

OUR SPECIAL CORRESPONDENCE.

The Cotton-seed Oil Manufacture—The Business Profitably Established on a very Large Scale—Description of the Establishment of the First Successful Manufacturer—Machinery and Process—Value of the Cake—Magnificent Future of the Business.

NEW ORLEANS, LA., May 30, 1860.

MESSRS. EDITORS:—Being forced to remain in New Orleans nearly the whole of a day, I thought I could find nothing of more interest in your line than a description of the great cotton-seed oil manufactory of F. M. Fisk. This business, after struggling through a feeble and ailing infancy of 30 years, has finally fallen into the hands of a man who has established it on a paying and permanent foundation, and it now has the promise of a brilliant and widely-expanding career. Mr. Fisk is the first man who has succeeded in this manufacture. I have been over his establishment. It occupies a plot of ground 150x150 feet, which is mostly covered by brick buildings three stories in height. His machinery is driven by a 35-horse power engine, and he makes 500 gallons of oil and a little more than 5 tons of cake per day, using from 12 to 15 tons of seed; from which it appears that a ton of cotton seed yields about 35 to 40 gallons of oil and 700 or 800 pounds of oil cake. Mr. Fisk shipped 800 tons of the cake to England, and visited that country himself to introduce the article among the English farmers as food for their cattle. It was upon effecting a sale for this portion of the product that the success of the business depended. The cake now sells for about \$40 per ton at the manufactory. Two kinds of oil are made, the variety depending upon the clarifying process used; the white selling for 80c. per gallon and the yellow for 60c. The seeds costs \$11 per ton on the levee, and about \$13 at the mill.

The process of manufacture is simple and rapid. The seed is hulled, crushed, heated and pressed; the oil is then refined; the whole process occupying less than two days. The hulling mill is made of German burr-stones, these being softer than the French, and, consequently, more easily dressed. The running stone is in the shape of a very thick grindstone, the periphery forming the grinding face. The stationary stone is concave, fitting the runner, and both have their grinding surfaces grooved; the grooves running diagonally in opposite directions. This rolls off the burr, at the same time crushing the seed. As the seed leaves the mill it falls upon a sieve, which separates the hull and adhering cotton from the crushed seed. It is then passed again through a similar mill, and again sifted; after which it is run between two iron rollers, which complete the crushing process. Being thus made sufficiently fine, it is now placed in an iron tub and heated as hot as can be done without burning; it being constantly stirred by arms upon a revolving shaft during this process. When the experienced workman finds (by feeling with his hand) that the meal is properly heated, it is put into stout linen bags, which are placed between stiff boards and subjected to the action of a powerful hydraulic press. The oil runs out in a stream, and the cakes, on being removed from the press, have the bags stripped from them, and their edges smoothly trimmed with a knife. Each cake is nearly two feet long, some nine inches wide, an inch thick, and weighs about seven pounds. The oil is clarified by a secret process, and the residue from the clarifying is used for making soap. This soap looks precisely like ordinary bar soap, but Mr. Fisk says that, as there is no resin in it, it is as soft and pleasant to the hands as the best Castile. I have tried it once, and, as far as I could judge from that one trial, the statement seems to be true. Mr. Fisk and his foreman assert that the oil is quite equal to the best of sperm, for both lubricating and illuminating purposes.

This business having been proved to be profitable with seed at \$11 per ton, considering that hundreds of thousands of tons are wasted annually, it would seem that, unless the coal oil should master it, it might grow rapidly into one of our very largest manufactures. B.

THE COTTON-SEED OIL BUSINESS

As an appropriate appendix to the foregoing letter, we here publish an interesting communication just received from the secretary of an oil company recently established in Tennessee, and which is now "floating along on the high tide of successful experiment."

MESSRS. EDITORS:—On page 280 of the last volume

of that very valuable paper, the SCIENTIFIC AMERICAN, we observed a notice of our enterprise; and thinking it might be desirable upon your part, and possibly useful to us, that you should be fully informed of the nature of our products and the extent of our operations, we have sent you (by the same mail which brings this letter) a copy of our charter, list of officers, bye-laws, &c., in pamphlet form, and we will now give you some further details of the business in which we are engaged.

The supply of seed for all purposes, for years to come, is inexhaustible; the only difficulty in obtaining it existing in the fact that, when the seeds are produced at remote points from the river, they do not well bear freight at the price we can afford to give for them. This difficulty, however, will, we hope, be hereafter removed, first, by improvement in the hulling machines, so as to produce those that are portable and suitable to put up upon plantations, thus reducing the freight to simply that on the clean meat or kernel of the seed; and secondly, by an improvement in the demand, and consequent improvement in the price of the products, as they become (as you suggest) utilized by the ingenuity of the thousands of ingenious minds which are scattered through the cotton (and I will add, also, the northern) States. We now have an ingenious and experienced machinist at work upon a model for a small, light and portable huller, of such simplicity as will render it available in ordinary hands upon plantations; those now in use requiring too great an amount of mechanical skill in keeping them in order. We are well convinced that the more tests that these products are subjected to, and the more they are brought before the public, the greater will be the demand for them, and, consequently, the better price will prevail. The legitimate products are the crude oil and the oil-cake. The crude oil is of a high, clear maroon color, and much freer from the albumen, gluten and other component parts of the seed than would be supposed. We have a process—the best yet known, but one which we think susceptible of improvement by scientific men—of producing a clarified or refined oil, of about the consistency and appearance of the best lard oil, and which can be applied to all the uses that the lard oil may be. Partial and very imperfect experiments have been made by ourselves, and by other persons under our instructions, in applying it to purposes of mixing and grinding paints, and also for tanning and currying purposes, which latter it seems well adapted for; it penetrates the leather thoroughly, and tends much to soften the fiber of it. We have sold over 1,500 barrels for this purpose, and in every instance it has given entire satisfaction. As a machine oil, in its refined state, it is about equal to the best lard oil. We have also a process of preparing from it what we have named the "railroad lubricator," which we hope to so far perfect as to make it an article that will supersede all others for machinery of a heavy kind or which runs at great speed. The object we have endeavored to obtain is to remove from the oil all glutinous matter of the seed, and yet to give it a consistency that will retain it long upon the journals while all its liquid and lubricating qualities are retained; this we have arrived at to a great extent, but we are aware that the process may be very much improved.

As an oil for soap of every quality—from the lowest to the highest grades of fancy toilet soap—it has no superior; the refuse of the refining process making the best class of the common washing soap, and the refined oil being capable of converting into the finest qualities of delicate shaving and toilet soap.

The oil-cake is a clean and portable article of food for "stock," such as beef cattle, hogs, sheep, poultry, and especially milch cows, and of greater richness than any other food known; combing, as it does, all the qualities of the best food used. We are confident, too, that when this cotton seed oil-cake and meal shall have been properly tested, it will prove a far more available, cheaper, cleaner, and more pleasant article as a fertilizer of the soil, or as a dressing for vegetation, than any other. We have made some experiments in this way, but desire others having better opportunities to test the subject fully.

It remains but to give you a synopsis of capacity, &c. We are now manufacturing daily 500 gallons of oil and 7½ tons of oil-cake and meal. In 60 days we calculate to have six presses running, when our daily products will be 1,500 gallons of oil and 24 tons of oil-cake and meal. We refer all who may wish to purchase any of our pro-

ducts to Messrs. McBride & Brothers, No. 176 Washington-street, New York City. They are our agents for sales and keep samples.

JAMES A. GRANT, Secretary.

Grant White-lead and Cotton-seed Oil-works (Navy Yard), Memphis, Tenn., June 23, 1860.

RATS AND LEAD PIPES.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of June 2d, I noticed, under the head of "Notes and Queries," a reply to W. G., of Md., in which you say:—"Common sheet iron will soon rust out," &c., &c., and "there are some instances on record in which leaden water pipes have been cut through by rats." Let me give you an incident in my experience. In 1854, a gentleman in this neighborhood employed me as a carpenter to re-model his dwelling-house; and, among other things, he had a bathing-room made in the second story, with the usual water-closet arrangements, &c. A "soil pipe" extended into the cellar; thence some 20 or 30 feet horizontally (a little declining) to the outside of the house, where it emptied into a brick sewer, which extended some 50 or 60 feet into a barn cellar. Before I had completed the job, having occasion to do something in the cellar near this soil pipe (which, by-the-way, is some 4 or 5 inches in diameter, made of thick lead), I discovered a hole in the upper part of the pipe, a little on one side, some 2 inches (more or less) in diameter, irregular in shape, and very rough about the edges. On examination, it was perfectly clear that a rat had entered the sewer from the barn cellar and found his way along into the pipe some 15 or 20 feet and cut into the house cellar. To prevent any further intrusion of this kind, the proprietor placed a wire netting over the mouth of the sewer in the barn cellar. You have this fact from me, that rats will cut lead with little or no difficulty.

O. T.

Newton, Mass., June 22, 1860.

[We have known of instances where rats had cut through lead pipes from the outside; but this is the first case brought to our attention of one eating his way out from the inside. It would be a hard matter to keep an old rat, that has acquired the art of chewing poisonous lead pipe and spitting out the crumbs, out of any pantry.—EDS.]

MILK AND ITS PRESERVATION.

The general use of milk, as well for the nursery as in various culinary preparations, justifies a frequent recurrence to the subject, calling attention to the character of the article. Milk, like blood, is a living fluid, and it will begin to die after removal from the seat of vitality, as soon as "a fish out of water." It is so delicate a fluid that nature has provided that all young animals, as well as the infant child, shall receive it in such a way as to prevent any contact with the air. It was this idea that first turned Gail Borden's attention to adopt a plan to prevent incipient decomposition, by condensing milk in vacuum, evaporating its watery elements as soon as it could be drawn and brought from the cow. Milk had previously been concentrated by various methods, several of which had been patented, but previous to Mr. Borden's patented improvement, condensed milk had been used to a limited extent, principally by voyagers. Practically, it had not been produced at a sufficiently low cost to enter into competition with the sale of common milk. This has now been done. Mr. Borden claims that, by his process, milk can be condensed so rapidly and cheaply that the extra cost is more than balanced by what is saved in the reduced expenses of transporting it to market, and therefore it is now sold by the New York Condensed Milk Company at a less price than the best fluid milk. He claims that the milk is better, because it has not been exposed (as common milk must necessarily be) in its fluid state, from the time of milking to that of using it in the city.

By the process of Mr. Borden the milk is first heated by steam to a temperature of from 190° to 200°; then strained into a receiver connected with the vacuum pan, into which the milk flows in quantity indicated by the progress of evaporation. When reduced to the richness desired, which usually requires over 4 quarts of ordinary milk to make one of condensed milk, the latter is drawn from the pan and subjected to a second heating in the steam bath, to a degree indicated by the consistency; it is then again introduced into the vacuum pan

where the ebullition goes on until the temperature of the milk is reduced by means of the vacuum and the use of cold water passing through the steam chambers. The milk is lastly put into 40-quart cans and immediately cooled down to a low temperature, when it is ready for the market.

Sometime ago, we noticed the above invention of Mr. Borden, and we are happy to be able to state that it has now become a very large business in this city.

TEA, COFFEE, AND COCOA FOR THE SICK. BY FLORENCE NIGHTINGALE.

Too much is said against tea by wise people, and too much of tea is given to the sick by foolish people. When you see the natural and almost universal craving in English sick for their "tea," you cannot but feel that nature knows what she is about. But a little tea or coffee restores them quite as much as a great deal; and a great deal of tea, and especially of coffee, impairs the little power of digestion they have. Yet the nurse, because she sees how one or two cups of tea or coffee restores her patient, thinks that three or four will do twice as much. This is not the case at all; it is, however, certain that there is nothing yet discovered which is a substitute to the English patient for his cup of tea; he can take it when he can take nothing else, and he often cannot take anything else if he has it not. I should be very glad if any of the abusers of tea would point out what to give to an English patient after a sleepless night instead of tea. If you give it at five or six o'clock in the morning, he may even sometimes fall asleep after it, and get, perhaps, his only two or three hours' sleep during the twenty-four. At the same time you never should give tea or coffee to the sick, as a rule after five o'clock in the afternoon. Sleeplessness in the early part of the night is from excitement, generally, and is increased by tea or coffee; sleeplessness which continues to the early morning is from exhaustion often, and is relieved by tea. The only English patients I have ever known refuse tea, have been typhus cases; and the first sign of their getting better was their craving again for tea. In general the dry and dirty tongue always prefers tea to coffee, and will quite decline milk unless with tea. Coffee is a better restorative than tea, but a greater impairer of the digestion. Let the patient's taste decide. You will say that in cases of great thirst, the patient's craving decides that it will drink a great deal of tea, and that you cannot help it. But in these cases be sure that the patient requires diluents for quite other purposes than quenching the thirst; he wants a great deal of some drink, not only of tea, and the doctor will order that he is to have barley-water, or lemonade, or soda-water and milk, as the case may be. Lehmann, quoted by Dr. Christison, says, that among the well and active "the infusion of an ounce of roasted coffee daily will diminish the waste going on in the body by one-fourth;" and Dr. Christison adds that tea has the same property. Now, this is actual experiment. Lehmann weighs the man and finds the fact from his weight. It is not deducted from any "analysis" of food. All experience among the sick shows the same thing. Cocoa is often recommended to the sick in lieu of tea or coffee. But independently of the fact that English sick very generally dislike cocoa, it has quite a different effect from tea or coffee. It is an oily, starchy nut, having no restorative power at all, but simply increasing fat. It is pure mockery of the sick, therefore, to call it a substitute for tea. For any renovating stimulus it has, you might just as well offer them chestnuts instead of tea. An almost universal error among nurses is the bulk of food, and especially the drinks they offer to their patients. Suppose a patient ordered four ounces of brandy during the day, how is he to take this if you make it into four pints with diluting it? The same with tea and beef-tea, with arrowroot, milk, &c. You have not increased the nourishment, you have not increased the renovating power of these articles, by increasing their bulk; you have very likely diminished both by giving the patient's digestion more to do; and most likely of all, the patient will leave half of what he has been ordered to take, because he could not swallow the bulk with which you have been pleased to invest it. It requires very nice observation and care (and meets with hardly any) to determine what will not be too thick or too strong for the patient to take, while giving

him no more than the bulk which he is able to swallow.

[Professor Christison, the greatest living authority on poisons and poisoning, holds beef-tea to be the best known combination of food and drink for most cases of sickness. He has lately written about its use in the most flattering manner.—Eds.]

ADVANTAGE OF A TASTE FOR SCIENCE.

A mind which has a taste for scientific inquiry, and has learned the habit of applying its principles readily to the cases which occur, has within itself an inexhaustible source of pure and exciting contemplations. One would think that Shakespeare had such a mind in view when he describes a contemplative man as finding—

"Tongues in trees, books in running brooks,
Sermons in stones, and good in everything."

Accustomed to trace the operations of general causes and the exemplification of general laws, in circumstances where the uninformed and uninquiring eye, perceives neither novelty nor beauty, he walks in the midst of wonders; every object which falls in his way elucidates some principle, affords some instruction and impresses him with a sense of harmony and order. Nor is it a mere passive pleasure which is thus communicated. A thousand questions are continually arising in his mind, a thousand objects of inquiry presenting themselves, which keep his faculties in constant exercise and his thoughts perpetually on the wing, so that lassitude is excluded from his life, and that craving after artificial excitement and dissipation of the mind which leads so many into frivolous, unworthy and destructive pursuits, is altogether eradicated from his bosom.—*Sir John Herschell.*

AMERICAN PATRONAGE OF INVENTIONS FOR SHIPS.

An English ship of 998 tons, bound from London to Calcutta, was once compelled to anchor in the Downs to procure two more hands, although she had then a compliment of 45 all told on board, whereas an American ship of nearly the same size, bound on the same voyage, proceeded with only 21 men. The crews of both ships, excepting the captain of the American, were British seamen. Mr. Duncan Dunbar, an English shipowner, recently made this statement before a committee of the British Parliament, and stated the cause of the difference. The English ship was rigged in the old fashioned style, somewhat like a ship-of-war, and therefore required a large number of men to work her; while the American ship had almost all the modern improvements—such as patent trusses to her lower yards, iron barrels to her topsail and topgallant yards, the best of blocks and cordage, and Cunningham's patent rig, whereby her topsails could be reefed from the deck, (an English invention) and Emerson's patent windless. These enabled her to be sailed with less than half the number of men required to navigate the British ship.

COLORING OF ADULTERATED WINES.

Although many experiments have been instituted by chemists for the detection of the coloring matters employed in adulterated wines, so as to be able to distinguish the true from the false, no very positive results have yet been arrived at, because the color of genuine wine itself changes with age, and because the same colors can be imitated by various substances, all of which possess nearly the same elements when analyzed.

It is believed that some of the cheap claret wines contain alum and sulphuric acid, and the chemist Lassaigne has lately called attention to the addition of about 0.33 per cent of sulphuric acid which he had detected (but with some difficulty) in French clarets. An easy method of detecting alum, acids, logwood, cider, tannin and other mixtures used in the adulteration of wines is a great desideratum; chemists have not yet made the discovery.

AERIAL NAVIGATION BY SUN HEAT.—One of our correspondents proposes a novel method of aerial navigation, by propelling balloons through the agency of a caloric engine revolving a screw propeller, without employing fire or fuel. He designs to concentrate the rays of the sun with a large burning lens, and thus make the solar heat rarify the air to operate the engine. The proposal is a grand and novel one. No fuel fire or water being required to enable us to career in mid-heavens. We wish our correspondent success.

AMERICAN JEWELRY.

Prior to the panic in 1857, the jewelry business in the United States was in a very flourishing condition; but since that period it has been very dull, and during the past year few factories have been in operation more than four months out of the twelve. There are large jewelry manufactories in Providence, R. I., Boston and Attleboro', Mass., Waterbury, Conn., Philadelphia, Pa., New York City, and Newark, N. J. The latter place is, perhaps, the most distinguished for the extent of its establishments and the quality of its articles. These consist of gold and silverware, watch-cases, bracelets, rings, chains, seals, brooches, and all kinds of personal ornaments of this character. The stones or brilliants for American jewelry are mostly imported, but the articles themselves are supplied by our home manufacturers, and they rival those of any other country in beauty of design and skill in fabrication.

There are various classes of jewelry. "Solid" is that which it composed of gold entirely—18 carats fine, at least; "massive jewelry" is mounted with *solid* gold, but its groundwork is of inferior metal; "filled-in work" is composed of thin-rolled gold, filled-in with common solder; "plated jewelry" is composed of an inferior metal, with a thin face of gold. Cheap trinkets are made with rolled metal, "struck-up" with dies. The ingots of which they are made contain about 1-60th of gold on the surface. Many articles are composed of brass, slightly gilt by the galvanizing process.

At the present moment, several of the jewelry manufactories in Newark, in which there were formerly employed from 200 to 400 workmen, do not contain over a dozen. It has been said by some that articles of jewelry, being luxuries, are generally first affected by "hard times," and the last to recover from their influence; and this is given as a reason for the long depression of American jewelry manufactures.

INDUSTRIAL FAIRS.

THE eighteenth annual exhibition of the Ohio Mechanics' Institute will be opened at Cincinnati on the evening of Sept. 24th, next, and will continue to the evening of Oct. 20th. The committee of managers intend to make it superior to any of the previous exhibitions.

MECHANICS, manufacturers, artists and inventors are referred to the advertisement of the Massachusetts Charitable Mechanic Association, in another column of this week's paper, of their ninth exhibition of American manufactures and the mechanic arts, to be held in the city of Boston, in September next. It is supposed that this will be the largest and most complete exhibition ever held by the association.

THE American Institute, at New York, will not hold their usual mechanical exhibition this Fall, owing to the difficulty of procuring a suitable building. They hope next year to have a permanent building of their own. A horticultural show will, however, take place, under the auspices of the Institute, probably in September.

PLATINUM.—This metal has a greyish-white color. In the state of fine powder it is grey, and without metallic luster; but the luster can be produced by friction. Platinum is the heaviest of all metals. (Specific gravity 21.5.) It is harder than copper but not so malleable as gold and silver. It can be drawn into exceedingly fine wire. It cannot be melted by the heat of a furnace; but it can be fused by means of a blowpipe, supplied with oxygen gas, and directed upon the flame of a spirit lamp. It can be welded at a white heat. It does not oxidize when heated in the air. Platinum dissolves in hot aqua-regia, but not in any simple acid. The solution contains chloride of platinum. When pure alkalis or nitrate of potash is ignited with platinum, the metal is corroded. When brought, in the state of a fine, porous, spongy mass, into a mixture of oxygen and hydrogen gas, it becomes red-hot and inflames the gas.

THE GREAT TORNADO IN THE WEST.—We have received an extremely graphic and interesting description of the wholesale devastation occasioned by the tremendous tornado which swept over the West on June 3d, but it is unavoidably "crowded out" of the present number.

THE CITY OF THE DEAD.—There have been interred at Greenwood Cemetery since Sept. 5, 1840 (when the first body was placed in the ground at that place), up to Saturday, June 9, 1860, 76,797 persons!