

## SCIENTIFIC MATTERS.

The use of peat as a fuel is mentioned by Pliny.

The reverberatory furnace for baking porcelain is said to have been introduced from China.

The liability of safety valves to stick, in consequence of corrosion, is obviated by nickel plating both the valve and the seat.

At the recent General Assembly of French papermakers, MM. Jourdeuil, Parizot and Gresse, the well-known French firm of paper manufacturers, submitted some samples of a new textile fabric, namely—the sheath of the hop-stalk. By removing the outer skin, and subjecting it to a certain chemical process, a textile substance possessing the qualities which make rags so valuable in papermaking—namely, length, suppleness, and delicacy of texture, has been produced. The invention has been patented.

The Abbé Plessis gives, in *Les Mondes*, some curious facts relative to the muscular strength of insects. He placed a stag-beetle, weighing 3gr. 20, on a piece of wood, and balanced on its back a case, in which he put weights, gradually increasing to 1 kilogramme. On being incited somewhat, the animal moved forward with this enormous load, about 315 times its own weight. An ordinary man is certainly 100 times less strong. An elephant, proportionally endowed, might carry the obelisk of Tong-sor, 230,000 kilogrammes in weight. The common flea can leap more than 500 times its height, while man can rarely leap even once his.

The seeds of beets, when germination takes place very slowly, often become the prey of a species of small subterranean myriopoda. M. Pagnoul has recently made experiments on the effects of immersing the seeds for a short time in various solutions previous to sowing. He finds that a solution of sulphate of magnesia gives the best result, and among other beneficial substances are (in order), phenic acid, arseniate of potassium, chlorhydric acid, and sulphate of zinc.

**POWER OF EXPLOSIVES.**—Some experiments have been made recently in a German iron mine at Hamm, to ascertain the relative efficiency of powder and some of the nitro-glycerine compounds for blasting purposes. The following were the results obtained:—Ordinary saltpetre gunpowder, one unit of force; extra best powder, with excess of saltpetre and cherry tree charcoal, made by L. Ritter at Hamm, three units; dualin, obtained from Herr Dittmar, lieutenant of artillery, Charlottenburg, five units; lithofracteur, from Krebs, Co. Deutz five units; colonia powder (a sort of powder saturated with thirty to thirty-five per cent nitro-glycerine), five to six units; dynamite, six to seven units. It will be seen that dynamite far exceeds the others in power, and its use is displacing theirs in German mines.

An interesting paper was communicated, at the recent meeting of the French Academy, by G. n. Morin, on the cubic space and the volume of air necessary to insure healthiness in inhabited places. He constructs a mathematical formula expressing the amount of air necessary to be renewed hourly, so that the noxious gases (CO<sub>2</sub>, &c.) emitted may not accumulate beyond a certain proportion not far from that in normal pure air, which contains about 0.0005 CO<sub>2</sub>. The following numbers are obtained:—

	cub.	m.	cm.	cm.	cm.	cm.	cm.
E (Cubic space per individual.)	10	12	16	20	30	40	50
x (amount of air to be renewed hourly for each.)	90	88	84	80	70	60	40

The formula and results are of much practical value. Thus, a bedroom 60 cubic metres capacity is generally thought sufficient for one person; but there should be an hourly circulation of 40 cubic metres in it, so that the CO<sub>2</sub> may not exceed 0.0008. The ventilation of an amphitheatre at the Sorbonne, and other public buildings, is shown by the author to be enormously defective. In hospitals an allowance of 50 cm. to each bed, with an hourly renewal of 60 cm. gives good results.

## MISCELLANEA.

**POLISHING WOOD IN THE LATHE.**—After sand papering a very little preparation is required. Fill up the grain with oil and plaster of Paris, wipe off clean, polish with French polish, and finish off with alcohol.—*Samuel Smither, London.*

**AN INDELIBLE RED INK.**—Dr. Elsner states that an indelible red ink can be prepared as follows: Equal parts, by weight, of copperas and cinnabar, both in fine powder and sifted, are rubbed up with linseed oil with a muller, and finally squeezed through cloth. The thick paste can be employed for writing, or stamping woolen or cotton goods, and the color remains fast after the goods have been bleached. The reds usually employed are not fast colors, and do not resist the action of bleaching agents.

**SHAPING SOFT RUBBER WITH A FILE.**—President Morton, of the Stevens Institute, states that he finds the ordinary thick sheet rubber, used in making up lantern tanks, and for many similar purposes, may be readily dressed into exact shape with a file, if only it is supported by being clamped between plates of wood or metal in the vise. The file is used dry, and in all respects as in working on wood or metal.

**A GOOD CEMENT.**—A very adhesive cement, and one particularly useful for fastening the brass mountings on glass lamps, as it is unaffected by petroleum, may be prepared by boiling three parts of rosin with one part of caustic soda, and five parts of water, thus making a kind of soap, which is mixed with one-half its weight of plaster of Paris. Zinc white, white lead, or precipitated chalk may be used instead of the plaster, but when they are used the cement will be longer in hardening.

**TO CUT AND BORE INDIA RUBBER STOPPERS.**—Dip the knife, or cork-borer, in solution of caustic potash or soda. The strength is of very little consequence, but it should not be weaker than the ordinary re-agent solution. Alcohol is generally recommended, and it works well until it evaporates, which is generally long before the cork is cut or bored through, and more has to be applied; water acts just as well as alcohol, and lasts longer. When, however, a tolerably sharp knife is moistened with soda lye, it goes through the india rubber quite as easily as through common cork; and the same may be said of a cork-borer of whatever size. We have frequently bored inch holes in large caoutchouc stoppers, perfectly smooth and cylindrical, by this method. In order to finish the hole without the usual contraction of its diameter, the stopper should be held firmly against a flat surface of common cork till the borer passes into the latter.

**WATERPROOF GLUE.**—Red chromate of potash has the attribute of rendering certain organic matters insoluble, such as gum, glycerine, and gelatine, especially with the aid of light. If a sheet of paper, coated with gum mixed with the red chromate is exposed to the light, the coating becomes perfectly insoluble, even in boiling water. This property is applied in photography in the so-called carbon process. Strong glue becomes insoluble more rapidly than gum, the action going on slowly even in the dark. A concentrated solution of the red chromate is prepared and kept in a dark place. When required, a little of it is added to some dissolved glue. Articles glued with this preparation may, after the lapse of some time, be washed without inconvenience either in cold or boiling water. Paper prepared with this glue becomes a kind of parchment, and serves for the covers of the pen-sausages (Erb-surst) used in the Germany army.

**AMMONIACAL PRESERVES.**—A German technological paper makes the following frightful suggestion:—“Very satisfactory experiments have been made in using ammonia to lessen the amount of sugar required in preserving acid fruits. In the course of the operation a small quantity of sugar is to be stirred in and its effects carefully noted. The alkali of the ammonia, combining with the acid of the fruit, produces a neutral action, which permits the sugar to have its full effect. An excess of ammonia can be remedied by the introduction of a little vinegar.” The ammoniacal salts which would be formed by this process, especially the acetate, have, in addition to certain undesirable medicinal qualities, a taste which can best be described as strongly urinous!