

Science Familiarly Illustrated.

What Old Leather and Bones are Good For.

Articles are not to be despised because worn out, for wearing out means, almost always, only a change of use; when an article becomes useless for one purpose its being fitted for others. This fact is well exemplified in the value of old leather and bones. Let us consider the latter first because of its variety of uses. The fresh bones from the butcher's stall, as those of beef, which have been entirely stripped of the flesh, are excellent bases for soup. Indeed, bones alone make a far better soup than meat alone; and even after being cooked, unless boiled, bones are superior materials for this purpose. Even the rib bones of a piece of roasting beef, after having been placed once on the table, although marrowless, are good soup bones, and the skeleton of the turkey, gosling, or chicken, which as a roast has done its duty, will make a nourishing broth. Gelatin and not fat is the true foundation for soup, and this is largely contained in bones. So much for the domestic uses of bones; now let us look at their other uses.

First, then, the bone boiler deprives them of their fat, which is used for a hundred purposes, from the basis of fancy soaps and pomatums to the "slush" for ships' masts. The gelatin becomes the "isinglass" put up in fancy colored papers and sold at the groceries for making jellies, soups, and blanc mange; or it enters into the composition of jujube paste and gum drops. Old bones are the foundation of the much valued fertilizer known as superphosphate of lime. Ground and mixed with sulphuric acid they restore to the soil what it had given us in our wheat.

But they are almost invaluable in the arts. Very much of our "ivory handled" cutlery, probably nearly all of our ivory handled umbrellas, parasols, and whips, many similarly ornamented canes, etc., are handled with bone and not true ivory. In fact, some of the bones in our domestic animals approach very nearly in texture to genuine ivory. We have seen a complete set of dental instruments handled with horse bones, which made as fine an appearance as the real ivory. Bone buttons are so commonly used that only an allusion to them is necessary. Almost all, if not quite all the phosphorus employed in the arts and sciences is procured from old bones. It is probably the most valuable extract which bones yield.

But it may be questioned whether any other use for old bones can equal in value that to which they are put in the manufactures of iron and steel; and here comes in the value of old leather. The carbon contained in bones and leather is a necessary element in case-hardening iron, and also in some instances of hardening steel. For the first purpose prussiate of potash, or ferro-cyanide of potassium is largely used, but it is a general belief among mechanics that its effects are not so thorough as those from the employment of ground bones and leather scraps. The article to be carbonized or case-hardened is packed in an iron box with the ground bones and leather and exposed to a red heat for several hours—more or less, as the depth of the cementation desired—then removed and plunged into water. Its surface becomes hardened steel. For some parts of gun work and of machinery this is a very necessary process.

Then there are occasions when an extra hardness to steel is desirable; such as the hardening of dies for "raising" the steel "mills" used in engraving calico-printing rollers. These are treated in precisely the same manner as articles of iron to be case-hardened. They are prepared for being engraved—which is done by hand—by being deprived of a portion of their carbon by a process of annealing, when they become nearly if not quite as soft as silver. To harden them this carbon must be restored, and for this purpose it is doubtful if anything is better than the old bones and leather scraps which we so thoughtlessly cast aside as valueless. Fortunes were made during our late war by gathering and sending to market the bones of horses, mules, and the edible animals which accompanied our armies, together with the cast-off scraps of leather, in the form of equipments. The above are only a part of the uses of these despised articles, but our object was mainly to draw attention to the value of what are too often considered used up and worn out materials.

THE EXPENSE OF A HERO.

The old saying that republics are always ungrateful should not be accepted without liberal exceptions. While republics, as history shows, are for the most part very parsimonious with respect to expenditures which are really important—except perhaps when their existence is at stake, then money flows like water. But, on the other hand, when expenditures the most lavish, which cannot in any way benefit the nation, are necessary for some ostentatious purpose, the amount is immediately forthcoming. No voice is raised against them, no one apparently possessing the courage to brave the indignation of those noisy patriots who are always ready to grant any sum they think necessary for the display of national vanity. A case in point is the vast and quite unnecessary expense incurred in sending the immense wooden frigate *Franklin*, to Europe for no other object, in reality, than to give two or three naval officers and their wives a change to indulge in the reciprocity of champagne, balls, and dinners.

If this expensive and idle excursion could raise the price of American securities in foreign markets, we would certainly have nothing to say, thinking perhaps that the game was worth the powder; but it can have no more influence on our national progress or security than would be secured by letting the match-wood *Franklin* go over Niagara Falls.

It is quite safe to assert that the expenses of such a craft as the *Franklin* are over \$2,000 per diem; or in round num-

bers, nearly a million dollars a year, and this to keep a vessel in commission in foreign waters which is utterly useless as a war vessel. As far as a representative of actual power is concerned, there is not a cadet in any of the European schools who does not know that the poorest of their iron-clads could set her on fire with their shells, blow her up, or sink her with her army of sailors and marines, in a very short time.

The *Franklin* is the representative of that obsolete class of kindling-wood vessels which can never again be used to advantage in Naval warfare. It is true they are very elegant as yachts, but it would be almost as agreeable and far less expensive—when it is deemed necessary by the Hon. Secretary for our gallant admirals and their families with their ladies' maids, to air themselves in foreign parts at the expense of the Nation—to supply them with a steam yacht, about one-fifth the size of the *Franklin*—in fact such as are used by many of the English swells, Mr. Lancaster, for example. A yacht such as we have suggested could, of course, save the immense expense of a regiment of men, and a few brass howitzers would answer just as well for salutes as the tuns of cast iron installed in the *Franklin*.

The money saved might be devoted to the benefit of the one armed and legless Union soldiers one frequently sees about the street operating on grind organs.

A friend at our elbow hints bravery and bloody combats. Admitted, but then let it be borne in mind that frequently more men were killed and wounded in before-breakfast skirmishes in the Armies of the Potomac and the West than in both the engagements of Mobile and New Orleans put together.

VOGELMANN'S COMBINED STEP AND EXTENSION LADDER.

This combination ladder appears to be exceedingly simple in construction and easily adjusted. The main portion, A, is furnished with steps, while the other, B, has simply "rounds." As a step ladder, B is a support or brace to A. In the bars of A, are channels or grooves in which slide the ribs of blocks,



C, connected by a strap or clamp, D, which projects at the back sufficiently far to receive a bolt or rivet that acts as a hinge to attach the portion, B, to the step ladder, A. At or near the upper step of A is pivoted a double hook, seen at C and E, the swing of which is governed by a semi-circular guide. A line or iron rod, F, prevents too great a spread of the two portions when combined as an ordinary step ladder, while the engagement of the lower prong of the double hook with the upper round of B, holds the two parts in their relative vertical position.

When used as an extension ladder the part, B, is slid up on A to the requisite point and held by the engagement of the upper prong of the double hook with one of the rounds of B. The union and steadiness of the two parts in this position is further assured by ribs on B fitting in channels in A, as well as by the rigidity of the clasps, D. By unhooking the line or rod, F, and sliding B with its blocks, C, and clamps, D, entirely off, the two ladders can be used separately, and whether thus separated or together the two can be folded instantly for transportation or moving from place to place.

Patented July 30, 1867, by Timotheus Vogelmann, who may be addressed relative to this apparatus at Hamilton, Ohio.

Making Railroad Iron Direct From the Furnace.

Mr. Daniel E. Brady writes us that he is erecting a furnace for producing steel and iron for making railroad bar direct from the furnace, and that it will be in operation by Sept. 15th, when he will invite all interested in steel and iron to witness its operation. The furnace is located one-and-a-half miles from Rockbridge, Alum Springs, in Rockbridge county, Va., and only six miles from the Virginia Central Railroad.

SALT FOR INVALIDS.—"Should salt be used as seasoning in rice or any other article of food prepared for invalids?"

No. Salt should not be used by either sick or well people in any form. It is never useful; always injurious.—*Herald of Health*.

Editorial Summary.

ELIMINATION OF HYDROGEN.—M. Heurtebise communicates to a late number of *L'Invention* a plan for producing and economically employing hydrogen gas, which is both new and valuable. He places charcoal in a retort and raises it to a red heat, then passing a stream of carbonic acid over it, each molecule of the acid absorbs two atoms of carbon forming two molecules of oxide of carbon. In another retort heated red hot he passes two currents, one thus obtained and another of superheated steam, when two atoms of carbonic acid and two equivalents of hydrogen gas result. The carbonic acid gas is again passed over the heated charcoal and four equivalents of hydrogen are obtained. A continuous action is thus kept up, with a steady supply of hydrogen.

THE PNEUMATIC IN FRANCE.—Written telegraphic dispatches are transmitted from the central telegraph station in Paris to various other points of business through iron tubes three and a half inches diameter, laid down not very far under the surface. At each station there is a reservoir of water compressing by its weight a reservoir of air beneath it. The telegrams are placed in a cylinder fitting the tube air tight; the compressed air is turned on, and the cylinder with its roll of dispatches is shot through to the next station, or, if by any chance it sticks fast at any point, the water from the reservoir is let in, and by the fall of water the point of stoppage is marked. The system is as simple as it is economical.

THE GLOVER MUSEUM, a valuable collection of specimens of natural history, has at length come legally into the possession of the Government. The price paid was \$10,000. The collection is the result of fifteen years spent in scientific research by Mr. Glover and the expenditure of several thousands of dollars. The museum, which now fills two rooms in the Patent Office building, will soon be removed to the new building, now in process of construction for the Agricultural Department, and it is to be made the nucleus for an extensive collection of specimens and books calculated to impart information on the various branches of industry connected with agriculture.

TREDEGAR IRON WORKS.—These works, at Richmond, Va., covering eight acres of ground, employed during the past month six hundred hands, and disbursed \$25,000 in wages. The *Richmond Dispatch* says:—"Among the heavy jobs just completed and now being shipped, are two iron bridges of superior construction. One of these is for the road now building between Columbia, S. C., and Augusta, Ga. It will cross the Congaree river, and consists of three spans 160 feet long and seven spans 80 feet in length. The aggregate weight of this bridge will be within a fraction of 500,000 pounds. C. Shaler Smith, Esq., of Baltimore, is the engineer."

MAP OF THE MOON.—Our nearest planetary neighbor is being mapped out for our inspection and study, on a scale of 200 inches to the moon's diameter. The work has been undertaken by an English scientific body, and two sections just completed comprehend two areas of twenty-four superficial degrees each, which are equal to 17,688 square miles in the two. On these sections the plains, craters, mountains, valleys and other objects are laid down in outline, each known object being referred to in the text accompanying the map.

FRENCH VELOCIPEDES.—In Paris the young men have inaugurated velocipede clubs, and may frequently be seen riding through the streets at a great speed. The fabrication of these vehicles has been brought to such perfection, both for velocity and lightness, that at high velocity they are scarcely visible, and the man has the comical appearance of flying through the air on an imaginary tread mill. Experts in this mode of locomotion make twelve miles an hour, and a higher speed will be attained.

TO IMITATE MAHOGANY.—The surface of any close-grained wood is planed smooth, and then rubbed with a solution of nitrous acid. Next apply with a soft brush a mixture of one ounce of dragon's blood dissolved in a pint of alcohol and with the addition of a third of an ounce of carbonate of soda. When the polish diminishes in brilliancy, it may be restored by the use of a little cold-drawn linseed oil.

POISONING BY CHLORINE VAPOR.—Professor Maisch says that a direct antidote to the poisonous effects of the inhalation of chlorine is sulphuretted hydrogen, the halogen combining instantly with the hydrogen, liberating sulphur. The professor has tried it himself after accidentally inhaling chlorine, and obtained immediate relief. The same remedy would doubtless be effectual in the cases of bromine poisoning.

DENTAL AMALGAM.—A young lady who had been languishing for several years in St. Louis under a mysterious disease which baffled the skill of the most eminent physicians, it has been ascertained by a dentist, was dying from a slow poison distilled through the system by the amalgam with which two of her teeth had been filled.

ASPARAGUS is a very healthful article of diet, for the reason that it is nutritious, easily digested, and contains no proper ties which are injurious to the human organism.

An interesting historical print, a fac-simile of the death warrant of Charles I. of England, has been issued by Thos. F. Carter, Louisville, Ky.

Two English inventors have just exhibited in the streets of Paris a musical locomotive, which ran backwards and forwards to the air of "The Tannhauser March."