

descriptions:—I shall proceed to investigate the subject, in all its parts and details, and with the utmost care and attention, and first with regard to the smoking chimnies.

There are various causes by which chimnies may be prevented from carrying smoke; but there are none that may not easily be discovered, and completely removed; this will, doubtless, be considered as a bold assertion, but I trust I shall be able to make it appear in a manner perfectly satisfactory to my readers, and I have not ventured to give this opinion but upon good and sufficient grounds.

Those who will take the trouble to consider the nature and properties of elastic fluids of air, smoke and vapor; and to examine the laws of their motions, and necessary consequences of their being rarified by heat, will perceive that it would be as much a miracle if smoke should not rise in a chimney, (all hindrances to its ascent being removed,) as that water should refuse to run in a cyphon, or to descend in a river.

The whole mystery, therefore, of curing smoking chimnies is comprised in this simple direction, *find out and remove those local hindrances which forcibly prevent the smoke from following its natural tendency to go up the chimney*, or rather to speak more accurately, which prevents its being forced up the chimney by the pressure of the heavier air of the room, although the causes by which the ascent of smoke in a chimney may be obstructed, are various, yet that cause which will not commonly, and I may say almost universally, be found to operate, is one which it is always very easy to discover, and as easy to remove; the bad construction of the chimney in the neighbourhood of the fireplace.

In the course of all my experience and practice in curing smoking chimnies, and I certainly have not had less than five hundred under my hands, and among them many which were thought to be quite incurable. I have never been obliged, except in one single instance, to have recourse to other method of cure than merely reducing the fire-place and the throat of the Chimney, or that part of it which lies immediately above the fire-place, to a proper form and to just dimensions:

That my principles for constructing Fire-places are equally applicable to those which are designed for burning coal, as to those in which wood is burned, has lately been abundantly proved by experiments made here in London; for of above a hundred and fifty Fire-places which have been altered in this City under my direction, within these last two months, there is not one which has not answered perfectly well. And by several experiments, which have been made with great care, and with the assistance of thermometers, it has been demonstrated, that the saving of fuel arising from these improvements of Fire-places amounts in all cases to

more than *half*, and in many cases to more than *two-thirds* of the quantity formerly consumed.

Now as the alterations in Fire-places, which are necessary, may be made at very trifling expense, as any kind of grasse or stone may be made use of, and as no iron work, but merely a few bricks and some mortar, or a few small pieces of fire stone are required; the improvement in question is very important when considered merely with a view to economy; but it should be remembered that not only a great saving is made of fuel by the alterations proposed but that rooms are made much more comfortable and more salubrious; that they may be more equally warmed, and more easily kept at any required temperature; that all draughts of cold air from the doors and windows towards the Fire-place, which are so fatal to delicate constitutions, will be completely prevented.

Before I proceed to give directions for the construction of Fire-places, it will be proper to examine more carefully the Fire-places now in common use, to point their faults and to establish the principles upon which Fire-places ought to be constructed.

The great fault of all open Fire-places or Chimnies for burning wood or coals, in an open fire, now in common use is, that they are much too large; or rather it is *the throat of the chimney* or the lower part of its open canal in the neighbourhood of the mantle, and immediately over the fire, which is too large.

As the immoderate size of the throats of chimneys is the great fault of their construction, it is this fault which ought always to be first attended to, in the very attempt which is made to improve them; for however perfect the construction of the fire-place may be in other respects, if the opening left for the passage of the smoke is larger than is necessary for that purpose, nothing can prevent the warm air of the room from escaping through it; and whenever this happens, there is not only an unnecessary loss of heat, but the warm air which leaves the room to go up the chimney being replaced by cold air from without, the drafts of cold air so often mentioned cannot fail to be produced in the room, to the great annoyance of those who inhabit it. But although both of these evils may be effectually remedied by reducing the throat of the chimney to a proper size, yet in doing this several precautions will be necessary. And first of all, the throat of the chimney should be in its proper place; that is to say, in that place in which it ought to be, in order that the ascent of the smoke may be most facilitated; for every means which can be employed for facilitating the ascent of the smoke in the chimney must naturally tend to prevent the chimney from smoking; now as the smoke and hot vapor which issue from a fire naturally tend upwards, the proper place for the throat of the chimney is evidently perpendicularly *over the fire*.