purposes of two smaller. It is divided into two channels by a partition, called a brattice, made of iron plate or other fit material, and running down from the top to the bottom. One of the channels serves as the smoke-flue. This arrangement is objectionable on several accounts.

8. In imitation of this, a single short tube of metal, divided by a brattice or partition of metal into two channels, has been fixed through the ceiling of rooms, stables, &c., to ventilate them. It is much better than an open pane in the window, or a hole in the wall—and either of these is much better than no ventilation at all; but it has many faults. It has no source of heat immediately in one channel, like the mine-shaft, to make it draw strongly. The most impure air approaching the opening to pass out is always rubbing against, and mingling in a degree with the new air passing in. It injects and extracts much less strongly than the twin tubes described above, at No. 5. When there is little wind, and little difference of temperature in the two channels, there is little or no action. With closed doors and windows in the rooms below, and a strong fire, both channels become inlets of cold air. The cold air entering by it is not diffused in the room, and may prove hurtful, like that from an open window. Yet, with all these defects, it will, in certain cases, prove a useful aid, because it is a high opening to the external air, and has tranquil action. The model containing one or more burning candles, to represent men, which has been used to illustrate its action, is calculated to give to ordinary observers a very fallacious notion of its nature and power.

Anthracite Coal in the United States.

There are few subjects in the history of mining operations more remarkable than that of the anthracite coal field of Pennsylvania. For a century and a half after our countryman, William Penn, had founded that colony, and established that commonwealth, wood was the only fuel known to its population; but in time increased cultivation cleared away the forests, and Providence directed attention to the vast beds of coal to be found in the mountain ranges of the Schuylkill. The old German residents long laughed at the idea of making fires with what they called "black stones," and the adaptation of anthracite to the purposes of domestic fuel was generally ridiculed. The same silly prejudices still prevail in Ireland, where the anthracite abounds, and the inhabitants unaccountably prefer to expend the resources of their country in importing an inferior fuel to employing their own. Perseverance and science in the United States, however, overcame every difficulty, and by the use and construction of improved stoves, on new principles of strong draught and ventilation, anthracite coal is now burnt in the American cities with as much facility as bituminous coal is with us, while its radiation of heat and consequent power of imparting warmth are far more intense.

The anthracite coal trade of Pennsylvania is of recent creation, while its rapid and progressive advance in that state alone is a source of wonder. It commenced in 1820, in which year the quantity of Pennsylvanian anthracite sent to market was 365 tons. In 1830, ten years after, it reached 174,734 tons. In 1840, another interval of ten years having elapsed, it reached 865,414 tons, and in 1853 it swelled to the prodigious amount of 5,195,151 tons. The value of this mineral fossil fuel is every day winning its way with the people, who are adapting it to their wants and their comforts, so that the demand is daily increasing with more than progressive rapidity. For the express purposes of furnishing supplies to meet the demand, railways have been laid down, others are in course of formation, and still more have been projected. We are beginning to follow the example of the Americans in using anthracite coal in our steam-ships—for instance, in the *Great Britain*, for her voyages to Australia; and it is not impossible that before long their methods and appliances for using it will be adopted for domestic purposes in many districts.

We are enabled to present to our readers a very interesting detail of a recent visit to the coal field of Pennsylvania. The coal bed lies in a range of the Blue Mountains, and is found on the north side, extending from east to west about 70 miles, varying in width from 6 to 12 miles, while on the south side there is nothing seen but mould and red shale rock. When digging in the very centre of the summit, a black line was discovered, running along the range east and west, which is, in fact, a line drawn by nature, dividing the coal from the stony rock. The face of the country, with the exception that the hills are higher, resembles the coal and iron region of the Forest of Dean, in Gloucestershire; the coal dips in various angles from the horizon, and in no instance horizontally, as in some coal fields in England. The seams and veins the best of which are about 60 feet wide and 12 feet thick, converge towards a common mass at the eastern end of the range, near a portion of the mountain called Mauuch Chunk. Here, except the outside covering of rock and earth, the masses of the hills are solid coal, so much so, that a slice of the hill is cut away, exposing the coal, where is is actually quarried like stone, instead of being reached by subterraneous galleries and shafts, as at Pottsville. Many of the shafts in the latter district are 1000 feet deep, while a few are horizontal tunnels running into the mountains, while in some of the colleries there are horizontal tunnels, and then deep and perpendicular shafts crossing them. The mines are valuable in proportion as the coal is above or below the water-level of the springs.

The vast expanse of the galleries and shafts, of course, requires large quantities of timber for shores and props, and all the large timber in the vicinity of the collieries has been long exhausted. Although the neighbouring mountains would appear to be covered with trees, they are as yet too young and too small to be of much use, and timber for the use of the mines—and a few large ones will require a forest—has to be hauled for 15 or 20 miles, the expense of which exceeds that of the trees. The water raised from those mines is impregnated with iron and sulphur, and one feature in these valleys strikes the stranger with surprise—that is, that millions upon millions of tons of coal dust, or as it would be called in England small coal, are collected in heaps, apparently valueless. Hitherto these vast mounds of refuse, being anthracite, have been almost useless; had they been bituminous they would have been mixed, and converted into some kind of fuel; but we are told that as yet in America, means have not been adopted to render the small anthracite available for that purpose. Both in Wales and in Ireland it has long been the practice to mix the small anthracite with clay, which mass is then rolled into fire-balls, and used by the farming classes as fuel. Large quantities of it are also employed in the burning of lime for agricultural purposes, uses to which it will probably be hereafter extensively applied as cultivation spreads in America. Most of the collieries of Pennsylvania are worked upon royalties—that is, a coal company pays the owner of the land and mine at the rate of from 25 cents to 40 cents per ton for all raised, the company paying all the mining expenses, the land-