IMPROVED WATER INJECTORS.

The value of the water injector is now widely known, especially for locomotive use, as it enables the engineer to fill the boiler while the engine is in the shed, and the water evaporated in the steam passed through the blower can be replaced before the engine is ready to start on its trip. The invention now under consideration is constructed in several forms, two of which we illustrate. Both of them are locomotive injectors, Fig. 1 showing a lifting injector, which is intended to pump the water as well as to force it into the boiler against a steam pressure, and Fig. 2 showing a form of apparatus to be used when the water flows from the tank at a higher level than the feed pipe of the boiler. Fig. 3 shows a non-lifting injector as applied to a stationary boiler. Fig. 4 shows Fig. 2 in section.

The new features in Mr. Friedmann's invention are the intermediate nozzle, shown in Fig. 4, which admits steam to the flow of water in two annular jets instead of one. This is claimed to prevent the recoil of the steam from contact with the water, as momentum in the water is continuous, owing to the jets being two in number. Another advantage in this arrangement is that the overflow from the first orifice flows down to the second, adjusting the water supply to the pressure of the steam. It is also claimed that this injector starts as promptly and works as well with steam of a high pressure as with that of a low pressure, and delivers more water with the same consumption of steam than injectors with movable nozzles, or other contrivances liable to get out of order, besides being more simple and easily manipulated. The intermediate nozzle of this injector being fixed and stationary, it is not liable to wear or need repairs.

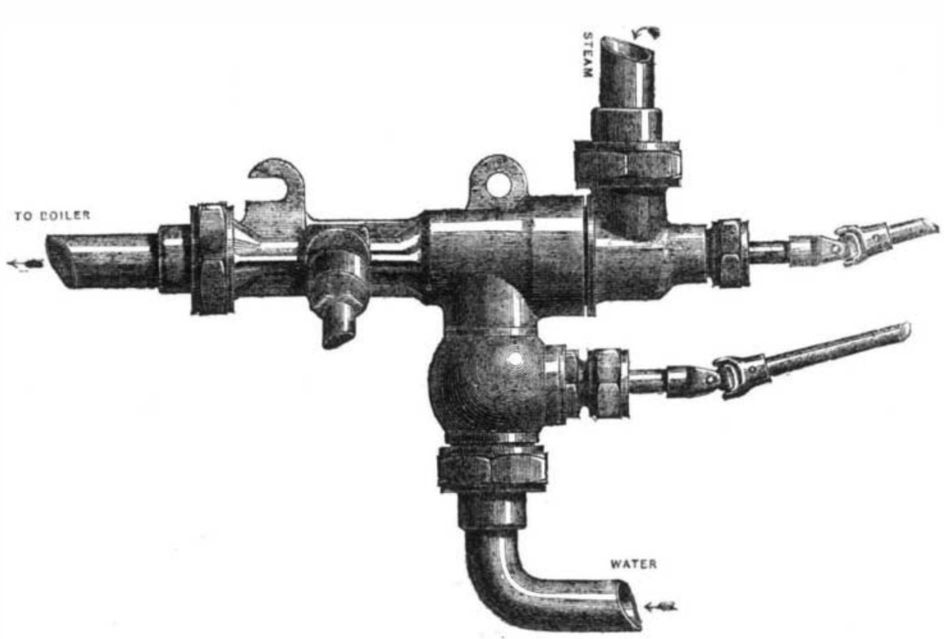


Fig. 1.—FRIEDMANN'S LIFTING WATER INJECTOR.

The lifting injector, Fig. 1, will raise water 6 or 8 feet with ease, and can be applied where want of space prevents the use of the non-lifting form, which must be placed below the water line. The latter, Fig. 2, can be used as a heating cock for the tender or water tank, by closing the overflow valve. The ordinary heating cocks are thus done away with, and the expense spared. The water in the tank can be heated by this means up to 120°, without any trouble in working or starting the injector. The overflow valve, with which each of these injectors is supplied, prevents air or dirt from entering the boiler. By simply transferring this valve from one side to the other, the injector may be used for either the right or left hand side of the engine.

Fig. 2.

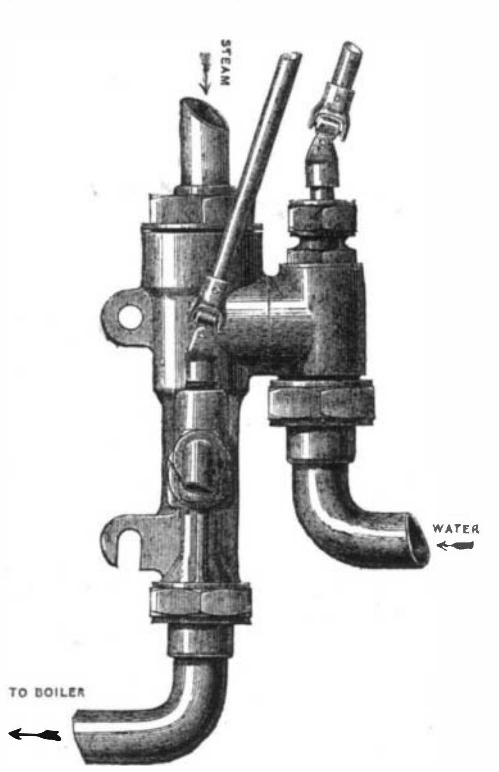
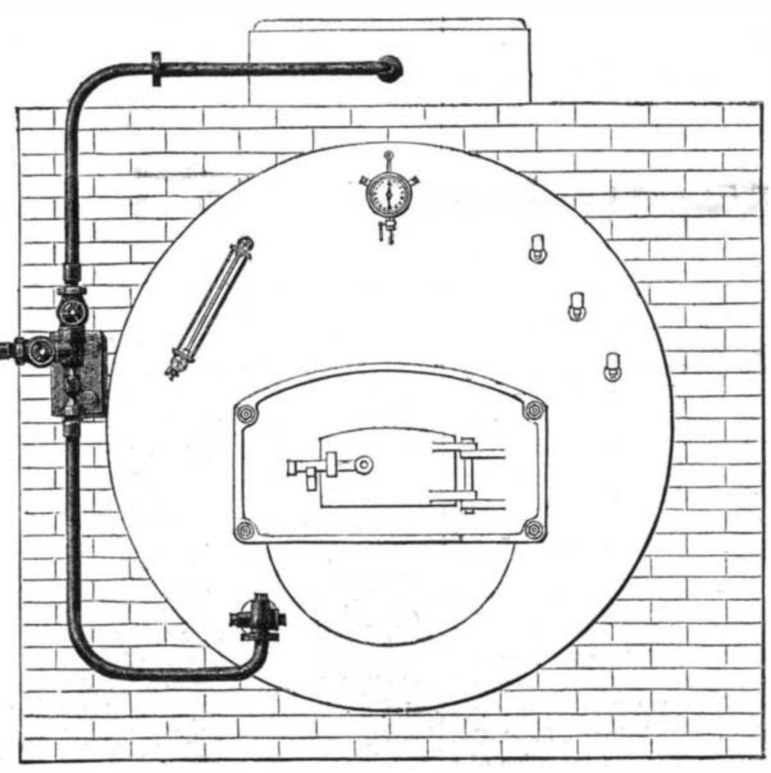


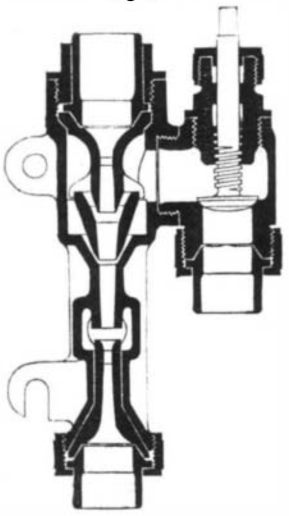
Fig. 3.



FRIEDMANN'S NON-LIFTING WATER INJECTOR.

The value of the injection system is very forcibly shown by its use on stationary boilers, which can be kept full when the engine is stopped for repairs. In a great many manufactories, hot water and steam are constantly needed for various processes, and the stoppage of an engine on which a boiler is dependent for its feed hinders the whole business. This, however, is obviated by the attachment of the non-lifting injector, as shown in Fig. 3. The injector is placed a little lower than the bottom of the heater or water reservoir, so that the water will flow to it by the action of gravity. The steam pipe should be attached to the top of the boiler, as shown, so as to secure dryness in the steam. The lifting form of injector is also adapted to stationary boilers.

Fig. 4.



On many locomotives, force pumps are altogether dispensed with, and two of these injectors are substituted on each engine. These are amply sufficient to keep the boiler supplied with water; and if one gives way the engine is not stopped. Another important point of economy is the wear and tear, as the force pump must keep moving while the engine is running, whether it is throwing water or not. Friction soon renders a new plunger necessary, and frequent stuffing and constant attention occupy much valuable time. These are saved by the use of the injector.

Other forms of the appliance, adapted to portable and marine boilers, are also made by the proprietors of the invention, who report that their sales of these useful and economical devices, in this country and in Europe, have reached 15,000 in number.

Patented April 6, 1869, by Alex. Friedmann. For further particulars address Messrs. Nathan & Dreyfus, 108 Liberty street, New York city.

A Tough Old House.

The Nashua (N. H.) *Telegraph* says: "There is an unoccupied house in Barnstead, Belknap county, having a chimney in the center. The house is 22 by 30 feet. The chimney is built so as to support the sills and beams. The frost has got into the cellar and frozen under the chimney and raised it up several inches, lifting the house free from the ground, except some nine feet where it touches the underpinning. In places it is two or three inches from the underpinning, and can be rocked by pushing against it with the hand. It has attracted a good deal of notice from the citizens of Barnstead."

We recommend the pattern of this house to dwellers in San Francisco and vicinity. A house that can be lifted by the chimney and rocked to and fro without danger would seem to be just the thing for all earthquake countries.

Paper as a Plant Protector.

A gentleman residing in Guernsey, Channel Islands, writes to say that he has saved his crop of early potatoes under glass by spreading newspapers over them, while his neighbors lost theirs by the severe frost. He suggests that a convenient number of newspapers be pasted together, and the edges folded over strings, thus making a screen which, suspended over the newspapers spread loosely over the plants, would give the young shoots an excellent protection in the severest cold weather, and from the sun's rays in summer.

AMONG recent curious inventions is the application of the camera obscura to a railroad car, imparting to the traveling and wondering beholder a moving diminutive picture of the country through which he is passing.

Keeping Ice without an Ice House.

Ice houses are not difficult structures to build, and we presume that few farms are without them. There are cases, however, when it is desirable to stow away a larger quantity of ice than the receptacle will contain, and when the farmer is unwilling to go to the expense of a house which he might utilize only for a single season. In such instances, as well as those where the ice house is absent altogether, the following plan for storing ice without an ice house will prove useful. The present time, we may here remark, should be taken advantage of at once to procure the ice, as the spring thaws now beginning will speedily cause the opening of the streams and ponds.

The first thing to be done in following the directions, which we find in the English *Gardener's Magazine*, is to select a shady spot, on the north side, if possible, of a clump of trees. Throw up a circular mound, some twelve inches in hight and at least fifteen feet in diameter, flattening the summit carefully, and leaving a trench around the eminence, two feet in width and eighteen inches in depth. In gathering the ice, there is no necessity of cutting into uniform shape or of seeking large pieces. Fill up the carts with any kind of fragments, transport them to the mound, and dump them on a platform made of a few planks. Ram the surface of the mound hard and firm, cover with sawdust, and then place the first layer of ice, which should previously be cracked into small pieces, for which purpose the men should be provided with wooden mallets. As each layer is put on the stack, the ice should be thoroughly pounded both above and at the sides so as to form a huge block of ice, the shape of which will be slightly conical.

When the stack is completed, it will require two coverings of straw, one lying upon the ice and the other supported on a wooden framework about eighteen inches outside the first covering.

The layer of straw next the ice must be well beaten and flattened down upon it, and when this is done be twelve inches in thickness. The framework, upon which a similar thickness of straw is placed, may be formed by inserting stout larch or other poles of a suitable length round the base in a slanting direction, so that they can be readily brought together at the top, and securely fastened with stout cord From six to eight of these will, when joined together by means of strips of wood fixed about twelve inches apart, afford ample support for the second covering of the straw. This must be put on nicely, so as to prevent the possibility of the rain's penetrating to the inner covering. By this arrangement there will be a body of air, which is one of the most effectual non-conductors known, between the two coverings of straw. To effect a change of the enclosed air, when rendered needful by its becoming charged with the moisture arising from the melted ice, a piece of iron or earthenware piping a few inches in diameter should be fixed near the apex, one end being just above the straw, and the other end reaching into the enclosed space. The pipe can be readily opened or stopped up, as may appear necessary, but as a rule it will suffice to open the pipe once a week, and allow it to remain open for about two hours. This should be done early in the morning, as the air is then much cooler than during the day or in the evening.

In removing ice from the stack, the early morning should be taken advantage of, because of the waste which must naturally ensue from a rush of warm air at midday. That removed can be placed in a cellar, or even an outhouse, and be enveloped in sawdust until required. The ice must be taken from the top; and when the first supply is obtained, a good quantity of dry sawdust should be placed over the crown. The principal points to avoid waste are to ventilate in the manner indicated, to avoid opening the stack more frequently than is really necessary, and to take the supply early in the day, before the air has been warmed by the sun.

ACCORDING to recent investigations by M. Cailletet, the results of burning sulphide of carbon, alcohol, and carburet of hydrogen, under pressures reaching thirty-five atmospheres, are that the flame augments considerably in brilliancy, while the combustibility of the substance burned is notably diminished.

Honing a Razor.

"The first requisite," says our correspondent G. W. D., "is to have a well shaped, well tempered and well (water) ground razor; unless very truly ground, it will be impossible to hone it properly. Take an Italian hone, of not too fine grit, face it perfectly with fine emery paper glued on a board; dust it off, and drop 6 or 8 drops of sperm oil on its face. Hold the razor perfectly flat on the stone, draw firmly but lightly from heel to point (from the further right hand corner to the lower left hand corner), against the edge; if a wire edge be produced, run the edge lightly across the thumbnail, and a few strokes on the hone will remove all trouble on that score. If you will examine the edge of the razor now, by aid of a magnifier, you will find that the fine grooves or teeth incline towards the heel.

I would here say that the hone must be kept perfectly clean, as, after using a few times and then neglecting it, the pores will get filled with steel, and in that case it will not be possible to get a keen edge on the razor. I have had a hone in use for forty years, for my own and friends' razors. I have kept it perfectly true, and yet there has been no perceptible wear.

I make my own straps as follows: I select a piece of satin. maple, or rose wood, 12 inches long, 1½ inches wide, and ⅝ inch thick; I allow 3½ inches for length of handle. Half an inch from where the handle begins, I notch out the thickness of the leather so as to make it flush towards the end. I taper also the thickness of the leather; this precaution prevents the case from tearing up the leather in putting the strap in. I then round the wood very slightly, just enough (say $\frac{1}{16}$ of an inch) to keep from cutting by the razor in strapping and turning over the same. I now select a proper sized piece of fine French bookbinder's calfskin, cover with good wheat or rye paste, then lay the edge in the notch, and secure it in place with a small vise, proceed to rub it down firmly and as solid as possible with a tooth brush handle (always at hand or should be), and, after the whole is thoroughly dry, trim it neatly and make the case.

Use cold water for lather, as it softens beard and hardens the cuticle; hot water softens both and makes the face tender. Always dip the razor in hot water before using, and also after use, as it will dry it and prevent rusting."

RED DEER.

The deer family, species of which are indigenous to all countries in the world except Australia, are everywhere renowned for their graceful and elegant form and their timidity, their remarkable fleetness of foot enabling them, in open country, to keep away from the haunts of man. The race includes genera of all sizes from the little muntjac to the moose, and the chief peculiarities of the species, the horns, the hairy skin, the habit of rumination, and the feet, each with two principal and two rudimentary toes, are to be found in all of them. The American deer (*corvus Virginianus*) has a long head with a sharp muzzle, with large eyes; and the legs are long and slender. It is easily domesticated but requires a spacious range to keep it in health. The hind produces two or three young at a birth, but no *accouchement* takes place till she is two years old; she conceals her young carefully, visiting them only three times a day.

The subjects of our illustration are the red deer, formerly found in all parts of Great Britain, but now seen only in the mountains of Scotland and on one or two extensive moors. The red deer are so exclusive in their habits that they will not feed with inferior animals; they have an especial abhorrence for sheep, leaving the place at once if there are foot prints of sheep on the herbage.

The kind usually kept in parks in England is the fallow deer, a native of Africa originally; but it has been domesticated in England for some centuries. It is humbler in its tastes, and accommodates itself well to a small park or paddock. Like all its tribe, it sheds its horns annually, retiring as if in shame till the new growth appears.

Chemistry of Milk.

C. A. Cameron, M. D., states that the opacity and whiteness of milk are due, not to the liquid being an emulsion of fats, but to the reflection and refraction of light by solid caseous matter suspended in it.

COW'S MILK.—Forty analyses of pure milk from Dublin dairy cows gave the following average results: Water, 87·00, fats, 4·00, albumenoids, 4·10, sugar, 4·28, mineral matter, 0·62.

MARE'S MILK.—The average of the fourteen specimens gave: Water, 90·310, fats, 1·055, albumenoids 1·953, sugar, 6·285, mineral matter, 0·397. Mare's milk is bluish white; specific gravity about 1·031; reaction neutral, or faintly alkaline.

SOW'S MILK.—The sow parts with its milk (except to its young) with great reluctance. Its specific gravity is 1·041; its reaction faintly alkaline, and color yellowish white: 100 parts contain (mean of two analyses): Water 81·760, fats, 5·830, albumenoids, 6·180, sugar, 5·335, mineral matter, 0·895. These results show this species of milk to be very rich. It is remarkable that in the lactometer it shows up no cream. Drying on the water bath, it exhales the odor of roast pork, and on putrefying that of putrid bacon.

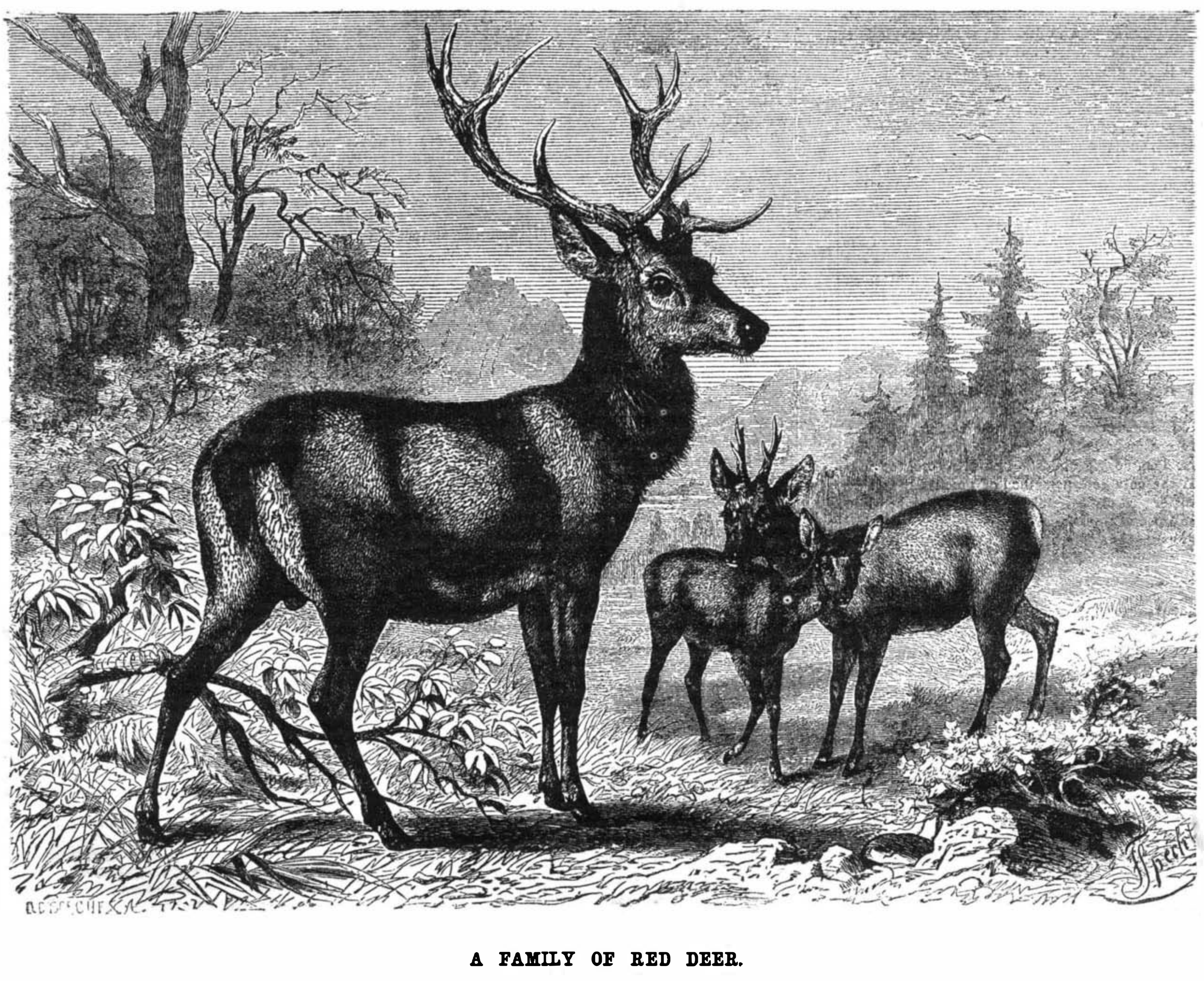
Salting, Packing, and Selling Butter.

Blanchard's *Butter Manual* recommends one ounce of salt to a pound of butter as sufficient for keeping it; but the better paying class of customers, who are a little more fastidious about the quality, prefer about one half as much; and this is found sufficient, if the casein has been properly removed. Butter makers in the vicinity of large towns should seek out regular customers for their produce, in which cases it may be put up in balls or any other form adapted to the demand. "Philadelphia prints," which have acquired a worldwide reputation, are pound balls, with a small figure upon the top They are usually enclosed in a white linen napkin, and packed in a cedar, zinc-lined chest, with apartments at each end for ice, to keep it hard while being transported to market For the great mass of butter makers, the wooden tub, holding from fifteen to one hundred pounds, must ever be the most economical form of package. In the vicinity of New York city, heavy return pails, of the best white oak, with thick covers, having the owner's name branded on them, are used and re-used year after year. In some parts of the West, miserably poor oaken tubs are employed, which affect the butter very injuriously. In other localities, ashen tubs are favorites, while in Northern Vermont the most approved tubs are spruce. Spruce is unquestionably the least liable of all timber to affect the flavor of butter injuriously; while it is generally believed that, for long keeping and much exposure, good white oak is preferable. Stone jars and crocks are sometimes used, but we do not recommend them. Much depends upon the purity of the salt—it must be perfectly white, and completely soluble in water. The office of salt is, first, to remove the buttermilk from the pores of the butter, and, secondly, to render harmless what cannot be removed.

A New Utilization of Refuse Materials.

A very important discovery has recently been made by MM. Croissant and Bretonniere, of Mulhouse, France, which consists in producing dyes of a large variety of brown hues from substances not merely refuse but in themselves colorless. The pigments are obtained by the reaction of alkaline sulphides upon ordinary wood sawdust, humus, horn, feathers, linen, silk, cotton, and paper waste, gluten, blood, and a number of other materials. In certain cases, when treated with the sulphides or polysulphides, the sulphur directly combines with the organic body; in others sulphuretted hydrogen becomes substituted for the hydrogen atoms eliminated.

The same body gives different shades, according to the degree of temperature, the duration of the operation, and the proportion of sulphide employed. The longer the heating and the higher the degree, the nearer the dye approaches to black. Humus gives a fine bistre shade, which does not fade and is unalterable by organic or mineral acids, caustic lyes, soap, oxalate of potassa, etc. With bran, a color is produced which subsequently, with bichromate, yields a fine brownish yellow or rosin color, which can be changed to gray by the addition of carbonate of soda. Sawdust, preferably of oak, chesnut, and other non-resinous woods, gives a soluble dye of a brownish black, which appears upon the fabric of a greenish hue. It is possessed of high coloring properties and is very permanent.



A FAMILY OF RED DEER.