

NOTES OF SCIENCE AND INDUSTRY.

Investigations made by Sir William Thomson show that metallic copper, when heated to the temperature of boiling water, in contact with rubber, exerts upon it a destructive effect. In order to ascertain whether this is due to the copper in or of itself, or to its power of conducting heat more rapidly than the rubber, a sheet of rubber was laid upon a plate of glass, and on it four clean disks were placed, one of copper, one of platinum, one of zinc, and one of silver. After a few days in an incubator at one hundred and fifty degrees, Fan., the rubber under the copper had become quite hard that under the platinum had become slightly affected and hardened at different parts, while the rubber under the silver and under the zinc was quite hard, and elastic. From this it would appear that metallic copper exerts a great oxidizing effect on rubber, while platinum has only a slight effect and zinc and silver respectively have no injurious influence at all. The interesting fact also appears that the rubber thus hardened by the copper really contained no appreciable trace of copper—the latter, therefore, presumably, setting up the oxidizing action in the rubber without itself permeating it.

One of the largest establishments in this country has for some time been turning out paper belts that have the reputation of being superior in many respects to those of leather; these belts are made from pure linen stock, and are of any desired thickness, width, or length, having also a driving power equal to any other from an equal surface, and, while it is not claimed for them that they are adapted to all kinds of work, they are found to serve well as straight driving belts of not less than five inches in width. Where they have been tested side by side with leather belts for strength and durability, they are alleged to have proved equally satisfactory, adhering very closely to the pulley, generating no electricity while running, being also flexible, and unaffected by temperature within ordinary limits, though there is one place in which they cannot be used, and that is where they have to run in water, or where they would be constantly subjected to moisture. It is admitted that this kind of belting is best adapted to heavy driving belts, and for this purpose it is not only much the cheapest material, but when once in position will run until worn out.

As compared with the products of other countries in this line, the residue from the distillation of Canadian petroleum are pronounced superior in the manufacture of lubricating oil and vaseline. They form a viscid and even soapy mass, and this, in the subsequent manufacturing process, is heated by steam and then well agitated with sulphuric acid to remove the resin which is still present, after which, and running off the resin by a tap, the excess of acid is neutralized with caustic soda or sodium carbonate solution, and the oil thoroughly washed with hot water until all the soda is removed. The material is then decolorized by animal charcoal, the liquid vaseline being stirred up with the charcoal by the aid of steam, and then filtered hot. The only difficulty which is to be overcome in purifying this distillation residue lies in the correct proportion of soda solution to acid, which must be closely adhered to since an excess of the former may emulsify the whole mass. The animal charcoal which is employed to decolorize the hot vaseline contains, of course, many inorganic salts, especially calcium phosphate and magnesium phosphate, as well as potassium chloride, sodium chloride &c., that it must be washed out with hot water then with hydrochloric acid, then again with hot water, and finally dried.

Another substitute for bone, celluloid, &c., in some of the industrial arts has been brought to public attention, the substance in this case being milk, its usefulness being exhibited in the form of combs, billiard balls, brush backs, knife handles, and various other articles for which ivory, bone, or celluloid are employed. In accomplishing this casein, or the solids in milk, is first reduced to a partially gelatinous condition by means of borax or ammonia, and then mixed with mineral salt dissolved in acid or water, which liquid is subsequently evaporated. The casein is placed in a suitable vessel, and the borax incorporated with it by heat, the proportions being ten kilograms of casein to three of borax, dissolved in six litres of water, and, on the casein becoming changed in appearance, the water is drawn off, and to the residue, while still of the consistency of melted gelatine, there is added one kilogram of mineral salt held in solution of three litres of water. Almost any of the salts of iron, lead, tin, zinc, copper, or other minerals soluble in acid may be used. On the mixture being effected, the solid matter is found separated from the greater portion of the acid and water, and is then drawn off. Next the solid matter is first subjected to great pressure to drive out all possible moisture, and then to evaporation under great heat to remove any remaining moisture. The resulting product, called "lactites," can be moulded into any form, and by admixture of pigments or dyes may be of any desired color.

A most interesting account was given at the Freiburg meeting of the International Conference on degree measurement, concerning a series of simultaneous observations carried on in three different cities—Berlin, Strasburg, and Prague—and which showed that an appreciable decrease in latitude is in progress, at least in Middle Europe, a similar phenomenon having also been noted at other places in Europe. This, of course implies an alteration in the direction of the earth's axis—that is, the poles and equator, latitude and longitude, are not, as has usually been assumed practically fixed dates. It appears according to this interesting communication to the Conference that the amount of ascertained decrease of latitude at the end of a six months period, as thus noted viz., from August, 1889, to Feb. 1890 was half a second; and it is also stated that the Berlin observations, as recorded for the half year ending last August, showed an increase in latitude amounting to 0.4, or two-fifths of a second. Fluctuation of the axes is thus due, it is remarked, to a minute oscillation, probably owing to some changes in the internal mass of our planet, and not to be confounded with the precession of the equinoxes.

A writer in the Glasgow Engineer, in pointing out some of the most practicable data in testing iron and steel, lays down a simple rule to start with, namely, that in any case where a fracture of iron gives long, silky fibres of a leaden hue, the fibres cohering and twisting together before breaking, it may be considered a tough, soft iron. Further, a medium, even grain, mixed with fibres, is a good sign, while a short and blackish fibre indicates badly refined iron, a

a very fine grain also denoting a hard and steely iron, which is apt to be cold-short and hard to work with the file. Again, coarse grain with brilliant crystallized fracture and yellow or brown spots, denotes a brittle iron, cold-short, working easily when heated, and welding well. Nitric acid will produce a black spot on steel—the darker the spot the harder the steel—while iron, on the contrary, remains bright if touched with that acid. Good steel in its soft state has a curved fracture and a uniform gray lustre, but in its hard state a dull, silvery, uniform white; again, good steel will bear a white heat without falling to pieces, and will crumble under the hammer at a bright heat, while at a middling heat it may be drawn out under the hammer to a fine point.

Punishments in the French Army.

The punishments in vogue in the French army are of a very severe nature, more especially when it is considered that the men thus punished are not by any means criminals, but only soldiers who have not behaved so well as they might. These are deported to Algiers under the name of "Camisards," where they are entrolled in the *compagnies de discipline*. Before embarking, the man has his boots taken from him, which are replaced by sabots, and on arriving at his destination he receives a uniform of grey wool and a cap with a large brim. The men are farmed out to do work, and are all the time under the supervision of non-commissioned officers, who treat their inferiors with the greatest brutality. It is, however, the punishments to which the men are subjected for the most trifling offences which most excite indignation.

A common punishment is to keep them night and day in a hole in the ground with perpendicular walls, so that escape is impossible. Scorching heat by day and cold by night, with rations reduced to one quarter of their proper quantity, make the very common punishment of the *gargouille* very trying. The imprisonment of men in the *tombesaux*, or regulation tents, which are only fifty centimetres broad and sixty high, is no rarity; and during their incarceration the prisoners receive no water, nor wine, nor coffee. A little meat and some *touillon* is their whole nourishment during the day.

But those who are punished with cells are incomparably worse off. They are never allowed, under any circumstances, to leave the hole they are kept in either by day or by night. They have no duties or work to pass the time, and only get some warm soup every second day, with a very limited quantity of water daily. This punishment is made still more severe by putting the man into irons on certain occasions. The delinquent has two iron rings round his ankles, which are connected by an iron bar rather more than a foot in length, so that his legs form an isosceles triangle with it. He is forced to lie down on his face, and then his arms are chained on his back, whereupon he is put into his *tombesaux*. He can only eat his soup like a dog, and if he wants to drink he must seize his bottle with his teeth, and should he let the bottle fall his ration of water is lost for that day.

Any complaints are at once stopped by a gag. Only quite recently a punishment was in use called the *crapaudine*. The prisoner's hands and feet were chained together, and in this posture he was strung up on to an iron bar. The *camisard* is also in use. The soldier is first put into a strait-jacket, his hands are tied on his back, and round his neck an iron collar is fastened, which is attached to an iron bar in the wall. The man has to stand in this position as long as eight days, unable to lie down, or to do anything for himself.

Dynamic Experiments.

A recent departure in firing dynamite or other high explosives in a shell and from an ordinary gun has recently met with great success in Manchester, England. Mr. J. E. Bott is the inventor. Instead of the cumbersome machinery necessary to furnish the compressed air to drive the projectile Mr. Bott supplies a shell containing highly compressed air in its rear portion. The gun used is a breech-loader smooth-bore. When the shell is entered the action of firing forces a pin inward at the base of the shell, thus tearing a hole in the retaining valve and liberating the compressed air. This drives the shell from the gun with wonderful force. It does not heat the gun, makes scarcely any noise, produces no smoke and has a much greater range than any pneumatic gun yet made, and the absence of fouling enables it to be used continuously.

Two gentlemen having a difference, one went to the other's door and wrote "Scoundrel" upon it. The other called upon his neighbour, and was answered by a servant that his master was not at home. "No matter," was the reply; "I only wish to return his visit, as he left his name at my door in the morning."

Charlatans and Quacks

Have long plied their vocation on the suffering of the people. The knife has pared to the quick; caustic applications have tormented the victim of corns until the conviction shaped itself—there's no cure. Putnam's Painless Corn Extractor proves on what slender basis public opinion often rests. If you suffer from corns get the Extractor and you will be satisfied. Sold everywhere.

For love of money is the disease which renders us most pitiful and groveling, and love of pleasure is that which renders us most despicable.—[Longinus.]

Athletes all over the world chew Adams' Tutti Frutti Gum. Healthful and beneficial and aids digestion. Sold by all Druggists and Confectioners, 5 cents.

Man can not sin alone; his acts, or words, or influence affects others, and till the judgment book is opened, no sinner will know the awfulness of his sin, or the widespread influence of his vice.

GIBBONS' TOOTHACHE GUM.

Sold by all Druggists. We must be made fast to something that is fast, if we are not swept like thistle-down before the wind.

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Too Careless with the English Language.

A clothing dealer, in Boston, advertised all-wool pantaloons for \$2, advising the public to make haste and secure the great bargain, saying: "They will not last long." Probably they would not. Neither will your health last long if you don't take care of it. Keep Dr. Pierce's Pleasant Pellets in your house. They are indispensable to every family, as they positively cure biliousness, with its endless train of distressing ailments—sick headache, irritability, constipation, dizziness and indigestion; a marvelous specific for liver and kidney troubles, and a pure vegetable compound. They are sugar-coated, the smallest pills made, and the best, because they do all they promise. All druggists sell them, and the proprietors guarantee them, and refund the price if they fail.

He is my friend that helps me, and not he that pities me.

"What a pity it is that his face is all pimples; He'd be very fine looking if 'twasn't for that." Said pretty Miss Vere, with a smile at the dimples.

Reflected from under the nobby spring hat—As she looked at herself in the glass, softly sighing.

That she had for the young man a tender regard.

There wasn't the least need of denying—for every one knew it. "His beauty is marred by the frightful red blotches all over his face. I wonder if he couldn't take something to cleanse his blood, and drive them away?"

He heard what she said about his looks. It hurt his feelings, but he couldn't deny she told the truth. He remembered a friend whose face used to be as bad as his. It had become smooth and clear. He went to him and asked how the change had been brought about. "Simply by using Dr. Pierce's Golden Medical Discovery," was the reply. "Take that, and I'll warrant you to get rid of your pimples."

Verily, courtesy is the sister of charity, who banishes hatred and cherishes love.—[Fioretti.]

The One-hoss Shay.

The peculiar feature of the "one-hoss shay" was, that it was "built in such a wonderful way" that it had no "weakest part." The "weakest part" of a woman is invariably her back, and "female weaknesses" are only too common. With the use of Dr. Pierce's Favorite Prescription, this may be avoided, and women may be comparatively as strong as their brothers. Prolapsus, inflammation, ulceration, periodical pains, leucorrhoea, dragging-down sensations, debility, nervousness, sleeplessness, despondency, are only a few of the symptoms of weakness of the female organs which the "Favorite Prescription" is warranted to remove.

Disease could not make a sun in the heavens; but it could make a man blind that he might not see it.

Hay fever takes a prominent place among the maladies that go to make life uncomfortable during this month. Through the use of Nasal Balm the sufferer will experience immediate relief and rapid cure. No other remedy equals it for the treatment of hay fever and catarrh. Sold by all dealers or sent on receipt of price (50c. and \$1 a bottle). G. T. Fulford & Co., Brockville, Ont. A. P. 567.

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