science, and we owe our present knowledge of the subject especially to modern researches and discoveries.

In private houses the necessity for ventilation will arise from, commonly : 1. The presence of fires ; 2, artificial light ; 3, the presence of persons living in the house (that is from the air required by them as well as the exhalation from their bodies), and 4, from badly constructed waterclosets, cess-pools and drains.

In factories, there will be in addition to the above causes the presence in the air of a vast quantity of minutely divided fiber and dust, which is highly prejudicial to health of the workers, and also the fumes from chemicals, etc., where the manufacture of such is carried on.

In sewers the necessity of sufficient ventilation will almost entirely arise from the generation of poisonous gases by the putrid filth carried down. And in underground railways the fires of the engines and the saturation of the air by the waste steam will render ventilation in certain cases a necessity.

Considering these cases, in the above order we have, first, in dwelling houses the presence of fires.

At first sight it would seem an error to include this under the head of causes which make ventilation a necessity, as fires are often, indeed, mostly the only means of ventilation in private houses. But under the term, I include not only the removal of foul air, but the supply of fresh air, and from this point of view it will be seen that the common fire is a very grrat consumer of fresh air and requires a supply of that, quite as much as of the fuel which feeds it.

It may be well to mention here some well known facts connected with the combustion of fuel.

The fuels commonly used are composed principally of carbon and hydrogen in about the following proportions :

Name	Carbon	Hydrogen	Ashes, etc.	Water
Coal	.812	.048	.140	——
Coke	.850	——	.150	——
Wood	.408	.052	.350	.200
Charcoal	.930	——	.070	——
Peat	.464	.048	.288	.200

Now combustion consists in the union of oxygen gas with the elements, carbon and hydrogen, and the results is the development of light and heat, and the formation of carbonic acid and water, the carbon of the fuel uniting with the oxygen of the air to form carbonic acid and the hydrogen doing the same to form water.

Carbon exists in its pure and chrystalized form as the diamond, and this beautiful gem is combustible in oxygen gas, burning entirely to carbonic acid. This experiment has been tried, however, only in the labratory.

One pound of carbon requires for its combustion 158 cubic feet of air, while the same weight of hydrogen requires 473 cubic feet. From these facts it will be seen that the different fuels mentioned above will take for their proper combustion the following quantities of air, viz.:

Coal	148 cubic feet	½ pound
Coke	134 "	
Wood	65 "	
Charcoal	147 "	
Peat	81 "	

There is a certain quantity of oxygen in coal, wood and peat which somewhat reduces the amount of atmospheric air required by these fuels.

From the above tables, at which assume the temperature of the air to 26 deg. F., it will be seen that the ordinary fire plays no unimportant part in the consumption of air; for if we assume one pound of coal per hour as the quantity required, then 148 cubit feet of air will be consumed in that period, or 2.46 feet per minute or 2.072 cubic feet per day of 14 hours.

These, as we have said, are minimum quantities. In practice, at least double must be allowed, as a large percentage will escape unconsumed.

In the case of common fire the products of combustion do not certainly escape into the room, but the air to supply the fire is required all the same, and I feel sure that not in one house in a hundred is this supply ever thought of, but is left to chance and the cracks in the doors and windows, from which drafts whistle across the room in every direction.

The second clause—artificial light—requires far more serious consideration than the fire, for commonly the products of combustion are passed directly into the room, and are breathed in a diluted form by the persons in it. The introduction of coal gas has been most pernicious in this respect, for few houses are built with any regard to the method of lighting, nor are the ways in which the gas is generally burnt calculated for anything but to do the greatest amount of injury to the persons using it. Some form of gas light such as the sun-burners and the ventilating globe lights are comparatively free from defect in these respects, but I have never seen the latter used save in one or two private houses, and the former are almost entirely confined to offices and public buildings. I have experienced some difficulty in obtaining the quantity of air consumed by the ordinary bat's wing or fish tail burners when lighted. But taking the Argand burner, using five feet of gas per hour, and forty-five feet of common air in the same time, as a standard, and knowing that the common burners burn from two to four feet per hour, according to size and pressure, I think I shall be safe in calculating that the average consumption of gas by the common burners at thirty-six cubic feet per hour.

Now, a room twenty-five feet long by sixteen feet broad, and ten feet six inches high, will contain 4,200 cubic feet of air, but a deduction must be made for furniture, etc., of at least ten per cent., leaving 3,780 cubic feet, or say 3,800, as the net quantity of air in the room.

Such a room will require at least three gas burners to light it, and these, as we have seen, will consume 108 cubic feet of air per hour, rendering it absolutely unfit for breathing by depriving it of its proportion of oxygen.

Road Making Again.

It appears that the gentlemen of one of our municipal councils do not agree with the views expressed in this journal on the subject of road-making. It is better that they should differ from us than that they should ignore the subject altogether. We have had municipal bodies and the public differ from us before—at least for a time. There is a natural tendency to cling to old ideas and old systems, no matter how antiquated or absurd. A few years ago municipal representatives and a majority of the people were opposed to a poor house. Now we are getting a poor house with almost universal approval. So, too, a new court house was bitterly opposed. Now people are so pleased with the new structure that they wonder why they didn't build it years ago. And no one will ever feel the slight burden of taxation which these evidences of progress will impose. So some councillors and path masters will cling to the statute labor system in road making long after its usefulness is gone. But the question of better roads is here to stay. And the man or the systems that stand in the way of good roads will be changed or disappear. Once the people realize how much worse their roads are than the roads of other countries, and how much they lose every year by having bad roads, and they will have good roads, no matter what they cost. But as a fact, good roads cost far less in the end than bad ones, and the intelligent and progressive people of the present day begin to see this.—*Sentinel-Review.*

The provisions with respect to the new criminal code, in regard to the sale of firearms to minors, are far more severe than most of people imagine. One clause says: Everyone is guilty of an offence, and liable on summary conviction to a penalty exceeding $50, who sells or gives any pistol or air gun or any ammunition to a minor under sixteen years, unless he establishes to the satisfaction of the justice, before whom he is charged, that he used reasonable diligence in endeavoring to ascertain the age of the minor before making such sale or gift, and that he had good reason to believe that such minor was not under the age of 16. Everyone is guilty of an offence and liable under summary conviction, to a penalty not exceeding $25, who sells any pistol or air gun without keeping a record of such sale, the date thereof, and of the maker's name or other mark by which such arm may be identified.