it has a thickness of 37 feet 2 inches. There is also a small bed adjacent, and of little thickness, but this is not quarried as a rule. The gypsum of this bed is almost entirely crystalized, and there are found there, in abundance, those beautiful specimens called *fers de lance*, on account of their form. These fragments split with ease into thin transparent leaves, and when the apparent limit of diversibility has been found with the blade of a knife, if one takes one of the leaves, which has less than 1-80th inch of thickness, and heats it, it exfoliates into more than twenty films as the water it contains is heated and disengages itself in steam.

The bed of gypsum that is excavated is covered by some 40 feet of earth, consisting of calcareous deposits, and marl and clay. It is excavated, for the most part, by subterranean galleries, but it is sometimes found more economical to work from the surface, in spite of the great thickness of superincumbent earth, because there are numerous situations where the excavated material employed to fill elsewhere can be made a source of revenue, while the limestone can be sold to make lime, and the clay to make earthenware, or bricks.

It is thus that the quarry of Eprisette, worked at first in galleries by M. Morel, is changed at the present time into open excavation.

The gypsum is extracted by blasting. Holes are pierced in the rock, which, for the most part, is sufficiently soft for a workman to drive in less than an hour a hole from 4ft. 6in. to 6ft. deep and 2ft. in diameter. After a blast, the rock is struck with crowbars, which divides it into blocks from 30 to 40 meters cube, advantage being taken of the numerous faults in the material, which the workmen learn to recognize at a glance, and which they call "*mailances*." A heavy blow, or the introduction of a pick, at the right spot, divides easily the largest blocks into convenient fragments.

These fragments are loaded upon trolleys, which follow the face of the gallery or cutting or tramways, and which lead up to the eight furnaces composing the factory. These kilns, or furnaces, are of the simplest form. They consist of an end wall 15 ft. long, and of two side walls of the same length. The three walls are also 15ft. high, and the square hearth that they surround, carries perpendicularly to the end wall, five gratings, through which passes the air necessary for combustion. On the ground, the largest blocks of gypsum are arranged in such a manner as to construct, above these gratings, arches sufficiently high to receive the fuel for burning the material. The spaces intervening are filled up with other fragments of rock, more of which is added from above so that the hight of the mass is raised. When the greatest hight conveniently attainable by hand is reached, the charging of the kiln is continued from trolleys brought upon inclined planes which are also supplied with rails. This is carried on until the hight of the charge is equal to that of the walls of the kiln. All the interstices are then carefully packed with small fragments of the stone, and the front of the furnace, which is raised by a low wall, receives a movable cover of plate iron intended to prevent the loss of heat by radiation; and to retain such morsels of stone as become detached during the operation of baking; the joints in the front of the kiln are luted.

Everything being then prepared, fagots are placed within the arches and lighted, and when the embers are in full glow and the arches half empty, they are charged with *briquettes* of artificial fuel, and the fire is so managed by regulating the access of air, that the baking of the mass is effected equally throughout without any extremes of excessive or imperfect burning. The operation is complete in 24 hours.

The employment of *briquettes* is one of the improvements introduced by M. Morel into his establishment. The baking was generally done with wood, and the substitution of coal has effected a saving of two thirds of the total quantity produced. There is a comparatively small loss of heat in this apparatus, so simple and apparently so primitive. In calculating the calorific power of the quantity of fuel consumed and the amount of heat necessary to evaporate all the water contained in the gypsum, it is found that he utilizes one half of the available heat, which is certainly a satisfactory result considering all the various losses inseparable from an identical enterprise.

After the calculation is complete, the furnace is allowed to cool, and the burnt gypsum is again loaded into wagons and carried off on the tramway to the grinding mills. This part of the manufacture consists of two parts. There are millstones in cast iron or stone, banded with rings of iron and turning in a circular trough with a grated bottom. The calcined stone is fed into the mill, and those parts which are ground down extremely fine pass through its gratings. The rest is removed by a suitable mechanical appliance for grinding.

One of the mills carries a most ingenious arrangement for screening the fine powder. Below the grate there is a strainer in the form of a truncated cone. Of the powder which falls upon this strainer through the base of the annular grate, part passes through the meshes and escapes through the lower part of the apparatus; the rest slides on the conical strainer falling on a table at the bottom, and is constantly lifted by a chain and replaced on the table of the mill. After the powder is sufficiently ground, it is conveyed below into a storehouse where it is placed in bags. The machines are driven by a 12 horse steam engine.

The whole of this establishment is ably arranged and managed, from the quarries to the plaster depôt; and the working out of all the practical details does honor to the able proprietor who created them, and who still works daily to improve them.

Mr. Crookes on the "Psychic" Force.

With a boldness and honesty which deserve the greatest respect, Mr. Crookes has come forward as an investigator of those mysterious phenomena which have now been so long before the public that it is unnecessary to name them, more especially as their generally received name is very objectionable. Two things have contributed to retard our knowledge of these strange events. In the first place, until lately, few men of name have been associated with their occurrence, so that outsiders have not had the facts put before them in a proper manner. In the next place we are inclined to indorse the remark of Mr. Crookes, that men of science have shown too great a disinclination to investigate the existence and nature of these alleged facts, even when their occurrence had been asserted by competent and credible witnesses.

Before adverting to the results obtained by Mr. Crookes, a few words may be said about our mode of procedure in accepting testimony.

Let us suppose that a man comes before us as a witness of some strange and unprecedented occurrence. Here it is evident that we are not entitled to reject his testimony on the ground that we cannot explain what he has seen in accordance with our preconceived views of the universe, even although these views are the result of a long experience; for by this means we should never arrive at anything new. Our first question is manifestly one regarding the man's moral character. Is he an honest and trustworthy man, or is he trying to deceive us?

Let us assume that we have convinced ourselves of his honesty; we are then bound to believe that *he thought he saw* what he described to us; not necessarily, however, that the occurrence which he described actually took place. Convinced, already, that he is not deceiving us, the next question is whether he may not be deceived himself. Let us, however, assume that, upon investigation, the circumstances are such that collusion of any kind is out of the question, and that the man is neither trying to deceive us, nor that it is possible that he himself can have been deceived by others. Even yet we have an alternative in our judgment of the event. The phenomenon may be *subjective* rather than *objective*, the result of an action upon the man's brain rather than an outstanding reality. For nothing is more certain than the occasional occurrence of such strange impressions; and that the cat or the dog, or the skeleton by which the patient is haunted, is frequently recognized even by himself as having no external existence. Of late years we have been able to produce instances of this depraved consciousness almost at will. The author of these remarks considers it certain that the electro-biologist has frequently caused them. The unimpeachable character of the patient, combined with the fact that he has sometimes pronounced water to be wine, or a snow storm to be taking place in a room, can only be accounted for on the supposition that he has been put into a peculiar state, during which his evidence of events is utterly worthless. But beyond the bare fact, we know next to nothing of the laws that regulate this action, nor can we tell under what conditions one man is capable of influencing another, or whether a man or body of men may not be capable of influencing themselves.

To come now to the class of events which Mr. Crookes has witnessed. It is greatly to his credit that he has come forward so frankly and honestly; and since he has begun to investigate the peculiar class of facts, we are sure that he will consider it his duty to continue the investigation in such a way as to convince those men of science who may not themselves be able to take up the question—outsiders in fact. Mr. Crookes will, we are sure, not object to a few critical remarks honestly made with the sole view of finding out the truth, and we would therefore express a wish that, in order to facilitate operations the experiments should, in future, be conducted by only such men as Mr. Crookes himself, and that it should always be absolutely superfluous to investigate whether machinery, apparatus, or contrivance of any sort, be secreted about the persons present. We should thus start from a higher platform, and the investigation would gain in simplicity, although perhaps something might be lost in the marked nature of the results obtained.

Allowing, however (as we are disposed to allow), that things of an extraordinary nature are frequently witnessed on such occasions, yet we are by no means sure that these constitute external realities. The very fact that the results are uncertain, and that, as far as we know, they have never yet been obtained in broad daylight before a large and unbiassed audience, would lead us to suspect that they may be subjective rather than objective, occurring in the imaginations of those present rather than in the outward physical world. Nor can this doubt be removed by any precision of apparatus; for what avails the most perfect instrument as long as we suspect the operator to be under a mental influence of the nature, it may be, of that which is witnessed in electro-biological experiments? The problem is, in fact, one of extreme difficulty, and we do not see how it admits of proof, provided the influence cannot be exerted in broad daylight and before a large audience. There is, however, a cognate phenomenon which admits of easy proof. We allude to clairvoyance, and have in our mind at the present moment a man of science who, if not himself a clairvoyant, has yet the power to command the services of one who is. Now, were he at once to communicate to a journal such as *Nature*, in cipher if necessary, the knowledge derived through the influence, giving the proof afterwards when obtained in an ordinary manner, the public would soon be in a position to judge whether there is any truth in the influence or not.

It is, in fact, somewhat hard upon the writer of these remarks and some others who are disposed to allow the possibility of something of this nature, but have not the opportunity of investigating it, that those who have will not satisfy the public with a convincing proof.—*B. Stewart, in Nature.*

Lace Manufacture in Brooklyn, N. Y.

There is now in course of construction on Park avenue, near Hall street, a large brick structure, to be 60 by 140 feet in dimensions, and five stories high, surmounted with a Mansard roof, which is to be provided with the most approved modern machinery for the manufacture of Nottingham lace and also of fine silks. A large amount of capital is invested in the undertaking, and, if successful, additional buildings are to be erected on the adjoining lots. It is said that when the works are in full operation, a thousand females, and nearly as many males, will be employed in the establishment. The first story of the main building is now up, and the work progresses as rapidly as the weather will permit. One reason for selecting Brooklyn is that the Ridgewood water is chemically well adapted for dyeing purposes.