Science & Progress.

SILENT MACHINERY.

Something About Compressed Rawhides for Cogs of Gearings.

One of the little great inventions of the times is that of adapting compressed rawhide, for the cogs of gearings. That material is used that each set of iron or steel cogs on one wheel shall "smash" into a wheel furnished with cogs of raw hide. In this manner iron or steel will in no case come in contact with the same or any other metal, but will come in contact at every point of contact with rawhide. This obviates the roar of machinery that has from time immemorial made life unpleasant, especially to nervous people, in manufacturing towns. Wood of all feasible kinds and in all forms, has been employed heretofore, but without satisfactory results, since a certain sonorousness still exists. Wire cables running round both the driving wheel and the receiving wheel and supported between these on intermediate pulleys have been introduced quite extensively and the roar of the gearings largely obviated, but the loss of power by slipping on the wheels at the two extremes seems to have prevented the general introduction of this method of propulsion.

The continuance of the rigid and positive character of cog gearings seems to be desired by all, if only destructive friction and incessant noise can be banished. The introduction of rawhide may work out results more than ever before satisfactory. The banishment of noise is assured, and the banishment of severe friction may reasonably be expected. So small will probably be the wear of any substance impinging on the rawhide, that wooden wheels, with cogs of the same for one side of a set, may largely be re-introduced. With this expedient in use, the enormous weight of iron wheels can be avoided, and the question of durability of shaft bearings find an easy solution, since the weight of the entire system of iron wheels on a shaft, either horizontal or vertical, now makes the cost of bearings to endure under such a weight of great importance.

Heretofore, the greatest drawback to the general use of rawhide gearings has been the expense, but with the superabundance of animal hides now seeking a market, and the consequent low price, cost ought no longer to be an impediment. What mechanical genius will now come forward and do his brethren in the craft a great service by the introduction of compressed rawhide, pinions, cogs, and possible boxes for shaft bearings, and at the same time benefit farmer and meat packer by creating a market for thousands of animal hides, now lying as a practical drug on the markets?

The Earth's Motion.

Dr. L. Swift, in Popular Astronomy, gives the following method of making the earth's revolution manifest to the eye.

Place on the floor of a room free from tremors and air currents a good sized bowl nearly filled with water, and sprinkle over the surface of the water an even coat of lycopodium powder, and across this make a narrow black line of pulverized charcoal. Place the bowl so that the black line shall coincide with a crack in the floor, or, if the room be carpeted, lay a stick upon the floor exactly parallel with the mark. After a few hours it will be found that the line is no longer parallel with the stationary object, but has moved from east to west, proving that, during this interval, the earth has moved from east to west.

The reason appears to me to be that the solid floor has with the earth and bowl moved from west to east, and so has the water also, but at a slower rate, as there is a slight inertia, of which the yielding liquid does not instantly partake, to be overcome. It will be seen that the line or charcoal mark always moved from east to west.

Cast Steel in Bells.

As cast steel has of late years come so much to the front, metallurgists may be interested in some remarks of Herr Crause, choirmaster in the church of St. Nicholas and St. Mary, Berlin, concerning bells made of this metal. "Although," he says, "the proportions of bell metal (78 parts of copper to 22 parts of tin) are well established, the difficulty of procuring a pure, sweet tone lies in the fact that unsophisticated metals, and especially tin, are almost impossible to procure. The use of tempered cast steel causes much less care and anxiety." He admits, however, that bronze "may be cast so as to give a perfectly sweet, clear tone, whilst cast steel does not ordinarily reach the same degree of perfection;" but, again, "a cast steel bell costs about one-half as much as one of bronze, while it can be furnished of any desired size, tone, and softness of effect."—Iron and Industries.

Creeping Rails.

Every railroader of a scientific or investigative turn can tell you queer stories of how the rails "creep," but the greatest scientists of the world do not attempt to explain the phenomenon. It has been known for years that rails "do creep," as brother Jasper would say, but it has only lately been learned that on lines running north and south the west rail "creeps" faster than the east.

Fire-Proof Insulation.

A German electrical paper gives the following recipe for painting electrical wires, making a fire-proof insulation. The proportions by weight are about as follows: Forty magnesia, 28 tallow, 15 pulverized asbestos, 30 liquid glue, 15 glycerine and ¼ chromate of soda or potassium; to this may be added an additional ¼ of lampblack if it is desired to make it black.

Electric Forging.

Electric forging is economical, not only because the current is applied just as long as needed, but also because its energy is expended wholly on the piece of metal, or concentrated on the part of the bar which may at any moment be in process of operation.

Fine Work of a Steam Hammer.

A new steam hammer, said to be the largest in the world, recently put up in the Krupp Gun Factory at Essen is so delicately adjusted that it could be made to beat out a hair-spring.

Fire Proof Walls.

There is a fireproop covering for walls, composed of asbestos sheets, softened by steaming, embossed by rollers and dried or painted or otherwise decorated.

ECONOMIC SLAUGHTERING

Scientific Methods in Vogue at the Great Abattoirs.

Very few people have any idea what rigid economy is practiced at the great slaughtering plants. Scientific men are constantly cudgeling their brains to devise valuable chemical properties and new compounds in materials heretofore wasted or imperfectly utilized, says the Drovers' Journal.

The cross-roads butcher who kills a few animals a week, throwing away a large part of the offal, must make a large profit on the meat sold, but modern utilization of by-products makes it so the slaughterer who does business on a large scale could much better afford to sell the meat without profit than to waste what the old-fashioned small butcher could not utilize.

The packing business as at present carried on utilizes a great number of products which were formerly allowed to go to waste. For instance, the stomachs of hogs, instead of being sent to the rendering tanks, are now used for the manufacture of pepsin. Pigs' feet, cattle feet, hide clippings and the pith of horns, as well as some of the bones, are used for the manufacture of glue. The paunches of cattle are cleaned and made into tripe. The choicer parts of the fat from cattles are utilized for the manufacture of oleo oil, which is a constituent of butterine, and for stearine. Large quantities of the best of the leaf lard are also used for the manufacture of what is known as "neutral," also a constituent of butterine. The intestines are used for sausages casings; the bladders are used to pack putty in; the undigested food in the cattle stomachs is pressed and used for fuel; the long ends of the tails of cattle are sold to mattress makers, the horns and hoofs are carefully preserved and sold to the manufacturers of combs, buttons, etc. Many of the large white hoofs go to China, where they are made into jewelry. All of the blood is carefully preserved, coagulated by cooking with steam, then pressed and dried and sold to fertilizer manufacturers. All of the scrap from rendering operations is carefully preserved and dried and sold to fertilizers. Bones are dried and either ground into bone meal or used for the manufacture of bone charcoal, which is afterward utilized for refining sugar and in some other refining processes.

Photographic Hints.

A double plate-holder will be found a great convenience during the process of printing as a receptacle for the paper. Remove the dozen sheets of sensative paper from their wrappers and place the entire batch in one side of the holder; they will be readily accommodated, since the thickness will be no greater than the average glass plate. Cover them with the slide, with the word "exposed" inward. The other side of the holder with the word "exposed" showing to the outside is now ready to receive the prints as they are removed from the printing frame. In this simple manner fresh paper and prints are kept separate. The paper is easily accessible, the trouble of wrapping and protecting with envelopes avoided and the box or drawer not required to protect the prints.

Negatives that have been slightly under exposed but are not deficient in detail may be made to yield fairly satisfactory prints by dimersion in a dilute solution of bluish green aniline dye. This dye is absorbed by the gelatine film in inverse proportion to the quantity of reduced silver forming the image. Consequently the denser portions of the negatives absorb little or no color, while the most transparent parts absorb a considerable quantity. The result is a species of compensation by means of which excessive contrasts are greatly modified.—American Amateur Potographer.

Science Scissorings.

Brick is made from slag.

Electric tanning is increasing.

A ton of diamonds is worth $35,000,000.

Submarine cables stretch 140,400 miles.

Paper can be made from the standing tree in the space of 24 hours.

Edison claims to have in his laboratory every substance, organic and inorganic, in the world.

A single steam shovel in the Lake Superior region mines loads on the cars in a single day 3100 tons of iron ore.

In order to protect an invention all over the world no less than sixty-four patents are required at a cost of about $17,500.

An advocate of electrical cooking claims that of every 100 tons of coal used in a cooking stove 96 tons go to waste.

Leather scraps are now converted into a pulp and manufactured into door knobs, canes, combs, cups, buttons and other useful articles.

Aluminum is destined soon to take the place of lead and copper to a large degree, as well as iron when it becomes cheap enough.

Remedy for Prickly Heat.

Photographers are said to be particularly subject to the ravages of prickly heat and the journal of the Photographic Society of India gives the following "magical" remedy: "Simply rub the skin with the hand wet with the ordinary fixing solution, and allow it to dry. In a couple of days there will be no trace of the irritation."

Speed of Transmission.

Where the telephone wires are overland, the speed of transmission is at the rate of 16,000 miles a second; where the wires are through cables under the sea, the speed is not more than 6020 miles a second.

Electric Connection.

The Italian fire engines are supplied with hose fitted with electric wire so that the firemen can communicate with those at the engine.

The Devil's Liquor.

In 1583 Philip Stubbs inveighed with great energy against the use of starch, which he called "the devil's liquor."

Mountains of Pure Alum.

There are two mountains in Lower California that are estimated to contain 100,000,000 tons of pure alum.

Three Thousand Propellers.

The French Government has among its naval archives about 3000 propellers of different design.

Compressed Gas for River Boats.

Compressed gas is being introduced for motive power in river boats on the Seine

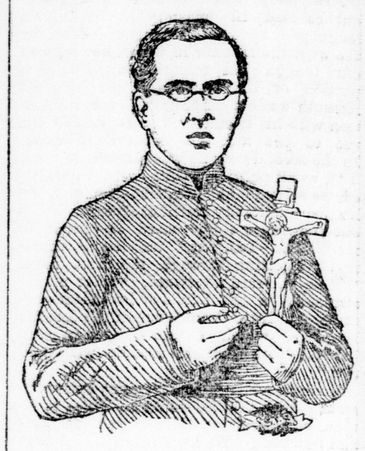
REV. FATHER DAMIEN.

A VISIT TO THE LEPER SETTLEMENT AT MOLOKAI.

The Place Where the Good Priest Spent His Martyred Life—The Distressing and Heartrending Surroundings—Something About the Canadian Leper Colony.

Rev. W. H. Barnes, of Banff, N.W.T., writes as follows in Saturday Night about his recent visit to the leper settlement at Molokai, Hawaiian Islands:

Hastening next across the settlement, looking in at the barrack-like dwellings provided by the Government for such as are too poor to build for themselves, and finding in these sick and well, sound and diseased, eating, talking and smoking together, we come to Kalawao, the village where Damien lived and died. Here we were welcomed by Father Conrady as warmly as though we belonged to his communion. He took us into the Boys' Home, which Damien founded; into the church, neat, plain and comfortable, built first by Damien's own hands, then enlarged and enriched out of the £1,000 collected in England. Hard by, within sound of the waves lapping on the beach, is the lauhala (pandanus) tree, which was Damien's only shelter when first he arrived and under which his body now rests. A flower was



REV. FATHER DAMIEN.

plucked from the grave as a souvenir of that devoted man; one whose life, notwithstanding any contradictions his character may present, must ever stand forth as a monument of what Christian love can lead a man to do for his fellows. Others besides Damien have done such things, are doing them still, not only in Molokai, but elsewhere also; it may be in a better way. Yet Damien, wanting if you like in graces of character, was the lepers' friend; washing their sores with his own hands, tending them when in the most repulsive stages of their malady, when hideous and putrescent, even their dearest ones might well recoil from contact with them. His own hands administered to such as these the last rites of their religion. He it was who enshrouded and laid to rest the fragments of this horrid feast of death upon the human frame. By community of suffering, Damien truly sympathized with those for whom he gave his life. Only once I beheld him, and not knowing who he was, admired his fine physique. Even then, alas, the traces of the fearful disease were apparent. A few years later a picture of his wasted and haggard features was given to the world by one who had crossed two oceans to see him, as Damien lay on his deathbed, a leper. This man surely, whose monument now bears the inscription: "Greater love hath no man than this, that a man lay down his life for his friends," appeals by the eloquence of his devoted life to a self-seeking, money-grubbing generation, allures them by the attraction of a great example, to a higher ideal, a nobler conception of life and duty.

We pass into the hospital, where good Sisters now tend those who, in the last stages have no friends to perform this act of charity for them. Other Sisters of the same community take charge of a home for girls. These institutions were founded by Hon. C. R. Bishop of Honolulu, whose wife was a native princess.

While we were still at the Hospital, the Royal party arrived. Some of the boys were brought over from the Home to sing to the Queen. Poor little fellows! They sang the light-hearted songs of Hawaii, full of love and laughter and flowers. What a hollow mockery it all seemed! With faces the picture of misery, with voices either husky or strangely shrill, there they stood and sang in the glorious sunshine, with the blue sea beyond. One could hardly conceive that it was real. Rather did one seem to look upon it as some scene in a pantomime, and looked for the hideous masks to fall off and the young, laughing faces, to appear in all their freshness and beauty. But it was only too true, too real! They made their bow and shuffled off, and with them a pale, gaunt figure in blue dungaree garments, such as are worn by common laborers in that country. "Who is that?" one asked. "That was brother Joseph (Dutton), the American soldier who cast in his lot with Damien to tend him in his sickness. It was to expiate a misspent life," whispered someone. Ah, who can tell what promptings of the heart must have come to bid a man take up a task like that? What shall we gain if we enquire? "By their fruits ye shall know them."

The Sisters pressed us to stay for some refreshments. "Don't be afraid to eat," they urged. "No one but ourselves have touched it." These good women even cultivate with their own hands a patch of bananas and vegetables for their table.

And so, with the last rays of the setting sun, we left the "valley of the shadow," as a native editor present that day called it.

If the scene on arrival was distressing, that at parting was heartrending. What wailing, what lingering embraces, what tears! Here a poor child trying to fling herself out of the boat to get back to her leper father, on whom she might never hope to set eyes again in this life, unless—terrible thought—she herself should develop symptoms of the malady, and herself receive sentence of banishment to the isle of Woe. Thus surrounded by the unfortunate beings on whom the sentence of divine justice appears to have most heavily fallen in this life, we returned to the ship. Auwe! auwe! the terrible Hawaiian wail; more terrible when uttered by these poor creatures, rang in our ears the whole time we were re-embarking, and long after we had weighed anchor. When the houses of the settlement had become white specks upon the green patch of land beneath the frowning cliffs, we could still hear, or we seemed to hear, the farewells, the hoarse cries, the wails of its stricken inhabitants.

Soon night fell swiftly, almost sudden-ly, as in those tropical seas. And now the stars appear. To our right, low down on the horizon, the pole star, Orion; above, and on our left, the Southern Cross, "like silver lamps," brilliant above, only less brilliant as their reflection scintillates in the dark waters below. After a day surcharged with sorrow, they seemed to remind us that beyond these scenes there is a home where the afflicted sons of earth may find life and health, joy and peace.

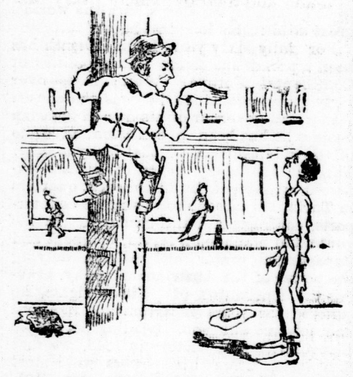
The Canadian Leper Colony.

It may be interesting in this connection to give a few facts relating to leprosy in Canada, for we have a small leper colony at Tracadie, New Brunswick. The medical superintendent, Dr. A. C. Smith, in a recent report to the Dominion Government, said: "The institution is fulfilling the object of its organization—the segregation of leprous persons, who otherwise would insidiously and surely become centres of contagion or spread the disease through hereditary transmission." There are at present twenty persons on the register of the lazaretto, eleven males and nine females. Eleven of these are in the first or early stage of the malady, six in the second and three in the third or final stage. There were six deaths during the year, and four new cases were admitted. Of those admitted two came from Lower Caraquet, one from Shippegan parish, and one from the parish of St. Isidore—all in the county of Gloucester, N. B. No new cases have occurred for several years in the Tracadie neighborhood, and Dr. Smith believes the disease has been thoroughly uprooted there. "I find," he says, "that here, as in other countries, poor sanitary surroundings, defective and bad dietetic conditions, and uncleanliness are important factors in the spread of leprosy." It is noticeable that the female patients on entering the institution, although seeming to suffer more keenly at first, become resigned to their sad lot much sooner than do the males. Friends and relatives are allowed to visit the poor unfortunates, but, as a general thing, a leper's relatives look upon him, when immured in the lazaretto, as gone from them for ever, and seldom visit him. In the early stages of the disease there is seldom much suffering beyond pains resembling rheumatism, but near the close of life there is much distress, particularly from ulcerated mouth, tongue and throat.

Great Telegraph Line in Africa.

The actual work of constructing the Zomba-Salisbury section of Mr. Rhodes' great transcontinental line of telegraph, which the cape premier hopes may some day connect Cairo and Cape Town, has been begun, and at the end of last year some thirteen or fourteen miles had been put up at the Nyassaland end of the section. An appeal for help made to the Makololo chiefs by the engineers in charge resulted in some 200 men being set to work to make the "telegraph road," and shortly as many as 600 men were employed in erecting the posts and carrying the material. Naturally, the chiefs expect some acknowledgment of their good will in this matter, and the agents of the company begged them to say what form they would prefer that their presents should take. It was a miscellaneous list which the chiefs forwarded, including as it did tea, sugar, jam, butter and biscuits. But the demands were by no means confined to edibles. One request was for "clothes for women," another for a rifle for shooting hippopotamuses, and one request—probably from an ex-student of the Blantyre mission schools—was for "writing materials." It is said that of the younger men among the Makololo chiefs three are able to read and write, having acquired their education at the mission schools.

Up and Down.



Sir John Thompson—See Wilfy, the country puts these Majority Climbers on my boots. You try to go up the pole without them and all you get is tears in your trousers.

Absorption of Heat by Water.

The eagerness and rapidity with which water will absorb heat is in direct proportion to the difference in temperature between the water and the fire. That is to say, the cooler the water the more intense its heat-absorbing quality. With cold water, circulation begins rapidly, even from a small fire; as soon therefore as the particles of water become heated they naturally strive to move up and out of the boiler and so make way for cooler and more heat-receptive particles. This is the natural way for heated water to move and in this way heated water will always move if it is not hindered and checked by a forced movement horizontally. The only direction in which heat will move water is a vertical direction. Heated water will rise and cooler water descends naturally, in vertical lines. Water in horizontal spaces will hardly move away from the fire at all, except as it is forced out by the movement of neighboring currents in vertical spaces.—Engineers' Review.

The Phonograph for Colleges.

Great are the uses of the phonograph when a college professor can "talk" his lecture into the device at his leisure, and the members of his class can suit their own convenience as to the time of hearing the disquisition. The fellow who is always asking questions in the recitation room will fine his occupation gone under the phonograph room, but his classmates will not mind that fact the least bit.—Boston Globe.

The Oldest Piece of Wrought Iron.

The oldest piece of wrought iron in existence is believed to be a roughly fashioned sickle blade found by Belzoni in Karnac, near Thebes. It was imbedded in the mortar under the base of a Sphinx, and on that account is known as the "Sickle of the Sphinx." It is now in the British Museum, and is believed to be nearly 4,000 years old.

Too Inconspicuous.

Gholly—I'd go west out on a wanche if I wasn't afwaid those savages would bwain me.

Miss Smartly—Oh, I don't believe those Indian braves would do so small a thing as that.