

with large pitches. It is akin to making small bolts with coarse threads. The coarse teeth have to be deeper, so that they are sooner broken and make more noise. Respecting the form of the teeth there is much diversity of opinion. It seems to be a favorite plan for general work to make them of the same shape that they naturally wear to, but very many mechanics make the teeth the frustum of a cone, or a regular taper from bottom to top. Gears with wooden teeth driven by wheels wholly of iron are coming more into use for large heavy sizes. The best wooden wheels have the teeth made of young hickory, or *lignum-vitæ* boiled in linseed oil, and set with the grain end on, in the direction of motion. The body of the wheel is iron, and recesses are cast in the face, in which the wooden teeth are set and fastened by wooden keys. When well made they run a long time. Tallow and blacklead are employed to lubricate them. Beveled wheels are also thus made.

A sprocket wheel, as the English artisans call it, is our rag wheel. The wheels on chain pumps are sprocket wheels, and are used to carry machinery driven by chains. The teeth are placed a certain distance apart, so that the wheels are sometimes eight sided, or six sided, the chain links are of course a certain length; this is called by some a clip wheel.

It is not necessary that gear wheels should be perfectly round; they work well when made elliptic or oval. Of course two wheels running together must be both of the same class, round or oval. When oval the longest diameter of one wheel gears into the shortest diameter of the other. Sometimes staggered gears are made by taking several spur wheels and keying them on the shaft so that the tooth of one comes opposite the space of the other.—*Scientific American*.

Gilding on Glass and China, Enamelling.

A correspondent of the *Scientific American* writes: "The tools required for this business are as follows:—Gilder's cushion, gilding knife, camel hair gilder's tip—cotton wool is best—camel hair pencils; also, a tin dipper, containing water, two parts, new rum one part, and two grains of isinglass dissolved by heat in the liquid. Use this solution cold.

Clean the glass both sides, make a design on the glass with soap sharpened to a point, place the design face downward, on clean paper, having cut the gold leaf to the design roughly and wet the glass over the design with camel hair pencil; lift the gold with the lip brush, and place it on the wetted glass; over the design continue the process till the design is covered. Then place the glass aside to dry; in about two hours afterward, with the camel hair pencil, coat the gilding once over with the same liquid, and again dry it. When dry smooth the gilding gently with fine cotton wool, free from rough particles. Then re-gild as before, and finish in like manner. Transfer the design on the gold side by any mode that will be free from grease. Then remove the superfluous gold; with a boxwood point make the edges perfect, and keep the point sharp and clean. Take white paint in oil, or weak gilder's whiting, and coat the design all over, one coating after another, until the surface is rendered opaque. Each coat should be dry

before the other is applied. The reverse side will appear, by reason of the transparency of the glass, to have a high polish. If gilder's size or whiting is used it should be weak, as that will increase its whiteness; by using oil paint the work done will be water-proof.

Gilding on china is done as above (no paint or soap used) and is rendered water-proof by coating the surface with white shellac varnish. Two coats may be applied, but while it is moist the work must be subjected to about 90° of heat or the varnish will become milky, and the design obscure. This is pleasant work for ladies."

Animal Manures.

In the *Journal d'Agriculture Pratique*, M. Barral gives some interesting details on the subject of the manufacture of animal manure at Aubervilliers. This manufactory consumes every year 8,000 horses, 200 donkeys, 300 cows, 300 pigs, 9,000 cats and dogs, 6,000 kilogrammes of meat unfit for food, 500,000 kilogrammes of offal from the Parisian abattoirs, and 600,000 kilogrammes of other refuse animal matters, such as skins, horns, &c. The raw material is first cut up and boiled to extract the grease. The flesh is then separated from the bones, pressed, and dried. It is afterwards ground and sifted, and the dried bones, which are also submitted to the same process, mixed with it, forming a manure containing 35 per cent. of nitrogen and 55 per cent. of phosphate of lime. The blood is collected separately, and also made into manure. The soup obtained in the boiling is strained, and the solid matter thus collected is added to the rest. The offal is piled in alternate layers with other organic matter, such as wool and parings of horn and hoofs, with which is mixed a certain amount of mineral phosphates. The heap is well moistened with the strained soup, fermentation is set up, and the whole is gradually transformed into excellent manure. During this process the phosphate of lime breaks up into phosphoric compounds, more or less soluble, and various salts of ammonia are formed. This is really a much better use to put dead horses to than making them into *saucissons de Lyon* or *filets de bœuf* for the cheap *restaurateurs*.

Greened Pickles.

The following is a capital and simple expedient to detect the copper in greened pickles. It may be conducted thus:—Cut a greened pickle into small pieces, and put them into a glass of rain water, adding ten or fifteen drops of sulphuric acid; put the bright blade of a knife, or any bright steel surface, in the liquid for twenty-four hours, and if the pickle contain copper it will be found upon the steel blade, as though it had been coated by the galvanic process. All pickles greened in brass or copper kettles shows this result. The green color comes from verdigris, which is deadly poison; the quantity usually taken with the pickles does not often kill, but it produces disease. Why are they colored?—only to please the eye, and make them represent cucumbers. A poisonous pickle may be eaten upon a full stomach: it should never be eaten upon an empty one. They should never be allowed among sanitary stores.