

pressing which the members could instantly print in colors "aye" or "no" on a list sheet at the speakers's desk. It was a simpler plan than that of Jaquin.

DOMESTIC INFLUENCE OF MODERN DISCOVERIES.

Soothing effect of the Knife and Fork, the Hackney Coach and a Sewerage System Upon Life and Manners.

In the twelfth century it was found necessary to pave the streets of Paris, the stench in them was so dreadful. At once dysenteries and spotted fever diminished; a sanitary condition approaching that of the Moorish cities of Spain which had been paved for centuries, was attained. In that now beautiful metropolis it was forbidden to keep swine, an ordinance resented by the monks of the abbey of St. Anthony, who demanded that the pigs of that saint should go where they chose; the government was obliged to compromise the matter by requiring that bells should be fastened to the animals' necks. King Phillip, the son of Louis the Fat, had been killed by his horse stumbling over a sow. Prohibitions were published against throwing slops out of the window. Until the beginning of the seventeenth century, the streets of Berlin were never swept. There was a law that every countryman, who came to market with a cart, should carry back a load of dirt!

PAVING

was followed by attempts, often of an imperfect kind, at the construction of drains and sewers. It had become obvious to all reflecting men that these were necessary to the preservation of health, not only in towns, but in isolated houses. Then followed the lighting of the public thoroughfares. At first houses facing the streets were compelled to have candles or lamps in their windows; then the system that had been followed with so much advantage in Cordova and Granada—of having public lamps—was tried, but this was not brought to perfection until the present century, when lighting by gas was invented. Contemporaneously with public lamps were improved organizations for night-watchmen and police.

By the sixteenth century, mechanical inventions and manufacturing improvements were exercising a conspicuous influence on domestic and social life. There were looking-glasses and clocks on the walls, mantels over the fireplaces. Though in many districts the kitchen-fire was still

supplied with turf, the use of coal began to prevail. The table in the dining-room offered new delicacies; commerce was bringing to it foreign products; the coarse drinks of the North were supplanted by the delicate wines of the South. Ice-houses were constructed. The bolting of flour, introduced at the wind-mills, had given whiter and finer bread. By degrees things that had been rarities became common—Indian-corn, the potato, the turkey, and, conspicuous in the long list, tobacco. Forks, an Italian invention, displaced the filthy use of the fingers. It may be said that the diet of civilized men now underwent a radical change. Tea came from China, coffee from Arabia, the use of sugar from Spain, and these to no insignificant degree supplanted fermented liquors. Carpets replaced on the floors the layer of straw. In the chambers there appeared better beds, in the wardrobes cleaner and more frequently-changed clothing. In many towns the aqueduct was substituted for the public fountain and the street-pump. Ceilings which in the old days would have been dingy with soot and dirt, were now decorated with ornamental frescoes. Baths were more commonly resorted to; there was less need to use perfumery for the concealment of personal odors. An increasing taste for the innocent pleasures of horticulture was manifested, by the introduction of many foreign flowers in the gardens—the tuberosa, the auricula, the crown imperial, the Persian lily, the ranunculus, and African marigolds. In the streets there appeared sedans, then close carriages, and at length hackney-coaches.—*Draper's History of the Conflict between Religion and Science.*

Our Forests.

The essay on tree planting read by Mr. Leonard G. Hodges before the Minnesota Agricultural Society, and published in *The Tribune* of Saturday, contained a striking sketch of the pressing need of forest-culture. Although it referred only to Minnesota, it implies throughout the west. The annual consumption of wood in that state is estimated at 1,710,000 cords. As much more is shipped outside the state. Thus, 150,000 acres of wood-land are stripped bare every year. The result of this, by 1900, is summed up by Mr. Hodges in this cheerful picture: "Our

pineries exhausted, the Big Woods pretty well thinned out, the Mississippi drying up, St Paul and Minneapolis 300 or 400 hundred miles above steamboat navigation, mercury 40 degrees below zero, and the wind blowing a hurricane. The remedy for the growing evil is tree planting. Somethine has been done in this direction. The congressional acts of 1873 and 1874, which allows a man who plants and tends a certain number of trees to enter land free, have stimulated individual action. Altogether, nearly 20,000,000 trees have been set out in Minnesota. Of these, 4,000,000 have been planted by the St. Paul and Pacific road, which has found the business a profitable one. Mr. Hodges indeed claims that it is more profitable than grain growing, although it yields small, immediate returns. He declares that "the net profits on a quarter-section of prairie, properly prepared, planted, and cultivated with forest trees, will, within ten years, exceed ten quarter-sections of wheat," and that "the genuine white willow, properly handled will increase faster than money at interest at 4 per cent. per month." While these statements may be, and probably are, somewhat exaggerated, they have a solid basis of truth. There can be no doubt that the destruction of forests in the northwest is working a vast injury to the country. The winters are already growing colder, so that we may, ere long, be forced, like New England farmers, to abandon the cultivation of the more delicate northern fruits. The drought which makes the great interior basin worth less is creeping eastward. We need forests to break the violence of freezing gales, to preserve the moisture of the ground, and to serve as the raw material for buildings, fences, fuel, railroad-ties, etc., in the future. The west is beginning to appreciate this fact. Congressional action has been wisely taken. Nebraska has established a legal holiday, called, we believe, "Tree-Planting Day." There is a state superintendent of arboriculture, and prizes are given to the men who plant the most trees during the year. The plan is said to work well. It should be tried elsewhere. The northwest, in cutting down its forests at the present rate and making no provisions to replace them, is living on its capital, as Virginia planters did when they ruined the soil of the Old Dominion by growing successive crops of tobacco. The man who makes two trees grow where one grew before is a public benefactor.—*Chicago Tribune.*

Bearings.

[From the Metal World.]

M. C. Runzel has tabulated the results of experiments made on the effects of friction between various substances. The heat produced, other conditions being equal is in proportion to the hardness of the substances; and, on the other hand, the greater the difference in the hardness of two substances rubbing against each other, the less the heat produced by the friction, and the harder of the two heats more than the other. If friction take place between glass and cork the amount of heat received by the two respectively is as seven to one, and between bronze and cork, four to one.

For durability alone, of course, bearings should be of metal as hard as that of the arbors which they support, but considering the wear of the latter the former should be as soft as possible. In practice, however, certain precautions are to be observed; the bearing must not touch the arbor, and it must wear as little as possible; it should not get hot even when lubrication fails, and, lastly, it should possess resistance enough to bear all the shocks that fall upon it without being deformed or broken. The alloys of copper and tin generally in use are rarely homogeneous, with the exception of that which contains eighty-two to eighty-three parts of copper to seventeen or eighteen of tin. When there is less tin in the composition granulation takes place during cooling, which alters the homogeneity of the alloy, and causes the cutting both of bearing and arbor. When an alloy of copper and tin sets slowly the first part consolidated is a very soft alloy not containing more than 7 to 10 per cent. of tin; this forms, as it were, the shell of the bearing, while the hard alloys containing seventeen to eighteen parts of tin, set afterwards and fills up the shell. When a bearing thus formed is in work the soft alloy soon gives way, and the hard grains within attack the arbor and are often torn out and carried away when grease fails.

A good bearing should be the very opposite of the above: its shell should be very hard and durable, and the interior filled up with a softer composition. This result is attempted to be obtained by fusing together several alloys of different compositions and degrees of fusibility, so as to produce by two given alloys, but the operation is delicate and the result uncertain. Phosphorus bronze succeeds best in this way; the shell is then almost entirely formed of very hard bronze, and the interior of a soft alloy of copper and tin. The