

crucible imbedding the vial in sand, and subject the whole to a low red heat for half an hour. The vial now contains lead powder, the particles of which are prevented melting together by other fine particles of carbon. This lead powder takes fire as soon as it is brought into the atmosphere. Dissolve phosphorus in bi-sulphide of carbon, and dip a piece of cloth or paper in the solution and expose it to the air. Instantly as the solvent has evaporated, the phosphorus (now finely divided) takes fire. I might describe hundreds of similar experimental illustrations, but I hasten to the cases of spontaneous combustion which occur in the ordinary routine of life.

Ninety-nine hundredths of these cases originate from the oxidation of linseed oil. This oil in a paint-pot has little surface exposed compared with its whole mass, and the heat generated and diluted over the whole body of the oil, radiates into the air, etc. When the paint is spread on wood, the oil oxidizes rapidly and heat is correspondingly produced but being in contact with the conducting wood it is carried away. But if the wood were a non-conductor and no heat were radiated the oil would speedily take fire. When the oil is mixed with saw-dust or spread on cotton, wool, paper, or clothing, and the mass is kept away from strong currents of air, spontaneous combustion ensues. A painter rolls up his greasy overalls in a bundle; throws them in a corner or on a shelf and the house is set on fire; dozens of cases like this have occurred in this city. Linseed oil is so remarkable in this way that I think it might sometimes be made available for kindling a fire where matches and other conveniences are not at hand.

The spontaneous combustion of nitro-glycerin, gun cotton and pyrotechnic compounds may be brought within the category of oxidation. But in all these cases the oxygen is not supplied from the air. It is part of the substance itself, and is gradually eliminated to the part which is combustible. A complete explanation of these cases would extend this article beyond reasonable limits.

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An ex-coffee manufacturer has given me the particulars of two interesting cases of spontaneous combustion which occurred in the course of his business; and as it seemed to me that the facts might prove useful if widely known I obtained his consent for their publication. For the information of a small number of my readers it is necessary to explain that a coffee manufacturer is one who roasts beans, peas, wheat, barley, rye, corn, chicory, etc., grinds with a few roasted coffee-berries, and divides the mixture in neat paper parcels to suit the demand of the public. Many consider this business illegitimate. I do not, unless the product is represented to be what it is not. The public will always have what they call for.

My friend in various ways had observed a tendency towards spontaneous combustion of some of his roasted material, and had adopted what he supposed sufficient precaution against dangers. One day he roasted about ten bushels of barley. As was then his practice the grain was drawn from the roaster on a large cooling table covered with zinc, spread out and turned over until it was supposed to be cold. It was then late in the day, put into barrels, and shortly the factory was locked up

for the night. During the night a watchman discovered smoke issuing from the premises, made a forcible entry, and found the barley in all the barrels on fire. The barrels were promptly rolled into the street and the fire was extinguished by an abundance of water.

After this he adopted further precautions, but failed again. As soon as the roasted grain was spread out it was sprinkled with water from a watering pot, and was left a longer time on the table. A few bushels of roasted wheat were spread on the table, sprinkled with water and left on the table for the night. In the morning in place of his wheat, he found only a heap of clean ashes. There was not a kernel left unconsumed.

In explanation of these cases I would suggest that during the roasting there is generated a substance which has a peculiar affinity for oxygen and in this respect is akin to linseed oil. This substance is probably a volatile oil to which the peculiar aroma of roasted grain is due. Such a substance is known to exist in roasted coffee-berries. The aroma of coffee is soon lost by reason of its affinity for oxygen which changes it into a substance which has little or no odor. Hence also dried coffee grounds are not near so combustible as fresh roasted coffee.—*Scientific American*.

BUSINESS FAILURES.

We copy the following from the *Trade Review*, as suggestive to those who have already made, or are contemplating, to make a start in business, either as Mechanics or in Commercial life:—

The causes which operate to produce failures in business are various—but they are by no means so numerous as many superficial observers suppose. The chief parent of failures are periods of stagnation in the business of a country. During such periods, failures may be considered *legitimate*, inasmuch as in many cases they arise, not from folly on the part of the insolvent, but from derangement in the business of the country. At other times, however, the great bulk of failures arise from over-speculation—want of judgement—personal extravagance—undue credits—want of business education and similar causes. Those who become insolvent from such reasons as these are unjustifiable, inasmuch as the circumstances were not beyond their control and might have been so moulded as to eventuate in success.

During the past year—1866—it is gratifying to know that both Canada East and West have suffered less from failures in business than for many years past. During the years '62, '63, and '64, many business men who had struggled on since the previous commercial convulsion went down; others, too, who had started more recently, found they could not make headway against the "hard times" which the comparative failure of the crops for several successive years produced. The aggregate of the failures throughout Upper and Lower Canada was quite large, both as regards numbers and the amount of losses sustained. The splendid harvest of 1865 was the turning point of the tide, and it is gratifying to know that it still runs in the same direction, for the failures in 1866 were considerably less than during the