Rural Economy.

HOW TO BUILD CHEAP AND COMFORTABLE DWELLINGS.

Those who have plenty of money can purchase the brains of an architect to tell how to construct a house, if they have none of their own; but those who have but little money must plan their own houses, perhaps build them. The popular method of constructing wood houses, particularly cottages, has not been by any means the most economical that can be devised. From thirty to forty per cent. more lumber has been used than is necessary, and much labor expended that is wholly concealed when the house is completed, and altogether unnecessary. A small dwelling need not be constructed as we would build a warehouse or a grain elevator. It is never subjected to any test of its strength, and wooden cottages never fall down so long as they have a good foundation and those little repairs which all houses must have to stand the ravages of time. No square timber, and but few scantlings are required in a small cottage. Mortises and tenons are of no account—indeed they are a positive detriment, while braces are equally useless. The studding of a house may as well be made of inch boards four inches wide, as of double that thickness. These studs will hold the nails of the siding and lath just as well as those two inches in thickness. Just so the floor joists may be of inch stuff, eight inches wide. Having laid up the cellar walls of stone and levelled them at the top, boards should be laid on this wall to form a sill. The bents of the frame may then be set up, one after another, and stayed till the siding can be put on. These bents may be made on the floor joists, studs, cross-joists for the ceiling and rafters, all nailed together firmly with cut nails, while lying upon the ground. Every piece of siding nailed to this frame tends to make it firmer and stiffer, and so do the laths upon which the mortar is to be spread. The partitions made in like manner, well secured, also tend to stiffen the whole fabric. With here and there a good support in the cellar, such a house, when completed, would be just as desirable for all practical purposes as one of the same size containing nearly twice as much material, and it would certainly be just as warm. A cottage with five or six rooms may be speedily constructed on this principle, at a much less cost than in the popular style of building. This is a substantial building compared with those constructed on leased lands about Chicago, and they are deemed very comfortable, and their strength and safety are not questioned. Some method must be devised to cheapen the cost of dwellings, and we know of none that commends itself so well as this that we have suggested.—*Rural American.*

RANCID BUTTER.

It is owing to a lack of information, or to carelessness on the part of butter makers, that so much of a rancid or inferior character of butter finds its way to market. A good article is as easily made as a poor one, and the former will be found more profitable to the manufacturer, in the long run, than the latter. The butter-maker should reflect that to make or prepare good butter is one thing, and only a portion of the business. It requires care in the preservation after it is made. If it is to be kept any considerable time, it should be packed down with great care, in order that the air may be excluded from the mass as much as possible. Cracked crocks or imperfect butter-tubs should not be used, because they will not hold brine nor exclude the atmosphere as perfectly tight ones will do. Work the butter clear of milk, but do not tear the grain more than is absolutely necessary for this purpose. Salt liberally and evenly, but not for the purpose of selling salt instead of butter. Pack closely, excluding all the air possible. If not intended for immediate use, cover the surface with a strong brine or a profuse coating of salt. Over all put a tight cover, and the necessary precautions for preservation will have been taken. When a portion of a tub or crock is removed for use, see that the surface covering is kept intact, else the action of the atmosphere will soon impart a rancid flavor to what is left, rendering it unfit for table use. It is owing solely to carelessness in these respects, that so much poor butter finds its way to the market, entailing an unnecessary loss upon the manufacturers, and impairing their reputation in the market.

CURING MEATS.

"Massachusetts Hams" writes:—"I cure and smoke 50,000 to 100,000 pieces per year, and know my business. Meat cured in pickle made of water is not as good, and only used because more profitable and less laborious. The flavor of cured meats depends mainly upon the kind of molasses used. The best temperature is 40 deg., frozen meat will not cure, and if above 50 deg., will be liable to taint. For 100 pounds of meat take three pounds of salt, one quart best molasses or two pounds of sugar, one-half pound of saltpetre, two ounces ground alum; mix and rub on the fleshy side of the meat; place in pans, so as to keep all the mixture; repeat the rubbing every three days, rubbing in thoroughly. For large pieces, and cold weather, sixty days will be required; if mild weather, fifty days, and fifteen days less for small pieces. The skin and fat of hams should be cut clean from the face, as far down as the second joint, to allow the salt to enter. The recipe for keeping meat, viz., in ashes, given in September *Agriculturist*, is good. Smoking is no benefit; it is only a quick way of drying. Most people would prefer drying without smoke. If you smoke, use only walnut or yellow birch wood, or mahogany saw-dust. Be sure your meat is well cooled off before salting, ten days after killing is better than ten hours.

APPLES HALF SWEET AND HALF SOUR.

In the American Institute Farmers' Club, John G. Bergen revived the oft exploded notion that apples can be grown at the will of the cultivator, so as to be partly sour and partly sweet. Such had been lately exhibited to him by Mr. Kimball, of Brooklyn, which he said grew upon a tree in Connecticut, and that the origin of the sort was the uniting of two buds, one sweet and one sour, which being inserted in a stock, grew into a tree which produced these hybrid apples. Mr. Dodge contended that such an origin was an utter impossibility; that such dissecting of buds would destroy the life. He had often seen these mixed sweet and sour apples, but it was only a freak of nature. Dr. Jarvis thought that if any mixture had occurred it was through a mixing of pollen, and not a union of buds. No such anomalies are found in the natural condition of fruit. It is possible that the nature of these apples had been entirely changed by cultivation, so as to produce the fruit of the hybrid character mentioned. Mr. Bergen contended strongly for the point as to the origin of the apples presented by Mr. Kimball, because he told him that was the way in which they were produced. Dr. Snodgrass thought we must take that statement as authority in opposition to all theory. Mr. Dodge said he did not dispute the fact stated by Mr. Bergen, but did dispute the possibility of producing any such result. Wm. S. Carpenter had investigated this matter, and thought he had found what appeared to be the parent tree of this kind of apples; it grew in Putnam county, New York. A great many persons have obtained buds and grafts from that tree for the mere curiosity of growing apples that are both sweet and sour.

CLOVER.

Clover differs entirely from the cereal plants in this respect, that it sends its main roots perpendicularly downward, when no obstacles stand in the way, to a depth which the fine fibrous roots of wheat and barley fail to reach; the principal roots of clover branch off into creeping shoots, which again send forth fresh roots downward. Thus clover, like the pea plant, derives its principal food from layers below the arable surface soil; and the difference between the two consists mainly in this—that the clover, from its larger and more extensive root-surface, can still find a sufficiency of food in fields where peas will no longer thrive; the natural consequence is, that the subsoil is left proportionately much poorer by clover than by the pea. Clover seed, on account of its small size, can furnish from its own mass but few formative elements for the young plant, and requires a rich arable surface for its development; but the plant takes comparatively but little food from the surface soil. When the roots have pierced through this, the upper parts are soon covered with a corky coating, and only the fine root-fibres ramifying through the subsoil convey food to the plant.—*Liebig.*

TO MAKE NEAT'S-FOOT OIL.

The hoofs are chopped off, and the portions are cracked and boiled thoroughly. From the surface of this boiled mass, about one pint of pure neat's-foot oil is skimmed, which is unsurpassed by any other oleaginous matter for harness, shoes, &c. After the oil is taken off, the water is strained to take from it any fatty particles that may remain, and then it is boiled again, until, upon trying, it is found it will settle into a stiff jelly. It is then poured into flat-bottomed dishes, and, when cold, cut into suitable-sized pieces. It hardens in a few days, and then you will have a very fine article of glue, free from impurities of every kind, sufficient for family use for a twelvemonth. By taking a portion of this glutinous substance before it becomes too thick, and brushing it over pieces of silk, you have just as much court-plaster as you desire, inodorous, tenacious, and entirely free from those poisonous qualities which cause (as much of the article sold by apothecaries does) inflammation when applied to scratches, cuts, and sores.

Scientific.

BESSEMER'S PROCESS.

[*Concluded.*]

It was, however, found in practice that this remarkable peculiarity of the Bessemer process constituted its principal defect. Thus it was extremely difficult, if not impracticable, to determine with certainty when the decarburization had proceeded to the desired extent, and to the exact point at which the blast was to be stopped. If arrested too soon, no dependence could be placed on the result, as the metal might be only one-half or three-fourths converted, according to chance; while if continued until the iron was quite decarbonized, it would be burnt and comparatively worthless. The workmen could only judge by the appearance of the flame—first violet, then orange, then white—issuing from the throat of the vessel, when it was proper to interrupt the process. But the eyesight of the workmen was not to be depended on; and as the stoppage of the blast ten seconds before or ten seconds after the proper point had been attained, would produce an altogether different result, it began to be feared that on this account the Bessemer process, however ingenious, would never come into general use. Indeed, the early samples of Bessemer steel were found to exhibit considerable irregularity; the first steel tyres made of the metal, tried on some railways, were found unsafe, and their use was abandoned; and the ironmasters generally, who were of course wedded to the established processes, declared the much-vaunted Bessemer process to be a total failure. It was regarded as a sort of meteor that had suddenly flitted across the scientific horizon, and gone out leaving the subject in more palpable darkness than before.

Mr. Bessemer himself was by no means satisfied with the results of the first experiments. He was satisfied that he had hit upon the right principle; the question was, could he correct these serious defects in the process, which to practical men seemed to present an insuperable obstacle in the way of the adoption of his invention? It was a case of persevering experiment, and experiment only. The inventor's patience and perseverance were found equal to the task. Assisted by Mr. Longsdon, he devoted himself for several years to the perfection of his process of conversion, in which he at length succeeded. We can only very briefly refer to the alterations and improvements in the mode of conducting it which he introduced. In the first place, he substituted for the fixed converting vessel a moveable vessel, mounted on trunnions, supported on stout pedestals, so that a semi-rotatory motion might be communicated to it at pleasure. It was found both dangerous and difficult, while the converting vessel was fixed, to tap the cupola furnace; for the blast had to be continued during the whole time the charge was running out of the vessl, in order to prevent the remaining portion from entering the twyers. By the adoption of the moveable converting vessel, this source of difficulty was completely got rid of, while the charging of the vessel with the fluid metal, the interruption of the process at the precise moment, and the discharging of the metal when converted, were rendered comparatively easy. The position and action of the twyers were also improved, and the converting vessel was lined with "ganister," a silicious stone, capable of resisting the action of heat and slags, so as to last for nearly a hundred consecutive charges before becoming worn out; whereas the lining of fire-brick, originally used, was usually burnt out in two charges of twenty minutes each.

Another important modification in the process related to the kind of metal subjected to conversion, and its after treatment. In his earliest experiments, Mr. Bessemer had by accident made use of a pure Blaenavon iron, but in his subsequent trials iron of an inferior quality had been subjected to conversion, and the results were much less satisfactory. It was found that the high temperature and copious supply of air blown through the metal had failed to remove the sulphur and phosphorus present in the original pig, and that the product was an inferior metal. After a long course of experiments Mr. Bessemer at length found that the best results were obtained from Swedish, Whitehaven Hæmatite, Nova Scotian, or any other comparatively pure iron, which was first melted in a reverberatory furnace, before subjecting it to conversion, in order to avoid contamination by the sulphur of the coal.

Finally, to avoid the risk of spoiling the metal while under conversion, by the workmen stopping the blast at the wrong time, Mr. Bessemer adopted the method of refining the whole contents of the vessel by burning off the carbon, and then introducing a quantity of fluid carburet of iron, containing the exact measure of carbon required for the iron or steel to be produced. To six tons of pig-iron decarburized in the converting vessel, he added four cwts. of molten carburet of iron, containing about four per cent. of carbon, and six per cent. of manganese. The result was a given quantity of steel; and, according as the proportion of carburet was increased or decreased, so was the product a harder or milder steel. The important uses of carburet of manganese in the conversion of iron into steel had long been known. It formed the subject of the unfortunate Mr. Heath's patent of 1839, as well as of Mr. Mushet's patent of 1856, the form in which the latter gentleman proposed to employ it being that of *spiegeleisen*, or specular cast iron. But when the ores used in the Bessemer process are sufficiently rich, the use of the spiegeleisen is unnecessary; and in Sweden, where this is peculiarly the case, the fluid crude iron is carried direct from the blast furnace to the converting vessel, and reduced at once to the point of steel, as in the original programme.

When Mr. Bessemer, after great labor and expense, had brought his experiments to a satisfactory issue, and ascertained that he could produce steel of a quality and texture that could be relied on with as much certainty as any other kind of metal, he again brought the subject of his invention under the notice of the trade; but, strange to say, not the slightest interest was now manifested in it. The Bessemer process had been set down as a failure, and the iron and steel makers declined having anything to do with it. The inventor accordingly found that either the invention must be abandoned, or he himself must become steel manufacturer. He adopted the latter alternative, and started his works in the very stronghold of steel making, at Sheffield, where he has for some years carried on his operations on an extensive scale, with marked success. He has not only turned out large quantities of steel of excellent quality, but his works have been a school for the instruction of numbers of steel-makers, who have carried the art with them into every iron-making country in Europe, as well as to India and America.

Nothing, it is said, succeeds like success; and no sooner had Mr. Bessemer demonstrated the certainty, the celerity, and the cheapness of his process, as was abundantly proved by the article itself, and the price at which he sold it, than many of the great iron-manufacturers followed his example, and the production of Bessemer steel is now a large and rapidly increasing branch of English industry. In September last, there were in actual operation in Great Britain, seventeen extensive Bessemer steel works, and there were then erected, or in course of erection, no fewer than sixty converting vessels, capable of producing 6000 tons of steel weekly, or equal to fifteen times the entire production of cast steel in Great Britain before the introduction of the new process. The average price of the steel so manufactured being at least £20 less per ton than the previous average price of the metal, there is thus shown a saving of not less than £6,240,000 per annum in this country alone, even in the present comparatively infant state of this important manufacture.

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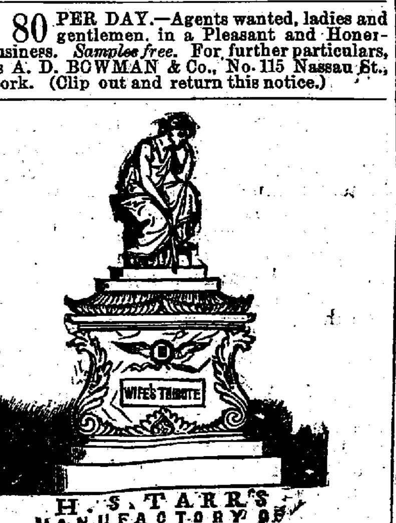

Schools and Academies.

Photographic.