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MECHANICS AND THEIR TOOLS.

It is useless to expect first-class work from even good mechanics using strange tools. The hand and the handle, the workman and his tools, should be well acquainted; if such a sentiment could be predicated of inorganic matter, they should be in sympathy. It has been said that "any fool can work with good tools, but it takes a workman to use poor tools." It is much nearer the truth to say that "few can work well with strange tools." Some branches of mechanical business offer advantages in this respect over others. The carpenter or the joiner, for instance, owns his own tools, selected with great care, or made by himself to suit his hand and his peculiarities of workmanship. But the machinist, unless a very ambitious workman and one who has possessed unusual opportunities for working for himself, seldom carries with him anything more than a pair of small callipers and a steel gage. When he goes into a shop, if he works at the bench the vise is strange, the hammers are not handled and balanced to his mind, the cold chisels are "stunt" and misshapen, and the file handles unhandy. If he works on the lathe or planer, he finds the cutting tools entirely different in their forged form and ground edge from those to which he has been accustomed; and until he "gets the hang of the new school-house" his productive work amounts to very little. So well is this understood that the new comer in the shop is generally allowed a day or two with *carte blanche* on the forger to put his tools in shape. This should always be the case, and the machinist ought to be encouraged to occupy his time "between jobs" with the work of finishing his hammers, center punches, scratch awls, etc., until he gets a set fitted to his hand and consonant with his taste. Time so spent and material so used would not be wasted, as the workman, if he is worth anything, would, by his more cheerful and ready interest in his work, soon make up for the time thus spent, while if he did not purchase the tools at the expiration of his term of employment, they would add to the stock on hand, which is always available.

All this can be done under a judicious manager without encouraging finicalness or fanciful notions in the workman, while it would offer encouragement and assist endeavor. The habituation of the workman to his tools has been and still is too much overlooked by employers. If every workman was a machine, merely, what would suit one would fit another; but the human organism is affected and sometimes controlled by circumstances in themselves trivial; every workman should have his own tools, or he should be privileged to select his own style of tools to suit his handiwork. In the end it will be found to be better for both the workman and for the employer.

PRETENSIONS OF MECHANICS.

Assumptions of superior knowledge and pretensions of superior position and acquirements are, under any circumstances, obnoxious. Especially are they so when made in relation to mechanical processes. The workman who descends to this mean trickery of pretension to sustain himself at a fancied elevation above his fellows is either a charlatan, pretender, or miser. If a mechanic has made a discovery of any real value, whether relating to the construction of a machine or to an improved process of manufacture, our patent laws, liberal and just, will protect him in the proprietorship of his improvement; but the attempt to impose upon his fellows by the pretense of a knowledge above theirs, is neither manly nor honorable. Really, there is no reason for keeping a secret in the mechanical arts, and it is as impossible as unreasonable, especially if the improvement is valuable, and if not so, there is no reason for attempting to keep it private. We are aware that some large concerns make it a point to keep some of their processes secret; but out of a number we know, who have preferred this course to a publication by means of letters patent, no one of them has been able to preserve the secret inviolate. Locked doors and "iron-clad" oaths exacted from employés, avail nothing against the insatiable curiosity of men, or the cupidity or interest of employés. In fact, in many cases the product of manufacture, when analyzed by an expert, exhibits the method of production as exactly and satisfactorily as though the process itself had been exhibited.

As the working of steel involves many problems seemingly contradictory, not a few of which are still unsolved, its manipulation is made the occasion for much of this charlatanism. Pretended sleight of hand in heating and hammering, mysteriously compounded baths for hardening, etc., are used to befog the uninitiated and astonish the ignorant. Such nonsense is paltry, and wholly unworthy the dignity of the mechanic. It is highly proper that the mechanic should feel a pride in his superior skill and his superior knowledge, for these have been attained with labor, time, and patience, and are really valuable, but to make pretension where no ground for it exists is childish and foolish.

But if these pretensions are unworthy when made by experienced mechanics, they are simply contemptible in an ignorant charlatan who attempts to impose by loud talk and "blowing." Hardly a concern of any extent but has one or more of these "blowers" about the works. They pretend to know everything, while they really know very little. Such a one we once saw, who attempted to teach a machinist how to use prussiate of potash in case hardening, condemning the plan of one single heating, and insisting on re-heating the article after the flux had melted. When he failed to produce the hardness sought, he condemned the chemical, instead of acknowledging his ignorance of the process.

Running over in our mind the list of the best practical mechanics with whom we have had the honor to be associated and acquainted, we find that almost all of them were reticent of speech, careful of giving counsel or of obtruding their notions, obedient to the directions of those set over them, and otherwise unassuming in manner; while at the same time they were capable of doing, directing, and managing when their duty called. True merit is generally modest. Pretension may for a time impose upon credulity and good nature, but the shop is a great leveler, and the pretender will sooner or later disclose his true character by his assinine bray, in spite of his lion skin disguise.

LAMPBLACK----ITS MANUFACTURE.

A correspondent from North Carolina asks for information in regard to the manufacture of lampblack. He is engaged in distilling turpentine and making resins, and has large quantities of dross, etc., left, which he supposes may be made available in the production of lampblack.

Its manufacture is very simple and the apparatus cheaply built. The refuse tar, resin, etc., is put in iron pots or in a furnace and burned with the least possible admission of air—just sufficient to keep up a low combustion—in order to produce a dense smoke without much flame. The smoke is led into cylindrical upright chambers lined with sheepskin, woolen cloth, or canvas. The roof is conical in form, made of sheet iron, hanging within the cylinder, the circumference fitting the sides of the cylinder. This roof is suspended by pulley and chain, and is occasionally lowered to the bottom, in its progress scraping the accumulated lampblack from the sides and depositing it on the bottom, from which it is removed by means of a hoe or scraper through a small door. A series of these cylinders may be used, communicating with each other by horizontal passages, the roof of the last one being partially open at the apex, to allow for a draft. The lampblack deposited in the last of the series is the finest; but the best of it contains more or less resinous and oleaginous matter, which must be eliminated to purify the product. This is done by heating the lampblack in cast iron boxes with a close cover, raising and keeping the lampblack at a red heat for two or three hours.

Ivory black, used largely by artists as a pigment, and bone black, employed in the purification of sugars, are the product of the destructive distillation of animal bones. Spanish black is the carbon of cork, and has a brownish tinge. Peach black, resulting from the combustion of peach kernels, has a bluish tint. All these forms of carbons are used as pigments.

SIZE OF WHEELS FOR VEHICLES.

A correspondent from a portion of Hartford county, Conn., which is blessed with many hills, says he is in much need of a solution of the question as to the proper size of wheels for teams. He says, "With a team (two horses probably) I can draw a tun of 2,000 lbs., using wheels five feet diameter; how much more can I draw on wheels of seven feet diameter, and how about drawing on a level or on ascent?" He further says: "It has for a long time seemed to me that the principles involved in the above were very important to a large class. I propose to construct wheels of seven feet diameter on trial, as the roads over which I do my teaming are quite hilly."

We are not aware that any rules, practically effective, have ever been published as to the best diameter of carriage wheels. A great change has taken place within fifteen years in this respect, so far, at least, as relates to pleasure carriages. The small forward wheels, with low axles and high bolsters, which were the style ten, fifteen, or twenty years ago, have given place to those which are as large, or nearly so, as the hind wheels, the difference on the draft being made up by the downward rear curvature of the shafts. They run much easier than carriages with diminutive forward wheels. For level traveling it would seem that pretty large wheels, suited to the draft animals, would be preferable to small wheels but on an upward grade they have their objections.

COMMUNISM IN THE SHOP.

Interchange of tools and other appliances in the shop may be made either very pleasant, or a source of great annoyance. The "stealing" of tools is often practiced, but only by those who not only forget their duties as mechanics, but their honor as men. No right-minded mechanic will refuse assistance to his fellow workman, either in advice or in the loan of tools, but it is the hight of impudence to reject the advice without giving a reason, or to return borrowed tools in a condition unfitted for service.

There must be more or less of the apostolic idea of communism in the shop: "all things must be in common" to a certain extent; but it is an evidence of a mean nature when the workman is willing to use the tools of his fellow and return them in a shape unfit for further service until repaired.

The habit of leaving a borrowed tool, when done with, where last used is almost criminal. This negligence—to call it by no harsher name—is very common, but it is dishonest as well as careless. Many valuable tools are thus injured, and sometimes lost. The workman who is so neglectful and careless can hardly be deemed honest. There is, or should be, a sentiment of honor in this repect among workmen, and we are certain that a simple allusion to the matter will induce our careless mechanics to "reform their ways."

UTILIZATION OF TINNER'S WASTE.

In the scraps of the tinshops, thrown away often to hundreds of tuns by the tinners of one single city, we possess two valuable metals, iron and tin. Attempts have been lately made for separating these metals by melting, but the process has been as yet without success. What physical action, however, could not do, chemical affinity, will surely complete. We say this in regard to a process by which the sheet tin may be freed from its coating without being subjected to heat. The process is by first treating the scraps with a solution of caustic lye, thereby obtaining as a product a valuable color base (stannate of soda, resp. potassa), which of late has come into extensive use among dyers. As both the iron scraps and the tin solution serve useful purposes in the arts, we trust that many of our readers will be interested and instructed if we devote some space to the above subject.

PREPARATION OF STANNATE OF SODA.—For fastening and brightening dyes, especially Turkey red from madder, stannate of soda is unsurpassed by any mordant; it is furthermore not poisonous, as is the double salt of arseniate and stannate of soda, a base hitherto employed to some extent for fixing fabrics. For its preparation the tin scraps are rolled up spirally and put in a wooden tub with 10 per cent of sulphur and 5 per cent of solid caustic soda (in manufacturing the resp. potassa salt, take 7 lbs, of the latter), enough water being added to cover them. Then steam is turned on and the same allowed to pass into the liquid, until the scraps are free of tin, when the alkaline liquor is drawn off by a faucet and left to evaporate in an iron kettle until crystallization takes place. From the crystals which simply constitute glauber salt, the mother lye is separated, evaporated to dryness in another vessel, leached out by water and filtered. The product thus obtained is left to crystallize, thus forming the stannate of soda; 100 lbs. of scraps yield 12 to 15 lbs. of the latter.

PREPARATION OF A NEW (TIN) GREEN.—This paint—which we propose to call "Phenician green," because its base, the tin, was first obtained by the ancient Phenicians—is not poisonous like Paris and other greens; it does not bleach; may be used as lime and water color and it deepens in oil. We prepare it by adding a solution of stannate of soda, made of 15 parts of the dry substance to one consisting of 12 parts of blue copperas. The precipitate obtained is collected and washed out; by adding chrome yellow or a decoction of fustic a blue shade may be imparted to it.

PREPARATION OF MOSAIC GOLD.—Bisulphuret of tin forms gold colored, translucent scales, of a peculiar soapy feeling. It is largely employed in bronzing wood. The following is a description of its mode of preparation from tin scraps: Put the scraps in glazed pots, cover them with muriatic acid, and when the tin is all taken up, transfer the liquid into another vessel. Should it yet contain free acid, add new scraps. Then immerse copper plates into the liquid; the tin will thus by galvanic action precipitate upon them as a spongy mass. Collect the tin, wash it with water, dry it and mix it intimately with equal parts of sulphur and salammoniac, fill the mixture into glass retorts and heat them up gradually on a sand blast. The bronze is obtained partly as a sublimate, partly at the bottom of the retort.

FOR THE MANUFACTURE OF COPPERAS.—This process is too well known to be described.

PREPARATION OF A NEW POLISHING FOR OPTICAL GLASSES.—The same is obtained by precipitating a copperas solution by oxalic acid, and drying and heating the precipitate.

PREPARATION OF "IRON GREEN."—First prepare Prussian blue by mixing a solution of copperas with one of yellow prussiate of potassa, solve the same in oxalic acid, and add to the resulting blue liquid a solution of bichromate of potassa and a small quantity of lead sugar. Collect the green precipitate, wash it out, and dry it. You may obtain any intermediate shade, from the deepest blue to the brightest green, in varying the proportions of the three solutions. In closing, we will mention that zinc and cadmium are thrown down in a dentistri from a solution of binoxide of tin in potassa.