

*On the means of giving a fine edge to Razors, Lancets, and other cutting instruments.* By THOMAS ANDREW KNIGHT, Esq. F. R. S. President of the Horticultural Society, &c.

In the preparation of steel, and in the art of subsequently forming it into cutting instruments, the British manufacturers are, I believe, unrivalled; and they have probably approximated, if they have not attained, to perfection: but in the art of giving the finest possible edge to their instruments, when formed, I think they have generally still something to learn; for I hear surgeons often complain that they rarely find themselves in possession of a well set instrument; and I have never yet, in any instance, seen a razor come from a cutler so set that I could use it with any degree of comfort; though I have obtained razors from many of the most eminent manufacturers of the metropolis. The machinery which they employ, has long appeared to me to be imperfect, and uncertain in its mode of operating, and in many respects inferior to that which I have been some years in the habit of using, and which I shall proceed to describe.

This consists of a cylindrical bar of cast steel, three inches long without its handle, and about one-third of an inch in diameter. It is rendered as smooth as it can readily be made with sand, or, more properly, glass paper, applied longitudinally, and it is then made perfectly hard. Before it is used, it must be well cleaned, but not brightly polished, and its surface must be smeared over with a mixture of oil, and the charcoal of wheat straw, which necessarily contains much siliceous earth in a very finely divided state. I have sometimes used the charcoal of the leaves of the *elymus arenarius*, and other marsh grasses; and some of these may probably afford a more active and (for some purposes,) a better material; but upon this point I do not feel myself prepared to speak with decision. In setting a razor, it is my practice to bring its edge, (which must not have been previously rounded by the operation of a strop,) into contact with the surface of the bar, at a greater or less, but always at very acute angle, by raising the back of the razor more or less, proportionate to the strength which I want to give to the edge; and I move the razor in a succession of small circles, from heel to point, and back again, without any more pressure than the weight of the blade gives, till my object is attained. If the razors have been properly ground and prepared, a very fine edge will be given in a few seconds; and it may be renewed again, during a very long period, wholly by the same means. I have had the same razor, by way of experiment, in constant use during more than two years and a half, and no visible portion of its metal has, within that period, been worn away, though the edge has remained as fine as I conceive possible; and I have never, at any one time, spent a quarter of a minute in setting it. The excessive smoothness of the edge of razors thus set led me to fear that it would be indolent, comparatively with the serrated edge given by the strop; but this has not in any degree occurred, and, therefore, I conceive it to be of a kind admirably adapt-

ed for surgical purposes, particularly as any requisite degree of strength may be given with great precision. Before using a razor after it has been set, I simply clean it on the palm of my hand, and warm it by dipping it into warm water; but I think the instrument recommended operates best when the temperature of the blade has been previously raised by the aid of warm water.

A steel bar, of the cylindrical form above described, is, I think, much superior to that of a plane surface for giving a fine edge to a razor or penknife; but it is ill calculated to give a fine point to a lancet, and I therefore cause a plane surface to be made, a quarter of an inch wide, on one side of the bar, by cutting away a part of its substance; and I have found this form to be most extensively useful.

The edge of some razors, whether formed of wootz, of mixed metals, or of pure steel, but particularly of mixed metals, has generally appeared to me to be more keen and active when used a few seconds after it had been applied to the bar, than on the following day; and I have often seen the utmost activity restored to the edge of such instruments, so instantaneously, and by so apparently inadequate means, that I have been sometimes led to suspect the operation of the bar to have been something more than that of having worn away a minute portion of the metal; but I am not disposed to offer any conjectures respecting other effects which I may have conceived it to produce.

I have in many instances been able to give a very fine edge to razors in possession of my friends, which I could not set tolerably well by any of the ordinary means; and I have found that those composed of different materials could be set with equal facility, though the sensations they excited, when used, appeared to me to be in many instances dissimilar. The instruments upon which I have chiefly made experiments, have come from the manufactories of Mr. Pepys, Mr. Stoddart, and Mr. Kingsbury. The material which appeared to me to receive that which I shall call the most eager edge, (and it was very durable,) was wootz, from the manufactory of Mr. Pepys; and that which received the smoothest edge, and which I thought best calculated for surgical purposes, was a mixture of rhodium and steel; the powers of the pure steel of Mr. Kingsbury, appeared to be intermediate; and my experience leads me to believe that, under different circumstances, each of these materials might be used with some exclusive advantages.

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*The Chemistry of the Arts, being a practical display of the Arts and Manufactures which depend on Chemical Principles, on the basis of Gray's Operative Chemist. By ARTHUR L. PORTER, late Professor of Chemistry in the University of Vermont. Carey & Lea, 1830.*

THE work, on the basis of which the above treatise has been written, is already advantageously known; the demand for it, even at