Transactions of the British Scientific Association.—No. 2.

REFINING OF SUGAR.

Dr. Scoffern, after a few preliminary remarks on the anomalies which beset the colonial sugar-manufacturing functions, stated the actual amount of pure white and crystallizable sugar existing in the sugar-cane juice to be from 17 to 23 per cent., and the amount of juice contained in the cane to be about 90 per cent: of this amount only 60 per cent., on an average, is extracted,—and of this quantity only one-third part of its sugar is obtained, in a dark impure condition, instead of white and pure as as it might be extracted. The operation at present generally followed, in the colonial production of sugar, involved the use of lime, an agent which although beneficial in separating certain impurities and decomposing others, effects both these agencies at the expense of two-thirds of the original sugar. Curious plans have been followed to avoid the use of lime :—alumina, in its hydrated condition, had been employed but with inconsiderable success. As a purifying agent, the basic acetate of lead was known to be most potent, but could not be generally employed, owing to the existence of no sufficient means of separating any excess of that agent which might remain. Dr. Scoffern effects this separation by means of sulphurous acid forced by mechanical means into the sugar solutions. The process had been used for more than twelve months in one of the large British refineries, and a lump of sugar prepared by means of the operation was exhibited.—The advantages presented by this operation were thus summed up :—1. As applied to cane juice, and other natural juices containing sugar, it enables the whole of the latter to be extracted, instead of one third, as is now the case ; and in the condition of perfect whiteness if desired, without the employment of animal charcoal. Owing to the complete separation of impurities, the juice throws up no scum when boiled, and therefore involves no labor in skimming. Finally, the process of curing is effected in less than one-third of the present time,—and the quality of the sugar being in all cases so pure and dry, no loss in weight occurs during the voyage home. 2. As applied to the refinery operation, it enables the manufacturer to work upon staples of such impurity, that he could not use them on the old process. It yields from these staples a produce equal in quality to the best refined sugars produced heretofore—in larger quantity and in less time. It banishes the operation of scum-pressing, the employment of blood and lime. Finally, its cost is even less than that of the present refinery process.

Mr. Miller remarked that it had been objected that sulphurous acid absorbed oxygen, and passing into sulphuric acid impared the grain of the sugar. Dr. Playfair said it had been stated that sulphurous acid gave a taste to the sugar. Dr. Scoffern observed that his specimens proved that neither of these objections was valid. It having been asked if voltaic electricity had been found successful in removing the salts of lead from the sugar in Dr. Scoffern's process, Dr. Faraday expressed his opinion that it was impracticable. Prof. De Vry thought the molasses would contain acetate of lime which would be unfit for the uses to which it is put in Holland.

ON THE MANUFACTURE OF THE FINER IRONS AND STEEL.—BY MR. W. GREENER.

The first innovation on the old principle of manufacturing gun barrels entirely from old horse-nail stubs was due to the late Mr. Adams, of Wednesbury, who brought out what is termed Damascus iron, which is constructed of alternate layers of steel and iron faggotted, drawn down into rods, then tortuously twisted and when welded into barrels, forms the Damascus barrel. The success of this experiment, both in point of beauty and strength was so great as to be under-estimated at 50 per cent. as compared with the strength of stub twist iron. The next experiment was to blend more intimately than the above, steel, with the horse-nail stubs in the proportion of one to two of the latter. The paper described the mode of this ; and then went on to narrate that the next and most important improvement in metals was the manufacture of gun barrels from scrap steel entirely, and for this purpose old coach wheels were generally in request ; by clipping these into pieces, perfectly cleansing them, and welding in an air furnace, a metal is produced which surpasses in tenacity, tenuity, and density, any fibrous metal ever before produced. The tenacity of it when subjected to torsion in a chain testing machine is as 8 to 2½ over that of the old stub twist mixture. The perfect safety of barrels produced from it is astonishing ; no gunpowder yet tried has power to burst them when properly manufactured. These experiments had induced others on a more extensive scale ; to effect this, ingots of cast steel were taken from the mill made to No. 3 in the scale of carbonization. These after rolling into flat bars, were clipped into small pieces, immediately mixed and welded as before in the air furnace, drawn down into rolls, and re-faggotted ; these were subsequently drawn down, and were then ready for being made into gun barrels, either with or without spirally twisting them ; to form Damascene barrels from this was perfectly safe—this was ascertained by experiments. It was discovered that the density and tenacity of the metal was sufficiently great to effectually resist the enormous force of this great cast of gunpowder. The manufacture of swords was another article to which this improvement applied. All the investigations of the writer had tended to satisfy him that the Arabs thus produced their finely-tempered Damascus swords ; namely, using two steels of different carbonization—Mixing them in the most intimate manner, and twisting them many fantastic ways, but observing method in that fancy ; and it was a fact that no European sword has ever yet been produced equal to the Damascus.

COLORING GLASS.—BY M. G. BONTEMPS.

In this communication some important practical points connected with the coloured ornamentation of glass and porcelain were brought forward. In the first place it was shown that all the colours of the prismatic spectrum might be given to glass, by the use of the oxide of iron in varying proportions and by the agency of different degrees of heat—the conclusion of the author being that all the colours are produced in their natural disposition in proportion as you increase the temperature. Similiar phenomena were observed with the oxide of manganese. Manganese is employed to give a pink or purple to tint glass, and also to neutralize the slight green given by iron and carbon to glass in its manufacture. If the glass coloured by manganese remains too long in the melting-pot or the annealing-kiln, the purple tint turns first to a light brownish red, them to a yellow, and afterwards to green.—White glass in which a small proportion of manganese has been used is liable to become light yellow by exposure to luminous power. This oxide is also in certain window glass disposed to turn pink or purple under the action of the sun's rays.

M. Bontemps has found that similiar changes take place in the annealing oven. He has determined, by experiments made by him on polyzonal lenses for M. Fresnel, that light is the agent producing the change mentioned ; and the author expresses a doubt whether any change in the oxidization of the metal will explain the photogenic effect. A series of chromatic changes of a similiar character were observed with the oxides of copper ; the colors being in like manner regulated by the heat to which glass was exposed. It was found that silver, although with less intensity, exihibited the same phenomena ; and gold, although usually employed for the purpose of imparting varieties of red, was found by varying degrees of heating at a high temperature and recasting several times to give a great many tints, varying from blue to pink, red, opaque yellow, and green. Charcoal in excess in a mixture of silica alkline glass gives a yellow colour, which is not so bright as the yellow from silver, and this yellow colour may be turned to a dark red by a second fire. The author is disposed to refer these chromatic changes to some modifications of the composing particles rather than to any chemical changes in the materials employed.

Dr. Faraday spoke on the importance in all our inquiries of associating physicial and chemical science. In the beautiful facts brought forward by M. Bontemps it appeared that many of the changes of colour mentioned are purely physical. The phenomena of the change of manganese from white to pink in glass appeared to him inexplicable as a chemical effect.—Mr. Dilke inquired upon what peculiarity depended the differences discovered to exist in the coloured glass of the the windows of old churches and that of modern manufacture.—M. Bontemps stated that the observed differences were entirely due to age and imperfections in manufacture.—Dr. Faraday remarked that any irregularities tended to produce the diffusion of the rays which permeate the glass ; and that the opacity of ancient church windows was probably due to a superficial change of the external surface.—M. Bontemps stated that old glass was by repolishing rendered as transparent as any modern glass.

Nova Scotia Grindstones.

MESSRS. MUNN & CO.—*Gentlemen* :—Your truly useful and valuable paper has found its way into the British Provinces, where it cannot fail to advance the useful arts, and act as a stimulus to industry and invention. Among the numerous improvements, appliances and machines, which you have carefully delineated, I have not seen one adapted to cutting grindstones. In this Province there are a number of quarries which supply grindstones for domestic purposes and for manufactories. The most extensive and valuable of these quarries are in the County of Cumberland, at a place called the South Joggins. They are all noticed in Dr. Gesner's Industrial Resources of Nova Scotia—a work recently published in this city. One of the quarries at that place is particularly mentioned by the author, and is worthy of more than ordinary remark. It is called the "Bank Quarry," and is owned by Amos Seaman, Esq., of Minndie. The stone is called the "blue grit," and for its speedy operation in grinding, and for imparting a fine edge, is unrivalled in any part of the world. Twenty thousand grindstones are annually shipped from this quarry to the United States, besides a great number supplied to the country and other parts of the world : indeed, by the present process of cutting, the demand can scarcely be supplied. The rock, after it is raised from the quarry and split into masses of proper thickness, is chiselled into grindstones by the hands of workmen. Upwards of one hundred men are employed in this work during the season, and the labor required for it, greatly increases the price of the article.

'I have thrown out these hints in the hope that some of your numerous readers in the United States, or in this quarter, may turn their attention to the subject, in order to invent a machine for cutting grindstones, whereby much labor would be saved and a valuable article of commerce rendered more perfect.

I am your obd't serv't, *****

HALIFAX, Nova Scotia, Oct. 24, 1849.

The Hero and the Printer.

"When Tamerlane had finished building his pyramid of seventy thousand human skulls, and was seen 'standing at the gate of Damascus, glittering in steel, with his battle-axe on his shoulder,' till his fierce hosts filed out to new victories and new carnage, the pale onlooker might have fancied that Nature was in her death throes ; for havoc and despair had taken possession of the earth—the sun of manhood seemed setting in seas of blood.—Yet, it might be, on that very gala-day of Tamerlane, a little boy was playing nine-pins on the streets of Mentz, whose history was more important to men than that of twenty Tamerlanes. The Tartar Khan, with his shaggy demons of the wilderness, 'passed away like a whirlwind,' to be forgotten forever ; and that German artisan has wrought a benefit, which is yet immeasurably expanding itself, and will continue to expand itself through all countries and through all times. What are the conquests and expeditions of the whole corporation of captains, from Walter the Pennyless to Napoleon Bonapart, compared with these movable types of Johannes Faust? Truly, it is a mortifying thing for your conqueror to reflect how perishable is the metal which he hammers with such violence ; how the kind earth will soon shroud up his bloody foot-prints ; and all that he achieved and skilfully piled together will be but like his own canvas city of a camp—this evening loud with life, to-morrow all struck and varnished—'a few earth-pits and heaps of straw.' For here as always, it continues true, that the deepest force is the stillest ; that, as in the fable, the mild shining of the sun shall silently accomplish what the fierce blustering of the tempest in vain essayed. Above all, it is ever to keep in mind that, not by material, but by moral power, are men and their actions governed. How noiseless is thought! No rolling of drums, no tramp of squadrons, or immeasurable tumult of baggage-wagons, attends its movements.—In what obscure and sequestered places may the head be meditating which is one day to be crowned with more than imperial authority! for kings and emperors will be among its ministering servants ; it will rule not over but in all heads—and with these its solitary combinations of ideas, as with magic formulas, bend the world to its will! The time may come when Napoleon himself will be better known for his laws than for his battles, and the victory of Waterloo prove less momentous than than the opening of the first Mechanics' Institute."—CARLYLE.

Good Cooking.

Good cooking does not consist in producing the highest seasoned dishes, nor such as to foster a morbid appetite ; but in preparing every dish well, however simple or common it may be. There are, for instance, families who never eat any good bread from one century to another, and have no idea in what it consits. Nor are meats cooked any better within their precincts. Those little, simple, and healthy delicacies, which the good housekeeper knows intuitively how to produce, are never seen here. Even a dish of potatoes cannot get themselves well boiled. A member of the family might as well fall among the Hottentots, as far as any proper nursing is concerned. These things ought not to be, nor is there any need of their existence, if the wife has any just notions of her obligation to herself and those about her.

Grapes of California.

California grows some splendid grapes, and and from letters received from that country, it appears to be well adapted for the culture of the grape vine. At Pueblo de los Angelos there are some fine vineyards. They make both red and white wine, and great quantities of agua ardiente, or Spanish brandy, of a very pure and colorless description, of an agreeable taste, superior quality, and the highest proof. A most delicious cordial is likewise made, called Angelica. The grape likewise grows in great luxuriance around San Francisco.

Another Intestinal Snake.

The Cumberland (Md.) Alleganian states that on the 24th inst. an Irishman who resides near Lonaconing, threw from his stomach a living snake, five or six inches in length.—for several years past he has been in delicate health, and latterly subsisted almost wholly upon milk. On Wednesday, at the earnest persuasion of several of his countrymen, he was induced to drink with them. Directly after swallowing the liquor, he was seized with vomiting, and threw up the snake.

[This story must be set down in the regular vocabulary.

Consumption of Cotton.

According to an estimate in the New Orleans Bulletin, the cotton manufactories in the United States will require for the next ten years at the rate of 470,000 bales of cotton, of 400 lbs. each, per annum ; equal to 752 millions of yards ; eighty millions for exportation and 772 millions for domestic consumption. This allows for an average annual increase of population from immigration and natural increase in ten years of one million per annum.

At a wedding in Albany recently, the bride's cake excited general admiration. It cost $100, and was a beautiful temple nine feet high, of the Grecian and Italian style of architectur e.

Iron was discovered in Crete by the burning of Mount Ida, B. C. 1432 ; first cast in England at Backstead, Sussex, A. D. 1544.