

avoid over-eating at any time, and particularly so before any period during which they desire to keep awake.

In this, as in all other complaints, an ounce of prevention is worth a pound of cure. It will, we think, be rare that drowsiness will occur if perfectly regular hours for sleeping are observed; unless it is induced by a plethoric condition, consequent upon high living, or a constitutional habit. Nevertheless, there are some simple remedies. One of the best is to wet the head suddenly and thoroughly with cold water. The shock will generally suffice to throw off the sleepy feeling. Strong tea or coffee will often aid in preventing drowsiness, but these are only temporary helps. A radical cure can only be attained by the correction of the habits, whatever they may be, that induce it. Temperance in eating as well as in drinking, regular hours, avoidance of too exhausting labor, must be observed. We do not advocate the use of drugs for this complaint. Each person so afflicted ought to make a thorough examination of his habits of living, and in most cases he will find the stomach to be the offending organ.

#### EDUCATION OF IDIOTS.

With all our advancement in science the question "What is mind?" still remains unanswered, and will probably remain unanswered till the end of time. Like the question "What is force?" it seems beyond the reach of human intelligence. We know something of its manifestations, and a little—very little—of the laws which govern them; that is all. One primary fact is sure; viz., the increase of its powers by exercise. We have also found by experience that certain methods of training are more successful than others, and that a certain order in the presentation of ideas is desirable. The reasons for differences in mental power wholly elude us. We observe that, in general, extraordinary mental deficiencies are accompanied by marked bodily defects; but whether the latter are the cause or the effect of the former, we are totally unable to decide.

Elaborate treatises have been written upon mental philosophy. Physiologists have struggled for ages with this question, and nothing but hypothesis has been the result of their labors.

The present age has, among its other achievements, demonstrated the fact that many of those formerly considered hopelessly imbecile, are capable of considerable mental development. It needs no argument to convince those familiar with the trials imposed upon parents by the idiocy of a child, that anything which can render these unfortunates capable of even measurably caring for themselves, is worthy of careful attention.

It has been reckoned that between thirty and forty per cent of genuine idiots are capable of being educated to some extent. Not unfrequently some particular faculty is developed in a high degree. The writer of this article once knew an idiot, who, although singularly deficient in most mental qualifications, had that of construction very highly developed. He could never lay out or plan work, but he could execute with great precision, and was of much assistance to his father, who was a carpenter. This lad (lad only in appearance, at the time we saw him he was 25 years old) would cut a hole in a plank with a compass-saw nearly as round as it could be described with the compasses. He delighted in work, and was always ready to go to bed as soon as he had eaten his supper.

We might mention many other instances, both from hearsay and observation, showing that the minds of idiots frequently possess some faculty or faculties as fully developed, or nearly so, as others more richly endowed by nature. One of the most remarkable cases, and one with which the public is already familiar, is that of Blind Tom, the negro boy pianist.

Quite a number of schools and asylums for idiots, are now in successful operation in Europe and America. One of the prominent facts brought to notice in the results of these institutions, is that the majority of imbecile children capable of any improvement at all, may be taught to do and delight in doing simple kinds of labor. As most idiots are meager in stature and of weak constitution, such exercise improves their bodily health, which, of course, reacts favorably upon their mental condition.

The qualifications of patience, insight into individual character, and adaptability to mental peculiarities, are even more requisite in teaching these weak minds, than those of ordinary children. Indeed, it has been asserted by many heads of institutions like those mentioned above, that their greatest difficulty has been to find good teachers. It is thought by some, that almost any person capable of teaching average intellects, ought to be competent to teach inferior ones, but such is not the case.

We look with great interest upon the humane efforts now making to ameliorate the condition of imbecility; and we have no doubt much that will be valuable to mental science may be obtained by the study of the means by which light is made to dawn on the clouded minds of imbeciles.

#### PROTECTION CONSIDERED AS A CONSERVATIVE ELEMENT IN NATIONAL AFFAIRS.

No better illustration of our proposition, made in a recent article, that it is unwise for a nation to depend upon foreign sources for any commodity which is a national want, when that want can be supplied by home production, could be furnished than the present rise in the price of sugar consequent upon the Cuban insurrection. A very much larger proportion of the sugar used in the United States has hitherto come from Cuba than from all other sources put together.

The rapid rise in this commodity, shows how thoroughly commercial men understand the effect upon the market, sure to occur upon a total or partial interference with the success-

ful harvest of the sugar crop in the (so far as size is concerned) insignificant area upon which we have become so abjectly dependent for one of our most important articles of diet.

The inconvenience and rise in price which is certain to take place, should the apprehensions of a diminished crop be realized, will in this instance more than counterbalance the burden of twenty years' protective duty, to those not engaged in the production of sugar, to say nothing of the value of such protection to all engaged in that industry.

The deprivation of accustomed comforts—necessities, for comforts are necessities to people of the present age—engenders discontent among the masses, and thus becomes a disruptive force. Citizens demand of Government that it shall secure to them the privilege of living comfortably as well as safely, and they are discontented, and reasonably so, with a government that fails in this respect. Deprive the mass of American citizens of shoes and compel them to go barefoot, by want of proper foresight on the part of the Government, and such an important mistake would produce a murmuring that would shake its foundations.

A protection to home industry, which will make our nation as far as possible independent of others for any important product, is, then, a conservative power. Though it increases the price of particular manufactured commodities, it lightens the price of agricultural products also by its indirect effect upon all collateral branches of industry.

We do not in these views disregard the claims of commerce for protection, in our zeal for the manufacturing interests of the country, but we do believe that if the interests of any class of people have a prior right for consideration, they are those of the hard-toiling producing class. All we want of commerce is to bring us those things which we cannot produce, and those things which it is not easy to produce in our own land. We can easily produce iron, cotton goods, woollens, sugar, etc., in quantity ample to meet our requirements. It is such industries that we believe it the duty and the wise policy of the Government to protect.

#### CONNECTION ON ENGLISH RAILWAY TRAINS.

The great trouble now, and the great trouble for years past, that has bothered English railway managers, is the insolvable problem how to enable a passenger to communicate with the "guard," or conductor, and the guard to communicate with the "driver," or engineer. Probably more time in inventions and tests, at which Col. this and Capt. that, and Hon. Mr. Blank, M. P., and Sir Toodles, K. C. B., assisted, has been spent in the repeated attempts to solve this terrible problem—to cross this modern *pons asinorum*—than has been expended by all our improvers of steam engines, agricultural machines, and velocipedes; and these may be counted by the hundreds. Still the railway murders, and ravishments, and assaults, and insults go on, and the passengers are still locked in their cushioned and upholstered cells, subject to the exploiting pleasure of any well-dressed and purse-competent villain.

Some of the ingenious arrangements for establishing communication between the victims of Müllers and Booths and the guard (what a misnomer!) are sufficiently ridiculous to excite a laugh, was not the subject one too mortally serious. The passenger, in peril of his life, or throttled by garotters, has only, in one case, to smash a pane of glass and turn a handle, previously defended by that glass screen, when he will show a signal that may be seen by the driver or guard if either happen to be looking back over the train. As it is the constant custom for the driver (engineer) to be always looking back over the top of the cars, and the guard (conductor) in his van is continually doing the same thing, it is evident that the after telegraphic communication between the two could be established within less than an hour, and, better still, the railway officials would be able to ascertain in what compartment the audacious breaking of the protective glass was done, and possibly fix the act on the impertinent and presumptuous victim of English fashionable railway assault.

Semaphore signals worked by similar means, electric signals and alarms, ringing a bell or waving a flag, and flexible air tubes extending the length of a train, and operated by the compression of air, and other similarly ingenious (?) contrivances have been tested, but as hitherto without success. Not entirely so, however; for recently at a trial of the atmospheric "kudings" a Col. somebody, stationed on the "foot-plate" of the locomotive for the purpose, really recognized the signal and informed the engineer. It was highly successful.

Seriously, this nonsense is pitiable—shameful. But, there may be some reason after all for it. One of our exchanges gives a probable solution of what might be otherwise incomprehensible to our minds. The Hartford Post says:

The manners of our English cousins don't seem to be as refined as they might be, indeed many of them would fare hard if tried on a charge of rudeness and boorishness. The English railway companies steadily resist all efforts for the adoption of the American mode of communication, by a cord, between the different portions of passenger trains and the locomotive, on the ground that the trains would be liable to constant stoppage by young gentlemen "on a lark" or by other mischievous people. It is said to be useless to tell the railway officials that in America trains are never stopped in this manner, and that there is no good reason for supposing the British traveling public worse than the Americans. They know their countrymen too well. It does really seem as though there is something exceptionally rude, to say the least, in the average Briton and there seems to be a natural proclivity to wanton mischief even among the educated classes. Two illustrations of this are recently reported: Two persons described as "gentlemen," lately amused themselves on the way from London to Dover, with tearing up the cushions and carpetings of the railway carriage; and another, likewise dignified with the title of "gentleman," was fined five shillings at Dewsbury for singing "If I had a donkey," in a church, while a funeral service was going on. Both of which instances are cheerful evidences of refinement

and gentlemanliness. We know better than that even in this "dom blarsted country."

Another instance of rudeness not mentioned by the above writer lately occurred in Dresden. An elderly English gentleman persisted in pounding with his cane on the floor of the chapel, whenever the chaplain undertook to pray for the President of the United States. He was very devout and docile when Queen Victoria and other members of the royal family were mentioned, but became violent the moment an attempt was made to remember our Chief Magistrate. A Frenchman would have recognized the propriety of such a prayer, but an Englishman "could not see it."

#### SCENTING, DEODORIZING, AND VENTILATING.

The sense of smell is one of the most important of the warders on the walls of health's citadel. When alert it is unfailing and reliable in its warnings, but it may be drugged or stupefied by the insidious foe if too often allowed to hold a parley. To drop metaphor, the sense of smell is as useful as a guardian of health as it is as a contributor to pleasure. As a rule, any atmosphere that is offensive to the olfactory nerve is detrimental to health. The effluvia from decaying animal or vegetable substances is instinctively shunned by the human race, unless the demands of business or duty have proved strong enough to silence the monitor. There are those, however, who seem but little affected by villainous smells, and some who by accustoming themselves to such offences come to disregard them; yet it would be difficult to find one possessing the sense of smell in any degree who could stand unmoved the assaults of sulphureted hydrogen. Others there are who are injuriously affected by scents which yield a positive pleasure to most. Some sicken at the smell of musk; some faint at the aroma of cheese; others turn with disgust from the pungent onion, the succulent cabbage, or the fragrant lemon. To these, where the instinct is natural and not an affectation, there can be no doubt that these scents are really harmful.

The bodies of all animals have a scent peculiar to their kind. The healthful scent of the cow is associated in the mind of many a country-bred resident of the city with the labors and pleasures of the farm. The scent of the horse is not unpleasant, the cat and the dog have each their own peculiar aroma. To go further, it is more than conjecture that each individual of the human race gives out his own atmosphere else how can the dog, the horse, the cat distinguish, by smell alone, the person of his master or mistress? The dog will track his master through traveled roads by the sense of smell. In some individuals this personal atmosphere, more pungent than pleasant, surrounds them with an acrid flavor, despite frequent bathings and great care in cleanliness. This misfortune is more general than may be supposed, and after cleanliness there is no remedy but a neutralizing agent in the form of an odor, pungent and powerful, or soft and suggestive as the case may demand. And here we may say that strong odors of any one element, or any one kind rather, are to be shunned as possibly being more offensive to those with whom we come in contact than the annoyance they are designed to remedy. A judicious mingling of differing odors blending into one perfume is the most agreeable bouquet for the handkerchief, gloves, or hair.

The utility of scents is, however, noted more strongly in the sick room. Here perfumes that would be most agreeable and refreshing in health are positively unpleasant and injurious in sickness. He who is ill cares little for the scent of musk, cologne, or even of flowers. These are for the convalescent. What he desires is pure air; the life-giving oxygen. But at times it is impossible to purify the sick room of its offensive and unhealthy odors by the comparatively slow process of ventilation, without danger to the invalid. Then resort must be had to some powerful deodorizer that will act at once. Latterly, carbolic acid has been strongly recommended for "killing" the offense of human excreta and the other offenses of the sick room; but to many persons the odor of this acid is very unpleasant. It gives an idea of cleanliness, to be sure, an idea born of our consciousness of the fact; but the sense of smell instinctively revolts at it. Burning sugar is objectionable for the same reason, and it loads the atmosphere of the room with a bitter, acrid property, trying to weak lungs and the throat. On the contrary, the scent of boiling sirup, as in "sugaring off" in the manufacture, and the sweetness in the shop of the candy maker are pleasant and healthy.

Probably no means of deodorizing, quickly, and not offensively, the atmosphere of a sick room equals that of roasting coffee. The agreeable aroma thus thrown off is due, undoubtedly, to the essential oil in the berry and not to the element known as caffeine. The best method of using it is to pound up or grind the unroasted berry and sprinkle a few grains on a hot shovel or pan. If the raw material is not obtainable, the roasted material will do, treated in the same manner.

But, after all, ventilation is the proper means of affording the invalid and his attendants the comfort of pure air; but where these scenting and deodorizing agents must be employed, no opportunity to change the loaded and vitiated atmosphere of the room for God's life-bearing and health-giving air should be neglected.

#### PERIODICAL SCIENTIFIC PUBLICATIONS.

The periodical literature of the period may be divided into four classes. The first may be said to include those papers—chiefly dailies—which make the publication of news, upon any and all subjects, their prime object.

A second class including a large number of weekly papers, and all the purely literary monthlies either make news subordinate, or omit all mention of facts as they occur, unless they can be made the text for some discussion, or otherwise sub-

serve some general literary purpose; general literature being the scope of this class of publications. A third class includes those papers and magazines devoted to some specific object, to the advancement of whose interests, and the collation of news specially bearing upon it, their entire space is allotted. A fourth class comprises those devoted partially or exclusively to scientific literature, and to scientific news. It is of the latter class, we propose to speak in the present article, confining ourselves to those published in America.

The sole claim any publication can make that can entitle it to public favor is, that it educates its readers. If it does not accomplish this it is a failure, unworthy of public patronage. Whatever its scope may be, whether scientific, purely literary, or amusing, it should still educate, or it is worthless. More than this it should educate in the right way, or it is mental poison. The scientific press of the country claim more than any other department to instruct the masses, and the demand for popular scientific instruction is largely increasing in this country. Our own paper, which is the oldest of its kind published in the United States, has without doubt been largely instrumental in developing the present popular taste for scientific information, and its success is an evidence that it has supplied satisfactorily the public demand in this regard.

The *Journal of the Franklin Institute*, the oldest monthly scientific periodical in this country, and *Silliman's American Journal of Science*, the oldest quarterly scientific periodical, respectively fill places in American scientific literature which is occupied by no other. The SCIENTIFIC AMERICAN also fills another and distinct place, and notwithstanding the many attempts which have been made, and are making, to compete with it, its progress is steady, and its circulation larger than at any former period of its history.

The more recent publications devoted to scientific and industrial matters are the *American Builder*, Chicago; *Stoan's Architectural Review*, Philadelphia; *Journal of Chemistry*, Boston; *Industrial American*, *Manufacturer and Builder*, *American Artisan*, *Inventors' and Manufacturers' Gazette*, New York; and *Van Nostrand's Eclectic Magazine*—a monthly which consists of articles copied from the current scientific literature of this country and Europe. The two numbers of this monthly already issued are well supplied, and the articles generally are selected with considerable care. We are happy to record a growing interest on the part of our people for a greater knowledge of scientific subjects.

#### A Mechanical Whale.

The ingenuity of man often manifests itself in curious shapes, a recent instance of which was brought to light in one of our city courts. It appears that a German, by the name of Gebhard, was employed by one of his countrymen to construct a whale, to be exhibited as a veritable monster at his "natatorium," or swimming tank, at the foot of Sixty-sixth street, on the East river. Gebhard set to work, and applied all his inventive and mechanical skill to produce a whale rivaling in appearance the famous creature which swallowed up Jonah.

A nice mechanical contrivance was introduced inside the whale, whereby it might be "vivified" and made to enact the part of the genuine thing. Gebhard then placed flaming advertisements in the newspapers, announcing himself as an eminent doctor and traveler who had just arrived from the Pacific ocean, where he had captured a monster whale, which would be exhibited on such a day at his "natatorium." This advertisement drew a large crowd of persons to the place designated on the day set down for the exhibition. But the amazement and delight of the people, who had paid to see the sight, were destined to be of short duration; for on the return of the whale to the "natatorium" one or two parties, who had secreted themselves for the purpose, saw four modern Jonahs emerge from his capacious belly, and a further inspection revealed the fact that the whole operations of his whaleship in the water had been managed by machinery. The nonplussed Gebhard had to beat a speedy retreat, or he would have received rough treatment at the hands of the incensed crowd, who vented their chagrin on the now inanimate whale, and almost tore it to pieces.

The party who employed Gebhard's skill, brought suit against him to recover sixty-seven dollars, the amount paid for constructing the animal, and, strange to say, the judge encouraged the swindle by giving judgment to the plaintiff.

#### Carbon Printing by a Single Transfer.

Some months ago M. Soulier submitted to the French Photographic Society numerous proofs (some of which were of very large dimensions) obtained by the carbon process. These proofs were on very thin but tough films, which remained perfectly flat during the development of the image, and could afterwards be applied to the cardboard with great exactness. There is no occasion to transfer the proof twice, as in Swan's process. M. Soulier operates as follows: He spreads on glass a very thin collodion; when this has been effected he covers it with a very thin layer of gelatin which is afterward rendered insoluble. On these two layers adhering together, he spreads, lastly, the sensitive mixture in which the image should afterward appear. After desiccation the film is easily detached from the glass and is sufficiently rigid to be handled. The exposure is made in the usual way as in Swan's process, and the washings are proceeded with afterward in the ordinary manner. When this is done nothing further remains but to paste the pellicule on the cardboard. M. Soulier showed by numerous specimens what could be achieved by this process, which is very economical and very quick. With the chromatized gelatin are mixed lampblack, carmine, sepia, purple, etc.

#### Editorial Summary.

**AN INDIGNANT INVENTOR.**—Andrew Whitely has issued a printed memorial to Congress wherein he pitches into Secretary Browning, Commissioner Foote, and Chief Examiner Hodges, because they refuse to execute the decree of a court which ordered certain patents to issue to said Whitely. In his memorial, he twits the Honorable Andrew Johnson of "being politically dead," "a rebel and a knave," and then goes on to compliment President Grant, and calls upon him to name a fit man for the Commission of Patents, and also "to name three men fit to take the place of the present unfit Board of Examiners-in-Chief. He also wants Congress to enact a law to send to the penitentiary officials of the Patent Office who refuse to execute the decision of the judge. This is a good suggestion. For some reason Mr. Whitely has had a good deal of trouble in getting his patents issued to suit his views, and, if we mistake not, this is not the first manifesto that he has put forth on the subject. It appears to us that if the Commissioner refuses to execute the decrees of the courts, the shortest and best way is to have him arrested and brought up for "contempt of court," and compel him to behave in a legal manner. We are not now speaking of the merits of the case, but desire simply to point out to Mr. Whitely a simple remedy, the choice of which may save him the trouble and expense of printing sensation pamphlets.

**REFINING OF ALLOYED GOLD.**—Certain kinds of gold, especially from Australia, are alloyed with antimony, by which they are rendered brittle and unfit for use in many practical applications. One method of removing this ingredient has been to melt the gold with oxide of copper, which converted the antimony into a volatile oxide, but left the gold alloyed with copper, which has to be removed by a subsequent operation. Another method consisted in melting the gold with corrosive sublimate, by means of which both antimony and mercury were driven off as volatile chlorides, involving, however, serious loss of mercury. A new and much improved plan has finally been adopted in Australia, applicable to the purification of gold from silver and the baser metals, and which consists in passing a stream of chlorine gas through the melted metal for an hour or two, and after allowing the gold to harden, the still liquid chlorides are poured off. A subsequent operation recovers the silver and every remaining proportion of gold.

**LARGE PUMPS.**—The *Colliery Guardian* notices some centrifugal pumps just completed at the Hammersmith Iron Works, England, which are the largest ever made. Each is intended to lift 250 tons, or upwards of 50,000 gallons of water per minute, to the height of six feet. The revolving disk, or "fan," is 4 feet 6 inches in diameter, and its width at the periphery 8½ inches. The suction and delivery pipes are 3 feet 6 inches in diameter. The whole height of each pump is 11 feet 6 inches, and its length 9 feet, while the extreme width in the direction of the main spindle, is 8 feet 6 inches. The spindles are of Bessemer steel, 6 inches in diameter through the disk. The weight of the disk is 18 cwt., of the spindle 16 cwt., and of each side casing 2 tons 13 cwt., the whole weight of each pump being 7 tons.

**SHEEP** multiply so prodigiously in Australia, that the boiling down of the animals merely for the extraction of the tallow, has grown into a business of huge proportions. Four hundred sheep are cut to pieces, and thrown into a big boiler, steam from another boiler is turned on, and soon the carcasses are reduced to a pulp; the tallow rises to the top, and is drawn off through large taps into barrels for export. The gravy and other juices, the remains of the meat, and the bones, which are so softened as to crumble easily in the hands, are given to pigs. Four thousand sheep are boiled down in a day.

**THE** New York Society of Practical Engineers recently spent a whole evening in discussing the feasibility of flying. The discussion was simply a rehash of all the absurd notions upon that subject, which have troubled the minds of enthusiasts for nearly a century. Not a single practical idea was suggested.

**SHARP JUSTICE.**—A man in England was recently fined for holding a rough political controversy in the cars, to the annoyance of three other passengers. The court considered the case a gross one, and inflicted a fine of £3 upon the offender. If we could get such a fine as this upon similar offenders here, it would pay a man well to go about picking up jobs.

**A** NEW illuminating material, recently patented in Germany, consists of a mixture of two parts of the poorest rape seed oil, and one part of good petroleum. It is burned in a lamp of peculiar construction, but somewhat similar to that of the ordinary moderator lamp, and gives a light not to be surpassed for purity and brilliancy.

**A** CEMENT said to possess many advantages, and to be especially adapted for sealing up vessels containing benzoles, etherial oils, etc., is prepared by rubbing up finely ground litharge with concentrated glycerin. The liquid cement is to be poured upon the cork or stopper, or it may be applied with a brush.

**FOR** a polish for mahogany cameras, take three ounces of white wax, half an ounce of castile soap, and one gill of turpentine. Shave the wax and soap very fine, and put the wax to the turpentine; let it stand twenty-four hours; then boil the soap in one gill of water, and add to it the wax and turpentine.

#### MANUFACTURING, MINING, AND RAILROAD ITEMS.

In pegging boots by steam, twenty cases, or 240 pair of boots, are a usual day's work. One man in Hopkinton, Mass., has pegged eighty-three cases 1,982 boots, in two days. He once pegged forty-eight boots, twice round in fourteen minutes, and did one boot, in a trial of speed, in thirteen seconds.

The California papers state that the total amount of treasure exported during the year 1868 from San Francisco to New York and foreign countries was \$35,444,395, a decrease of over \$6,000,000 from 1867, and that the amount of merchandise exported was \$22,000,943, showing an increase of about \$500,000 over the previous year.

California exchanges state that the track of the Central Pacific Railroad was a week ago laid to a point 49½ miles east of Sacramento. The road is graded 100 miles west from the northern end of Salt Lake—and between these two points the gap is only 65 miles, 56 miles of which are graded. Forty to fifty days more will complete it.

In several of the mines in Cornwall, England, there are galleries which extend under the sea, where the sound of the waves is distinctly heard when the sea is a storm rolls boulders and pebbles over their roofs.

The little town of Lisbon, N. H., manufactures annually over 50,000 mackerel kits, 500,000 bobbins, 25,000 bushels of shoe pegs, and over 300 tons of starch.

The large six driver engine recently put on the Boston, Hartford, and Erie Railroad will draw with ease one hundred loaded freight cars.

From 1804 to 1827, North Carolina furnished all the gold produced in the United States. The aggregate of all her gold yield up to 1866 is about \$9,300,000.

The Pacific Railroad Company have commenced arrangements for a grand excursion from New York to California upon the completion of the road.

We have received some good specimens of okra paper made at the Chickasaw Paper Mills, near Mobile, Alabama, recently noticed in our paper.

An English improvement in envelopes is to gum the under side, so that the tongue is not applied to anything but the paper in sealing.

It is contemplated to erect water works in Meriden, Conn., including six dams, which will cost nearly \$200,000.

It is said that for every acre put in cotton last year in Tennessee two will be planted in 1869.

A very fine quality of glue has, it is said, been made from the eyes of fishes.

The twelve leading railway companies of Great Britain own 6,595 locomotives valued at over \$80,000,000.

A line of four first-class steamships is proposed to run between Philadelphia and Bremen.

A starch manufactory in Massachusetts uses a thousand bushels of potatoes daily.

East Tennessee is experimenting in the culture of tea.

A plan for driving piles by gunpowder has been invented.

The Madison, N. H., lead mine is being worked with great success.

#### Answers to Correspondents.

**CORRESPONDENTS** who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

**SPECIAL NOTE.**—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1 00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

**O. I. C., of Ind.**—The best and cheapest material for making concrete pavement with gravel is coal tar from the gas works.

**J. K., of Boston.**—A person has no right to construct a velocipede or any other machine for his own use, which would infringe on an existing patent.

**J. W. R., of N. J.**—A permanent magnet will gradually lose its power when the armature or keeper is removed from the poles. The circumstance you mention will not affect the action of this law.

**C. Y., of N. Y.**—You can easily make your name upon steel by the process called etching. Coat over the tools with a thin layer of wax or hard tallow, by first warming the steel and rubbing on the wax; warm until it flows, and then let it cool. When hard, mark your name through the wax with a graver and apply aquafortis (nitric acid); after a few moments, wash off the acid thoroughly with water, warm the metal enough to melt the wax and wipe it off with a soft rag. The letters will be found etched into the steel.

**W. R. J., of Pa.**—A perpetual motion as the term is understood in mechanics, is a machine that creates the force by which it is driven independently of any external cause. It must of course be able to start itself and remain in motion until its parts are worn out. Any machine that depends for its motive power upon any force derived from any external source as heat from coal, electricity from the corrosion of metals by chemical reagents, etc., is not a "perpetual motion." A body immersed in a fluid, subjected to pressure would require more power to move it than when the pressure is removed.

**W. G., of N. Y.**—A hollow tube in order to possess maximum strength must have its external and internal diameters in the proportion of 10 to 7. The external diameter of a bar being 5 inches, its internal diameter should be 7-10 of 5 equal to 3½ inches. When this proportion is maintained the hollow bar has twice the strength of a solid one containing the same amount of material. The absolute strength of beams, geometrically similar in form, is as the squares of their corresponding dimensions. These data will enable you to solve the particular case you mention.

**F. D., of La.,** wishes to know the composition and mode of manufacture of gold colored and violet colored inks. We have seen these and other colors lately displayed in store windows, and we are inclined to the opinion that coal tar, or aniline colors are the coloring bases. We do not understand the manufacture. Perhaps some correspondent can give the information.

**J. E., of Mass.**—We were correct in our reply to B. M. R., of Va., that plumbago is a compound of carbon and iron. The purest ever yet discovered contains 98-95 per cent of carbon and about 1 per cent of iron, the remainder being made up of other impurities. Graphite or plumbago is formed or produced artificially in the slags of furnaces in the process of reducing iron ores. To your second question we reply that, when dissolved, common salt is muriate of soda, when dry it is chloride of sodium. This may seem paradoxical, but if we had room we could give you an explanation of its reactions under treatment which would be convincing.

**J. R., of Ohio.**—"Gas lime" is regarded as being a good and cheap fertilizer upon soils deficient in lime.

**J. F., of Ind.,** asks how to temper blacksmith's anvils. We never imagined there was any peculiar difficulty in it. We have known of a "new laid," or new faced anvil, hardened simply by heating to the proper degree then immersed in a tank of cold water, face up, so that two or three inches of water were above the face, and a constant stream of cold water from a hose pipe kept playing over the face.