

Combustion.—Grates, Stoves and Ventilation.

Smoke from a chimney ascends because it is lighter than the atmosphere. When fuel is kindled in a grate it requires a supply of fresh air in order that it may burn freely. It is for this reason that bars are made below as well as in front so that the air may have access to all parts of the fuel, and if the smoke and vapor ascend swiftly it is said to draw well.

Most persons attribute to the chimney some inherent action by which it draws smoke and vapor from the fire, but this is not so, as the chimney is merely an outlet for the products of combustion, and these being heated—lighter than the air seek the readiest means of escape to the atmosphere. The theory of combustion is not very easily explained. The production of heat by friction and the excitement of fire by the chemical affinity of contact generating the inflammable elements, is something which is generally explained with no explanation but this, which is a very vague one, viz that a rapid chemical affinity is induced between the inflammable elements of fuel and the oxygen of the air. The products of the combustion are nearly similar to those of the candle flame, a portion of air is deprived of oxygen, the nitrogen heated as well as the surrounding air; and thus rendered lighter than the great bulk of colder air of the apartment, ascend the chimney; air from the apartment rushes forward to supply the fuel, so that the flame of the fire is constantly drawing upon the air of the apartment for support, which thus yields oxygen, and becomes heated, and formed new heated products, must have free escape, for if it be retarded as in badly-constructed chimneys, then it rolls back with the smoke in sooty volumes and fills the apartment.

Suppose the chimney to be perfectly constructed, it is essential that as much air should in some way enter the apartment, as the fuel consumes, and the endeavour of the air in the external hall or passage to gain entrance and rush towards the fire, is announced by a whistling sound through the keyholes and crevices of the doors and windows; the chief entrance of the air to the apartment is through the space between the door and the carpet; this causes what is commonly called a draught, the danger of which is proverbial; it is a current of air which rapidly deprives the animal frame of heat, and produces the disagreeable and often fatal effect called a cold.

If all crevices be stopped so as to prevent a draught, then the chimney refuses its office, the smoke descends into the apartment and in many houses a window or door must be kept partly or even quite open, to admit the required supply of air, or otherwise the inmates of the apartment could not endure to sit there for the smoke; but this is only remedying one evil by the introduction of another, for it is by no means agreeable to remain in such a thorough draught.

Nothing can be more difficult than to admit a proper supply of air to the fire without causing inconvenience to the inmates of the apartment. In order to warm an apartment comfortably by a common fire, the grate should be placed as near the hearth as possible; it should be wide and shallow, so that the heat may be thrown directly upon the floor; this imparts warmth to the air which sweeps over its surface; this warm air ascends, colder air descends, in its turn becomes warmed, and thus currents are established which soon bring the temperature of the apartment to a proper degree.

In the method of warming apartments by open fires, even when the fire-places are most judiciously constructed, much heated air is lost by passing up the chimney; therefore to economize fuel, more particularly when very large apartments are to be warmed, the coal is burned in close stoves.

The advantages of a stove consist in the very small quantity of fuel which will maintain a very strong fire; the whole mass of the iron stove becomes heated to a considerable degree, and as it is usually placed in the middle of the apartment with its iron chimney or flue partly perpendicular and partly horizontal, the whole surface throws off heat very powerfully, and the air rushing forward to support the fire, impinging upon the heated sur-

face becomes warmed instantly; it ascends, colder air descends, becomes warmed and ascends; and thus currents are more rapidly established, and the apartment more effectually warmed than by the combustion of the same weight of fuel in the ordinary fire-grate.

Very little heat is lost if the flue is tolerably long, and very little smoke passes out at its extremity, because the draught of air through the door of the stove is rapid and powerful, so that all the inflammable matter of the coal is consumed.

It should be remembered that the stove requires a supply of fresh air, as imperatively as an open fire-place, so that a draught is the inevitable consequence of its employment, unless it be supplied with air from a tube entering its lower door and opening into the external air; and if this be done, then there is very little chance of the air in the apartment being renewed; and unless the door of the apartment be opened frequently to admit fresh air, the whole atmosphere will become insufferably heated and unpleasant.

Care should be always taken that the iron-work of a stove never becomes red-hot, or it will gain the power of vitiating the air by combining with the oxygen; and though the apartment will be more powerfully heated by the red-hot iron, the air will be rendered unfit for the support of life.

The abstraction of oxygen from air, and the combustion of dust, by the action of red-hot iron, are the principal causes by which apartments warmed by overheated stoves are rendered so proverbially unwholesome.

It is a very excellent plan to place a vessel of water on the top of the stove, that the water may evaporate and supply the air with moisture, and thus correct its oppressive dryness in some degree. Water is always present in the atmosphere in the state of vapor, and is indispensable for the support of life, as will more particularly be shown hereafter.

The ventilation of apartments, and buildings depends upon the escape of the air, which is heated and vitiated by respiration and combustion, and the entrance of fresh air to supply its place.

Nothing conduces more to health than to have plenty of fresh air. It is better to suffer cold than to suffer from a vitiated atmosphere. It is better to wear a great deal of comfortable clothing, than to heat the body at the expence of destroying the lungs. In our cold winters, the seeds of death are strewed broadcast among those who labor at sedentary occupations by roasting themselves in ill ventilated apartments. Who is he that does not shudder at the late suffocation of 70 poor Irish peasants in a steamboat, where they were pent up with covered hatches in a space where they could receive no supply of fresh air?—Let those who study "the best means to remedy disease" seek for the philosopher's stone in "the best means of preventing it."

Currents of the Ocean.

Many have heard of Lieut. Maury's Current Chart, but there are very few who really know what it is. We will endeavour to explain from his own remarks before the Scientific Association. The object of the Nautical Chart, is simply by the comparison of a great number of log books, to present a chart which will give every master of a vessel the knowledge, at a glance of the direction of the wind and the set of currents which others have experienced in the same place and at the same season.

Charts upon this plan are in course of preparation at the National Observatory, at Washington, for each of the three great Oceans. When they are completed, they will, it may be imagined, form for navigators one of the most complete "Directions" as to the Winds and Currents of the Ocean, that can be found.

For the completion of this undertaking, multitudes of records are required—for it is only by bringing multitudes of such observations together, that we can hope to approach anything like a fair result. For this, several thousands more are still wanting.

As far as the work has progressed, it gives indications of some truly interesting and valuable results. Among these may be mentioned a region of warm water off the Coast of South America, quite as remarkable for its temperature as is the Gulf Stream. "Perry"

in August (their Winter month,) found the temperature of the water as high as 76°. The most stormy part of the South Atlantic, between the Equator and the parallel of 40°, is in the vicinity of the Perry's warm region.

These indications of warm water here, and cold water there, are pregnant with meaning. They signify a cold current from the Polar and a warm one from the Equatorial regions. They denote that icebergs are drifting down in a certain direction—that storms and gales are brewing in another—and they remind one with painful emphasis how much that most useful and valuable instrument, the Water-Thermometer, is regarded by Navigators.

Lieut. Maury has been enabled to follow an indication manifested by these Charts up to a point of considerable interest. An examination of several thousand log books led to the discovery of an anomaly in the Trade Winds of the North Atlantic. This anomalous region is situated between the Equator and 10° North, the Coast of Africa, and 25° West. It is somewhat wedge-shaped with its base on the Coast of Africa, and its apex about midway the Atlantic. The log-books of a great many vessels through this region, have been examined and they show that the prevailing winds there, instead of blowing from the Trade quarter blow in the opposite direction. The Trade-winds in this conform part of the Ocean instead of coming from some point between N. and E, come, so to speak, from the southward and westward of these points. To the westward of 25°, and between the same parallels, the prevailing winds are from the regular Trade quarter.

Now it is a curious fact, that vessels bound from Europe or America to Southern latitudes, should, from time immemorial, have been in the habit of passing right through this region, with the view of getting winds favorable to the course to the southward and westward. This is the course alike for all whether they are bound for South America or the Indies by either Cape. 2,200 records of the wind in this region, by vessels so bound, have been discussed, and the practical results to be announced to the seafaring men are head winds and calms 1,400 out of 2,200 times. The chances, then, for a fair wind being a greater odds than two or one. The discovery of this fact regarding the winds, led to the pointing out of a new route from the United States to the Equator. With the assistance of these Charts, Lieut. M. has been enabled not only to lay off a more direct route but also to locate it in regions of better winds for that much of the way to the Indies of the South Sea.

Seven of the Rio bound vessels that have been induced to try this new route, have returned their logs—and the average passage of the seven is seen to be eleven days less than the average by the usual route.

Who are the truly Valuable in Society.

The value we set upon a member of society should be, not according to the fineness or intensity of his feelings or the acuteness of his sensibility, or to his readiness to weep for, or deplore the misery he may meet with in the world; but in proportion to the sacrifices he is ready to make, and to the knowledge and talents which he is able and willing to contribute towards removing this misery. To benefit mankind is as much more difficult task than some seem to imagine; it is not quite so easy as to make a display of animal sensibility: the first requires long study and painful abstinence from the various alluring pleasure by which we are surrounded; the second in most cases demands only a little action, and even when sincere, is utterly useless to the public.

A blessed Land.

It is a singular fact that when the cholera, on its first visit, some seventeen or eighteen years ago, ran over Europe, it went entirely around Saxony, without a person being affected, and now, on its second appearance, it is said to be doing the same.

The Boston Journal is informed by Professor Noddlekrantz, that California comes from two old Indian words—*Kali*, gold, and *form* a *who*, don't you wish you may get it?

The First Locomotive.

The Carlisle Journal gives the following particulars of Mr. Stevenson's first celebrated engine the Rocket. It was brought in 1827 from the Liverpool and Manchester Railway Company by Mr. J. Thomas, of Kirkhouse. Here the engine was worked for five or six years on the Midgeholme line—a local line belonging to a Mr. Thompson. Soon after the engine was placed on the line the contest for East Cumberland took place, when Sir J. Graham was superseded by Major Aglionby; and it was used for conveying the Alston express with the state of the poll from Midgeholme to Kirkhouse. Upon that occasion the Rocket accomplished its share of the work, a distance of upwards of four miles in four minutes and a half—thus reaching a speed nearly equal to sixty miles an hour. On the introduction of more powerful engines, the Rocket was "laid up in ordinary," in the yard at Kirkhouse;—where it now stands, no less a monument of the genius of the inventor than as a mark of the esteem in which his memory is held by Mr. Thompson. Such an engine, says the Journal—the first constructed on the principle which has brought railways to such a height of perfection in this country—ought to have its abiding place in the British Museum.

We should like to see Oliver Evans's now. It would be a monument to that ingenious American inventor.

Cloth Made of Pineapple Leaves.

At Singapore in the East Indies, there is quite a thrifty branch of business in preparing the fibres of Pineapple leaves for exportation to China, where they are manufactured into cloth. The process of extracting and bleaching the fibres is exceedingly simple.—The first step is to remove the fleshy or succulent side of the leaf. A Chinese, astride on a narrow stool extends on it in front of him a pine-apple leaf one end of which kept firm being placed beneath a small bundle of cloth on which he sits. He then with a kind of two-handled plane of bamboo removes the succulent matter. Another man receives the leaves as they are planed, and with his thumb-nail loosens and gathers the fibres about the middle of the leaf, which enables him by one effort to detach the whole of them from the outer skin. The fibres are next steeped in water for some time after which they are washed in order to free them from the matter that still adheres and binds them together. They are now laid out to dry and bleach on rude frames of split bamboo. The process of steeping, washing, and exposing to the sun is repeated for some days until the fibres are considered to be properly bleached. Without further preparation they are sent into town for exportation to China. Nearly all the Island near Singapore is more or less planted with pine-apples, which, at a rough estimate, cover an extent of two thousand acres.

Eccentricities of Rivers.

Instances have occurred of rivers suddenly stopping in their course for some hours, and leaving their channels dry. On the 26th of November, 1838, the water, failed so completely in the Clyde, Nith, and Teviot, that the mills were stopped eight hours, in the lower part of the streams. The cause was the coincidence of a gale of wind and a strong frost which congealed the water near their sources. Exactly the contrary happens in the Siberian rivers which flow from south to north over so many hundreds of miles; the upper parts are thawed, while the lower are still frozen and the water not finding an outlet, inundates the country.

The tides of the ocean often flow up rivers to a great distance from their mouths, and frequently to a height far above the level of the sea. In the Amazons the tide is perceptible 576 miles from its mouth, and in the Orinoco it ascends 255 miles.

National Arbitration.

Richard Cobden the English Reformer, announces his intention to propose in Parliament, and advocate with all his energy, the settlement of international disputes hereafter by arbitration instead of war. This is the right way and it shews that "Richards' himself again."