

SELF-IGNITION.

Oxygen, one of the constituents of air, is necessary alike to explosion and combustion. When street gas, or kerosene oil vapor, or even very fine organic matter, such as flour, coaldust, etc., is intimately mixed with air in certain proportions, and a spark of fire applied, there will be an explosion like that of gunpowder.

But the oxygen is as necessary as the spark of fire. Plunge a lighted candle into a gasometer of pure street gas, and the effect will be the same as if it had been dropped into water. Liquid kerosene oil never explodes, and when the "lamp explodes" it is the oil vapor and air, mixed, above the oil that causes the mischief. A few years ago we read of a man who was repairing a gasometer, lowering a light into the manhole just at the wrong time; namely, while there was still a little gas remaining, and the entire apparatus was blown up. Had it been full of gas alone, he might safely have lowered his light into the place. Furnaces using coal-dust fuel would go out, should the supply of air be shut off.

Prof. Pepper's interesting experiment along this line is worth giving in this connection. Take a box a foot square and containing a quart or two of fine flour, and nail thereon, for a cover, a fine wire netting, like bolting cloth used by millers. Now shake this box at some open flame, like a burning stick, and in such a way as to send out a cloud of dust upon the flame. If the conditions are all right there will be instantly formed an astonishing volume of flame, resembling the flame from the burning of an open bunch of gunpowder. The flour, being largely carbon, will burn when mixed with air, about as readily as the coal-dust in a furnace, or as the fine particles of coal floating in the air in coal mine explosions, to which most of the violence of coal mine explosions is now believed to be due. A pile of flour is harmless enough, but surround each of its particles with oxygen and apply a spark of fire, and the result will be an explosion. It is, therefore, always dangerous to go about a flour mill with a light of any kind.

Gunpowder is a mixture of carbon and oxygen in solid form, as seen from its ingredients, charcoal and saltpetre, the one supplying the carbon, the other the oxygen. Take out the saltpetre, and a harmless mass is left. In kerosene vapor we have an example of a still finer form of carbon, but in chemical combination, and in illuminating gas and air, an explosive mixture where the ingredients are both perfectly gaseous. A coarse mixture is comparatively harmless because of the difficulty of combining in burning. The form of the mixture, whether solid or gaseous, is immaterial, but the two elements, oxygen and carbon, are essential. True, other combustibles than carbon may be combined with oxygen to form an explosive material. Street gas is, in fact, partly hydrogen. There are a few other substances that will partially take the place of oxygen, but they are usually experimented with in chemical laboratories, and need not be dwelt upon here.

Professor Tobin demonstrates by experiments, that dampness destroys the explosive tendency of fine organic dust, and he recommends that millers use the wet bulb thermometer constantly in their mills, and on its indication of dryness to inject live steam into the atmosphere. And Professor Baehr, of Dresden, has found that the leather belts used for the transmission of energy in mills are such rapid generators of electricity that finely divided forms of dust may be exploded thereby. Many fires have their source in self-ignition. A package of lampblack has been known to ignite spontaneously and fire a building. Oily or greasy waste and rags have been seen to blaze up a few minutes after having been thrown on the floor. Dry rubbish exposed to the sun has been seen to take fire under circumstances which precluded any other possible cause. Sawdust around oily machinery journals has taken fire. Hay

heating in the mows has taken fire and burned down many a barn.

Steam pipes will char wood touching them, and fire will result. Hot-air pipes are equally dangerous in contact with wood. Ships that have a cargo of damp goods stowed away, such, for instance, as cotton in bales, are liable to be burned, for spontaneous combustion occurs just as well where dampness is as where only grease or oil is present. This is the reason why hay or grain stowed away while wet, or bales of rags or even heaps of bituminous coal, have taken fire spontaneously. Barrels of damp sawdust, often seen around certain factories, are always liable to cause a fire. Even moistened tin-turnings and chips have been known to take fire.—*Popular Science News.*

BRITISH COLUMBIA MINING STATISTICS.

The annual report of the British Columbia Board of Trade, just issued, is a valuable compilation of information. Its statistics have been prepared with great care, and may be absolutely depended upon as accurate. We quote a few tables taken from the report of the Minister of Mines for British Columbia for 1896:

TOTAL MINERAL PRODUCTION FOR ALL YEARS.	
Gold, placer	\$ 57,704,855
Gold, lode	2,177,869
Silver	4,028,224
Lead	1,606,427
Copper	254,802
Coal and coke	33,934,427
Building stone, bricks, etc	1,000,200
Other metals	25,000
	\$100,931,604

The next table shows the rapid increase in production during the last seven years, the increase for 1891 over 1890 being due to the larger export of coal, the output of which for that year of 1,000,000 tons being the largest ever reached by our collieries. In the year 1892 the influence of the production of the lode mines began to be felt, and since then the very marked increase in production, has been carried by the quickly growing value of the gold, silver, lead and copper produced.

Table III. gives a detailed statement of the amount and value of the different mine products for 1895 and 1896, but it has as yet been impossible to collect statistics concerning the amount of building stone, brick, lime, fire-clay, tiles, etc., hence these tables do not contain any particulars this year about the mining of economical materials, which, of course, should be here included.

However, the increase in the value of the precious metals produced, and the baser metals, especially of lead, is marked, and the total increase for 1896 over 1895 very gratifying, the total production of the mines, other than coal, having increased from \$2,816,000.

VALUE OF MINERALS PRODUCED, 1895 AND 1896.		
	Value.	Value.
Gold, placer	\$ 481,683	\$ 544,026
Gold, quartz	785,271	1,244,180
Silver	977,229	2,100,689
Copper	47,642	190,926
Lead	532,255	721,384
Coal	2,818,962	2,327,145
Coke	2,260	3,075
Other materials	10,000	15,000
	\$5,655,302	\$7,146,425

The output of gold and silver during 1897 will show a great increase over 1896, Kootenay alone yielding more by one million than all the rest of the province last year. It is a conservative estimate to say that, excluding Klondyke, British Columbia will yield over \$10,000,000 during the current year, and that during the next four or five years the increase will average from three to five millions yearly. British Columbia is entering upon a mining era of which no person can predict the end or

estimate the importance; but the evidences "in sight" warrant the prediction that the next five or ten years will be a period of unexampled prosperity, especially in mining, although the development of the great natural wealth of the province in other directions must necessarily follow on an extensive scale.—*World.*

THE DODGE AND GILBERT WOOD-SPLIT PULLEYS.

Litigation has been going on for some months in the United States respecting what is known as the "Dodge wood split pulley patent." About a year ago the validity of the patent issued to Dodge & Philion was sustained by the United States courts at Cincinnati in a suit against the Chattanooga Pulley Company, which was making a pulley substantially identical with the Dodge. Following this decision the Dodge Company, whose works are located at Mishawaka, Ind., instituted a sort of reign of terror among manufacturers and users of wood split pulleys by literally claiming the earth in the matter of infringements. Practically every wood pulley manufactured was claimed to be an infringement of this patent, no matter what the particular construction of it might be.

A great many people, not caring to go to law, made compromises with the Dodge Company, and, if manufacturers, took licenses under the Dodge patent, or if dealers agreed to handle in future only the Dodge pulleys.

This went on until of the three largest manufacturers of split pulleys made entirely of wood in the country, only one remained to fight the owners of the patent. This was the Saginaw Manufacturing Company, of Saginaw, Mich., which makes a peculiar pulley called the Gilbert. Suit had been brought against agents of this Company, as well as against the Company itself, but no efforts were made to prosecute any of them to a final hearing. Our opinion was that the Gilbert pulley was not an infringement of the principle of the Dodge, and we predicted it would be so held. This prediction has been verified sooner than was expected, for on Monday, November 29th, the United States Circuit Court of Appeals at Chicago, consisting of Judges Woods, Jenkins, and Showalter, handed down an opinion in one of the suits upon the Dodge patent, in which it followed the precise line of distinction which was drawn in the article alluded to, between the Dodge pulley and the Gilbert, and held substantially that the Dodge patent does not cover any pulley constructed upon the principle of the Gilbert and embodying the distinction above referred to.

The case in question was an appeal from the decision of the Circuit Court of the United States for the Eastern District of Wisconsin by the Menasha Wood Split Pulley Company. As explained in our former article, the pulley of the Dodge patent is so constructed that when the two halves are placed together, either off or on a shaft, the meeting ends of the rims will come in contact with each other, while the two halves of the hub remain apart from each other.—*Condensed from Northwestern Lumberman.*

—Fifteen men in McNair's lumber camp on the Tobique River, New Brunswick, were recently taken seriously ill from eating diseased pork. One of the victims died, but the doctors hope to pull the others through. The pork was taken in last winter, and the carriers, to lighten the load, threw away most of the pickle.

A \$1,200 shipment of cats has just been made from Waterville, Me., to a Philadelphia merchant who has conceived the novelty of placing them on sale in his big departmental store in the Quaker City. The shipment included one hundred kittens, and they are of all kinds and colors, the Angora variety predominating.