

Miscellaneous Items.

THE DANGERS OF ENGINE-DRIVING.—At the meeting of the London Association of Foremen Engineers and Draughtsmen, held some weeks ago, Mr. M. Reynolds read a paper "On Practical Engine-driving, Locomotive and Stationery." He said that there were many dangers on railways to be provided against, for there were coral reefs and sand banks, and traps of all kinds—trap points, trap sidings, and gulleys. They were put in for the public safety, but if a man who did not know the road was driving an engine they would trap the train-man, carriages, and passengers. The drivers in charge of passenger trains had in many instances met with ugly traps in their earlier life, but having served for some years on good trains, they had become qualified to take charge of the more responsible part of the traffic. The rank and value of every engine-man was in proportion to the labour and study he had bestowed on railway traps. If he had not the hidden rocks upon his chart he drove by chance, and a railway was of all places in the world the one where chance should not be in force. Locomotive-driving, he considered, should be based upon certain rules and principles, which, if followed out, would enable drivers to keep time without cutting too deeply into the coals. Without such rules and principles all was uncertainty; the hand trembled upon the regulator, the eye watched with painful anxiety the needle of the pressure-gauge, and the driver, though looking into a white fire for a moment, became colour blind. He then referred at length to the rules and principles, which, he urged, should be carried out, and remarked that engines should be properly organised, both on and off the pit before joining a train. Attention should be given to both water and steam; the fire should be properly constructed, the engine should be properly oiled, and precautionary measures to prevent heating should be taken. He observed that the history of the locomotive failures was instructive for at least two-thirds occurred through preventable causes, and those failures would have been prevented had the engineers systematically and thoroughly examined their engines before joining the train.

In the battle of the guns it is as well to consider their relative cost. It is stated that Krupp's 70-ton costs £22,000, the Armstrong 100-ton, £16,000, and the Woolwich 80-ton only £10,000.

According to a paper in *Polybiblion*, the following are the laws of meteorology as affected by forests:—1. It rains more abundantly under identical circumstances, over forests than over non-wooded ground, and most abundantly over forest with trees in a green condition. 2. The degree of saturation of the air by moisture is greater above forests than over non-wooded ground, and much greater over masses of *Pinus sylvestris* than over masses of leaved species. 3. The leafage and branches of leaved trees intercept one-third, and those of resinous trees the half of the rain-water, which afterwards returns to the atmosphere by evaporation. On the other hand, these same leaves and branches restrain the evaporation of the water which reaches the ground, and that evaporation is nearly four times less under a mass of leaved forest than in the open, and two and one-third times only under a mass of pines. 4. The laws of the change of temperature out of and under wood are similar to those which result from the observations of M. Mathieu. The general conclusion seems to be that forests regulate the function of water, and exercise on the temperature, as on the atmosphere, an effect of "ponderation" and equilibrium.

CHEAP BLACK FOR WOOL.—The cheapest black for wool is obtained by treating the wool in a mixture of dilute sulphuric acid and dichromate of potassium, or of sulphuric acid, potassium bitartrate and copper sulphate, and subsequently dyeing with logwood. Reimann now proposes to use, instead of either mixture, one of chrome-alum and bitartrate with logwood. For the chrome-alum, the impure solutions of it obtained as bye-products in many manufactures may be used. The iron-alum in the process not only serves as an oxidizing agent, taking the place of chromic acid and copper sulphate in the first two mixtures, but also deepens the black by itself forming a compound with the logwood. The advantages of the first new process are: (1) there being no chromic acid in the mixture, the wool is not oxidized, and remains soft to the touch; and (2) the black is a mixture of chrome and iron-black, and while free from the drawbacks of either, possesses the good qualities of both. Chrome-black is unaffected by acids, but is injured by alkali and exposure to light; iron-black has exactly opposite properties.

NEW CLOTHING MATERIAL.—A Berlin inventor has patented

a new kind of cloth, which consists principally or entirely of sponges. The sponges are first thoroughly beaten with a heavy hammer, in order to crush all the mineral and vegetable impurities, so that they can be easily washed out. They are then dried and pared like a potatoe, with a sharp knife, the parings being sewed together. The fabric which is thus obtained is free from all the danger which sometimes arises from the absorption of poisonous dyes into the system; it absorbs without checking the perspiration, so as to diminish the danger of taking cold; it is a bad conductor and therefore helps to maintain a uniform surface temperature; it can be more readily cleansed than the ordinary woollen garments; its flexibility diminishes the liability of chafing; the ease with which it can be employed in shoes, stockings, drawers, undershirts, hat-linings and other articles of clothing.

SUMMER AND ITS DISEASES.—This is a bright volume of the *Health Primer* series, published by Lindsay & Blakiston, Philadelphia, and for sale by A. L. Bancroft & Co., S. F. It is, however, more adapted to a variable climate, where "the changing seasons remind man that the seed is not quickened except to die, and each one brings to him, as it comes with its many blessings, some new suffering and sickness." The book aims to point out the causes of summer sickness, and by proper warnings enabling all to avoid those combination of causes which bring about so many death strokes in summer. "Preventive medicine is the highest development of the healing art." We can avoid occasions much more easily than we can combat maladies already established. The series may be considered a "blessing" in literature. Dr. Wilson is the author of this last one, and all stand upon the highest medical and scientific authority.

Wood acts with tremendous force when wetted, and advantage has been taken of this fact in splitting blocks of granite. After a mass of granite has been sent from the mountain by blasting, it is measured in every direction to see how best to divide it into smaller blocks. These are traced out by straight lines on the surface, and a series of holes are drilled at short intervals along this line. Wedges of dry wood are then tightly driven into the holes and wetted, and the combined action of the swelling wood splits the block in the direction required, and without any destructive violence. The same process is then carried out upon the other faces, and the roughly shapen block finished with the hammer and chisel. The action of the wood is due to capillary attraction—the same as that which draws the sap through the small tubes or pores of the growing tree.

According to a German authority, sponge-growing may be made a profitable branch of industry. The method of cultivation consists in cutting the live sponges into small pieces, attaching the same to a wooden frame-work, and sinking it in the sea in locations favorable to their natural growth. In three years such pieces will have attained a marketable size. The total cost of raising 4,000 sponges (including interest on capital expended) is estimated to be \$45, and the income for their sale \$80, leaving a net profit of \$35. As the growing of sponges, after their first immersion, require no attention, it will be readily perceived that the quantity thus propagated could be indefinitely increased. As the Gulf coast and Florida Keys annually produce over \$100,000 worth of sponges naturally, it is very probable that their income might be largely increased by judicious cultivation.

SULPHIDE OF CARBON is now largely used in Paris for extinction of chimney fires. Dr Heeren has remarked in the Hanover Society of Engineers that, according to his experiments, 100 grammes of the sulphide, consumed in a shallow open dish, with free access of air, require fully six minutes, and the sulphurous and sulphuric acids formed most undoubtedly be much diluted by the large amount of nitrogen in the air required for combustion, while they must also be greatly expanded by the high temperature. Dr Heeren therefore recommends the use of condensed sulphurous acid as a powerful agent for the purpose in question.

TO CLEAN ENGRAVINGS.—Put the engraving on a smooth board, cover it thinly with common salt finely pounded; squeeze lemon juice upon the salt so as to dissolve a considerable proportion of it; elevate one end of the board, so that it may form an angle of about 45 or 50 degrees with the horizon. Pour on the engraving boiling water with a tea-kettle until the salt and lemon juice be all washed off; the engraving will then be perfectly clean, and free from stains. It must be dried on the board, or on some smooth surface, gradually. If dried by the fire or the sun it will be tinged with a yellow colour.