

bottom of the lane, and have been sitting on the grass in the shade! But the thermometer is standing at 90, and *there is less oxygen in the air.*

These two pictures have a lesson for us who want to warm our houses in winter, and for that reason they have been painted with so much detail. Has the reader ever considered the fact that in summer-time the newspapers day by day tell us that the thermometer registered so many degrees *in the sun*, and, perhaps, 20 or 30 deg. less *in the shade*? The All-wise Providence knows that we need our air as cool as we can get it, and has taken care that the sun shall not heat it over much! For air expands very rapidly with heat, and the capacity of our lungs and our rate of breathing being constant, we inhale a lesser weight of air when it is warm, and, consequently, absorb also a smaller quantity of oxygen.

Under 30 in. of barometric pressure, a cubic foot of air at 32 deg. Fahr. weighs 0.0807 lb.; at 52 deg., 0.0776 lb.; at 62 deg., 0.0761 lb.; at 72 deg., 0.0747 lb.; and at 82 deg., 0.0733 lb. The proportion of oxygen in each case being constant, it is evident that a given volume of air at 30 deg. must contain 10 per cent. more of this essential gas than the same volume of air at 82 deg. For this reason we feel exhilarated on a cold day and enervated when the weather is sultry.

The original source of all the heat upon this globe seems to be the sun, and its way of communicating this warmth to the earth is to send its rays of heat through the atmosphere without affecting its temperature to raise that of every solid object they may strike. The air, ever restless, is constantly brushing the surfaces of these solids, so warmed, and robbing them of some of their heat, grows gradually warmer also, but it is only in this manner that it does so. Were it not for this physical law our flesh in summer would soon become baked meat!

Now, the wisdom of these provisions of Nature, being so obvious that the meanest intelligence can grasp it, is it not an extraordinary thing that, with the exception of man's first attempt to secure artificial warmth, every one of his inventions in this direction have been in absolute contravention of the teachings of Providence? For each and all of them strive to warm our surrounding objects by heat first imparted to the ambient air! One system openly declares its objects, and is quite unblushingly called the "hot air" apparatus. Another seeks to veil the hideous truth under a Latin pseudonym; it is styled the "Plenum" system, and depends for its effect upon the driving of large volumes of air over heated surfaces, and then through channels and openings into the various apartments. Such a system, by the way, is used in our Houses of Parliament, where the fresh warmed air comes up through the interstices of the horsehair matting on the floor, on which everyone treads (this may have been altered now, for there have been some modifications quite lately of

the warming arrangements, concerning which the complaints were many. In any case, such was the system until quite recent years). Other inventions partially warm the surrounding objects in the same manner as the sun, but also, and to a great extent, heat the air in which they are placed. In this category must be included all hot-water and steam-heating apparatus, the pipes and heating surfaces of which are within the rooms to be warmed. Even these of late years have striven to gull the public as to their real method of working by calling their surfaces "Radiators," when they are in fact little better than "Heaters." This deceptive title, be it said, hails from America, and shows that whoever invented it must have known well what was really needed, though he did little or nothing to supply the want beyond hitting upon a specious name. To prove that such deception was actually intentional, it may be said that one of the persons who first introduced these radiators here about 1879 or 1880 was wont upon the plans he submitted to his customers to emphasise the proposed position of these heaters by a strong red glow of colour fading to nothing, and thus seek to convince his clients that these surfaces were radiators in fact as well as in name. The truth is that a heated surface will yield from 25 per cent. to 50 per cent. of its warmth by radiation to surrounding objects, provided it can project its rays uninterruptedly at them through space (the exact proportion depends upon the temperature and also on the shape of the heater). The first radiators that came to this country, the "Bundy," undoubtedly did seek to expose the largest surface possible in this way, but on that account took up a great deal of wall-space. Many of the present-day types, therefore, though they still retain the specious title, are constructed without the slightest regard to this original and admirable principle, and, indeed, give off far less heat in this way than the confessedly unsightly hot-water or steam-pipes which they seek to displace. For instance, some are composed of elements 6 in., 8 in., and even 12 in. in depth, by widths varying from 1½ in. to 3 in. For the purpose of examining its available radiating surface we will take one with a horizontal section of 6 in. by 2 in. Its girth is evidently 16 in. and as only the narrow width shows outwards it is clear that but 4 in. or one-fourth part only can yield any of its heat in this way, and then the apparatus must be freely exposed in the room; if it is placed against some wall, as is generally done, only half this small proportion is really effective for radiation of heat. Yet, notwithstanding, the old specious title is adhered to and the long-suffering public are deceived.

But worse tricks than these are played upon unwary purchasers in need of warmth, and all of them seem to have a vogue for a time. In the 90's a gas stove was sold which could be met with all over the kingdom. It consisted of two cylinders

[previous page](#)

[next page](#)