This process is available and practicable for all milkmen. The milk should be cool in all cases before carting it. Milk that is not cooled commences decay in a few hours after milking, and is not a healthy diet. Sour milk is not so injurious. It is milk that is in a state of change that is unhealthy.

No food should be eaten while a chemical change is going on among its constituents.

The plan suggestion, then, is to have milk cooled before it is offered for sale. Milk in the evening and peddle it in the morning, and sell the morning's milk in the afternoon.

In this manner the territory around our large towns and cities for producing milk will be greatly enlarged, and milk may become an important article of food.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held at their room at the Cooper Institute on Thursday evening, Sept. 25th, Dr. Stevens in the chair, and Mr. Stevens acting as Secretary *pro tem*. After a long discussion of miscellaneous matters, the Association took up the regular subject of the evening—

FUEL IN THE ARTS.

Prof. SEELY—The cost of power, of iron, and of many of our most important materials is almost exactly measured and controlled by the cost of fuel. Indeed the cost of fuel is an element in the cost of everything we manufacture. Now the fact that in our very best regulated plans of using fuel we seldom realize more than one-twentieth of its actual value, and in our ordinary operations not one-hundreth, shows how much improvement is to be desired and to be striven for. These truths are well known, and the question of fuel is discussed everywhere. In our club it is quite threadbare, so that I need to make the explanation that I introduced it only to bring out opinions on the new system of using fuel illustrated by Siemens's Regenerator Furnace, and the new material for fuel, rock oil. (A brief description of Sieman's invention was here given). In this furnace it is to be observed that the coal produces no more heat than in other furnaces where the combustion is equally perfect. Also by the use of water and the water gases (hydrogen and carbonic oxide) the total heat is not increased; the coal is, in effect, partly converted into water gases, which burn and give the heat which otherwise would come directly from the coal. Coal and water are fed at the stoking place, and the solid coal and liquid water expand into the combustible gases carbureted hydrogen, hydrogen and carbonic oxide and pass on to the spot where they are to be completely burnt. The advantage of this transportation of the coal lies in the fact that the burning of the gaseous products can be more easily controlled, the heat can be more directly and completely arried to the point where it is useful. The novelty of Sieman's furnace is, however, his regenerator, by which the heat from the otherwise waste products is preserved and brought again to the working point. It is also evident that this waste heat of the regenerator is so added to that of the gaseous fuel that the intensity of the working heat is greatly increased, a fact of great consequence in many industrial operations.

With reference to rock oil I will only remark that although its cost by weight must always be much greater than that of coal, yet for many purposes it will be much cheaper for the reason that the heat it gives can be more completely utilized. Although it costs 50 times more than coal, yet if it does 51 times more work, it is plain that it is cheaper. Later in the discussion I will present some new methods of burning it.

Mr. FISHER—I have made here on the blackboard a rough sketch of the apparatus invented by Mr. Clark for burning the smoke in locomotives in which bituminous coal is used. A number of small openings—usually 14—are made into the furnace, and small jets of steam are blown through these openings, carrying currents of air with them. This air mingles with the gaseous products of combustion, and burns them. It was found that this plan worked very well on locomotives where steam is usually carried at a pressure of 100 lbs. or more to the inch, but when the attempt was made to apply it to marine engines where the pressure is only 30 lbs. to the inch it did not answer so well; there was too much steam in proportion to the air. Even in the locomotive engine the steam must tend to reduce the temperature, as it enters the firebox at some 300° while the burning gases are not less, probably, than 2,500°.

It has occurred to me that the vapor of petroleum might be blown into the furnace in place of steam, and thus the heat might be considerably increased. A separate boiler might be used for evaporating the petroleum, and the jets arranged in the manner adopted by Mr. Clark. Where petroleum is to be employed as fuel, I suggest this as a good plan for using it.

Prof. SEELY—I would ask Mr. Fisher what he expects to gain by this arrangement.

Mr. FISHER—I expect to avoid the reduction of temperature which results from the use of steam. I suppose the combustion of the smoke will be quite as perfect—or perhaps more so—and that the heat will be greater. It is known that the temperature in the boiler flues is much lower than in the fire box. Experiments have shown that a foot of heating surface in the flues is worth only about a third as much as the same surface in the firebox. If a higher heat can be imparted to the gaseous products of combustion before they enter the flues, a larger quantity of steam can be generated.

Mr. DIBBEN—I think that Mr. Fisher is right and that his explanation might be made more full. If the temperature of combustible gases, however thoroughly they may be mixed with air or even with pure oxygen gas, is reduced below the burning point, combustion ceases. It has accordingly been found that the old plan of lining fireboxes with fire brick is better than leaving the iron walls exposed. Whenever the gases come in contact with the comparatiuely cold iron they cease to burn. Anything, therefore, which tends to reduce the temperature in the firebox, tends to prevent a perfect combustion.

(The speaker then made a drawing on the blackboard and described Siemens's gas furnace, the same that was explained so fully by Professor Faraday in his lecture, an abstract of which was published on page 148 of our current volume.) Mr. Dibben concluded by expressing an opinion of the very great value of this invention, saying that Mr. Siemens deserved the highest credit for pushing it through to practical success; and that it was satisfactory to learn that this inventor is at least enjoying a reward for his inventions.

Prof. SEELY—I indorse what Mr. Dibben has said in relation to the value of Mr. Siemens's furnace, and I have no doubt that it will come into very extensive use throughout the civilized world. I regard it as a very great invention.

The same subject was continued for the next Thursday evening, and the Association adjourned.

SORGHUM AND IMPHEE CULTURE.

From the able treatise on sorghum culture and sugar making by Isaac A. Hedges, published in the agricultural volume of the Patent Office Reports for 1861, we take the following extracts:—

THE TWO VARIETIES OF CANE.

There are really but two varieties of the sugar-cane, commonly called Sorghum, in cultivation in the northern States of this Union, viz., the Chinese and the African. Although of the latter variety, introduced by Mr. Leonard Wray, of England, there were originally several sub-varieties, they are now fast becoming merged into each other, and their various shades of difference are becoming obliterated by hybridization, consequent on contiguous cultivation.

Since the first introduction of these plants into the United States I have been a careful observer of their habits and tendencies, with a view to arriving at a proper estimate of their relative values. As a result of these observations, I shall here state what I conceive to be the chief differences between the two varieties, in a practical sense; that is to say, those differences which render one or other preferable as an article of cultivation to the sugar or sirup manufacturer. The Chinese cane seems more closely related to broom corn than the African, and manifests a greater tendency to "crossing" and deterioration from contiguous crops of the broom; it is also very liable to be thrown down by the winds, and to the production of large, gummy joints, which exercise a detrimental influence on the production of either sirup or sugar. The plant, too, when thrown down by winds or rain, in its efforts to regain the upright position becomes so crooked as to give great trouble to the workmen employed in handling the stalks. The African variety or *imphee*, on the contrary, is much more vigorous in the stalk, and seldom falls before the wind; its joints are much smaller relatively to the size of the stalk, and its juices are more limpid and rich, generally showing about one degree richer in sugar, by the saccharometer, than the juice of the Chinese cane. Upon a deep, rich soil I have generally found the Chinese cane to be rank in growth, and yielding juice of inferior quality, which is difficult of defecation. Upon a similar soil, however, the African cane (several lots of which I have worked during the last fall) yields a uniform crop of large plants, which, although not perhaps as sweet as those grown on poorer soil, yield in the aggregate more sugar or sirup to the acre. Upon the whole, therefore, it will be perceived I give a decided preference to the African cane or *imphee*.

WILL THE SORGHUM SUPERSEDE THE BEET?

It has been supposed by many that the introduction of these sugar canes into France would lead to the abandonment of the cultivation of the sugar beet in that country; but from a letter I have received from a well known house in Paris, it would appear that no expectations may be entertained that the cane will supersede the beet.

THE MODE OF PREPARING THE SEED.

For preparing seed I would recommend the use of a simple revolving cylindrical hackle, such as is used for cleaning the broom seed from the wisp; this will not fully prepare the seed for planting, but will make it ready to be freed from the twigs or clusters which adhere, so that greater uniformity in planting may be attained. For this latter purpose I use a machine consisting of two vertical wooden plates, one of which is stationary, and provided with an opening in the back, communicating with a hopper, and the other revolving by means of a crank turned by hand. The revolving plate is held up against the stationary one by a spring of just sufficient strength to cause the seed to roll between without injuring it, and thus separating all the twigs and much of the hull. This separation of the hull from the seed of the *imphee* is rather a benefit than otherwise, as it enables the moisture of the earth to penetrate sooner, and thus hastens germination.

PLANTING THE SEED.

I would specially caution farmers against planting seed without first having tested its capability of germination; then, having satisfied themselves on that point, let care be taken not to plant too thickly. If planted in rows, they should be fully four feet apart; and if planted in drills, about four or six inches between each seed. A reliable planter will pay his extra cost in the end; but, however planted, and by whomsoever, I repeat, plant shallow—not exceeding one inch deep, and half of that depth would be still better.

Plant as early as the ground, by being dry and warm, seems fitted for the seed, and then plant shallow—very shallow.

The seed should, previous to planting, be soaked in warm water until an appearance of germination is perceived. This in the *imphee* will require about two days; in the sorghum, nearly six.

CULTIVATION.

The young cane plant is exceedingly diminutive, and is hardly distinguishable from the fox tail or summer grass; hence the importance of having clean ground wherever practicable. The plants require no other or greater attention in the way of hoeing or dressing than is bestowed upon Indian corn or broom corn. In some soils the cane is liable to "tiller," or, as it is sometimes called, "sucker." It will therefore be advisable to remove the young suckers, in order to permit the main plants to mature uniformly and vigorously, and also to facilitate the stripping and gathering.

CUTTING AND HANDLING.

As has already been intimated, in reference to the time for planting, the time for commencing cutting depends greatly on the season, varying as the weather has been more or less favorable for maturing the plant. Of one thing we are, however, certain, viz.,

that as soon as frost shall have killed the foliage and seed tufts, the cane will gain nothing by standing out in the hill; on the contrary, if the stalk has been frosted, and is left exposed to the warm sun, it will commence much sooner to ferment in its juices than if cut and stacked, or housed.

Previous to cutting, the leaves should be stripped off by hand, if desired for fodder, or, if they are designed to be left on the ground, by a smart stroke of a stick about four feet long. The seed heads, together with about four feet of the cane, should be cut off and tied into small bundles with the leaves; they are far better as food for every kind of stock than sheaf oats, and are richly worth saving. I am aware of a rumor which has gone abroad to the effect that they are injurious; and although the statement has a thousand times been refuted, I am still asked whether the seed will not kill cattle and horses. I once lost a valuable horse by feeding to him imprudently a mess of oats, and so, but only so, it may be with this seed; yet, according to the proverb, "A lie once started, the truth seldom overtakes it."

After the canes have been stripped and cut, as above directed, they should be cut off near to the ground, and tied in bundles of twenty or thirty stalks, with the wilted leaves. Each bundle should be tied in two places, which will greatly facilitate the subsequent handling. In this condition the cane may be set up in ricks in the open air, or, preferably, under shelter, and kept for some weeks. Such keeping improves the juice not only in flavor, but also in saccharine richness, from one to three degrees. This improvement takes place upon the same principle and from similar causes which determine the sweetening of acid fruit after pulling, viz., the change of the gum and starch into sugar.

If, at any time while the cane is standing, a sharp freeze should occur, the whole crop should be slashed down and thrown into windrows, with the tops uppermost. If much difficulty should then arise in stripping off the leaves, the canes may be ground with the leaves adhering, but the tops should be freely cut off. All possible dispatch should be used after freezing in getting the canes through the mill, lest a warm sun should come out, and fermentation and souring commence. The frost does no harm of itself, but when warm weather follows the mischief is done.

In handling an extensive crop a dumping wagon will be found highly convenient. In the Southern States they are in common use for the purpose.

Our Teeth.

They decay. Hence unseemly mouths, bad breath, imperfect mastication. Every body regrets it. What is the cause? I reply, want of cleanliness. A clean tooth never decays. The mouth is a warm place—98°. Particles of meat between the teeth soon decompose. Gums and teeth must suffer. Perfect cleanliness will preserve the teeth to old age. How shall it be secured? Use a quill pick, and rinse the mouth after eating. Brush and castile soap every morning; the brush and simple water on going to bed. Bestow this trifling care upon your precious teeth, and you will keep them and ruin the dentists. Neglect it, and you will be sorry all your lives. Children forget. Watch them. The first teeth determine the character of the second set. Give them equal care. Sugar, acids, saleratus, and hot things, are nothing when compared with food decomposing between the teeth. Mercurialization may loosen the teeth, long use may wear them out, but keep them clean and they will never decay. This advice is worth more than thousands of dollars to every boy and girl.—*Dr. Lewis.*

Manufacture of Shot.—The Dubuque shot tower having been purchased and closed up by a St. Louis house, in order to remove its competition, the citizens of Dubuque became indignant, and commenced experimenting to make shot by dropping metal down the deserted lead mine shafts, and with the most satisfactory results. They are now going into the business quite strongly, having decided that there is no necessity for building fifteen thousand dollar towers, when a hole in the ground, with an expenditure of $500, will do as well.

The average daily supply of water in the City of Brooklyn is 5,461,813 gallons.

Correspondence

Speculations on Projectiles.

Messrs. Editors:—I noticed in No. 9 Vol. VII. a description of a new non-glancing projectile, and, being a practical gunsmith, it took my attention. Now I wish to explain my views on the subject, which may be of some use to the inventor, as well as to our Government, in which I feel a great interest. The point of the projectile, I think, is all right, also the wings, excepting they should be on a slight twist, as they would not only catch the air more, and thereby serve to keep the point foremost, but a rotary motion would make it still more accurate. But as for the projectile striking with more force, or making a greater breachby being in two parts, it is erroneous in my view of it. It would be like using a light hammer instead of a trip hammer, or a light weight instead of a heavy one for a pile driver. You cannot do as much toward breaking a rock or a piece of iron with a light hammer as with a heavy one. Now, suppose you strike two blows with a hammer that weighs one pound, and then one blow with a two pound hammer, and see which will break or do the most damage to the substance encountered. I think those wings a good invention, as it will save rifling, and the guns will last longer and be less liable to burst. There is one thing I wish to say in regard to rifled cannon. I suppose, by what I can find out, that the twist is the same at the breech as it is at the muzzle, and that the great trouble is to make the balls follow the twist, and not cause so much strain on the gun. Now, suppose you have a gain twist, which must be of still more use in a large gun than in a common rifle, for it takes more to set a large body in motion than a small one, the grooves or hexigon should start at the breech nearly or quite straight, and then increase to whatever rotary motion is required to keep the projectile point first, as I have found by experiment that it takes more twist for a long conical ball than a short one. By this plan you can get any required rotary motion at the muzzle that you wish, without any extra strain on the gun, which is always at the start at the breech.

M. L. R.

Denver City, Sept. 13, 1862.

[We agree with our correspondent perfectly in regard to a projectile striking with less force if formed in two pieces, but we do not agree with him in thinking that accuracy can be obtained by means of spiral wings formed on the surface of a shot. The rotary motion, we think, must be imparted before the projectile leaves the gun. There is, however, no novelty in having wings of spiral form. In relation to increasing or uniform twist there is much difference of opinion, and the point can be settled only by experiment. Even when the twist is uniform, the rotary motion is imparted gradually, inasmuch as the projectile moves with constantly accelerated velocity during its passage out of the gun.—Eds.]

Information Wanted Respecting Hydraulic Engines.

Messrs. Editors:—I am desirous of ascertaining the cost of the most approved description of a water wheel, to be worked by being connected with the company's water pipes, where there is a direct head of 490 feet giving a pressure of about 240 pounds on the square inch. The wheel to be ofa suitable size and power for discharging ship's cargoes of coal, salt, &c.—probably the weightiest articles would be puncheons and hogsheads of molasses and sugar. Also, the cost of the necessary hoisting gear, &c., complete in every respect. State whether the power could be placed for discharging cargoes and hoisting in warehouses on same establishments. The distance in most cases between the warehouses and piers of discharging from is 150 to 200 feet. State the size of the feed pipes and power of a suitable wheel for this purpose, also the prices of greater and lesser power for different purposes, and the discount, if any, from one to one dozen or more wheels for different purposes. If on hand I would like to have a plan of the wheel and general arrangements of the hoisting gear, crane, &c.

S. G. Archibald.

St. Johns, Newfoundland, Aug. 26, 1862.

Coal Oil in Drilling Glass.

Messrs. Editors.—The best plan that I have yet found to drill glass or very hard steel is to take an ordinary bow-drill and lubricate or rather wet the point of the drill-bit with coal oil, which will give it a better bite than camphene or anything else that I have heard of. I have in my possession specimens of glass drilled full of holes large and small and without a scale or flaw. I have thus drilled into common window glass edgewise, to the depth of an inch, the drill forty-eighth of an inch in thickness.

J. J. B. Hatfield.

Indianapolis, Ind., Sept. 24, 1862.

PAPER AND BREAD FROM THE HUSKS AND STALKS OF INDIAN CORN.

We are informed by Mr. Loosey, the Austrian Consul General in New York city, that Mr. Auer the Director of the Imperial Printing Establishment at Vienna has made a most important invention, which is calculated to create quite a change in the manufacture of paper.

Mr. Auer obtains, by his process, from the leaves of the indian corn plant, a spinning and weaving material, and from the residue two other substances, one of which contains all the elements of cereals, such as flour, sugar, &c., while the other furnishes a paper and gum material which surpasses the rag stuffs in quality and durability.

Mr. Auer's invention also comprises a process for producing the spinning and weaving material, termed the "Maisfilament Paper." Mr. Loosey sends us the following circular, which we print verbatim:—

The imperial paper mill "Schlögelmühle," near Gloggnitz, has succeeded to make, out of the maize plant, particularly out of the shucks (that is to say out of the leaves which envelop the corn ear) excellent paper. Besides, there was imagined a process by means of which the fibers of the maize plant can be used for spinning and weaving, and another process by means of which the nutritive substance contained in the maize plant, if mixed with common flour, can be converted into agreeable tasting bread.

In order to give the public an opportunity to inform themselves not only of the results obtained till now, but also of the processes of fabrication, exhibitions of maize plant products will be arranged, first in the imperial printing establishment in Vienna and afterward in other large cities of the empire.

The extracting of the useful substances contained in the maize plant, is previously effectuated in the imperial paper mill Schlögelmühle and in the localities of the imperial printing establishment in Vienna.

Private individuals, who, in their proper interest, wish to make use of the said inventions, under the protection of the imperial patents granted to Counsellor Auer, will find the latter ready to give any necessary information.

In order to profit in a proper way of this year's maize crop and to obtain shucks of the convenient quality and in the greatest possible quantity, the producers ought to proceed in the following way.

The maize corn having attained its full ripeness and the ears having been twisted off, the shucks which envelop the latter, are torn off, for the purpose of being dried either on the earth, or, if the latter should be moist, on mats, after which they are packed up into bags and prepared for being forwarded to the respective places. The drier the shucks are, and the more carefully they are preserved from the natural putrefaction, the more they will be useful. It is therefore a matter of interest for the producers, to proceed with convenient care in cropping the shucks, that the latter may get to the manufactory in the cleanest and driest possible state. The shucks being only the least part of the maize plant, there is straw enough remaining to the planters to be used for agricultural purposes, and the money got for the shucks appears as an extraordinary profit they obtain of their maize crop. It is therefore to be hoped that a great many of producers will proceed according to this invitation in gathering the shucks.

This is the more to be expected, as it influences the promotion of a new branch of industry, which, duly deve loped, is likely to become a matter of importance for the national economy of this country.

Vienna in the month of August 1862.

A. Auer von Welsbach.

The reliable authority from which we received the above information, and the high position the author of the invention enjoys in the mechanical world, incline us to the conclusion that it would be to the interest of our paper manufacturers to put themselves in connection with Mr. Auer, and we have no doubt that Mr. Loosey will be very happy to render any assistance to effect that object.

A Prize of twenty thousand francs is offered at Parisforthe best essay on the "regeneration of bone," in the hope that, eventually, medical science will no longer have to resort to amputation. The next step will be to regenerate the dead body, and we have no doubt that under the stimulus of a liberal prize, French *savans* will endeavor to do it.

An explosion took place at the arsenal at Columbus, Ky., on the 25th ult. The property destroyed is valued at $200,000; fortunately no lives were lost.