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KEROSENE MURDER.

It is a matter of growing astonishment that the almost daily record of loss of life and property, through kerosene explosions, does not provoke some sort of special legislation upon the sale of dangerous fluids vended under different names throughout the length and breadth of the land. Petroleum has proved to be of vast and varied importance in the arts, but its more volatile products, have been made the instrument of the most heartless and wicked frauds; and these frauds are still daily perpetrated, and their authors go unhung, though their victims—called to meet the most horrible death known to man—constantly increase in number.

These victims are for the most part women, who, if they escape death, are obliged to undergo what is hardly less cruel to a young and beautiful woman, disfigurement for life.

It would seem in this case that the pecuniary risks involved would stimulate the fire insurance companies to action, though the public at large remain indifferent.

Our readers may recollect the case of Mary Gibson, who, only a short time since was burned to death by an explosion, of Danforth's (so-called) "Non-explosive Oil." This same material has figured before in other disasters. Its dangerous character was exposed in a former issue of this paper, yet still its sale is unblushingly continued.

We are now struck with horror at the disaster at Kenosha, in which the Halliday Hotel was destroyed, seven persons burned to death, and others fatally injured, the fire originating in a kerosene explosion; while from Baltimore comes another sad story of the burning to death of a child six years old, from the same cause.

If we chose, we might fill this column with the list of disasters which occurred last year from the explosions of petroleum fluids.

The public ought to know (surely it has been often enough told) that there is such a thing as safe kerosene, and that the dangerous fluids are either more volatile liquids, or kerosene mixed with more volatile liquids to increase the profits on its sale.

Most of these mixtures are sold under fanciful names, and are recommended by their manufacturers as better than kerosene. Now, when any manufacturer or dealer makes such a recommendation, he utters knowingly a wilful falsehood, to cheat innocent customers into buying a spurious dangerous article. No petroleum fluid more volatile than kerosene is a safe article for promiscuous and general use, and the man who sells it, is as criminal in so doing as a man who should knowingly introduced arsenic into table salt and sell it to his customers as an improved article. Let purchasers beware of these fancy names. In nine cases out of ten they are adopted as a cloak to cover cheating.

As to legislation upon this subject, it is perhaps not our province to propose measures to reach the root of the evil, but it certainly is a fact that the scoundrels who peddle death in the shape of burning fluids, are neither imprisoned nor hung. It would seem not a very difficult thing to frame a law that should bring to condign punishment such offenders.

ORGANIC MATTER IN WATER.

A very interesting paper touching upon a sanitary question of the first importance, was recently read before the Chemical Society, London, by Charles Heisch, of the Middlesex Hospital Medical College. Our views have long coincided with those of Mr. Heisch and many other chemists, viz., that "the deleterious nature of organic matter is dependent upon its containing living germs, which grow and set up a fermentative action within the body," so that the quantity of

such matter which may exist in the water we drink, is not of so much importance as hitherto supposed. If the germs be present in any sensible quantity, the water must prove more or less deleterious. It is in the nature of this class of poisons that the quantity entering into the system does not greatly influence the result, as witness the effects of poison received in wounds in the dissecting room, the poison of rabies, vaccine virus, etc.

Although, as we have said, many have for some time held the belief that organic poison in water was no exception to the above rule, there perhaps existed no very firm grounds upon which these convictions rested. They were arrived at more from theory than from demonstrated facts. But Mr. Heisch has been applying the test of elaborate experiment to the theory, and hence the results of these experiments are of more than ordinary scientific interest.

In his paper, Mr. Heisch says he was first led to a means of determining the characteristic properties and appearances of such germs by being called on to assist a large manufacturer of lemonade, who, some years ago, almost suddenly found it impossible to make lemonade that would keep. After a day or two it became turbid, and its odor anything but agreeable. On examining the liquid under the microscope, he found it full of small, spherical cells, with, in most cases, a very bright nucleus, and after a few days the odor of butyric acid was unmistakable. After examining all the materials employed, he found that the water was in fault. On putting a few grains of the purest crystalline sugar he could procure into some of the water, it became turbid in a few hours, and the same cells were distinctly to be seen with an one-eighth inch object glass; but the butyric odor did not come on for some days. This water was procured from a deepish well; it was hard, and contained a considerable amount of nitrates, but not any unusual quantity of ammonia, or unoxidized organic matter. On inquiry, he found some digging had been going on near the well, and it appeared that some drainage must have got in, though at the moment so small in amount as to be hardly appreciable. When water from the water works was substituted, everything got right again. This led him to try all the samples of water he could procure in the same manner, and in every case where diarrhea or other mischief could with any kind of certainty be traced to the use of a certain water, when that was treated with sugar these same smells made their appearance, usually within twenty-four hours, if the temperature were kept up to between 60° and 70°, and plenty of light admitted to the bottle in which the sample was contained.

During the past year he has been trying what substances contain these particular germs, which are so peculiar as to be quite unmistakable when the observer is once familiar with them. By permitting the action of these germs on sugar to go on, they present uniformly the following appearances: The cells gradually group together in bunches something like grapes, quite differently from the ordinary yeast globules; they next spread out into strings, with a wall surrounding and connecting the cells; the original cell-walls then seem to break, and leave apparently a tubular sort of threads branched together. The strong resemblance of these to, if not identity with, the sewage fungus, coupled with the almost universal properties of water which produced them, led Mr. Heisch to look to sewage as their source, and he found that the smallest quantity of sewage, mixed with a water which might be treated with sugar and remain clear and sweet for weeks, at once produced these germs, or rather set them growing. Water was procured from various sewers, and after standing a few days to settle, six drops of clear water were mixed with 10,000 grains of West Middlesex and New River water. To six ounces of this mixture ten grains of pure sugar were added, a like quantity being mixed with six ounces of the water without the sewage. All these samples were placed in stoppered bottles in a window, where plenty of light could reach them. The water and sugar remained clear and sweet. The water with this trace of sewage did the same. The water, sewage, and sugar became turbid, in times varying from twenty-four to sixty hours, and exhibited the cells and strings before spoken of, and ultimately the odor of butyric acid was always perceptible. One drop of fresh urine in 10,000 grains of water, a mixture which may be kept for weeks without showing any sign of turbidity, produced in twenty-four hours, abundance of cells, and in forty-eight hours, branched strings.

No other substances tried produced the same result, although urea, albumen, nitrates, milk, and other substances of unstable character, were experimented upon. Some of these produced growths of some sort, but none resembled the peculiar and unmistakable cells and strings referred to.

Mr. Heisch asserts that filtering the water through the finest Swedish paper does not remove the germs, as on the addition of sugar they grow as fast as ever. Boiling for half an hour in no way destroys their vitality. Filtration through a good bed of animal charcoal is, as far as he can find at present, effectual in removing them, and if the charcoal be well aired from time to time, it retains its power for several months; but if the water be passed continually through it without this precaution, it soon loses it, and the filtered water is as bad as the unfiltered. The softer the water the faster the germs grow.

In conclusion the author remarks, that he does not think these germs are the only unwholesome kind of organic matter that exists in water, or that water containing small numbers of them might not sometimes be taken with impunity; but he regards with great suspicion any water in which they exist, even in the smallest number, as they increase and multiply with great rapidity. The fact that in multitudes of cases increase of health and comfort has resulted from giving up the use of water in which they could be found, even

where its use had not produced positive disease, confirms this opinion.

STONE CUTTING BY MACHINERY.

All materials except stone are now successfully worked by machinery. We do not, of course, mean to say that stone is not so worked to a limited extent, but, in general, hand work of this material still maintains itself, against all the innovations of inventors.

The general reason for this is, undoubtedly, the abrading action upon tools which do their work by scraping, or by continuous cutting. Steel tools thus used soon wear out, and require a great deal of attention to keep them in working order. There are some kinds of soft stone which may be planed or turned by steel tools to advantage; but with the harder varieties, chipping with hand tools is the only method extensively employed.

A glance at some of the attempts hitherto made at substituting machinery for manual labor in this field, may not be unprofitable in this connection.

One method consists in the employment of a sliding eccentric, connected with a bar, in which a series of chisels is fitted; the chisels being made to adapt themselves to the surface by suitable mechanism, and being forced into the surface of the stone by the revolution of the eccentric.

Another method consists in the employment of rocking beams, carrying tools with serrated edges bearing upon the surface of the stone to be cut, and acting upon it by virtue of the rocking motion of the beams. Disks with serrated edges have also been used, which were caused to press upon and roll backward and forward over the stone, abrading it, and reducing it approximately to the form required. Rolling edges not serrated have also been tried.

Another plan is that of weighted cutters, actuated by wipers, cutting the stone by the force of their fall.

Rotating cutters, operating on the principle of drills worked in gangs, have also been used. To make a long story short, it may be said that scarcely any conceivable form of steel tool, or method of applying it, has not been tried, but without any marked success.

The introduction of the black diamond, or carbon points, as stone-cutting tools, however, seems to re-open the entire field again. In this material we have a substance harder than the hardest flint, and if properly applied to its work, capable of sustaining a vast amount of wear. It can be applied on the principle of either chipping or grinding. Drills pointed by it penetrate the hardest materials with astonishing facility.

Already several important machines for rock drilling, dressing millstones, etc., in which these points are employed, have been invented, patented, and successfully worked. It now remains for some enterprising genius to demonstrate that, by the use of these points, stone moldings may be cut as wood moldings now are, entirely by machinery.

A description of a new English machine, somewhat enthusiastically praised in the *London Builder*, will remind our readers of many attempts unsuccessfully made in this country, and the *Builder's* encomiums will therefore be received with some grains of allowance.

The machine is at work at Betterssea, England. It consists of a bed made to travel longitudinally, with a shaft mounted over it for receiving the revolving cutting or molding head. So far, the machinery resembles that used for sawing; the head, however, instead of being a plain disk, with cutters, is shaped to the profile of the required molding, and has the cutters fixed in it according to that outline. The rough block being fixed on the bed, which is made to advance while the head revolves, the upper face of the stone is cut very nearly to the shape of the desired molding; the edges, however, are rather blunt, and the surface shows the tool marks. When this operation has been performed, a scraping tool, formed exactly to the molding, is fixed over the block; and the block being made to traverse several times under this scraper, has its face finished true and smooth, with sharp, clean edges, and the perfect profile required.

The *Builder* says that, by this machine, strings and molded steps are well worked in a remarkably short time. The cutters being built up, as it were, can be made to give any required outline, and their form is such that they work a considerable time without needing grinding. A large amount of work for St. Thomas's Hospital has been done by one of these machines.

The journal referred to also asserts that great saving of money and time is effected by this improvement, and it thinks the machinery can scarcely fail to come extensively into use.

Possibly it may, but we do not share our cotemporary's hopes in regard to it.

THE ELECTRO DEPOSITION OF COPPER AND BRASS.

The above is the title of a paper recently read before the British Association by W. H. Walenn. As we cannot give place for the whole of this paper in our columns, and as a review may be made to contain such portions as are not of purely theoretical interest, we shall endeavor to compress into the present article the practical information contained in it, abstracting perhaps some portions which may be of such a character as to be only properly given in the language of the author.

The commencement of the paper is devoted to a review of Smee's work on Electro-Metallurgy, published in 1851, in so far as it relates to the subject under discussion. Much attention is given by Smee to the electro deposition of copper, from acid as well as neutral solutions, and he alludes to the cyanide of potassium as a menstruum for dissolving copper when articles of iron are to be coated with the first-named metal; but he omits to notice the evolutions of hydrogen