LXXXIII. Description of an œconomical culinary stove

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gative electricity of Franklin, and the element of light, or phlogiston, are only different names for the same thing.

And the fire-air of Scheele, the dephlogisticated air of Priestley, and the oxygen gas of Lavoisier, are only different names for the same gas; the elementary or imponderable part of which is the same as the positive electricity of Franklin, and the element of heat, or thermogen.

That one of these is the element of light, and the other the element of heat, may be demonstrated thus: The gas procured from coals, with which the streets of large towns are now illuminated, contains the element of light. This element produces a most brilliant light with very little heat, as it consumes only a small quantity of the oxygen gas of the air. That the oxygen gas of the atmosphere contains the element of heat, may be clearly understood from the use of the blowpipe. This instrument produces the most intense heat, without increasing the light of the lamp; and the same effect is produced by other blowing machines used to increase the heat of furnaces.

Scheele observes in his *Treatise on air and fire**, that “phlogiston is a true *element* and a simple *principle*, which enters into so close and subtle an union with empyreal or fire-air that it even penetrates through the most subtle pores of all bodies. From this union arise both the *matter of light*, and likewise the *matter of heat* †. In all these compositions phlogiston undergoes not the least change; and from the last composition it can be separated again. Phlogiston can by no means be obtained by itself; for it never separates from one body, though united with it ever so closely, unless there be present another coming in immediate contact with it.”

Hence the term *phlogiston*, which has been so much animadverted upon by chemical philosophers, is only another name for that inflammable *element* contained in a certain class of bodies, and this 's perhaps as proper a name as any other that has yet been invented.

Lynn, May 12, 1817.

EZEKIEL WALKER.

[To be continued.]

LXXXIII. *Description of an æconomical culinary Stove.*

By RICH. P. PLAYER, Esq. *Malmsbury.*

To Mr. Tillock.

SIR, — A CORRESPONDENT in your Number for November last has proposed some inquiries respecting the most æconomical

* Page 103. † The *elements* of light and heat are very different from the *matter* of light and the *matter* of heat. This very important subject still remains for investigation.

construction

construction of an oven for baking, &c. and an apparatus for heating liquids and drying substances by steam. Having had a simple, and by no means expensive, culinary stove for more than a year in constant use in my own kitchen, which was constructed without a knowledge of or reference to any other of a similar kind, is very œconomical with respect to fuel, and unites great convenience and cleanliness with extent of application, I have thought a description of it may be worthy of your notice. It has been adopted by several of my neighbours, who have expressed themselves much pleased with it; and though the description does not completely solve the inquiries suggested, it may be useful to your correspondent, or others who may choose to make trial of one of a similar construction.

It is extremely probable that something similar to the apparatus I am about to describe may have been employed by others; but the skilful direction of heat from a small quantity of fire to our various culinary and domestic purposes is by no means generally understood; and notwithstanding the exertions of Count Rumford and others, the attention of men of science to this interesting and useful subject will most probably be still repaid with valuable improvements. I venture to hope, therefore, that the present communication will not be without its use in contributing to improve our domestic œconomy, and diminishing that wasteful consumption of fuel unavoidable in conducting culinary and domestic processes by an open fire.

The stove which I am now to submit to your notice projects in front of the ordinary fire-place, which has been built up, the necessary communications with the chimney being preserved.

The fire-place of the stove is built of bricks; it is nine inches long in the grate, six inches wide, and seven inches deep. The grate is situated four inches and a half from the door, and the interval is covered with a plate of iron. The front of the stove as far as the side wall of an oven on the right is covered with a plate of sheet-iron 1-8th of an inch thick, in which the doorways are cut, and which is secured by stays walled into the brick-work. Over the top of this fire-place a cast-iron plate is laid twenty inches square and 3-8ths of an inch thick.

From the top of this fire-place a flue for the passage of the heated air passes under the oven, then up the side furthest from the fire till it reaches the top, whence it descends down the back of the oven to the bottom of the side next to the fire, and is continued up that side, and then along the top to the centre, where its escape into the chimney is regulated by a sliding register.

The width of the flue round the oven should be about three inches in the part under the oven, and two inches and a half up the side furthest from the fire; the space at the back of the

oven, which serves for the descent of the hot air, should also be about two inches and a half wide, and likewise that part by which the hot air ascends, seeking its way to the chimney. The other dimension, or the depth of the flue, depends on the size of the oven, the flue being of the whole depth of the oven excepting only the thickness of the brick-work in front, which should not exceed three inches, that the quantity of surface exposed to the hot air may be as little reduced as possible.

The oven which I have adopted is about fourteen inches wide, twelve high, and sixteen deep from front to back, which will be found convenient dimensions for moderate families.

Moveable stoppers are inserted in the brick-work for the convenience of cleaning the flue—one of these, placed at the back corner parallel to the bottom of the oven and top of the fire-place, serves for sweeping out the flue at the bottom, at the back of the oven, and up the side next the fire-place; another at the front bottom corner, furthest from the fire-place, serves for cleaning the ascending flue furthest from the fire; and a third in front over the door of the oven for cleaning the top part of the flue. A door, closed with sheet-iron, opens into the chimney, over the fire-place, for sending up a sweep to clean the chimney.

At the distance of about three feet over the stove, there is a horizontal frame of wood about four feet long by twenty inches wide, having wires or strings from end to end, three or four inches apart, for drying linen, &c. This frame, by means of a pair of hinges, may be turned back against the wall when not in use.

By this simple apparatus, the various processes of boiling, steaming, roasting, baking, &c. can be conducted on an extensive scale with the greatest ease and in the most cleanly manner, with a quantity of fuel so small as to be scarcely credited by those accustomed only to open fires, and with what are called small-coals, which can be purchased here at about two-thirds of the price of the mixed or large and small together. The same fire which heats the cast-iron plate sufficiently for boiling, steaming, &c., at the same time heats the oven for roasting or baking.

The kitchen is completely warmed in the coldest weather, and can be readily ventilated in summer. Linen, &c. is dried and aired with great rapidity, and flats are heated for ironing. The oven being constantly hot is found useful for various purposes, and when not otherwise wanted, is kept open, or shut, as more or less heat in the kitchen is required. On its top, plates and dishes are warmed for the table, or liquids may be kept at a moderate heat for any length of time. When the fire is not wanted, it may be kept in for several hours, by nearly closing the registers, with very little consumption of fuel, and may be blown up in a few minutes by opening them.

Boiling,

Boiling, steaming, and frying, are conducted on the cast-iron plate over the fire-place. One of the size above described, twenty inches square, is large enough for most moderate families; for, when a vessel is made to boil by being placed on the hottest part, it may be removed to one side, where it will keep boiling for any length of time; and another which is required to boil may be substituted in its place.

In families where large quantities of hot water are wanted, a boiler may be set on one side of the cast-iron plate and an oven on the other,—but this will not in general be found necessary.

Persons accustomed to place their vessels over the irregular surface of an open fire, or on the hooks and other contrivances made use of to support them, will be surprised at the great steadiness and cleanliness with which the process of boiling is conducted on an iron plate.

Steaming may be conducted immediately over the vessels of boiling water, or in others at a distance; or the steam, confined between the sides of double metallic vessels of various forms, may be applied to the purposes of warming water, drying, &c.

The bottoms of vessels used for boiling on an iron plate should be perfectly flat; and both these, and those used for steaming, should have their sides and tops kept as bright as possible.

The boiling temperature in liquids, except the plate be very hot, is not obtained quite so soon as over an open fire; but this will be found productive of little or no inconvenience, as the vessel has only to be placed on it somewhat earlier.

The common frying-pan may be used over an iron plate; but one with deeper sides would be preferable, to prevent the flying over of any particles of fat, which should be carefully avoided, both on the plate and in the oven.

Bread may be toasted by being cut with a smooth surface, and placed on a small wire frame laid on the iron plate, so close as just to prevent its contact. Small pieces may also be toasted in the fire place, and steaks, &c. may be readily broiled therein, on a gridiron adapted to its form and size.

Cheese may be toasted with much greater facility than before a fire, by being placed on the stove in a common plate, and turned once over.

That roasting can be well conducted in an oven, is by no means generally known. The difference between it and baking is this, that the latter process is performed, as your correspondent suggests, with the door closed; and the former, with it sufficiently open to admit of a gentle current of air passing constantly through the oven: and as in every oven, when the door is open, a current of cold air enters near the bottom, and, passing round up the back, returns out highly heated under its top, it is necessary

sary to place the meat in this upper current of air. The oven door may be kept quite shut till the meat is warmed through, and begins to roast; and then should be opened about the width of one-eighth of an inch in front, or wider if the process goes on too rapidly. The meat should be turned and dripped occasionally; and generally requires about one-third more time than when roasted before a fire; from which, however, when the process is conducted with moderate care, it cannot be distinguished by the nicest taste.

As the lower current of air tends to preserve the dripping-pan cool, placing it in another containing water, as described by Count Rumford, will not be found necessary after a little practice in regulating the heat of the oven by the registers.

It is obvious that one of Count Rumford's roasters, or roasting ovens, may be heated by the flue from the fire-place, as well as a common cast-iron oven; but as the former in particular are much more expensive, more complex, and less durable—and as the process of roasting can be conducted in the highest perfection in a common cast-iron oven, this, in families where cheapness and simplicity are kept in view, will obtain the preference.

The oven might be constructed of sheet-iron at a trifling expense, and would never be liable to injury from the fire, at the distance at which it is placed. Even an old cast-iron pot, placed sideways, with a wooden stopper, would make no contemptible oven; and with a cast-iron plate, a fire-place door, and a few bars, a stove might be cheaply constructed in those situations of life where comfort and æconomy are more particularly desirable.

As the temperature of the oven can be varied at pleasure, by urging the fire more or less, by keeping its door shut or open, and in the latter case by placing the article to be subjected to the effects of heat higher or lower, it forms of itself a small drying stove; and when in addition to it the iron plate on its top, and that over the fire-place, are taken into consideration, it is obvious that any degree of temperature up to red heat can be always obtained; and in the current of warm air immediately over the stove, when drying at a lower temperature is required, it can be conducted with great ease, and on a more extensive scale.

It will be observed, that the fire-place is not situated immediately under the centre of the iron-plate, but at the distance of about nine inches from its left-hand edge, which, allowing six inches for the width of the fire-place, leaves about five inches in the clear between it and the side-wall of the oven. The object of thus placing it towards the oven is, that too much of the heat may not be expended under the plate, but that a due share of it may be distributed around the oven.

It may, however, be placed immediately under the centre of the plate, in which case the entrance from the fire-place into the
first

first flue (which in the present construction is over the upright side of the fire-place) should be made sloping upwards from near its bottom.

It will be found convenient to have a strip of iron plate, three or four inches wide, riveted to the right-hand edge of the cast-iron plate, and turned up at a right angle against the side of the oven-flue, as the mortar is liable to crack with the strong heat, and to be struck off by the culinary vessels.

Once in three or four days a little straw, or a few shavings or sticks of brush-wood, should be kindled in the fire-place, and suffered to burn freely for a few minutes with the dampers open, to clear the flues of soot, which would otherwise collect and impede the passage of the smoke. With this precaution, the stoppers, which are left for cleaning them, will only require to be withdrawn once in a quarter of a year or longer, to remove the ashes of the soot, which is readily done with a brush having a flexible wire handle.

If at any time, for want of burning out, the flues should get so full of soot as to impede the current of the smoke, which only happens from inattention, it may be easily broken down by introducing the brush, and then burnt, without the trouble of sweeping it out.

The high price of what are called the steam kitchens, their complex structure, and the frequent repairs some of them stand in need of, together with the difficulty of heating boilers, ovens, &c. *æconomically*, from an open fire, even were the flues which surround their sides constructed in the most advantageous manner, are objections to their general adoption; not to mention the smoke, soot, and dust of open fires, and the more extensive application to the purposes of drying and warming of which a stove is capable.

I fear I may have trespassed on the patience of some of your readers by descending too much into detail on a humble subject; but I trust to their candour for excuse, when it is considered that my observations are ultimately for the use of persons in the humbler situations of life; that our culinary processes are, even at this enlightened period, commonly conducted with scarcely more skill in the application of heat, than they were by our aboriginal ancestors; that individuals accustomed always to open fires are likely at first to experience occasional embarrassment in the direction of its unseen energies in a more artificial manner; and that the highest speculations of science, however gratifying to our vanity, are comparatively of little value till they are made subservient to our necessities. I am, sir,

Your obedient servant,

Malmsbury, Dec. 10, 1816.

RICH. P. PLAYER.