

There is one point which may, I think, be a little enlarged upon with advantage. This is the insecurity of siphon traps (and all water traps are but modification of the siphon) if their water be not frequently renewed. All who sit up late at night must occasionally have become acquainted with the sickly smell that arises from the sink in the back kitchen or scullery. The main reason for this is that, the cook and scullerymaid having retired to rest, the water in the trap has not been renewed. The sewer gas on the far side of the trap has saturated the water and is being given off into the house. Pouring water down the pipe removes the smell for a time. If the waste-pipes be all cut off from direct communication with the sewer, as "M.D." advises, this nuisance cannot arise.

I once took part in an experiment to show the rapidity with which sulphuretted hydrogen gas is absorbed by water and given off again, and we found that this gas would, without pressure, pass through a column of water contained in the bend of a tube (a siphon trap, in fact), in about the time which it takes to write this paragraph.

A third correspondent writes. —

Some few years ago I instructed my builder to let me see the end of every basin, sink, waste, and overflow pipe in the open air, to ventilate the soil-pipe to the roof, and all water-closettraps and containers by half-inch pipe to the outside.

I am not competent to discuss the great sewage question, but I can confidently assert that, so far as the interior of each house is concerned, the adoption of the above plan is an effectual safeguard against the danger of sewer gas.

Now that winter is approaching, when fires will be lighted and doors and windows shut, the precaution suggested by "M.D." is more than ever needed.

The essential principle involved is that, by breaking the continuity of each pipe with the drain, atmospheric equilibrium is maintained between the interior of the drain and the connecting pipe during every variation of atmospheric pressure, and, notwithstanding the more or less highly rarefied condition of the air in the interior of the house, fresh air, and that only, can be sucked back through these insidious pipes.

RAZORS.

Razors, after all, form no unimportant subject, and their purpose—shaving—mounts in antiquity to pre-historic time. Far later than that rather indefinite epoch of the archeologists, Persians and Chinese, Egyptian, Jews, and Gentiles, Greeks, Romans, and innumerable barbarous peoples shaved, if not their beards, more or less of their heads. The processes and the instruments employed by divers peoples and times were, no doubt, various, and probably curious in many ways, though but little is known about them. While soap was unknown, or a rare cosmetic, and steel not widely diffused, "Easy shaving" could only have been accomplished by methods very different from our own. Almost in our own day might have been witnessed the extremes of the barber's craft in its primitive and its perfect instruments. Captain Cook was shaved in one of the Pacific Islands as an act of homage, by the king's barber, with a sharpened oyster shell, the process of getting over the tough beard of the great navigator occupying about six hours. Cook, no doubt, had his own old-fashioned steel razors in his cabin—quite as good, probably, as "the newest thing out" now in that line, and at the present day Sheffield razors are to be found plentifully amongst the Fiji Islanders, Bosjemen, Hottentots, and the tribes subject to King Coffee.

The Chinese razor is a curious bit of sheet steel, very much like a penny piece clipped off straight at one side, and sharpened at the opposite one, with a thin projecting tail which connects it with the split handle almost identical with that of modern European razors, which suggests the notion that the rather peculiar handles in which our razors are mounted may have come to us from Asia. In Europe the straight or slightly curved blade of some 4in. in length is universal, but innumerable varieties and vagaries, in form and proportion, weight, &c., are everywhere encountered, the real reason as the base of all being, probably, that there are razors made to sell and some to shave. But is an instrument for shaving a thing absolutely beyond the control of rational principle, or the teachings of ex-

perience? There must be some one size and form of blade, and some one weight, that should be the best possible for the average human face and beard. Yet as to this no certainty can be arrived at from the doctors of the craft of razor fabrication. One recommends a light razor; another "our own make," with a crooked shank next the handle, probably that no fingers not provided with the suckers of the octopus could hold; a third, and more particularly advises a heavy razor, with a thick back, and strong enough to cut the throat of Goliath; while Germans tell us our British razors are all wrong, that nothing shaves well but the Hamburgh razor, with its hollow sides and thin pliable edge, which never requires setting. We should like some light and guide through all this labyrinth and contradiction, for we must confess that the resulting impression chiefly left upon our minds by it is, that there are few branches of retail trade in small wares in which there is more humbug than in that branch of the cutlery craft which deals in razors. An excellent razor, well tempered, of good still, and with a black handle, can be purchased for about 1s. We can testify that such a razor can shave well, and for many years. Yet go into some eminent "cutlery establishment" in any of the great London thoroughfares and you will be asked 12s. to 14s. for a pair of instruments with, perhaps, ivory handles, and much glitter from the polishing wheel, but intrinsically not a white better than the soldier's razor at 1s. A curious essay, and of some length, might be written as to the improvements, pretended or real, that have within this century attracted scientific or general attention in razor making. Some of these, like those given account of by Parker, of Birmingham, in his "Chemical Essays" of some forty years ago, which attempted to fix the temperature at which razors should best be tempered, were laudable attempts to reduce empiricism in art to the science of rule, though little came of it. Nor did any real improvements result from the somewhat elaborate experiments of Faraday and Stodart on improving razor steel, by the alloy of other metals in minute quantities. Rhodium and silver-steel razors have all passed away, though so-called "silver steel razors" can still be purchased near Sheffield which do not contain a trace of silver. First-class cast steel of the most brilliant fracture and closest grain and perfect hardening and tempering are the only real requisites to form a first-class razor. The right quality of steel can be chosen, but in the tempering an element of uncertainty remains, which is no doubt the cause on which the capriciousness experienced in the goodness of any "pair" of razors proving quite alike depends.

A knife or surgical scalpel may cut through animal tissues with perfect smoothness and but little effort, but it may not shave well. The razor edge must not only be sharp, but smooth, if it be like all edges, that of a saw, it must be that of a saw which those teeth are more than microscopically fine. This was the basis of a mode of sharpening razors proposed about forty-five years ago by Mr. Gill, a patent agent and editor of "Gill's Technical Repository," which drew for a time some attention, namely, to burnish simply the sides of the razors' edge with the "currier's steel," which is only a bit of finely hardened and polished steel wire, and this thinning and smoothing of the edge is also the foundation of the Hamburgh construction, in which the edge formed by the osculation of opposite outside surfaces is thin enough to bend under the finger nail and yet return to its position. But though these razors are said to need no setting, they *scrape* rather than *shave*, and most uncomfortably.

Then the "setting" of the razor becomes a source of ever renewed need and annoyance, it being a rare thing to get it well done, and the expense is no longer beneath consideration, since London cutlers have fallen in with the prevailing habits of extortion and doubled their prices, under the plea of enhanced wages, &c. We have very many readers in all classes and in all sorts of occupations, and amongst them many ingenious and inventive men. We ask them to consider whether it be not possible to construct a machine for automatically setting razors—one that driven by power shall apply its fine grinding power to the razor blade already fixed into a suitable rest or frame, in such a manner as to effect all that now depends upon the dexterity of the "setter's" hand, or the degree of carelessness, or the contrary, with which he does his work. With the polishing machine for telescopic specula and the gem cutter's wheel before us, why should we despair of this? Once accomplished, it would prove, even in London alone, a little gold-field to reward the perseverance of the inventor.—*The Engineer*.