opinion that the waste of gl utin, in over-bating, is very great, but I have reason to fear that a greater loss is incurred by means of the *tardy* application of the tannin from the first handler to the last layer, than by all other wasting causes together. I have noticed the results of numerous experiments of both *slow* and *quick* tanning; and in all cases (the preparation of the hide for the ooze being equally well done) have found the *quick* tanned specimens of a firmer and closer texture, more solid, less pervious, vastly greater weight, and far more durable in the wear, than the slow tanned specimens. By *quick* tanning, I mean three to four months for light sole leather; five to six months for middling; and seven to eight months for very heavy; dating from the first handler. By *slow* tanning I mean any considerable additional time to the terms named. I believe a much quicker process might be had, that would give as great or greater weight; but it would render the leather too hard and ha sh in its texture to be conveniently worked up by the shoemaker. It will be observed, I am speaking of *sole* leather only, with which kind I am most intimate. The ordinary increase of weight among the large tanners of this State, on the *unsalted dry* hides, imported from Laguira, Angostura, Buenos Ayres, Rio Grande, and other parts of South America (and such chiefly make up their stocks) is such that each one hundred pounds of *dry* hide make one hundred and forty to one hundred and fifty pounds of sole leather. I may also repeat here that, when all the glutin composing the hide is entirely combined (saturated) with the tannin—when the union is perfectly formed—not a single additional ouncecan be gained from the strongest ooze, whatever time you continue the process. I had a most satisfactory experimental proof of the correctness of this conclusion. I consider active and long-continued handling vastly important, not only in the acquisition of weight, but in point of firmness and durability. I would handle sole leather from eighty to one hundred and twenty days, according to the weight of the sides, and the subsequent *laying away* should be short and frequentlyrepeated; a few days only for each layer, and in no case more than two-thirds the quantity of sides which is usually laid in each vat. I have ascribed the greatest loss or waste in glutin to the *tardiness* of the *tanning* stage of the manufacture. I am not able to satisfy my own mind precisely how or when it goes; I am rather inclined to think it does not separate and escape from the body of the hide, as in the process of softening and bating; but for want of an immediate conjunction with the tannin, I believe it somehow perishes, and becomes extinct in its original position, or becomes incapacitated ever thereafter to form the necessary union with the tannin. If these conjectures be well founded, then much handling will prove the best remedy. I believe that the glutin of the interior parts of the hide chiefly suffers this disqualification; for the exterior being brought into immediate contact with the tannin, the two surfaces are always first tanned, as every body knows. And it is somewhat curious to see the progress of the combination extending from the two surfaces inward—the interior remaining colorless, soft, raw hide, for months after the two surfaces have become firm, well-tanned leather; the glutin of the two surfaces having arrested and combined all the tannin before it reaches the interior."

The opinions of Mr. Lee, regarding the experiment of quick-tanned hides, are the very opposite of those generally entertained by almost every person *outside* of the tanning business.

DRAINAGE OF CITIES FOR MANURES.

A very valuable letter has lately been written by Professor Liebig, the eminent chemist at Munich, in Bavaria, to Mr. J. J. Mechi, the well-known enterprising English agrieulturist, in answer to a letter of the latter, which had been published in the London *Times*. We will give the substance of this letter, and request for it a careful attention, as the opinions expressed, and the information contained in it, are just as important to the citizens of all our large cities as to the inhabitants of London.

In reference to the use of sewerage matters for manures, he says:—I regard it as a fortunate event that a man of so eminently practical a character as yourself has now for the first time, in the interest of agriculture and the national welfare, taken up the question of the "sewerage of towns" with warmth, and in language adapted to produce conviction. I have labored many years to impress such views upon the public, but my efforts have not been attended with any perceptible results. The men to remove the difficulties which stand in the way of procuring manure from the "sewerage of towns" will certainly be found; and a future generation will look upon those men who have devoted their energies to the attainment of this end, as the greatest benefactors of their count y.

The ground of my small success lies clearly in the fact, that the majority of farmers do not know the extent to which their own interests are concerned in this matter, and because the views and conceptions of most men in regard to the circuit of life and the laws of the preservation of our race, do not generally rise above those of C. Fourier, the inventor of the phalanstery. He proposed, as you know, to supply the wants of the occupants of his phalanstery by means of eggs. He supposed it was only necessary to procure a couple of hundred thousand hens, each of which would lay thirty-six eggs a year, making as many millions of eggs, which, sold in England, would produce an immense income. Fourier knew very well that hens lay eggs, but he seemed not to know that in order to lay an egg they must eat an amount of corn its equal in weight. And so most men do not know that the fields, in order permanently to yield their harvests, must either contain, or else receive from the hands of man, certain conditions which stand in the same relation to the product of the fields as the hen's food does to the egg she lays. They think that diligent tillage and good weather are sufficient to produce a harvest; they therefore regard this question as one in which they are wholly unconcerned, and look forward carelessly and with indifference to the futu e.

It is true that the diligent tillage of the fields, sunshine, and timely rain, are the outward conditions, perceptible to all men, of good harvests, but these are perfectly without effect upon the productiveness of the field, unless certain things not so easy of perception by the senses are present in the soil, and these are the elements which serve for nourishment—for the production of roots, leaves and seeds—and which are present in the soil always in very small quantity in proportion to the mass of the soil itself.

These elements are taken from the soil in the products of the field, in the corn, or in the flesh of the animals nourished by these products, and daily experience shows that even the most fruitful field ceases after a certain series of harvests to produce these crops.

A child can comprehend that, under these circumstances, a very productive field, in order to remain *very* productive, or even simply productive, must have the elements which have been withdrawn in the harvests perfectly restored; that the aggregate of the conditions must remain, in order to produce the aggregate results, and that a well, however deep it may be, which receives no supply of water, must in the end become empty, if its water is constantly pumped out. Our fields are like this well of water. For centuries those elements which are indispensable to the reproduction of the field crops have been taken from the soil in those crops, and that, too, without being restored. It has only recently been ascertained how small a supply of these elements the soil really has. A beginning has been made to restore to the fields the loss which they sustain through the annual harvests, by introducing from external sources manures containing the same elements. Only a very few of the better-informed farmers perceive the necessity of this restoration, and those of them who have the means have zealously endeavored to increase the amonnt of these elements in their fields.

The loss of these elements is brought about by the "sewerage system of towns." Of all the elements of the fields, which in their prodncts in the sbape of corn and meat, are carried into the cities, and there consumed, nothing, or as good as nothing, returns to the fields. It is clear that if these elements were collected without loss, and every year restored to the fields, they would then retain the power to furnish every year to the cities the same quantity of corn and meat; and it is equally clear that if the fields do not receive back these elements, agriculture must gradually cease. In regard to the utility of the avails of the "sewerage of towns" as manures, no agriculturist, and scarcely an intelligent man, has any doubt; but as to their necessity, opinions are very various. Many are of the opinion that corn, meat, and manures are wares which, like other wares, can be purchased in the market; that with the demand the price may perhaps rise; but perhaps in half a century not one of those countries upon whose excess England has hitherto drawn, will be able to supply her with corn, and that too, from the natural law, that what is true of the smallest piece of ground is true also of a great country—it ceases to produce corn if the conditions of the reproduction of the corn which has been carried off are not restored to it.

In the United States the population increases at a still greater ratio than in other countries, while the corn production upon the land under cultivation has constantly fallen off. History teaches that not one of all those countries which have produced corn for other lands have remained corn markets, and England has contributed her full share towards rendering unproductive the best lands of the United States, which have supplied her with corn, precisely as old Rome robbed Sardinia, Sicily, and the rich lands of the African coast of their fertility.

Finally, it is impossible in civilized countries to raise the corn production beyond a certain limit, and this limit has become so narrow that our fields are no longer capable of a higher yield without an increase of their effective elements by the introduction of manures from abroad. By means of the application of guano and bones, the farmer of most limited capacity learns the real meaning of such increase; he learns that the pure system of stall or home-made manures is a true and genuine robbing system. In consequence of his restoring in the guano and bones but a small portion of the very same elements of seeds and of fodder which had been withdrawn from his fields by centuries of cultivation, their products are wonderfully increased. Experiments instituted with special reference to this end, in six different parts of the kingdom of Saxony, showed that each hundred weight of guano put upon a field produced 150 lbs. of wheat, 400 lbs. of potatoes, and 280 lbs. of clover, more than was produced by the same-sized piece of ground without guano; and from this it may be calculated how enormously the corn and flesh production of Europe has been increased by the yearly importation of 100,000 tuns, or 2,000,000 cwt. of guano.

The effect of guano and bones should have taught the farmer the real and only cause of the exhaustion of his fields; it should have brought him to perceive in what a condition of fertility he might have preserved his fields, if the elements of the guano which he has transported in the shape of meat and p oducts of his fields into the cities, were recovered and brought into a form which would admit of their being restored every year to his fields. But it is much simpler, he thinks, to buy guano and bones, than to collect their elements from the sewers of cities, and if a lack of the former should ever arise, it will then be time enough to think of a resort to the latter. But of all the farmers' erroneous opinions, this is the most dangerous and fatal. If it is considered that a pound of bones contains in its phosphoric acid the necessary condition for the production of 60 lbs. of wheat; that if the English fields have become capable, by the importation of 1,000 tuns of bones, of producing 200,000 bushels more of wheat in a series of years that they would have p oduced without this supply, then we can judge of the immense loss of fertility which the German fields have sustained by the exportation of the many hundred thousand tuns of bones which have g ne from Germany to England. It will be conceived that, if this exportation had continued, Germany would have been brought to that point that she could no longer have been able to supply the demand of her own population for corn. In many parts of Germany, from which formerly large quantities of bones were exported, it has already come to be the case that these bones must, at a much higher price, be bought back again in the form of guano, in order to attain to the paying crops of former time. The price of bones is now so high in Germany as to forbid their exportation.

In relation to guano, I have been assured that in 20 or 25 years, if its use should increase in even the same proportion as hitherto, there will not remain in South America enough to freight a ship. We will, however, suppose its supply and that of bones to continue for fifty years, or even longer—then what will be the condition of England when the supply of guano and bones is exhausted? This is one of the easiest of all questions to answer. If the common "sewerage system" is retained, then the imported manures, guano and bones, make their way

into the sewers of the cities, which, like a bottomless pit, have for centuries swallowed up the guano elements of the English fields; and after a scries of years the land will find itself precisely in the condition it was in before the importation of guano and bones commenced. A very little reflection will lead to the conviction that the relations of populations are governed by a great and comprehensive natural law, according to which the return, duration, increase or diminution of a natural phenomenon depends upon the return, duration, increase, or diminution of its conditions. This law governs the return of the harvest upon our fields, the maintenance and increase of the population, and it is easy to see that a violation of this natural law must exert upon all these relations a pernicious influence, which can be set aside in no other way than by the removal of its causes. If, then, it is known that certain existing relations work deleteriously upon the fields, it can be foreseen that their continuance must bring about the ruin of agriculture.

It has been maintained that the recovering of the manure elements out of the sewers in the large cities is impracticable. I am not ignorant of the difficulties which stand in its way—they are indeed very great; but if the engineers would come to an understanding with the men of science in relation to the two purposes—the removal of the contents of the sewers, and the recovery of their valuable elements for agriculture—I do not doubt that a good result would follow. Intelligence, in union with capital, represents a power in England which has rendered possible and practicable things of much greater apparent difficulty. I look forward with deep concern to the solution of the "sewerage question." For if this question is decided in Great Britain without regard to the wants of agriculture, we can scarcely hope for anything better upon the continent.

Countries may be fruitful, and become capable of sustaining a large population, when certain resisting influences, which in their unimpeded working make the cultivation of the soil impossible, are overcome by human intelligence; or when a land has all the conditions of productiveness except one, and then receives the one which it lacked. If Holland were without her dikes, which must be kept up at great expense, she would produce neither corn nor meat; the land would be uninhabitable. In a similar manner the inhabitant of the African oasis protects his grain fields by dikes against the storms of the desert, which cover his ground with a barren sand. I know that the prophets of future evil have at all times been derided by their own generation, but if history and natural law can furnish any ground whatever for a just conclusion, then there is none which stands upon a firmer basis than this: that, if the British people do not take the pains to secure the natural conditions of the permanent fertility of their land—if they allow these conditions, as hitherto, to be squandered, their fields will at no distant day cease to yield their returns of corn and meat.

California Wine.—The Sonora *Age* gives the following information relating to the wine manufacture in that place:—"At Moussaud's vineyard, near the foot of Bald Mountain, they are pressing nearly their entire crop, and have 1,500 gallons of white wine already made. They will make 4,000 gallons in all. Mr. Peltret has made 500 gallons of excellent wine, and has still a lot of grapes on hand, preserved for table use. Madame St. Cyr makes 500 or 600 gallons of wine; and about the same quantity will be made by Madame La Carce. Uncle John Moss has made 160 gallons of excellent red wine from 1,837 lbs. of grapes. Besides the wine thus manufactured from the grape, some brandy and a large quantity of vinegar will also be made. It will be seen, from the figures given, that very nearly 6,000 gallons of wine will be produced this season by a few small vineyards in the vicinity of this town. This will readily sell from $2 to $2.50 per gallon, which, at the lowest figure, will net $12,000 for the whole."

Liquid Glues.—Dissolve 33 parts of best (Buffalo) glue on the steam bath in a porcelain vessel, in 36 parts of water. Then add gradually, stirring constantly, 3 parts of aqua fortis, or enough to prevent the glue from hardening when cool. Or dissolve 1 part of powdered alum in 120 parts of water, add 120 parts of glue, 10 of acetic acid and 40 of alcohol, and digest.—*Druggists' Circular.*

TESTIMONIAL FROM AN INVENTOR.

Gentlemen:—I was at last compelled to employ you as agents to "fix up" my re-issue papers for a sugar evaporator; and I must say it is well done, and would have saved much difficulty if I had employed you to attend to my case in the first instance. I am not sure but that my present application for an improvement in ——— will have to be fixed up by your firm yet. Respectfully, D. M. Cook.

Mansfield, Ohio.

[The above gentleman prepared his papers for a re-issue, and attempted to act as his own attorney. The consequence was, he got his case in such a "fix" that it was difficult, for a time, to determine where to begin to straighten them so as to get them in condition for the action of the Patent Office. But it was done, as seen by the inventor's statement above, and done to his apparent satisfaction.

While we recommend all inventors who are competent to prepare their own drawings and specifications and act as their own attorneys before the Patent Office, we counsel those who have had no experience in such business, and have an invention worth protecting by a patent, to employ some experienced attorney to act for them from the first—not to wait until they get their case in such a condition as to require more labor and expense to amend it than it would have cost in the first place to have had the business well attended to. The preventive of trouble is cheaper than the cost of cure in such cases, as the writer above can testify.—Eds.

DISCOVERIES AND INVENTIONS ABROAD.

Substitute for Chloroform.—A considerable sensation has just been produced in Paris by M. Velpeau, an eminent surgeon, who has recently communicated to the Academy of Sciences the extraordinary fact that, if a brilliant object (such as a red bead) is placed near to the face of a person and between the eyes, and the gaze be fixed steadily upon it for a few minutes, the person will soon fall into a cataleptic state and become as insensible as if under the influence of chloroform. M. Rocco is stated to be the discoverer of this, and in making several experiments, persons were made to undergo surgical operations quite unconscious of pain. A correspondent of the Boston *Traveler*, writing from Paris, seems to bo enthusiastic on this discovery, and recommends its practice by the dentists of Boston in extracting teeth. We remember very well how this alleged new discovery was discussed in both the English and American papers about 20 years ago, as an explanation of the phenomena of animal magnetism and the cataleptic condition into which some persons may be easily thrown. It never can be used with certainty in surgery, in all cases, although it may be in some.

Red Dyes.—A patent has been taken out in England by R. A. Brooman (as a communication from abroad) for the preparation of red colors for textile fabrics from aniline. A mixture of aniline and anhydrous bichloride of tin are first heated up together to the boiling point and then boiled for fifteen minutes. At first the mixture is of a yellowish tint, but it finally becomes a beautiful red when held up to the light, although, in a very large quantity, it appears to be of a blackish crimson color. When hot, the liquor maintains its liquid condition; but on becoming cold, it assumes a jelly state. While still warm, the liquor is to be filtered to free the coloring matter from several impurities. By adding the tartrate of potash or the acetate of lead to the liquor while hot all the coloring matter is precipitated, and when it becomes cold it may thus be obtained solid, to be used like the extract of logwood in dyeing. The red solution of aniline thus obtained may be used with pyroligneous mordant, or the nitrate and acetate of lead in dyeing. To print calicoes with this preparation of aniline a very concentrated extract is required, which is mixed with dextrine or gum to make it into a printing paste. Acetic acid and alcohol will also precipitate the extract. The bichloride of mercury (corrosive sublimate), the protochloride of copper and the perchloride of iron can also be employed to mix with the anyline as substitutes for the bichloride of tin.

Aniline Blues, Lilacs and Drabs.—A patent has also been lately secured by Messrs. J. T. Beale and T. N. Kirkham, of England, for aniline in dyeing and printing. This invention consists in treating salts of aniline, or an acid solution of it, with hypochlorite of lime or common bleaching powder, to obtain fast colors. They take the nitrate of aniline, or the acetate, or a saturated solution of aniline in water, and add an equal quantity by measure of acetic acid. To this solution some hypochlorite or bleaching powder is also added, and a change in the color of the solution at once takes place. The shade of the liquor indicates the shade of color to be produced by it on textile fabrics. By varying the quantities of these substances different shades may be produced, from a blue to a lilac, purple, violet, slate and drab. It is well known to dyers that, by using the same substances in dyeing (only in different quantities—strong and weak), browns, drabs, &c., are colored; and so it is with using aniline of different degrees of strength, according to the shades desired. When preparing analine for dyeing, the chlorite must be added very cautiously until the proper shade is attained, because it is the re-agent which "tones" the colors. The following is the method of practically using the aniline:—Dissolve as much aniline as can be taken up in a certain quantity of water—say one gallon, and to this add one gallon of strong acetic acid and a pint of the hypochlorite of lime. The whole is then carefully stirred and the color of the liquor becomes a violet of an intensity proportioned to the amount of chlorine used, the greater the quantity of the latter the lighter the shades produced. According to the quantity of hypochlorite used, the shades of aniline will vary from a violet to a drab. With aniline liquors thus prepared, silk may be dyed various shades without mordants; with mordants, both wool and cotton fabrics may be dyed with the aniline thus prepared; and strong extracts may be employed for printing. We had been informed that aniline—which is a preparation of indigo with dilute nitric acid, and formerly called indigotic acid—had gone out of use, but these two patents afford evidence of it becoming more extended in Europe. None of these colors, so far as we know, have yet been introduced into this country.

Increasing the Strength of Paper.—We described a method of producing vegetable parchment on page 237, Vol. XIV. (old series) of the Scientific American, by steeping unsized paper for a brief period in sulphuric acid, slightly diluted. We learn from our able cotemporary, *Newton's London Journal of Arts*, that another method of producing vegetable parchment has been discovered and patented by Mr. T. Taylor, London. Paper—either sized or not—is taken dry and soaked in a concentrated neutral solution of chloride of zinc moderately heated; after which it is washed, dried and is ready for use, having the strength and appearance of parchment. The neutral solution of the chloride of zinc is formed by adding the carbonate or oxyd of zinc to a solution of zinc dissolved in muriatic acid, then evaporating the solution until it has arrived at the consistency of sirup when cold. In this state it has a high specific gravity, and the paper to be treated is immersed in it for a few minutes, then taken out, and the adhering zinc removed by a scraper. The paper is now thoroughly washed in clean cold water and afterwards pressed and dried. This treatment draws or *fulls* the fibers of the paper together, rendering the sheets smaller in size but much stronger and closer in the texture. The process described is conducted with cold liquors, and the paper is only partly rendered into vegetable parchment; when it is desired to produce the fullest change possible in the paper, the liquor is kept heated about 120° Fah. while the paper is immersed in it. Sheets of paper, when saturated with such a solution, may be joined permanently together by uniting their edges and passing a heated iron over them. The chloride of tin may also be nsed as a substitute for the zinc. Paper treated in this manner becomes much thicker, and can be glazed with a most beautiful surface.

Refining Sugar.—In introducing raw sugar for the purpose of refining, it is liable to sink down and come in contact with the heated steam pipes in the melting pan, whereby some of it is carbonized and more molasses produced than otherwise would be. To avoid this a patent has been taken out by Mr. John Aspinall, of London, for melting the raw sugar before it comes in contact with the steam pipes of the open heating pan; and he does this by placing the sugar upon a perforated false bottom which just comes in contact with the surface of the water in the pan, and dissolves it gradually before it can be precipitated to the bottom. The idea embraced in this invention is to melt all the raw sugar in the liquor before it can come in contact with the pipes which heat the pan.