Conn., this winter is available, some authorized men, foremen, bosses, contractors, and ready men should be sent to the lectures, or they should be given elsewhere. The chances of injury in a shop where machinery are used are greater than the opportunities of immunity from injury; machine has no conscience, no compassion, no consideration; the victim of its clutches is a victim without hope of redemption. If the shop or manufactory is provided with measurably safe appliances, there is still left the possible contingencies of personal injury; for belts, and pulleys, and connecting gear wheels with shearing, tearing cogs, cannot always be covered against ignorant meddling or unconscious contact.

There should be kept in every shop some ready appliances for accidents, when preventives against accidents are not sufficient. Most shops have their own local remedies, better at home than elsewhere, and generally favourably regarded where tested. So it would be improper to advertise any one remedy as better than another. But there are general remedies, of which there can be no question. A tincture of arnica is known, the world over, as a remedy for bruises, burns, scalds, and fresh wounds, as an external application; so is the salve of diachylum used in all portions of the country. There is also a common sticking plaster that may be bought in sheets or rolls, which is very useful in cuts and bruises. This is not the "court plaster" in common toilet use, but a solid basic linen, with a Lealing spread on it, that may be obtained at any apothecary's shop. Many ghastly wounds that would leave, in healing, livid and offensive scars are reduced and made merely triffing in character by timely application of adhesive plaster. There should be, in every shop, and manufactory, some ready means of prompt attention to wounds, and men should be designated to antedate the arrival of the surgeon. There are plenty of such men in our shops, amply competent tor the occasion if selected for the work .-

## CHINESE IRON FOUNDRIES AND RICE-PAN CAST INGS.

As a notable example of the patient, plodding ingenuity shown by the Chinaman in some of his trades and industries may be cited the manufacture of the very thin cast-iron ricepan which may be seen in almost any cook house in Hong Kong. The principal seats of this industry are at the towns of Sam-tiu-chuk and Fatshan. This latter town is distant but some twelve miles, in a south westerly direction, from the provincial capital of Canton, and has, from the extent and importance of its trade and manufactures, notably its great trade in iron goods, tools, and hardware, been apply termed the Birmingham of China. The previously mentioned towns of Samtiu-chuk is inhabited principally by Hakkas, and is one of the principal towns of the sparsely populated and mountainous district of Kweishin. The iron used is obtained by smelting the magnetic oxide which is found in large masses in the mountains surrounding the town. The ore is broken up and smelted with charcoal in a primitive smelting furnace or cupola some 8 feet high ; the cupola is cone-shaped, having its apex or smaller diameter at the bottom ; the single tuyere-pipe is of earthenware, the opening for emission of the blast being placed downward. The furnace itself is of earthenware, or rather puddled and dried clay, kept from falling to pieces and strengthened by hoops and longitudinal straps of iron ; the whole is lined with clay several inches thick ; the internal diameter at the bottom may be about 2 feet, or perhaps a little more, and at the top about 31 feet ; inside depth, about 6 feet.

The blast is produced by a rude, yet most ingeniously contrived, bellows, formed of a wooden box some 5 feet long by 3 feet in horizontal and 11 feet in vertical section. This box is divided longitudinally into two compartments, each 18 inches square in vertical section, in each of which compartments a piston works; the valves are so arranged that one piston is effective in the up stroke; the other in the down, or rather return, stroke-for the machine is arranged horizontally. It will be seen, however, from this arrangement, as there is no air-chamber, that the blast is not perfectly continuous, there being a slight cessation at the end of each stroke before the return stroke can be effective. The fuel used is charcoal, and the furnace being first heated by starting a fire with fuel alone is then filled up with alternate layers of charcoal and ore in small iragments. The blast is urged, and after a sufficient time has elapsed the molten metal is drawn off from a top-hole at the bottom, in the usual manner, and cast into ingots, which when intended for export, are afterwards reheated in an open

forge and beaten into blooms of about 6 pounds in weight; these may occasionally be seen for sale in the iron-dealers' shops in Hong Kong, and when made from genuine native iron fetch a very high price indeed, as much as \$4 per picul, or even more, being sometimes paid for the best quality made from the black or magnetic oxide. The Fatshan iron, which to a great extent, comes from Yintak (a town on the West River), is smelted from hematite (the red oxide), but mixel to a considerable extent with gargue, rarely pure, and of varying and uncertain chemical composition. The iron smelted from this latter ore, although far more valuable in the native estimation than foreign imported iron, does not realize so high a price in the market as the other.

For making the very thin rice-pans, which are cast without handles, pure native iron alone can be used, as, being smelted with charcoal, it has the property, when melted, of being more fluid than iron smelted with coal, or, it may be, that the iron itself, being uncontaminated with sulphur or phosphorus, possesses the property of greater fluidity on this account. The moulds in which the pans are cast require weeks of tedious and patient labor to bring them to perfection. They are composed of two parts-an upper and a lower-and are made of carefully puddled clay, the upper portion about 11 inch, and the lower somewhat thicker; the lower or under half is full of round holes about 11 inch in diameter, which pierce about twothirds the thickness of the mould ; these holes are made in order to allow the clay to dry thoroughly; the moulds are turned true on a revolving potter's table of the usual pattern, and when quite dry receive a final coating of fine mouldingsand, and are made perfectly smooth. The two portions of the mould are then luted together with clay and placed in a large round oven some 6 feet or more in diameter. The pans are cast bottom upwards, each mould having a runner, but no riser; the upper portion of the mould has three little legs in order to support it when drying, previously to the two moulds being luted together. After being placed in the oven, which is some 21 feet deep, the moulds are surrounded with charcoal, which is fired, and the ovens closely covered with a curiously constructed earthenware, or rather dried clay, cover, kept to-gether, as in the case of the furnaces or cupolas previously mentioned, with bands and straps of iron. The process is so fixed that by the time the moulds are at a bright red heat, or almost white heat, the iron in the cupola is melted and ready for tapping; the molten metal is then run into ladles made for the purpose, and quickly poured into the moulds. When these are all filled, the cover of the oven is re-adjusted, and the whole left to anneal or cool gradually.

The great secret about this process, which enables the Chinese founders to cast their iron pans of such large diameter, yet so thin and light as to scarcely thicker than a sheet of paper, appears to be the use of highly heated moulds, and pure iron smelled with charcoal. When the ovens and their con-tents have cooled forwn—which takes about two days—the luting attaching the upper portion of the mould to the lower is carefully removed, and, the moulds being separated, the pan can be extracted ; when the operation has been successful the same mould can, with a little touching up, be used several The pans now have each attached to its bottom a times. runner or lump of iron of greater or less size, which from the extreme thinness of the paus, making them but little less brittle than earthenware, requires the greatest care in its removal; these runners are carefully sawn off, the use of the more expeditious coal chisel being more likely to cause fracture than the slower, but steadier, saw; the edges are smoothed down, and the pan is ready for the export market. Handles are attached to these pans by the retail dealers, who bore holes near the rim of the pan and attach small ribbons of iron for the purpose of handles.

The pans made at Fatshan differ from the preceeding in being cast with handles attached near the rim to the inner surface of the pan, which necessitates the breaking of the mould at each casting, it being rare for the same mould to be serviceable a second time. The Fatshan pans are also usually cast much thicker and heavier than these of Sam-tui-chuk, and occasionally as large a proportion as one-third of foreign cast iron, generally Kentledge or ordinary pig iron, is mixed with the native iron for casting. In other respects the process iollowed at both places is the same. The Fat-han pans being thicker, are the more durable of the two, while the thinner Kweishin pans are the more popular with poor people, because, being thinner, a less quantity of firewood is required to heat