

is frequently more important, therefore, that recent plumbing should be ventilated than that of older date."

Both tight and open drains tend to produce evils; but those arising from a tight drain can be obviated by proper ventilation of the house pipes, while the evils from leaky ones are irremediable. Therefore we say drains should be tight, that sewer gas (or, what is worse, matters capable of producing sewer gas during a long decomposition) may not escape, and also that the water may not leak out, leaving the solid contents of the drain stranded.

This want of tightness is the commonest defect of all, and probably three-quarters of the annoyance from drains is due to it. In the annual report of the Boston City Board of Health for the year ending April 30, 1878, is given the result of examinations of 351 house drains in different sections of the city. Of these, 193, or 55 per cent., are reported as defective, and in nine cases out of ten the defect consisted in the drain not being tight. This defect, more than others, affects the better kind of houses.

We feel that we are performing a proper duty in bringing constantly before the public sanitary discussion, and exposing the inferior way in which sanitary work is generally performed. We now mention that in one of the main sewers in Ottawa, which we had an opportunity once of inspecting, the interior of the sewer presents exactly the appearance of Fig. 14, page 77, owing to the work being hurried through in winter, when the cement froze, as fast as laid, to the centre of the arch. In the tile drains laid in Quebec, many of the joints are as Fig. 15, and we believe that one reason why the water power is so slight in the upper town of Quebec, compared with its head at Lorette, is because it meets with so much friction from the protrusion of lead at the joints, and of which we were an eye-witness when the pipes were being laid.—Ed. S. C.

Scientific.

THE MOON'S SHAPE.

The moon is the nearest, and, next to the sun, the most brilliant of all the heavenly bodies; yet it presents more perplexing problems than any other. Whatever theory has been adopted and however carefully worked out, there are deviations and perplexities which cannot be accounted for or explained.

One of the most difficult puzzles appears to be the strong and somewhat peculiar grasp which the earth has upon the moon, differing quite materially from what it should be if that body was a sphere, or as approximately as the earth is to such a form. If we examine carefully a stereoscopic photograph of the moon—and such pictures are very common—it will be seen that the shape bears a much stronger resemblance to an egg, when viewed endways and looking at the smaller end, than to a sphere. By careful observation it will be perceived that there is a careful rounding away of the body of the moon from its point nearest the earth to a certain distance, when the surface appears to fall away in a nearly straight line. When this plane or surface is tilted by libration, first upon the one side and then upon the other, the true perspective can be readily observed.

This peculiarity in its shape may be accepted as an explanation why one side only of the moon is always turned toward the earth. With its longer axis pointed directly to the earth's centre, our planet's grasp upon her satellite is so strong as to admit of a diurnal revolution, comfortable only to the moon's revolution around the earth—thus keeping the same face or pole of the moon toward the earth—the only variation from this fixity of position being the slight swinging or pendulum motion of the mass, which is known to astronomers as the "moon's libration."

It is by means of this libration that it has been possible to get a true stereoscopic view of the moon. The artist, instead of moving his instrument to get the stereoscopic effect, waits for the moon to move, the change of motion between the one libration and the other, being sufficient for his purpose. In no other way can this peculiarity of shape be made visible to the eye. Instruments, however perfect, fail in this direction. Proctor says: "It need hardly be said that no instrumental means in our possession can show the ellipticity of the lunar disc."

How this peculiar shape was brought about is explained in the following manner: "When the moon was a molten mass, the centrifugal force at the equator was so slight that there was no bulging, but the earth's attraction drew out the mass, lengthening it in the direction of the polar axis, and keeping that axis forever directed towards the earth's centre."

SINGULAR CASE OF LIGHTNING STROKE.

A paper was read at a late meeting of the Clinical Society, London, by Dr. G. Wilks, of Ashford, on a remarkable case of lightning stroke which occurred on June 8th, 1878. A farm laborer was struck by lightning while standing under a willow tree, close to the window of a shed in which his three fellow workmen had just taken shelter from a violent storm of rain. His companions found the tree partly denuded of its bark, and the patient's boots standing at its foot. The patient himself was lying on his back two yards off, and though he was fully clothed previously, he was now naked, with absolutely nothing on except part of the left arm of his flannel vest. He was conscious, but much burnt, and his leg was badly broken. The field around was strewn with fragments of the clothing; the clothes were split or torn from top to bottom, the edges of the fragments being often torn into shreds or fringes; they only showed evidences of fire where they came in contact with metal, such as his watch and the buckle of his waist belt. There was no laces in the boots. The left boot was torn and twisted into fantastic shapes, but the sole was uninjured, and there were no signs of fire upon it; the right boot had the leather much torn and the sole rent and burnt. The watch had a hole burnt through the case, and the chain was almost entirely destroyed. The stockings were split down the inner sides; the hat was uninjured. The patient stated that he was struck violently on the chest and shoulders, became enveloped in a blinding light, and was hurled into the air, coming down on his back, "all of a crash," and never losing consciousness. The hair of his face was burnt, and the body was covered with burns. Down each thigh and leg was a broad crimson indurated band of burning, passing along the inner side of the knee, and ending below the left inner ankle and the right heel; a lacerated wound, with a comminuted fracture of the os calcis. The bones of the right leg were fractured, and the tibia protruded through the skin in the course of the burn. He was discharged healed twenty weeks after the occurrence. Dr. Wilks remarked on the almost complete exemption of the nervous system and on the probability that the clothes being wet acted as good conductors, and so diverted the electric current from the great nervous trunks, thus saving the man's life.

ACTION OF AMMONIA ON BRASS.

John Y. McLellan, of Glasgow writes to the *Chemical News*, as follows: "While experimenting on the action of liquor ammonia on various metals and alloys, with a view to determine the most suitable for the contraction of a certain part in an ammonia plant, I have met with a reaction on brass which, so far as I know, has not before been recorded, and of which this note is a preliminary notice. If a small piece of brass or a few brass turnings be covered with liquor ammonia, specific gravity 0.880, in a closely-fitting room stoppered bottle, and placed aside for a few days, it will be found that the ammonia has acted on the copper of the brass to such an extent as to produce a solution of a more or less characteristic violet color, due to the presence of oxide of copper held in solution by ammonia. If this solution be still allowed to remain undisturbed for a few days longer free from contact with the air, this violet color will gradually disappear, leaving a colorless solution, which, however, is no sooner brought into contact with the air by removing the stopper than the violet color is reproduced, and by again stopping the bottle and leaving it aside the same reaction occurs and may be reproduced over and over again.

The production of the violet color from a colorless solution on exposure to the air does not seem to be the result of oxidation, as on opening the bottle in an atmosphere of carbonic acid the same reaction takes place.

I am at present working up this subject in the hope of finding in what state this colorless solution of copper exists.

PROFESSOR HUXLEY ON SNAKES.

The opening lecture at the London Institution for the season was delivered by Professor Huxley, F.R.S., to a very crowded audience, his subject being "Snakes," than which