

pulping, and pressing department of a 500-acre beet root sugar manufactory are as follows:

1. One horizontal 20-H. P. steam engine for driving the root washer, pulping drum, the hydraulic presses, and two pumps capable of delivering 37,000 gallons per hour. Cost, \$1,700.

2. The beet root washer, 12 feet long, with iron drum and cistern. Cost, \$350.

3. One pulping machine, with double drum, and capable of working 150,000 lbs. of beets in twenty-four hours. Cost, \$660.

4. One spare double drum for the above. Cost, \$130.

5. Spare saws for same. Cost, \$40.

6. One sack filler, or "palotteur." Cost, \$74.

7. One Lecointe press. Cost, \$320.

8. Six hydraulic presses, with eight guides to each, two movable counterweights, twelve-inch pistons, and 40 inches stroke. Cost, \$4,000.

9. One iron frame, with two hydraulic pumps, these alternate, with differential pistons, eccentric transmission of motion, and patent compensator, fitted to work the eight hydraulic presses. Cost, \$1,200.

10. Six "returns," stops, and wrought-iron pipes for the hydraulic presses. Cost, \$200.

11. Two sheet-iron gutters, and three large funnels or "chapels" for collecting all of the expressed juice. Cost, \$150.

12. One "monte-jus" of a capacity of seventy-five cubic feet, with all its accessories, and a connecting reservoir of same capacity. Cost, \$210.

13. Pulleys, belts, etc., for transmissions of motions to root washer, pulper, hydraulic pumps, etc. Cost, \$520.

Total cost of washing, pulping, and pressing department of a factory which will work 150,000 lbs. of beet per twenty-four hours, will be \$7,274.

#### VELOCIPEDE NOTES.

The velocipede has got into the highest court in England. A lower court has decided that it is unlawful for toll-gate authorities to charge toll for a velocipede; but the company against whom this decision was rendered, mean to carry the case up to the chief tribunal. The charge of toll was made under the clause empowering to charge for "a foot passenger driving a wheelbarrow."

It has also got into the magazines, into the theatres, and into the hearts of the sport-loving community so deep that it will take it a long time to get out. It has a language of its own, and a literature of its own, which is not confined to prose, but includes also rhyme if not poetry. Grave periodicals write dissertations upon it, humorous ones caricature it, the daily press tells very extraordinary yarns about it. For our part we simply endeavor to keep our readers posted upon its progress.

In Boston the municipal authorities have recently granted fourteen licenses for velocipede rinks.

Two new styles of velocipede, which conflict with no existing pattern, are reported from Worcester, Mass. One of these is to run entirely by friction and the other with common foot paddles.

Mr. Calvin Witty has just received the original velocipede—the one built by Pierre Lallement before he had received his patent. It is a good velocipede in every way and has a much better saddle than is manufactured to-day. Lallement was a machinist, and this velocipede proves that he was a good workman. From appearances Lallement has ridden it a good deal. As a curiosity it is very valuable to Mr. Witty.

A new style of velocipede was exhibited at Witty's school on Tuesday night. It is a wire velocipede, the wheels being formed of wire entirely. Small thin wire takes the place of spokes, and it is made strong on the same principle that makes a suspension bridge strong—each wire strengthening the others. It is exceedingly light, and there is a slight vibratory motion which is very pleasant; doubtless it would do exceedingly well on the street. When it was run last night upon the new spring floor which Mr. Witty has laid down, the spring was very great. It attracted much attention on the night spoken of.

The unreasonableness of prohibiting velocipedes from the public highways is thus satirically spoken of by the *New York Herald*:

"Man's own feet or crutches and a wheeled vehicle with a horse in front—these, it seems, must be the Alpha and Omega of locomotion in the city streets. A wheeled vehicle without a horse is a thing so preposterous to the eyes of aldermen that it must be forbidden altogether. Such is the experience of several cities, and our city promises to follow suit. Now, though the horse is favored by popular prejudice, a man may move his wagon with a mule, or a jackass, or a goat, or a dog; but he is not permitted to move it without one of these in front, or he will be fined twenty-five dollars. We recommend the sports to tie their tan terriers in front of the machine with a piece of pink ribbon, and go it on the same dodge adopted for the dummies, where an old blind horse trots in front of the locomotive within city limits. Although the aldermanic abdomen is a guarantee against any experiment of the Fathers on the velocipede, cannot some juvenile of aldermanic lineage convince the old fellows how ridiculous they are in endeavoring to prohibit what only needs regulation?"

WHEN the machine, or its parts, is beyond the operator's powers, the machine has usurped the place of its governor or manager. Every person running a machine should understand it, sufficiently at least to retain his natural superiority. If not, the machine is his master, which is reversing the order of nature.

#### ARE UTENSILS OF COPPER INJURIOUS FOR CULINARY PURPOSES?

Translated from the German "Aus der Nature."

Utensils of copper are held in high esteem by most ladies, because they form when well scoured, a kind of ornament to the kitchen. They do not however, take into consideration that food may be poisoned when cooked therein. It has been stated, though scarcely to be believed, that articles of food containing acids may be prepared in copper vessels without any injurious effect, if they be not allowed to remain in such vessels any length of time. This opinion has even been sustained by men of science, who maintain that the action of the acid upon the metal is prevented, because the vapors which are constantly generated in cooking prevent oxidation taking place. Recent investigations, however, have proved beyond doubt that this supposition is incorrect. Pleischl, in Vienna, showed that cabbage, fresh and dried plums, etc., absorb a quantity of copper sufficient to cause injurious effects within one hour's boiling in pans made of this metal. Meat also, because of the acids, it contains, is acted upon by copper. This is also the case with water when it contains chloride of sodium or salt, which is rarely ever lacking in spring water. Copper is also readily dissolved by oil. In placing a drop of oil upon polished copper, it will be seen that the oil soon assumes a dark bluish green color, which change is due to the fact that the oxide of copper formed, has combined with the fatty acids contained in the oil. The power of solubility is, of course, considerably increased when the oil or lard has previously been subjected to the action of heat.

Quite recently Dr. Wald asserted in a German periodical that copper is not poisonous and the objection to utensils of copper therefore unfounded. He asserts that no case of poisoning by salts of copper is recorded! The doctor certainly must be unacquainted with Orfila's toxicology or similar works.

Copper, as long as it remains metallic, is indeed not always injurious to the system. Instances are known where individuals have swallowed copper coins and discharged them again without the least injury, and Drouard has administered nearly one ounce of finely pulverized metallic copper to a dozen dogs, without observing any case of poisoning. Still, Orfila himself relates that an individual in swallowing copper powder was seriously affected.

It is also well known that braziers and electrotypers are often subject to a peculiar disease called copper colic. Its symptoms are fever with violent pains in the bowels. The sickness itself consists in inflammation of the stomach and the intestines, and is produced by the introduction of finely divided copper into the system. The late Professor Runge also mentions that a dealer of the oxide of copper, in Berlin, was unable to obtain laborers for collecting and packing it, because of the illness it occasioned among them.

Orfila relates several cases of poisoning which were produced by salts of copper. Five children, of from three to eleven years of age, were taken ill after eating bonbons which had been colored green by the vessel in which they were prepared. Drouard suffered three days from colic and diarrhea after having eaten a "ragout" prepared from the wine of a cask of which the cock was found to be oxidized.

Orfila says that a dog died in less than three hours from the effects of a dose of verdigris not exceeding fifteen grains. A small one died in sixty-five minutes from a dose of sulphate of copper of forty grains. Death, also, took place invariably when the sulphate of copper was applied upon wounds.

Renne in his treatise on judicial chemistry also relates a number of cases of poisoning by copper.

We admit that cooking utensils of copper very rarely cause sudden death; but are they, nevertheless, to be called harmless?

If the copper taken up by food acts but slowly, it does not act with less certainty, no matter whether this may at the time be positively proved or not. That utensils of copper may be dangerous in certain cases seems to be known to cooks, for we have never found any who used copper pans for frying omelets.

The distinguished French chemist Chevallier who treats upon this question in a memoir recently presented to the French Academy of Sciences has been led to somewhat different conclusions from those of Dr. Wald. After having quoted numerous instances of poisoning caused by food prepared in copper pans, concludes as follows: "All the facts which have come to my knowledge, prove positively that the use of utensils of copper for culinary purposes is dangerous, and that it is unwise to say that copper and its salts are not injurious, or that cooking utensils of this metal are harmless." Chevallier suggests that copper ware employed in the kitchen should always be coated with tin. In Paris, and the department of *la Seine*, this is already the case, but he demands that the respective decree be made a law in all the departments, or that the mayors of the cities direct attention to the great importance of tinned copper. We find that in Sweden, though copper is one of the principal products of that country, the use of copper vessels is prohibited for the preparation as well as for the preservation of food. In 1774, the *chef de police*, in Paris, forbade the dealers of milk to carry the same in vessels of this metal, and even before that date a large establishment was founded in that city for the making of iron utensils for culinary purposes. At first, however, they met with little success, but gradually they came more into use. In 1790 copper vessels were made, the inner surface of which were silverplated. It was also, recently proposed to silverplate iron.

The silverplating of copper, aside from the expense, cannot be recommended. The silver, because of its soft nature, is easily detached, leaving the copper surface exposed, and wherever this is the case the copper is more readily attacked than otherwise. The reason for this is found in the electro-

chemical action which occurs. Cast iron vessels with enameled surfaces inside are better for culinary purposes. The enamel, however, should be free from lead.

The presence of copper in liquid food is readily detected by holding in it a knife blade for about ten minutes. If copper is present, it is thrown down upon the iron and can easily be recognized by its red color.

We find it stated in various cook-books that in order to restore the green color of pickled cucumbers, a copper coin should be dissolved in the vinegar. The evil effect of such a process must be apparent to all.

#### Chrome Green.

Oxides of chrome are prepared either in the dry or wet way; obtained thus, they vary from greenish grey to a more or less deep greenish yellow. They generally have neither brilliancy nor freshness. It is possible, however, to produce green oxides of chrome which are not devoid of beauty. One of the most intelligent chemists of the commercial world, M. Casthelaz, has, conjointly with M. Leune, prepared a chrome green, which is justly styled imperial green. This coloring matter of a superior brilliancy is obtained exclusively by the wet way. The process consists in slowly precipitating chrome salts by treating them with hydrated metallic oxides, insoluble, or but slightly soluble, in water, or by hydrated metallic carbonates, or hydrated metallic sulphides, or, again, by other salts of weak acids, which easily leave their bases; the action is only produced progressively, and the oxide of chromium is precipitated in the hydrated form; the color of the compound is magnificent, of a deep emerald green. For this preparation, it is convenient to adopt economical reagents, such as gelatinous alumina, oxide of zinc, carbonate of zinc, sulphide of zinc, etc., whose price is reasonable. The same result may be obtained by treating a chrome salt with the non-alkaline metals, which have a sufficient affinity to unite with acid of the chrome salt and precipitate the oxide. Iron and zinc will be more particularly used, as they are cheaper. It is necessary to select from among the metals, with their oxides and salts, those which, with the acid of the chrome salt, give soluble salts, as they should be removed by washing. If recourse is had to reagents forming, with the acid of the chrome salt, insoluble salts, it is only in order to modify the color and composition of the chrome precipitates and of the green color thus formed. As to the magnificent imperial green color obtained by M. Casthelaz, it possesses properties which will enable manufacturers ultimately to renounce the justly condemned and dangerous copper and arsenic greens. The use of the imperial green removes all danger from insalubrity; it is an impalpable substance, of perfect tenacity. It is believed that this property will cause the new green to be adopted for printing on stuffs, and for other purposes. The oxides of chrome known up to the present time, and generally obtained in the dry way, cannot, by pulverization, attain to the degree of fineness of the imperial green. It is expected that this substance will have great success in oil painting, colored papers, colors, and artificial flowers, printing, lithography, perfumery, and soap manufacture, as well as in the making of glass and in the ceramic arts.—*Moniteur Scientifique*.

#### NEW PUBLICATIONS.

APPLETON'S JOURNAL OF LITERATURE, SCIENCE, AND ART.

The first number of this new candidate for popular favor has made its appearance, and its mechanical execution is well calculated to invite the reader to "a feast of fat things," but we confess to a disappointment in the literary branch. Victor Hugo's new novel opens in a somewhat disjointed style, but the fame of the man assures us that the tale will progress with an increased power and interest; the opening chapters being the rougher work, which always precedes the more symmetrical structure. The general contents lack somewhat of that spicy flavor which necessarily must enter into all journals of a popular character; but the editorial department may improve with a little more experience.

THE ARCHITECTURAL REVIEW. Edited by Samuel Sloan, Architect. Published by Claxton, Remsen & Haffelfinger, Philadelphia.

The number for April contains a good article upon "Architecture in America," "The Cathedrals of England," beside several practical articles and illustrations of value to all who take an interest in the development of architectural taste in our country.

#### Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

A. J. S., of La.—Your inquiries relative to calorific engines will be found answered in our description of the Roper improved hot air engine, to be illustrated in our next issue, No. 17 current volume.

W. H., of Pa., is running a quarter-turn belt, 60 feet long and 16 inches wide, from a 48-inch pulley at the bottom to a 52-inch pulley above. It does not run well and binders are necessary. A 12-inch belt of the same length ran well for a time but subsequently required binders. He asks if there are any cases known where quarter-twist belts of these lengths and widths have run well without binders. We know of no such cases. In our practice we never attempted to run a belt of either 16 or even 12 inches wide on a quarter turn, and if compelled to do so would have insisted on a greater distance between shafts than that in this case—less than 15 feet. Where the limits between widths of belts and distances between points for the quarter turn we are unable to determine. The millwright usually relies much upon his own judgment.

H. B., Jr., of Canada.—If an invention has been patented abroad, that will not prevent the original inventor from patenting it here—unless the invention has not gone into public use before the date of his application in this country; but the term of his grant here, in such case, would be limited to the expiring of the term for which letters patent were first issued to him abroad for such invention. If a patent exists in a foreign country, that fact would debar the granting of a patent here to another inventor, unless he could show that he made his invention before the date of the foreign patent.