Disinfection of the Waste Waters of Manufactories.

While the purpose of the usual methods of disinfection is to prevent as much as possible all causes of putrefaction, Dr. Alex. Müller, of Berlin, has received a patent for a method of disinfecting waste waters which is based upon quite a different idea, namely, to cultivate those lower organisms which modern science considers to be causes of fermentation, putrefactive decomposition, etc., and to use them for the precipitation or mineralization of waters by decomposing their organic compounds.

To this end a temperature favorable for the development of such organisms is produced and maintained for a day or two in the waste waters, which are previously freed from substances obnoxious to fungi by means of sedimentation or filtration.

In sugar manufactories the necessary warmth is obtained by means of the condensation waters, in other factories by means of steam or superfluous heat, or if necessary even by heat produced specially for this purpose. Care has to be taken that the heat does not exceed 104° Fah., and a cooling below 73° Fah. may be avoided by covering and surrounding the reservoirs with substances which are bad conductors of heat. All substances that may be obnoxious to the life of the fungi, namely, antiseptic substances, such as tar oil, sulphurous acid, salts of copper, iron, and other heavy metals, must be kept away. Strong acids, as muriatic, sulphuric, or other mineral acids, must be neutralized by means of lime or soda; an excess of caustic alkalies has to be prevented.

A special planting of organisms of fermentation will be necessary only in rare cases. Mostly the numerous germs contained in the atmosphere are sufficient. Otherwise yeast, manured earth, or other germ-containing materials, may be employed. Of organic substances, salts of ammoniac, lime, and phosphorus may be used. Generally the nitrogen of the organic substances in the refuse waters should be reduced to about one per cent.

Such of the fermentation-organisms which during the defecation process have not been sunk into the ground, may be removed by filtration or oxidized by nitrification.

The mechanical and architectural arrangements for this method are very simple. They consist of 3 or 4 basins, each having a depth of at least 3½ to 4 feet, for the digestion and defecation of the waste water. They must be able to hold at least the quantity of sewer water produced during one day, and must be furnished with inlet and outlet pipes, through which the liquids continually stream in and out.

The basins are constructed by excavating the ground, and are covered with a swimming layer of porous substances (straw, chaff, foam, etc.) in order to prevent the refrigeration or evaporation of the liquids. Obnoxious gases of putrefaction and other disagreeable vapors are made harmless by conducting them into a system of drainage tubes, so placed in the ground that they are kept dry, or at least never filled up with water.

The basins are connected with filtration reservoirs (filled with coal, coke dust, sand, or other similar substances), which may be erected at any distance from the factories, and, being able to hold at least fifty times the quantity of the daily waste water, are furnished with drains, which are open on both sides.

The basin or filtration slime produced by this method of disinfection is a valuable manure for agriculture and horticulture, and the drainage water is as clear as the drinking water of most cities and may be used without danger.

Dr. Müller's method is especially well adapted for the disinfection of the very disagreeable waste water of beet-sugar manufactories, and may be also advantageously used in breweries, dyeing establishments, tanneries, etc.

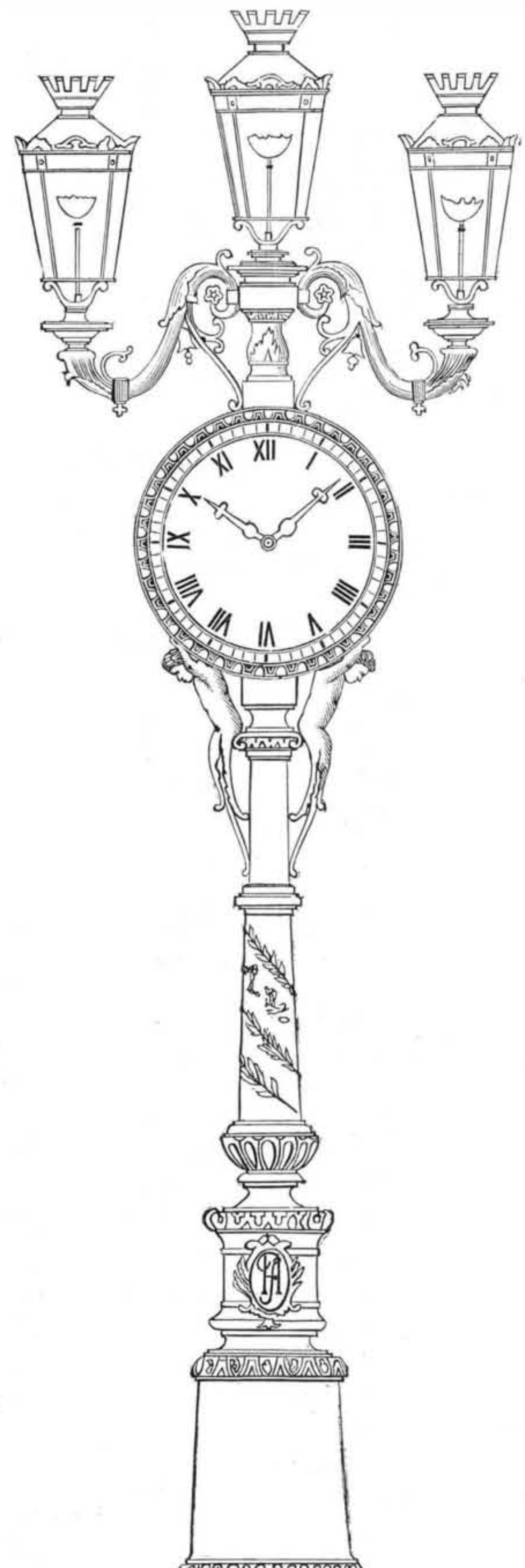
Diamond Mines of India.

A member of the Indian Geological Survey, Mr. V. Ball, says in a recent paper that there are in India three extensive tracts, widely separated from one another, in which the diamond has been found The most southern of these has long borne a familiar name, which is, however, to a certain extent, a misnomer. There are no diamond mines in Golconda. This name, originally applied to a capital town, now represented by a deserted fort in the neighborhood of Hyderabad, seems to have been used for a whole kingdom; but the town itself was many miles distant from the nearest of the diamond mines, and it was only the mart where the precious stones were bought and sold. The second great tract occupies an immense area between the Mahanunda and the Godavery river; and the third great tract is situated in Bundelcund, near the capital of which, Punnah, some of the principal mines are to be found.

The work of the Geological Survey has demonstrated that the diamonds occur in the Vindhyan rocks of Northern India. In the upper division of this formation there is a group of clay slate (Rewah), and in the lower a group of sandstone (Semri), in both of which diamond-bearing beds are met with. It is still very doubtful; however, if a diamond has yet been found in India in its original matrix. Mr. Ball gives an account of the chief mines, describing in detail, from personal observation, that of Sambalpur, which has now for some time ceased to be productive. The Punnah mines are still productive, yielding a mean annual produce of between $200,000 and $300,000 a year. Europeans have attempted diamond mining in each of these three tracts, but in no instance have their operations been attended with success, and yet there does not appear to be the least ground for supposing that there has been any real exhaustion of the localities where mining is possible.

CHANDELIER CLOCK.

An elegant chandelier clock, in which neither the clock nor the lights predominate to such an extent as to impair the effect of one another, has been in demand for public places; but most of the designs presented were encumbered with defects that rendered them unfit for their purpose. The chandelier represented in the annexed cut is of a very elegant design, and yet is not too elaborate. It may be provided with three lights in one row or with five, of which four rest on arms or brackets surrounding the center light, which rests on the top of the standard. The chandelier is designed to be 17½ feet in height, and to have a dial 3 feet in diameter. The design represented in our engraving is to us ornamental, but a manufacturer would likely change the style and adopt one more or less elaborate to suit the demand. We would suggest to Mr. J. W. Fiske, the extensive manufacturer of ornamental iron work in this city, a trial of the combined clock frame, with gas lights on the same post. They would be especially ornamental and useful in public squares and in front of public buildings.



CHANDELIER CLOCK.

Electrical Phenomena in Tropical Countries.

In a note addressed to the French Academy (*Comptes Rendus*, p. 446), M. L. Amat calls attention to the fact that the electrical phenomena produced by the friction of the hairy coat of animals acquire a remarkable intensity in tropical countries, especially to the north of the Sahara, toward the 35th degree of latitude. At an altitude of 2,500 to 3,600 feet he found that by passing a comb through the hair of the head or beard, sparks might be produced two or three inches in length. The phenomenon occurred at its best at from 7 to 9 o'clock in the evening, when the weather was warm and dry. In horses the effects are still more marked, and the hairs of their tail stand out from each other so as to form a sort of fan. If the hairs be touched a crackling of the sparks is heard, and at night these are distinctly visible. Sparks are also easily produced by the use of the brush or currycomb. According to M. Amat, the electricity developed in the tail of the horse is positive, as he learned by experiment. Naturally, during rainy or moist weather, the electrical tension is considerably lessened, and it is likewise less sensible in the stable than in the open air. In man the accumulation of the electric fluid is not so great as in the horse, doubtless because he is not so well insulated from the earth as the latter, the horny hoofs of which furnish insulating supports.

Professor Max Muller on Progress.

At the recent opening of the Mason Science College, at Birmingham, Professor Max Muller made the following remarks:

"The spirit in which this college has been founded strikes me as a truly liberal spirit—a spirit of faith in the future, a spirit of confidence in youth. Much as I admire the enlightened generosity of the venerable founder of this college, nothing I admire more than one clause in the statutes, which states that, with the exception of a few fundamental provisions, the trustees not only may, but must from time to time, so change the rules of this institution as to keep it always in harmony with the requirements of the age. You know how other colleges and universities have suffered, have been hampered in their career of usefulness, by the wills of pious and faithful founders and benefactors. Now here, in the founder of this college, we have a truly faithful founder—a man who has proved his faith in the future and his confidence in youth—who is convinced that in the long run the path followed by mankind will be the right path; nay, that those who come after us will be, as they ought to be, wiser and better than ourselves. We who are growing older ourselves know how difficult it sometimes is for an old man to have faith in youth and confidence in the future. Yet that firm faith in youth, that unshaken confidence in the future, seems to me to form the only safe foundation of all science, and on them, as on a corner-stone, every college of science ought to be founded. The professors of a college of science should not be conservative only, satisfied to hand down the stock of knowledge, as they received it, as it were, laid up in a napkin. Professors must try to add something, however little it may be, to the talent they have received; they must not be afraid of what is new, but face every new theory boldly, trying to discover what is good and true in it, and what is not. I know this is sometimes difficult. Young men with their new theories are sometimes very aggravating. But let us be honest. We ourselves have been young and aggravating too, and yet on the whole we seem to have worked in the right direction. Let us hope, therefore, that the professors of this college will always be animated by the spirit of its founder, that they will never lose their faith in progress, never bow before the idol of finality. Let them always keep in the statutes of their own mind that one saving clause in the statutes of this college—to keep pace with the progress of the world. By that clause, by that profession of faith in the future, Sir Josiah Mason has done honor to himself and honor to posterity. Let him rest assured that such faith is never belied, and that rising and coming generations, while applauding his munificence, will honor and cherish his memory for nothing so much as for that one clause, in which he seems to say, like a wise father, 'Children, I trust you.'"

To Get a Large Yield of Rich Milk.

The *Farm*, published in England, confirms our own experience in feeding milch cows with bran. If a large yield of rich milk is desired, says the writer, give your cows, every day, water slightly salted, in which bran has been stirred at the rate of one quart to two gallons of water. You will find, if you have not tried this daily practice, that your cows will give 25 per cent more milk immediately under the effects of it, and will become so accustomed to the diet as to refuse to drink clear water, unless very thirsty.

Prof. J. W. Sanborn, superintendent of the college farm, Hanover, N. H., reports experiments in feeding cows, giving full details of weights of each kind of feed, of milk and butter yield, and the weights of the animals at the beginning and end of each period. In summing up he says: "Meal will make more milk than bran, I no longer hesitate to say. The change in the butter product is remarkable; in changing from meal to bran there was a loss of 17·7 per cent in the butter-producing capacity of milk; in changing from bran to meal there was a gain in the butter-producing capacity of milk of 21·8 per cent." "The results in weighing the cows form an exception to previous experiments, bran and middlings keeping weight better than meal in this experiment. Is it a chance result, asks the professor, or is it due to well defined causes? I will not discuss it, he answers, but observe that it was not at the season of the year when a cow needs a carbonaceous food to maintain animal heat; also the grass of our pasture was browned, and in different condition from June grass or properly cut hay."