

**HEATING BY ARTIFICIAL
MEANS: FOURTH
EDITION - REVISED**

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Heating by artificial means: Fourth Edition - Revised by James Keith

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JAMES KEITH

**HEATING BY ARTIFICIAL
MEANS: FOURTH
EDITION - REVISED**

HEATING

BY

ARTIFICIAL MEANS.

BY

JAMES KEITH,

Gas, Hydraulic, Ventilating, and Heating Engineer,

LONDON, EDINBURGH, AND ABERDEEN.

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HEATING.

THE proper heating of all buildings, public or private, in cold or damp weather, is a most important matter both as to health and comfort; but, generally speaking, our homes, places of meeting, and places of business are neither properly nor healthily heated, rather the reverse—and those places which are warmed, or said to be warmed, are very often done so imperfectly, injudiciously, and at a great comparative cost for fuel.

Let us glance for a moment at the various modes of Artificial Heating in use.

I.—ORDINARY OPEN FIRES.

This is the most common and oldest plan of heating, and it effects the purpose very well in small places or rooms, only it is expensive, and generally furnishes a deal of dust and smoke along with it.

The small amount of heat given off, for the great amount of fuel consumed, condemns this plan, however, from an economical point of view—though, owing to the open fire and chimney assisting ventilation very materially in small places, it is not so injurious to the health as some other modes hereafter mentioned.

Also, the *cheerful* appearance of an open fire often gives an *apparent* warmth to a place, which the existing temperature does not warrant.

Though it is thus pleasant to look at an open fire, it should always be borne in mind that the little heat which is got from it is got at a tremendous waste of fuel—the chimney getting the principal benefit—the *cheerful feeling* of warmth notwithstanding, it being remarked in passing that the *cheerful feeling* spoken of is simply imaginary; as people generally feel quite as cheerful in a room in summer when there are no fires as they do in winter with fires, it being *warmth* that is required, and not a *feeling* or *appearance only* of warmth.

Ordinary open fires are, however, only suitable for rooms or small places, as formerly stated: in large areas they are utterly useless for heating, and we must look for something else.

Dr. Arnott, in his well-known "Treatise on Warming and Ventilating," enumerates many evils which are more or less inseparable from open fires. Among these are "waste of fuel, unequal heating, a stratum of cold air near the floor, the production of dust and smoke, loss of time in attendance, and danger to person and property."

While on the subject of open fires, it may be mentioned that we have lately perfected an arrangement, called our Open Fire Hot Water Apparatus, which is of an ornamental character, and forms a complete and powerful hot water heating apparatus in itself, of any size, combining the ventilation and cheerfulness of the open fire with the healthy warmth and safety of hot water heating. This apparatus is illustrated and more fully described under Hot Water Heating further on.

II.—STOVES OR HOT AIR APPLIANCES.

Hot air, as supplied by the ordinary stoves in use, or through *special hot air furnaces* (for the *principle* is the same in both *cases*), is largely used for heating halls, vestibules, churches, and

buildings of all sorts, and this plan of heating often does very well, plenty of heat, of a kind, generally being got, but at a great consumption of fuel.

Considerably better results, both as regards economy in fuel and amount of heat got, are obtained by this plan than by the open fires—only the heat so obtained is dryer, and much more injurious to health, owing to the overheating of the atmosphere by the contact of the very hot plates of the ordinary stove, or the passage of the air through the hot air furnace box or pipes.

For instance, if a room be *overheated* by a stove, or if a church be *overheated* by a hot air apparatus, the temperature being, say, over 60°, a nauseous, suffocating atmosphere will be felt on suddenly entering either the room or the church, and this feeling is quite correct, as places heated up to this temperature by hot air only, in this manner, are simply being heated by, as it were, *burnt* air or a form of gas, in a great measure, which, being breathed over and over again by people in these places, makes the whole style of heating most injurious, unhealthy, and unsatisfactory from every point of view.

The above remarks refer more particularly to coal, coke, or wood burning stoves or hot air furnaces. In regard to *gas* stoves for warming, they do very well on a small scale for heating any small and well ventilated place, such as open shops, vestibules, and offices, but in sleeping or living rooms they are very prejudicial to health, as, generally speaking, and unless specially provided against, the products of combustion (which are highly poisonous) are not carried off from these stoves, so that people living or sleeping in these rooms have to breathe the bad gases, which is, of course, very dangerous. Gas stoves for warming are mere toys at the best, as well as most expensive to keep going, and are quite unsuitable for large places.

These remarks of course do not apply to *gas cooking stoves*.

which in many cases, with a cheap low standard illuminating gas, give excellent results.

The danger arising from open fires, and especially from stoves and hot air furnaces, is very great, as is daily shown by the destruction of valuable buildings, such as dwelling-houses, mansions, churches, museums, and other public buildings by fire, which, in the majority of cases, is traceable to these sources; the only really *safe* mode of heating these places being by Hot Water Appliances, as explained further on.

III.—STEAM-HEATING.

There are various modes of heating by steam, viz., what are called *Low Pressure*, or the gravity system, *High Pressure*, or the Expansive System, and heating by Exhaust Steam.

Low Pressure steam heating, or the gravity system, is the heating by steam at a pressure varying from 5 lbs. to 10 lbs. the square inch. This is an admirable plan for heating large ranges of warehouses, public buildings, and offices, and it consists in placing a powerful and rapid heating boiler preferably composed principally of tubes, in the basement under the building to be heated: from this boiler, malleable iron pipes are run up through the rooms, or other places requiring warmth, where they terminate in neat box coils of pipes under cast-iron fret-work, or vertical pipe or other radiator, according to taste and style of building—the return pipes being carried back again to basement, where they are connected to the boiler in a peculiar manner direct, if the boiler is placed low enough, or to a curiously constructed return steam trap, from which the condensed steam is again returned to boiler without waste or exhaust.

This plan of heating, to be successful, has to be most care-