By comparing these with other pieces, already found in similar localities, the investigators have concluded that such fragments were thrown into the wells as votive offerings to local divinities by the ancient inhabitants of the country, and that the same custom, continued through centuries, accounts for the presence of the much more recent Roman money. A chain of proof, mainly circumstantial, has been elaborated, which refers the stone fragments to the neolithic epoch, in prehistoric ages, and further shows that the pieces probably represent the earliest money used by man.

Self-Acting Car Couplings.

At a recent meeting of the Master Car Builders' Association, the subject for discussion was "Freight Car Couplings, Draw Bars, and Buffers," upon which Mr. Partridge made an address.

Mr. Adams was called upon for information on what is required by railroad companies, and said that he had no specific facts to present in relation to the repair of drawbars throughout the country. It was very difficult to get very specfic data. The habits and customs of our car men have not been of the character to present these data accurately. The committee appointed on this subject, in looking over the matter, had made up their minds as to some important points to arrive at in the way of improvements. "We have been shown by Mr. Partridge some of the defects in the present arrangement, which had been considered by the committee. But there were some other things that presented themselves to their minds, and one of the most startling of the whole of them was the expense of links and pins. Upon some roads this expense was enormous, amounting to anywhere from $10,000 to $60,000 or $70,000 a year, according to the size of the road. The ordinary roads perhaps would average $30,000 to $40,000 a year. We need something to couple our freight trains which will enable us to dispense entirely with pins and links. This was one of the points to be striven for. Another point in which we thought there was an absolute necessity for improvement was a greater power of resistance in our buffer springs, and a greater range of motion. Our resistance is altogether below the line of connection. If the springs were made stronger, given more motion, and placed in the direct line of resistance, the difficulty would be materially obviated. Various devices have been presented to us during the past year; a good many models have been brought out, and some of them have approximated somewhat to the accomplishment of the idea, but we have not seen any yet that meet our wants, in the opinion of the committee. The thing, after all, is progressing, but yet there is room for improvement. We have got to have a device that will couple freight cars without a link and pin, and, in addition to that, a separat ebuffer placed directly in the line of the frame or bottom of the car, and we have got at the same time to use our present stock; that device must be made to connect itself with our manner of coupling. We have got to use our present stock until it is worn out. But the committee is not as yet prepared to recommend anything. They have not found anything that will entirely accomplish the purpose. A buffer must be so built that it won't couple when you don't want it to. Many inventors seem to think that you must get something that will couple every time it strikes. There have been but few models that seemed to embody the idea to dispense with links and pins, but I think we shall have to make it in two parts, a separate buffer and separate hook, because we want our connections to be in the floor of the car. Mr. Stone in his model has accomplished considerably towards it, and I have no doubt he may be able to bring it perhaps to something near what we want."

Mr. L. Garey said that it was easy to find fault, and difficult to apply the remedy. "The necessity for improvement in the attachment by which cars are coupled together has been felt for a great number of years, and it was still evident that the improvement had not been got. The necessity of these improvements was shown by the immense number of patents granted year after year. The real necessity is an automatic coupler with buffing attachments, either connected or with another device placed on the line of resistance. The buffing requires from one half to double the resistance of the drawing to make it substantially strong. Now if some of our inventors will dispense with the use of the links and pins entirely, provide us with a coupling, automatic or not, which can be uncoupled from cars from the top or side, and give us a buffing attachment which is sufficient for the work, that ought to make a dozen fortunes for him and secure him the blessings of all the people, not only those that travel, but especially of the men employed on railroads. He thought that the railroads would say that, out of the cars which were side-tracked for repairs, eight tenths were owing to some defect in the drawing or attachment. If this could be reduced to three tenths, it would be a great deal. There was more difficulty from the failures of the attachments than in the drawbars themselves."

Don't Leave a Legitimate Business for Financiering.

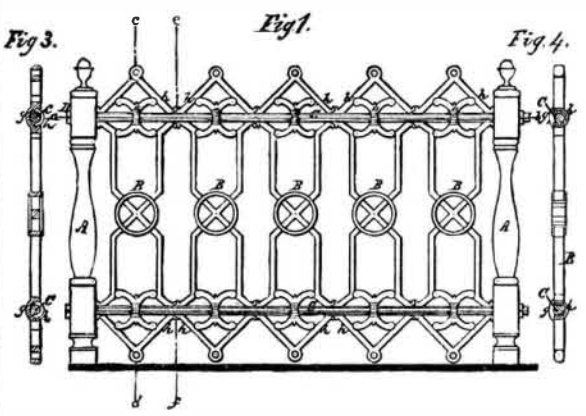
It is an evil of the intense competition in great mercantile communities that it drives many from the walks of legitimate business into schemes of speculation with reference to sudden and extravagant gains. The history of frauds teaches that they originate chiefly in the attempt to grow rich rapidly by financiering rather than by diligence in business. Financiering has its place in legitimate business. Some men have a talent for this, which is as true a mark of genius as is poetry or art. But it is not a talent that every man can acquire, and it is fortunate that this is so; for if all the world should turn financiers, the earth itself would soon go into bankruptcy. Now, the calamity of a great city is that every one who gains a little money takes to financiering as a readier mode of increasing it than regular business. Wall street, the focus of financiering, gives a tone to the whole business community.

But financiering is a deep game; and he who leaves an honest toil in a business that he does understand, for calculations of chance in matters where he has no skill, is very apt to become the loser, and, as in all lotteries, to grow desperate in the attempt to make up his losses. We do not speak of investments in stock as property, but of the spirit of speculation; and we have no doubt that a just verdict upon many cases of fraud would be: "This man lost his capital and his character by speculation in stocks." Keep, therefore, to honest toil in a legitimate business, and do not aspire to become a financier. "Be content with such things as ye have."

ROBERTSON'S IRON FENCE.

The use of ornamental iron fences is no longer confined to expensive city residences, but is gradually extending to the more humble suburban or village houses; and they would be used much more but for their great cost; to lessen this is the object of an invention lately patented by Mr. T. J. W. Robertson, which is illustrated in the accompanying engraving, Fig. 1 representing an elevation, and Figs. 2, 3, and 4 showing sections through the lines, *a b*, *c d*, and *e f*, respectively.

This fence is made up of castings having the metal so disposed as to allow rods to be passed through the ornamental openings in the sections or pickets, whereby the latter are so effectually secured to the former that they cannot be removed when the panel is in place between the posts by which it is supported; and this is done without fitting, riveting, or other fastening, except that necessary to secure the rods in the posts. To accomplish this, the sections or pickets are made with three vertical bars, *h g h*, where the tie rods are to be connected to them; and these bars are so formed as to admit the tie rods between them, in the same manner as the weft thread passes through the warp in weaving cloth. That the tie rods may readily pass through the sections, the two side bars, *h h*, have recesses on one side, and the central one, *g*, on the other, so that an edge view of the castings would show holes through it about the size of the rods, C C, through which the latter are passed.



With sections thus cast, all that is required to make a panel of fence is to pass rods or gas pipes through a sufficient number of sections and the posts, and then bind the whole together by screwing nuts on the ends of the tie rods, when the panel is ready to be erected. Where large hollow posts are used the nuts may be concealed in their interiors.

From this it will be seen that the cost of a fence of this character may be reduced to that of the castings, rods, etc., as no time is spent in fitting, boring, riveting, etc.; and although thus cheaply built, it is one of the strongest fences made, as the whole strength of the materials employed is utilized in fastening the parts together.

For further particulars, or the purchase of State or county rights, application should be made to the patentee at 818 O street (N. W.), Washington, D. C.

A NON-RETREATING BUNSEN BURNER.

BY PRESIDENT HENRY MORTON, PH. D., STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, N. J.

In consequence of the low pressure of gas during the day time, in this place, we have long experienced trouble from the retreating of Bunsen burners of the usual construction. This having repeatedly proved a source of annoyance and loss, I was led to a series of experiments with the view of removing the difficulty, if possible, by some modification in the form of the burner. After various trials with burners, in which the relation of hight to diameter in the main tube and the size of the gas jet were varied, I was led to the following consideration of the subject:

The retreat of a burner will evidently occur whenever any part of the ascending column of mixed gas and air is moving at the orifice with a velocity less than that at which the same will burn. Now, in an ordinary burner, with its main tube of regular cylindrical bore, it is evident that the friction of the surface of the ascending column of mixed gases will cause that portion to move at a less velocity than the central part, and that even currents of the nature of eddies will be developed. It will thus happen that, while the central portion of the ascending column of gaseous mixture issues at a velocity much greater than that at which the material can burn downwards, and thus is quite free from any danger of retreating, the marginal portions of the column or jet of gas will be escaping at a rate so much less that the velocity of their combustion downwards will exceed that of their upward motion, and retreat of the flame will ensue.

It is well known that, to secure a jet of water or of any other fluid whose particles shall move with equal velocities in all parts, and thus avoid currents and eddies, it is only necessary to make the orifice of efflux an aperture in a thin wall. In following out this idea, I made a burner of a bore rather large compared with its hight, and then drew in its upper edge into the form of an open-ended thimble, so contracting the orifice of escape to about two thirds of the area of the tube, and rendering this orifice practically an opening in a thin horizontal wall or plate. The results of this modification far surpassed my anticipations.

A burner thus constructed, as shown in the engraving, gives a a perfectly non-luminous flame with gas pressures varying between 1½ inches and $\frac{1}{10}$ of an inch of water, and with the lowest of these pressures cannot be made to retreat by the most violent handling in the way of sudden movement or waving about in the air, even when this violence is carried to the extent of extinguishing the flame altogether. Under like conditions of pressure, a burner of the ordinary construction is made to retreat by a slight draft of air or a very moderate amount of motion.

These burners are being manufactured, for our own use and for other colleges, by George Wale & Co.

Correspondence.

The Purification of Water.

To the Editor of the Scientific American:

In 1869 I took occasion through the columns of your valuable journal to call attention to the beneficial action of air for purifying water which had become foul with decomposing organic matter, and to offer my patent air treatment for the purpose, for domestic uses, free of charge. At that time the subject was new to the public; and few perhaps attached to it the importance which more recent developments have shown it to possess, especially for dwellers in cities. Recent articles by various writers on the subject tend not only to fully support my statements, but to show that bad water invariably suffers for want of oxygen, the degree of foulness indicating the diminished proportion or the absence of free oxygen.

The putrid water of a river can be reclaimed by absorption of oxygen, and it will arrive at sweetness and wholesomeness as soon as it possesses ⅓ of 1 per cent of free oxygen; this amount is necessary for fishes to thrive in water. But such water would not necessarily be suitable as a beverage for man.

Great apprehensions are now entertained that the horridly putrid condition of the ponds in Central Park will spread disease over the neighborhood, and these fears will be too fully justified if the present state of things continues. But there is no necessity for pond water to be putrid, or to become unwholesome, at any time. By the moderate annual expenditure incurred in running an air force pump or pressure blower, requiring about 20 horse power, in a place conveniently central, conveying the air by light but durable mains of about 12 inches bore to pipes of smaller bore near the bottom of the ponds, with perforated branch pipes through which the air issues, all apprehension of the re-occurrence of foulness in ponds can be entirely removed. Sufficient oxygen can be supplied by thoroughly agitating the water for about one hour daily, by pumping in air, to keep the ponds sweet. To purify them in their present state, the most rigorous air treatment for several days is needed; it may take a week to do it. The Croton water has suffered with this malady for years, and if it be not speedily provided against, it will fill our cemeteries at a still higher rate than 27 in 1,000 per annum, a death rate only exceeded by Bombay with 29.

R. D'HEUREUSE.

New York city.

The Treatment of Diphtheria.

To the Editor of the Scientific American:

I wish to make known to the public a method of treatment for diphtheria, which has been uniformly successful, in the practice of the writer, during a number of years, which included two epidemics; and in a large number of cases, not a case has been lost since this treatment was adopted. I feel confident that, by its general use, the mortality may be reduced to one per cent, or even less. I have heretofore delayed publishing the results in order to make sure that the treatment was really what it promised to be, and I now wish to use the columns of your journal, in order that the public generally may have the knowledge in their own possession.

An attack of diphtheria is usually ushered in with a high fever and headache, and, in children, with nausea and vomiting. There is great prostration. Upon the tonsils and surrounding parts are seen white, snow-flaky patches. In malignant cases, the patches are often yellow or brownish, and a terrible odor is perceived.

The remedy found successful by the writer is permanganate of potash, in conjunction (not combination) with the tincture of belladonna. The method of administration is as

follows: From 2 to 3 grains (not more) of the permanganate are dissolved in from 2 to 4 ozs. of water in a goblet. Five drops of the officinal tincture of belladonna, or, better, from 10 to 20 drops of the 1st decimal homœopathic tincture of the same drug, are put into another goblet with an equal quantity (2 to 4 ozs.) of water. A teaspoonful is to be taken from each goblet alternately at intervals of a half or one hour. It is, perhaps, needless to say that separate spoons should be used, and the goblets kept covered.

In twenty-four hours, frequently, a favorable change will be seen, but quite as often the disease seems to go on unchecked, save that the fever may seem a little more moderate; but I can assure my readers that, during the second day of the treatment, a most marked change will take place. The fever will entirely subside, the mind will brighten, the tongue will begin to grow clean, and the deposits upon the fauces will peel off at their edges or gradually break away. The patient will be upon the highway to recovery, and a day or two more of the treatment will bring back the normal hue of health, and an appetite to correspond. In rare cases, however, when the constitution is bad (cachectic), a longer time, five, six, seven days, may be required; but even here the treatment has not failed.

I think that, under this treatment, diphtheria is not a disease to be dreaded by the profession. The belladonna may, in special cases, find a substitute, but not the permanganate of potash. The only case in which the above treatment will promise unsatisfactory results is when the disease rapidly invades the larynx and bronchial air passages (diphtheritic croup), when suffocation threatens to supervene before the remedy can act, or when the mere presence of large detached deposits in the air tubes imperils the success of the case. Such an instance recently occurred, which was successfully treated with inhalation of the vapor (not the spray) of a dilute aqueous solution of bromine.

I know that the permanganate has been used as a disinfectant, locally applied, in putrid diphtheria heretofore, in dilute form (as a gargle), and upon general principles as an antiseptic; but I am not aware that the persistent use throughout the disease has heretofore been made known to the public or profession. That it does not act as an antiseptic is shown by the fact that the other antiseptics have no analogous effect; that it does not act locally may be inferred, because its marked curative effects appear in the system before they are seen in the fauces. The theory of the writer is that diphtheria finds its nutriment in partly devitalized organic matter in the blood, which the permanganate, rapidly absorbed, attacks and destroys by oxidation (being the most powerful non-poisonous oxidizer we have): thus cutting away the pabulum of the disease, when the deposits die a natural death and disappear. The process certainly sometimes appears magical in its action. I trust that, if others employ this treatment, they will not attempt to modify it till they have first given it a fair trial in the manner above proposed.

I have also found the permanganate of potash very successful in the treatment of certain slow forms of putrid and typhoid fevers, with loaded tongue, foul breath, etc., and in recurring boils. This lends additional force to the theory of its action above indicated. I am sure that this drug, so rich in oxygen the life-giver, so harmless in its action upon the human system, will well repay study by the profession generally, which it has heretofore only received, and that in a very inadequate degree, from the homœopathic branch.

Philadelphia, Pa. I. W. HEYSINGER.

What Flies Do.

To the Editor of the Scientific American:

An article on this subject, in a recent issue of your paper, by Mr. Emerson, an English chemist, has induced me to send you the result of some careful observations made upon the parasites that infest flies. It is not my purpose to dispute the theory, advanced by Mr. Emerson, that flies are scavengers of the atmosphere, and that, while flying through foul places, they collect on their bodies various organisms, which they feed upon at leisure. My desire is only to draw attention to the fact that the common house fly (*musca domestica*) is at certain seasons possessed of parasites. In examinations made during the summer months, I have failed to detect the parasites; but in the autumn, as a rule, they can be discovered in large numbers around the *coxa* (the joint of the leg that is attached to the thorax); and when disturbed, they become very active, running up and down the spines or hairs of the fly. They somewhat resemble in form the *acarina tellarius*, the little red mites of our hothouses. They differ from them in having but six legs; and in fact, they possess every quality, excepting wings, necessary to constitute perfect insects. They are half a line long, and, by the unaided eye, can be seen as mere specks, and therefore do not belong to the animalcules which represent the smallest and imperfect forms of life. By placing a fly possessed of these parasites upon a piece of clean glass, and then killing the fly, the parasites will immediately leave the dead body and wander away upon the glass. By holding the glass up to the light, the parasites can be seen as atoms, moving. Under frequent careful microscopic examinations, I have never observed that these parasites were eaten by the fly. On the other hand, I am very much of the opinion that the fly is consumed by the parasite. In every case of my observation, the fly possessed of these parasites was in a sickly condition. F. C.

BY a recent fire in the arsenal at Rendsburg, Holstein, forty thousand new Mauser rifles, an equal number of rifles of older construction, and much other war material were destroyed.

Prizes for Designs for a Concrete Villa.

In pursuance of past promises, and in compliance with numerous requests, we invite competition designs for a class of structure which commends itself to notice. Of the various kinds of building open to selection, not one seemed to us more suitable, in calling into exercise the skill and ingenuity of architects and the younger members of the profession, than the one we have chosen. We have thought of dwellings for the poor and middle classes, hospitals and asylums, churches and schools, all deserving subjects, but they have been more or less used up, and there appeared to us little in them to provoke inventiveness or to afford so ready a response as a villa designed in a material comparatively new, and affording ample scope for an independent architectural solution.

CONDITIONS OF COMPETITION.

1. The design to be adapted for a villa of the ordinary suburban class, suitable for a corner site.

2. The accommodation provided is to comprise a porch, hall, morning room, library, dining room, kitchen, and necessary domestic offices on the ground floor; two principal bedrooms, dressing room, bath room, and three other bed rooms on the first and second floors. Coal, wine, and beer cellars to be arranged in the basement. A servants' staircase to be provided. The sizes of the rooms are left to the discretion of the designer.

3. The cost of the villa not to exceed $9,000, calculated at 14 cents per foot cube of the whole building, the contents being measured from the foundation level to half way up the roof. Preference will be given to a design that exhibits economy of plan combined with a suitable architectural treatment of concrete.

4. The general drawings to be to a scale of one sixth of an inch to a foot, and to comprise the following: Cellar plan showing drainage, ground plan, first floor plan, three elevations, one section taken through principal staircase. A sheet of details, illustrating any important part of the construction or decoration, drawn to an inch scale, on a sheet of paper 22 by 14 inches, may accompany the drawings. The whole of the general drawing to be arranged on a sheet of double elephant paper (hotpressed), 37½ inches by 27½ inches, and to be sent in unmounted. The designer to be at liberty to send in a perspective view with the general drawings, in lieu of one elevation, but no account will be taken of this in selecting the design.

5. All the drawings to be drawn in black (Indian ink) lines, and to be suitable for photo-lithography. No wash of any kind to be used. The shadows, if any, should be hatched in line.

6. The drawings to be accompanied by a general specification of the method of construction proposed to be adopted, the scantlings of timbers, etc., with a general statement of the reasons that have influenced the designer, and the dimensions of the several rooms.

7. Particular regard will be paid to the constructive and sanitary merits of the designs submitted.

8. The drawings to be sent in under motto, accompanied by a sealed envelope containing the name and address of the designer, to the editor of the *Building News*, London, on or before the 25th day of January, 1876, carriage paid.

9. The decision will be published in the columns of the *Building News*, with a report of the judges.

10. The editor reserves the right of publishing any or all the designs.

11. The sum of $50 is offered for the best design; $35 for the second; and $15 for the third, all in gold.—*The Building News.*

Tænia and Raw Meat.

"Seventy years ago tænia (tapeworm) was such a rare affection in France that many physicians of large experience had not met with it; or if they had, the cases were extremely few. To-day tænia has become so common that every practitioner meets several or many cases yearly. To what is due this sudden multiplication of tæniæ? It is twenty or twenty-five years since Trousseau first, and many physicians after him, and more recently Professor Fuster, began to employ raw meat as a remedial agent; and it was at first received with distrust, but at present it has become of general use. This coincidence alone permits us to suppose that raw meat may have something to do with the production of tænia, and most physicians have adopted this etiology, which appears absolutely certain. Beef frequently contains the germ of tænia, which germ, transported into the stomach of man, developes, taking the form of the tapeworm. In Abyssinia, where the use of raw meat is general, every one has tænia. At St. Petersburg, Dr. Weisse observed, according to Cauvet, that children fed upon raw meat were frequently attacked by tænia.

"For my part, I have observed a great number of cases of tænia during the past few years, and in every case the individual had made use of raw meat or was at the time under that regimen. In a convent I recently administered raw meat to four nuns, three of whom were seized with tænia afterward.

"M. Laborde (*Tribune Médicale*, page 472) does not believe that raw meat is the cause of the increased production of the worm. 'Each of the three varieties of tænia which are found in man,' says he, 'argues its origin in an absolute manner. The *tænia solium* results from the transformation of the *cysticercus cellulosæ* of pork. The *bothriocephale tænia* is produced by fish. The *tænia mediocanelle* is the only one that can be communicated by beef or mutton, and we all know how rare the *tænia mediocanelle* is.' There is precisely where the error lies. The *tænia mediocanelle* is not rare; on the contrary, it is at least as frequent in our time as the *tænia solium*; and it is readily recognized by a simple magnifying glass. If M. Laborde were to examine the tænia that follows the ingestion of raw meat, he would see that the *tænia mediocanelle* has become very common in France from our new therapeutical habits, while the frequency of the occurrence of *tænia solium* has not increased, for pork meat slightly cooked or raw remains exceptional. Thus we see that it is beef or mutton which furnishes these frequent cases of tænia. Have we any means of doing away with this terrible inconvenience?

"It is at least probable, if not certain, that the addition of alcohol to raw meat, following the method of Fuster, of Montpellier, suffices to kill the germ. For that, the alcohol employed must needs be strong, and the meat should be well mixed with that liquid and allowed to macerate for some time. Thanks to heaven, the moment tænia becomes frequent, the *materia medica* enriches itself with the knowledge of a new tænifuge, at least as efficacious as any other, and superior, inasmuch as it is absolutely innocuous, and that its abundance and low price place it within the reach of every purse. Freely administered pumpkin seeds constitute a sure and inoffensive tænifuge, that seldom misses its effect. Some precautions are necessary in the employment of this medicine.

1st. The intestine is previously emptied by recommending the patient to abstain from eating on the eve of the day on which he proposes to take the remedy.

2d. Early in the morning we administer on an empty stomach 60 grammes (1 oz., 7 drachms) of pumpkin seeds, deprived of the skins and ground with sugar, then mixed with water, forming a sort of milk of almonds.

3d. When the patient feels the worm detaching itself, we administer 70 grammes (2 oz., 125 grains) of castor oil in a cup of hot broth or black coffee, and the worm, in all probability, will come away during the day.

If the head of the worm is not found, the same treatment is repeated in eight or ten days, or the day following the first treatment, if desirable. To recapitulate: It is certain that raw meat as prescribed to-day expose the patient to tapeworm. The species observed in such cases is the *tænia mediocanelle*. Mixing the meat with alcohol lessens the danger. The tænia, once developed, is easily removed by pumpkin seeds properly administered."—*G. Régnault.*

Punctuality in all Things.

It is astonishing how many people there are who neglect punctuality. Thousands have failed in life from this cause alone. It is not only a serious vice in itself, but it is the fruitful parent of numerous other vices, so that he who becomes the victim of it gets involved in toils from which it is almost impossible to escape. It makes the merchant wasteful of time; it saps the business reputation of the lawyer, and it injures the prospects of mechanics who might otherwise rise to fortune: in a word, there is not a profession, nor a station in life, which is not liable to the canker of this destructive habit.

In mercantile affairs, punctuality is as important as in military. Many are the instances in which the neglect to renew an insurance punctually has led to a serious loss. Hundreds of city merchants are now suffering in consequence of the want of punctuality among their Western customers in paying up accounts. With sound policy do the banks insist, under the penalty of a protest, on the punctual payment of notes; for were they to do otherwise, commercial transactions would fall into inextricable confusion. Many and many a time has the failure of one man to meet his obligations brought on the ruin of a score of others, just as the toppling down, in a line of bricks, of the master brick causes the fall of all the rest.

Perhaps there is no class of men less punctual than mechanics. Do you want an upholsterer? He rarely comes when he agrees. So with carpenters, painters, and nearly all others. Tailors and shoemakers often do not have their articles home in time. The consequence is that thousands remain poor all their lives, who, if they were more faithful to their word, would secure a large run of custom, and so make their fortunes. What would become of the SCIENTIFIC AMERICAN if it were not punctual in going to press? or if our paper makers were not punctual in delivering paper? or if our compositors were not punctual in coming to work? Be punctual, if you would succeed.

RAILWAY IRONCLADS.—Cologne is to be surrounded by a chain of forts in the same manner as are Metz and Strasburg. The works, which are now in course of construction, are connected with each other by a protected circular railway, which, now used for transporting material, is designed as an additional means of defence, as it will convey portable ironclad batteries from point to point. Within the outer fortifications there is to be a second line, and a series of revolving iron turrets.

PROFESSOR JAMES ORTON, of Vassar College, proposes at an early day to make an exploration of the Madeira and Beni rivers, which are branches of the Amazons, with the view of opening to science and commerce that portion of South America which is watered by those rivers. The Chamber of Commerce of New York city heartily seconds Professor Orton's project, and has addressed a memorial to the Secretary of the Navy, urging the importance to the United States of a knowledge of that district, and asking his cooperation in the enterprise. Professor Orton has had much experience on the Amazons.

Milk Preserving.---How an American Invention is Worked in England.

The Anglo-Swiss Milk Condensing Company has three establishments in England, one at Middlewich, one at Aylesbury, and the other at Chippenham. Perhaps a better situation for a milk-preserving depot could not be found than at Chippenham, a town long famous for the excellence and the large quantity of its dairy produce, and in the heart of one of the richest milk counties in England. By the kindness of the company's manager, Mr. Bosworth, we were lately allowed the privilege of going over the works in that town; and thinking that what gave us great pleasure might also interest our readers, we give a short account of what we saw and heard there.

Close by the side of the Avon (not the Swan's Avon), on the right hand side as you walk from the railway station to the ancient town of Chippenham, a nice, clean, white stone building attracts the eye. A tall brick chimney suggests a factory of some description, but the general appearance of the building is so clean, and there is so little noise or bustle, that at first one is inclined to think that, whatever work it is dedicated to, business has not yet been commenced. This, however, is not the case, for a busy and successful summer has just been concluded. Entering the large double doors we went upstairs to the office; and on making our desires known, a gentleman, Mr. Page, kindly undertook to show us round. Like Alice in Wonderland we wished to "begin at the beginning and go right on to the end"; and so we went to the other end of the building, where the farm carts bring in the milk every morning. At present this yard is open, but preparations are being made for roofing it in, so that the horses may stand there in comfort while the unloading is proceeded with. In the first room, into which the milk is taken from the carts, we noticed a number of tin saucers with brass plates on them, all numbered, and about half filled with milk. These, we were informed, were used for testing the cream-producing qualities of the different lots of milk; a small equal quantity from each farmer's consignment being poured into one of these neat little saucers, and allowed to stand until the cream was thrown up. It struck us that testing cream must be a most agreeable occupation. Here the milk is carefully weighed (measures are not used) and tested. It is then poured out of the farmers' cans into those of the company, and taken into the next room, where the cans containing the milk are placed into large tanks full of hot water. In the first room the milk cans used by the farmers are washed, the company prudently preferring to have this important duty performed in a thorough, systematic manner by its own servants rather than to trust to the tender mercies of the farmers' servants, and risk the loss of milk in hot weather. The way the cans are washed is at once simple and effective. First, they are roughly rinsed in a large tank nearly full of water; then the can is taken to a table, on the top of which a round hole is cut, the exact size of the can's mouth. In this hole are two pipes, pointing upwards, on a level with the table. The can is placed mouth downwards over this hole; and a handle being turned, a jet of spring water rushes with great force up one of the pipes into the can, thoroughly cleansing it. After this another handle is turned, when a jet of steam acts in exactly the same manner. Another turn of the first handle, and the cold spring water finishes the washing. Thus a very large number of cans are thoroughly washed in a marvelously short time, with very little labor. Leaving this room, we went into the next, where, as we said, the milk cans are placed in tanks containing hot water. From these the cans are lifted, and the milk poured into large open round copper tanks, and boiled by the action of steam. After remaining here for some time it is pumped up into the condensers in the room overhead. These condensers, of which there are three in this room, are also worked by steam, and in them the milk remains for from three to seven hours, according to the quantity. In these condensers a vacuum is created of about 20 lbs. to the square inch, and thus the vapors are drawn off from the milk, which we understand to be one of the most important details in the process, and that on which the future keeping properties of the milk chiefly depend. When the milk has remained in these condensers sufficiently long, it passes into another room, when it is cooled by being put in cans and placed in cold water. The final process is unknown to us, being the one secret of the establishment, but we have a shrewd suspicion that, like many other secrets, there is no great mystery connected with it. Be that as it may, when next we saw the milk it was in exactly the condition we see it in when the little cans are opened for table use. The filling room is a large airy apartment; and as the little cans are filled, they are closed up and sent to the room above to be packed away ready for the market.

Everything is made, and all the work is done, on the premises, upwards of 100 people being employed, of which about forty are boys and girls. One engine of four horse power is sufficient to do all the work, but the boiler requires to be much larger in proportion, in consequence of the amount of steam used for other purposes. Owing to this the boiler is large enough to supply working steam for a forty horse power engine. Not the least interesting part of the establishment is the portion devoted to the making of the tins, in which the milk is put when ready for sale. Here nearly all the work is done by boys and girls; and as each has only one part of the tin to make, the work proceeds rapidly. Thus, one boy cuts the sheets of tin into the proper sizes for the sides or barrel of the tin; the next boy passes three pieces between two little rollers, which curl them up ready for joining. From here they go to another little fellow, who sits and solders the two edges together, and so quickly is this done that a boy can turn out 2,000 a day. After this, the ends, which are punched out by machinery, are fitted on, and milled, or squeezed tightly to the top and bottom of the little cylinders which form the tins, when they are soldered and the tin is labeled. The milk is then run in through a small round hole left in the top, and then this hole is covered; the tin is rolled in paper and packed, which work is entirely performed by girls. The chief characteristic in thir milk-condensing is cleanliness, and the quantity of water used for this purpose is enormous. Ventilation is anothes necessity, and thus the employment is pleasant and healthy. With foot and mouth disease increasing, it is satisfactory to be able to get a pure article of food for children, and as the milk from diseased cows cannot possibly be used by the Preserving Company, it is particularly suitable for young or delicate persons. It has also the great advantage of being always at hand, ready at a moment's notice, and in any kind of weather, which is a matter of some importance. Condensed milk has long been largely used on board ship and in yachts, but it is only lately that it has begun to come into general use in families; so that, with increased consumption, it is probable that other establishments will have to be formed by the energetic Anglo-Swiss Condensing Company, and if so we wish it the same success which has hitherto attended it.

[The above from *Land and Water*, describes the valuable process invented by the late Gail Borden of Texas, and by him first put in operation in this country about fifteen years ago. Since that time it has spread to all parts of the world, and his condensed milk has become a staple article of commerce and manufacture. The adoption of Mr. Borden's invention in England is only one of many examples of American improvements there worked.—EDS. SCI. AM.]

Uncertainty of Wealth.

"The absence of the law of primogeniture causes a frequent change of ownership in the private residences which contribute so much to the adornment of our cities. While the head of the family lives, the home may be retained—though very often a reverse of fortune compels him to seek humbler quarters—but when he dies the heirs are obliged to get rid of the too expensive luxury. How many of the houses built in St. Louis twenty years ago are now owned by the men who erected them, or their descendants? How many of later date, now occupied by their builders, will be in possession of their present tenants, or their descendants, twenty years hence? Other influences beside the lack of primogeniture contribute to this, in some respects, unfortunate result. There are more ups and downs in life in the new world than in the old. Fortunes are made much more quickly, and disappear much more rapidly. Wealth is seldom transmitted beyond the second generation, and in many instances does not last through the first. The boy born with a silver spoon in his mouth frequently has to taste pewter before his pilgrimage is over, and he may have the pleasure of being splashed with mud from the carriage wheels of the man who was once his father's porter. This is a free country, very free indeed, and among the consequences of that freedom is the exceeding uncertainty of financial matters. Yet in no country is less provision made for the evil day so far as our children are concerned. The wealthy parent brings up his sons and daughters as though there were not the remotest possibility that they could ever be poor. If a rich father should insist upon his boy learning a trade he would be set down as a mild-mannered lunatic. If a rich mother should instil into her daughter rigid ideas of economy and industry, she would be looked upon as either very mean or very foolish—probably both. Yet every day we are taught the necessity of this preliminary discipline; every day we see men and women falling from affluence to poverty, who, if properly trained, might not have fallen at all, or, if they did fall, could have risen again. It is a shame and disgrace that, in a land where labor is supposed to be honorable, and where the law recognizes no distinction of caste, so small a proportion of the sons of the wealthier classes learn trades. No young man has a right to consider himself thoroughly independent unless he has some avocation by which, health permitting, he can always make a living. And the best and surest avocations are those for which there is always a demand. Lawyers, doctors, preachers, professors, clerks—all these and their kindred are frequently a drug in the market; but how seldom is it that a good carpenter, blacksmith, machinist, wagon maker, shoemaker, tinsmith, book binder, or printer has to travel far in search of remunerative employment! We shall never be thoroughly republican until there are fewer genteel drones in the national hive."

There is probably no subject on which more has been written than the above. Almost everybody has seen evidences of the fact about them; and how many who will read this article (from the St. Louis *Republican*) can realize its truthfulness!

Gas for Heating Purposes.

We confidently look forward to the time—and we hope it is not far distant—when, in all large cities, at least, a heating gas will take the place of solid fuel for culinary and general heating purposes. What the consumption for that use would be, were the price sufficiently low, can scarcely be calculated; but if the consumption of illuminating gas on the island of Manhattan alone may be roughly estimated at fifteen million feet per day, the consumption of heating gas would, probably, amount to one hundred million feet; and since it must be made on an enormous scale, at a very low cost, and sold with a narrow margin for profit, there is reason to hope that the efforts to solve the question of an economical heating gas will solve also the problem of cheap illuminating gas; for though the essential properties, and even the composition, of these two will differ greatly, yet any process that will enable us to make a heating gas, at, say, 20 cents per thousand feet, can, probably, be adapted to the manufacture of a cheap illuminating gas. In the interests of metallurgy, of manufacturing, and of general needs of civilization, we welcome every step toward the attainment of this great desideratum; and it seems, indeed, that no more inviting field for the application of science, skill, and economy exists than that of gas-making. This art has stood almost stationary for nearly half a century, while every other branch of productive industry has made enormous progress; and if the signs of the times are not deceptive, the day is approaching when the demands of consumers will force gas-making out of the rut of conservatism into the path of progress that is characteristic of our time and people.—*Engineering and Mining Journal.*

How to Reach the North Pole.

C. S. says: "I propose to reach the north pole by the construction of an overground tubular railroad, under the auspices of several governments, which should pay sufficient money to construct suitable shops for the making of a wooden tube, 5 or 6 feet in diameter, to be made in light sections for transportation. After some suitable landing place has been chosen, the road could be commenced at the dock. The sections of the tube could be placed on a car which would run inside of the tube and be propelled by hand, and furnished with a light, strong, convenient dummy engine and boiler, to be used when required. Theoretically this idea has many points of great benefit to the explorers. A car can be made and furnished with nearly all the comforts of a home; and the tube, getting covered with snow in the winter, would be quite warm. With properly constructed stoves, plenty of provisions, and fuel, a scientific party could pass a winter in the tubes quite comfortably. I have no doubt but that there are plenty of civil engineers who would jump at the chance of constructing a road of this nature if solid government support was guaranteed. If this idea proved feasible, and the barrier of 120 miles that is supposed to exist could be overcome, and the unexplored supposed open sea found, this road could be made the means of carrying material for the construction of suitable fishing vessels. If the open sea does exist, there is no doubt but whales are to be found there in immense numbers, so as to make the road profitable, and furnish oil for the people when the products of the oil region commence to give out. Shelter in nearly all emergencies would be found in a road of this description. Who can tell of the benefits that might come to the nations if the mysteries of the vast unknown region could be brought to light? The outlay on a road of this character would be a mere bagatelle to the results that would accrue from it."

A New Fumigator.

A new and excellent fumigator has recently been devised by Mr. Thomas Shaw, of Danville, Pa. (P. O. Box 612). We are indebted to the inventor for one of the machines, which we have practically tested to our satisfaction. It consists in a hopper in which the tobacco, sulphur, or other fumigating material is placed, resting on a perforated bottom. A pipe from the hopper enters a miniature fan blower, above the casing of which the hopper is placed. There is a hand wheel which is belted to the fan shaft, so that the latter is very rapidly revolved, causing a down draft through the material ignited in the hopper, and a strong current of smoke to be delivered through the outlet tube of the blower. The device is made large enough for use in large greenhouses or of a size convenient to be carried in the hand. It will also be found admirably adapted for smoking plant lice from window gardens, and for burning coffee or other disinfectants in hospitals and ships.

TO PREVENT GLUE FROM CRACKING.—Glue frequently cracks because of the dryness of the air in rooms warmed by stoves. An Austrian contemporary recommends the addition of a little chloride of calcium to glue to prevent this disagreeable property of cracking. Chloride of calcium is such a deliquescent salt that it attracts enough moisture to prevent the glue from cracking. Glue thus prepared will adhere to glass, metal, etc., and can be used for putting on labels without danger of their dropping off.

ENGINEERS and shipbuilders on the northern rivers in England feel the effects of the general depression. At some of the engineering shops and shipyards there is scarcely sufficient work to employ foremen and apprentices. Nothing better is expected till the spring of 1876, when it is hoped that the trade will vie with the promising season of the year.

A GERMAN astronomer has discovered two new small planets, not visible with the naked eye, in the constellation *Aries*. This makes the number of the lesser planets one hundred and fifty-three.

AT Bonn, Germany, headaches, dyspepsia, etc., affecting several patients, have been traced to evening studies pursued under the baleful influence of a green lamp shade, from which arsenic was set free by the heat of the flame.

EUGENE SCHNEIDER, the French statesman and mechanical engineer, died recently, at Paris, at the age of 70 years. He was called to the Paris Cabinet in 1821.

RECENTLY there was a lifting match at Eureka, Nevada, between two men, for a prize of $200, the winner lifting a 15 lbs. dumbbell at arm's length the greatest number of times. The loser lifted it 1,130, the winner 1,144, times.