S. W. B., Cornwall.—Steel rules on the metric system are made by the Brown & Sharpe Mfg. Co., Providence, R.I., and may be ordered through your local hardware dealer.

C. B., Quebec.—The yellow stains frequently seen on plastered ceilings and walls are due, we believe, to the action of the wet plaster in drawing the coloring matter out of the wood laths.

A correspondent wishes to know how to construct a battery for medical use. Get "How to Make a Medical Coil" by J. H. White, published at 10 cents, and to be had from the Toronto Electrical Works Co., 42 Adelaide St., west, Toronto. When you have made the coil connect it with a couple of dry batteries.

J. E. F., Niagara Falls.—The device described in November number for dealing with frost troubles in compressed air apparatus can be made as you suggest, with pipes, nipples and tees, or with pipes and headers.

X. Y. Z., Campbelltown, N.B.—Write to the Lunkenheimer Co., Cincinnati, O., for their card chart and pamphlet on the slide valve, sent free. If you want more information **write to Spon & Chamberlain, 12 Cortlandt St., New York,** for Tennant's Treatise on the Slide Valve.

W. G. T., and others, will be answered in next issue, and J. D. will find an answer to his question in the reply to W. H. P.

ELECTRICITY ON THE FARM.

The "Electrical Engineer," of London, England, gives the following interesting particulars regarding electricity as an aid to agriculture: "It may not be generally known that three German companies—the Union, the Schuckert, and the Helios—own model farms on which most of the work is done by electricity. It is used both for lighting and power. The Helios Company's farm, Quednan, covers some 450 acres near Konisberg, and is in charge of Professor Backhaus. There is a power-house equipped with a 50-h.p. engine driving a four-pole dynamo and yielding a current of 90 amperes at a pressure of 500 volts. For lighting purposes a small two-pole dynamo has been installed, giving current at 30 amperes and 220 volts, or at 18 amperes and a pressure of 320 volts when used for charging a Pollak storage battery of 130 volts. Incidentally, electricity is also employed for cooking and heating purposes at the farmhouse. The agricultural machinery is driven by three electric motors, one of 1½-h.p. being used for cutting vegetables. The other two are portable, and do odd work, such as driving mills and threshing machines, crushing flax seed, pumping water, turning a circular saw, and so on. A feature of the agricultural implements is an electrically-driven plough. The same company own the Simmern farm, where in the power-house the Helios dynamos are driven by turbines of the Beché type. The experiments which are being tried in this case are aimed at dispensing with manual labor as much as possible, and two small portable motors are employed. One of 10-h.p. does the heavier work of the farm, and one of ¾-h.p. drives either a centrifugal cream separator or else a winnower in the wheat bin. In other ways on the other farms electricity is taken full advantage of, and its application is being tried to a number of farm implements which have hitherto been worked by hand.

ELECTRIC SMELTING FURNACE.

The Electrical World and Engineer gives the following description of a new electric furnace invented by Prof. William S. Franklin, of Lehigh University: "A masonry structure contains a pear-shaped chamber communicating at its upper end with a short cylindrical passage, which opens into a flaring mouth. The lower portion of the hearth of the furnace is covered with a layer of carbon, which is connected by means of a metallic rod passing through the masonry structure with one pole of the source of current. A rod of carbon or metal which forms the other electrode is suspended into the top of the furnace. It is provided with downwardly-inclined teeth. The material to be acted upon is fed into the furnace by the reciprocation of the carbon rod. As the latter descends, the horizontal lower surfaces of the teeth engage the material and carry it downward. When the carbon rises both the action of gravity and the inclined upper surface of the teeth facilitate the passage of the teeth upward through the material without raising the latter, so that on the next downward stretch a fresh quantity of material is fed.

The first application of this furnace, described by the inventor, is to the reduction of iron ore. For this purpose the hearth of the furnace is first filled to a certain height with slag and the current is started. If the carbon rod dips into the slag the heat developed is altogether Joulean heat. If the carbon rod is raised above the slag, there is added to this the heat of the electric arc formed between the lower end of the rod and the slag. If then the iron ore is fed into the furnace through the mouth, it is reduced during its descent by the heat of the molten slag and the arc. When the ore reaches the intensely hot slag, it melts and filters through the slag to the bottom of the receptacle, where it collects. The iron is drawn off through a tap hole in the bottom of the furnace, while the slag is kept at the proper level through a tap hole at a higher level.

Another application of the furnace is for the manufacture of glass. In this case the inventor uses glass itself for the first filling of the hearth, instead of the slag in the former example. The raw materials from which the glass is to be formed are fed through the mouth. They become heated as they descend until when they reach the surface of the intensely hot molten glass they are fused and form glass. Only one tap hole is here, of course, required.

SURFACING ROADS.

In surfacing a road, the work should be well organized. The number of shovellers should be proportioned to the number of teams engaged, and the number of teams regulated by the distance of the haul, so that there may be little or no delay to teams or men by waiting. Beginning the work at the end of the section of road to be surfaced nearest to the source of the gravel, in this way each loaded team passes over the gravel already applied, and returning empty, does the same. This helps to build the road, especially if there is no road roller for this purpose. A man of skill should have charge of spreading the material, and the loads should be spread as they are dumped. In this way the material is evenly distributed. Other means are sometimes employed for spreading the gravel by the use of a harrow or road machine, after the material is all applied; but no amount of harrowing the surface with any tool will secure as good results as hand-spreading as each load is dumped. This gives not only even thickness, but an even compactness that cannot be secured by dumping loads one after another and simply leveling the surface. We should know that we are building an artificial floor, which, when finished, should have an even surface, hard and smooth, without depressions where water may stand and materially damage the road. The material should not be spread over too great surface and should be well rounded up in the middle. The greatest general fault with our roads is they do not shed water. A road when finished, and at all times, should have sufficient grade from centre to side drains to readily carry off all surface water. We should bear in mind that surfacing a road with broken stone, gravel or other road material, is but one step in the process of road building. The best of material, however well applied, does not build a road.—Municipal World.

—Dr. Karl Gruhn, of Dresden, has adopted a form of the telautograph in which, instead of using a stylus at the receiving end, he employs a moving beam of light, which writes the message transmitted on a strip of sensitized photographic paper. After being acted on, the moving strip passes through a developing bath and a pair of drying rollers, and emerges as a photograph of the writing despatched.