Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Australian Timber---A Variety of Questions Asked

To the Editor of the Scientific American:

The lumber most used in this colony is that called Swan River mahogany, or, as the natives call it, Jarrah; this timber is most peculiar in almost every sense, and appears to be different from every other variety. It grows where you would think it almost impossible for anything to grow, namely, on the Darling range of hills, which range consists almost entirely of cemented gravel, commonly called ironstone. The higher the hill and the more stony the land, the larger and better the timber grows, the roots frequently raising up large masses of the above mentioned cemented gravel, several feet high, as the tree grows. The tree itself belongs to the *Eucalyptus* family, which predominates in all the Australian colonies, and is variously known as Stringy Bark, Iron Bark, Red White and Blue Gum, etc.

The timber of the Swan River mahogany is the next thing to everlasting; it is affected neither by fresh nor salt water, nor has any position on or in the ground any effect upon it; it is impervious to the white ant on land, and the *teredo navalis* in the sea, and no known insect will touch it. This is usually attributed to the peculiar geological formation of the land on which it grows. Houses and fences that were erected, and piles that were driven, when the colony was first settled, forty years ago, are as perfect now as when first put in position. It is largely used for jetties, piles, shipbuilding, railway sleepers, etc., but my great difficulty with it, and the point on which I am positive the SCIENTIFIC AMERICAN can give me good advice, is: How to prevent it from splitting? I believe it to be much more liable to split than most woods. It is generally agreed that the proper time to fell trees is in the winter, or when the tree is at rest. Now, in these Australian colonies, where there is, strictly speaking, no winter (frost and snow being unknown), all the trees are evergreens; the sap begins to flow and the tree to grow immediately after the rainy season sets in, which is about April or May. By June the tree is in full growth. September, October, and Novemberare considered the spring, and December, January, and February the summer months, consequently March, April, and May are considered the autumn. Now, if we follow the practice of other countries, we should fell the timber in the wet season, which corresponds to the winter of most timber countries, but we find that the tree is growing then in full vigor, consequently it may reasonably be inferred that this is not the time to fell.

The information sough is what is the proper time to fell? and what is the best method of treatment after the timber is felled? Should the bark be left on, to exclude the effects of the hot sun and dry winds, or should it be removed to allow the sap to escape? To keep the logs under cover as they are cut is impracticable, except at very great expense. The questions are: Should the logs be covered with sawdust, earth, etc., at the ends, or not? Should the timber be cut up as soon as felled, or remain as felled for a given time?

In practice, we find that if any portion of the heart is left in the scantlings, they almost invariably split and rend in all directions, as if there were some substance in them, fermenting and causing them to burst. Another peculiarity is that no matter how long the lumber may have been in use or seasoning, if it be broken into, it is almost as full of sap and will shrink as much as when first felled.

The specific weight of the timber is 80 pounds per cubic foot; and consequently it sinks in water. It grows at an altitude of from 200 to 2,000 feet above the level of the sea. There is not morethan half an inch of sap wood, and this is as durable as any part of the tree. The wood is most unequal in quality; some trees split ten times as much as others. So free is this timber at times that I have seen trees split from end to end, when they were felled, when full of sap. When a log is being broken down, or sawn down the center, I have seen it open at every stroke of the saw, as if the inside or heart wood were swelling or the outside wood contracting; so much so, that I have seen a log, when half sawn through, fly asunder. Professor Abel and others who have analyzed this wood attribute its peculiar properties to tannic acid.

Perth, Western Australia. WEST AUSTRALIAN.

Mechanical Equivalent for Zinc.

To the Editor of the Scientific American:

In your journal of the 24th of June, you assert that the "mechanical equivalent for twenty-two pounds of zinc, or the consumption of that quantity of zinc in such a manner that its total mechanical effect could be realized, would be a duty of two horse power maintained for nine hours." I am aware that it is the accepted formula of eminent scientists, and it is my purpose in this paper to prove that, as far as the researches of any public scientist are concerned, the world knows nothing about the mechanical equivalents of zinc, under combustion in a battery. Dr. Page, backed by eminent scientists, estimated three pounds of zinc to the horse power; Liebig, sixty four pounds.

Joule and Scoresby are capital experimentalists, and good orthodox authority, men who assert that the duty of electro-magnetic motors is as the quantity of zinc consumed in a given time. Well, they constructed such an engine, and found that one kind of battery consumed a third more zinc than another. A Daniell's battery uses seventy-five pounds, and a Grove's only fifty pounds, to do the same duty. Common sense might pertinently here enquire, if the different condition under which the zinc is consumed in the Grove battery gave it such an immense advantage over the Daniell, whether, in still other conditions, in some other battery, the quantity of zinc might not be still further reduced? The experiments of Joule and Scoresby, and also those of Jacobi and others, prove only that the work done is as the conditions under which the zinc is consumed, and not as to its quantity. This question of equivalents is, however, foreign to my purpose, and I will proceed to show, in a clear and unmistakable manner, that even three pounds of zinc is not requisite to the production of one horse power per day of twelve hours.

An electro-magnet, with limbs (one fifth of the area of the limb should be bored out) eight inches in length, and two inches diameter, bound with 1,100 feet of No. 14 wire, will lift fifty pounds at one tenth inch, under the action of four Bunsen eight inch cells. One hundred and twenty of these magnets, so arranged that their coils connect with a commutator making one revolution per second, will raise one hundred and twenty times fifty pounds one tenth inch high per minute, or 360,000 pounds one tenth inch high per minute, which, reduced to foot pounds, gives us a duty of 3,000, just one eleventh part of a horse power. Now, let us find the quantity of zinc consumed in the above duty. Four eight inch zincs, under the resistance of 1,100 feet No. 14 wire, will, in twelve hours lose just three ounces of their weight. We, therefore, have a dynamical value of one tenth of a horse power for a twelve hours, at a cost of three ounces of zinc, or one horse power for thirty-three ounces of zinc, three ounces less than three pounds. If it be alleged that such an arrangement of magnets is impractical for the continuation of motion, I reply that I am not now discussing the application of battery forces to purposes of motive power, but showing that the potential value of the battery has been extremely underrated.

In a future communication, I will as clearly show that the battery cost has had nothing to do with the non-success of electro-magnetic motors; that if the electric currents were generated absolutely costless, they never would have been more than a large toy. H. M. PAINE.

Peter Cooper's Success in Life.

To the Editor of the Scientific American:

I wish to say a word in relation to an expression in Mr. Peter Cooper's address and your comments.

No person not personally acquainted with Mr. Cooper, can, I think, regard him more highly than myself. The name of Peter Cooper can never be adorned or honored by any title or appendage. Of itself it stands alone, the most honorable name in the land.

But you say, "he shows how to earn a fortune," etc., and quote his words, that "whatever of wealth I have achieved has been due primarily to habits of patient industry."

Now, while the value of these virtues cannot be overestimated, it is a fact, nevertheless, that very many men have been as earnest, as industrious, as economical, and as patient as Mr. Cooper, but have no , like him, won a "fortune." Beside possessing and practising these virtues, he has been endowed with a keen business sagacity, a quality entirely independent of the former. He has also been fortunate; that is to say, circumstances over which he had no control, have favored him. The necessary elements of financial success include much more than "patient industry, integrity, and economy;" and it is the knowledge of this fact which leads so many to resort to questionable practices to make a "fortune;" seeing as they do, that while the practice of these virtues will get a man a "living," it will not, of necessity, make him "rich;" and also seeing numerous examples where large fortunes have been made by corruption and deception.

"Shunning intemperance, and practicing rigid economy," have been among the means by which this noble man has won the proud position which he occupies; but they are not the only on s. In a case like this, I think no other statement but the exact truth, is safe in the long run, and therefore it is that I wish to suggest that young men should understand that while the practice of these virtues will secure to them that which is more valuable than gold, it will not necessarily bring them the pecuniary success which has attended Mr. Cooper.

BETA.

How to Look at the Sun through a Telescope.

To the Editor of the Scientific American:

Take a good telescope, and cover the larger glass with a paper cover similar to the brass cover used to protect the glass. Pierce this paper cover with innumerable small needle holes, or with a ring of small holes. Unprotected, you cannot look at the sun, but with this protection, you will see the sun as a large white disk—sometimes a full disk, at others as a phase—accompanied by two sets of colored rings, which assume, during the different hours of the day, different combinations.

If you observe the sun at sunset, neither of those rings or disks appears, but the sun vibrates and follows a straight linear horizontal or vertical course

Happening to look through the glass in the evening, at a stockade of posts some six inches apart, those posts appeared some six feet apart. If you puncture a straight line on paper with needle holes, and look at two posts of equal hight, using both your eyes, one post will appear much shorter than the other.

By using an opera glass, no rings appear; but the sun seems to move around a ring, if we provide both glasses with the pierced paper covers mentioned.

Why does the sun show different phases and rings at different hours, and why does it roll or drop at near sunset? Also, why does it, when looked at through the glass, set some five minutes sooner than when seen without the glass?

Missouri, Montana. A. H.

Paine's Perpetual Motion.

"*Qui prouve trop ne prouve rien.*"

To the Editor of the Scientific American:

The object of this communication is to prove that if H. M. Paine's assertion (see his letter, page 404, No. 26, last volume) that the mechanical equivalent of the electricity, developed by the oxidation of 3 grains of zinc, is equivalent to 67,000,000 foot pounds, be correct, he has found perpetual motion, and even more than that, and that it is no use for him to deny this.

It is known to all electricians that we possess the means of developing electric currents by purely mechanical power; for instance, the old friction machine, the modern Holz induction machine, and the different kinds of magneto-electric apparatus first made by Pixis, Clarke, Ettinghausen, and since considerably improved by Siemens, Stoerer, and others. The latter kind have the advantage of giving currents of great quantity, even superseding batteries in telegraphing, while the first named give only intensity. The magneto electric machines, therefore, give currents similar to those of the ordinary batteries of zinc and acids; this has been fully established by the practical results obtained by the large machines of this day. These results are of three kinds: First, in regard to the production of heat and light; second, in regard to chemical action; and third, in regard to electro magnetic attraction.

1st. PRODUCTION OF HEAT AND LIGHT.—A beacon at South Foreland, England, is illuminated by means of a magneto-electric machine, rotated by a small steam engine of two horse power. It produces a light equal to that of fifty Bunsen cells, 6 by 4 in. plates, consuming each half an ounce of zinc per hour, with the necessary acids.

A few years ago, the Place du Carrousel and the Jardin des Tuileries in Paris, were illuminated at night with three electric lights (Dubosq's lamps) produced by a magneto-electric machine driven by a steam engine of four horse power. Its cost was half that of common street gas, while the equivalent battery, of fifty large Bunsen cups, consuming three pounds of zinc, three pounds of sulphuric, and two pounds of nitric acid per hour, would cost considerably more.

Quite recently a French government vessel, provided with such an apparatus, exhibited in our harbor an electric light, produced by steam power; it was placed at the bow of the vessel, in place of the ordinary lanterns, on which it was an immense improvement.

2d. PRODUCTION OF CHEMICAL ACTION.—Some years ago a company was formed in New York by a certain Mr. Shephard, to electroplate, by means of a magneto-electric machine driven by steam power. It was seen in operation at the fairs, and fine specimens of electroplating and electrotyping were produced. It was based on the fact that it is economical to replace the consumption of zinc in the battery, by that of the cheaper coal in the furnace; but the company was, financially, mismanaged, as is so often the case in companies. Another trouble was, that the machines were constructed in total ignorance of certain peculiar laws of magneto-electric induction, and manipulated by persons who could by no means be called electrician , of which I satisfied myself by personal investigation.

A permanent success was attained at College Point, L. I., at the india rubber works of Mr. Poppenhusen, who had several magneto-electric machines, constructed after the patented plans of Mr. Beardslee, running by steam power; he had for many years a successful electroplating establishment in operation, or rather he rented out electric currents to an electroplating firm of New York city, in the same way as it is customary to rent out steam power. I visited this establishment often, and a great saving of expense, by the substitution of steam power for the consumption of zinc and acids, was the result. I believe that the process is no more in use at present, as an ordinary steam engine gives much more battery power than the largest electroplating establishment can make use of; perhaps also for reason of the difficulty of subdividing a powerful current properly between the different electroplating troughs, for which purpose different smaller zinc batteries are more easily adjusted.

3d. PRODUCTION OF MAGNETIC ATTRACTION.—In regard to the magnetic force of the thus produced electric currents, I can state that Mr. Beardslee occupied himself with manufacturing magnetic hammers, horseshoe magnets, magnetic toys, also magneto-electric rotary machines, and field telegraphs, in all of which it was necessary to obtain a strong magnetic power; and that all of this, he obtained in immense quantities from colossal soft iron systems, surrounded by coils, and solely charged by the currents produced in the magneto-electric machine by the power of the steam engine rotating the same. He saved in this way several hundred times the 3 grains of zinc Mr. Paine speaks of, while employing only about the hundredth part of the 67,000,000 foot pounds which Mr Paine asserts that he can obtain from the 3 grains of zinc.

I have avoided theoretical reasonings for the simple reason that, according to Mr. Paine, the theory is all wrong; and I confined myself to purely practical results, to stubborn facts; and among those bearing especially on our subject, I selected only a few obtained in our city and neighborhood. They may be multiplied *ad infinitum*, and they all show that, independent of any theories, we may, by using mechanical power, develop electric currents equivalent, to all intents and purposes, to the currents developed by the consumption of zinc. These machines are coming more and more in use, one of the latest, that of Wilde, which was an improvement on Ladd's, obtained a prize at the Paris Exposition of 1867; while S. Marcus, in Vienna, now manufactures magneto-electric machines equal to a Bunsen cell consuming 500 grains of zinc per hour, and in which the current is developed by the power of a man only. A large magneto-electric machine

needs not even to be of the most improved kind in order to produce, by means of a single horse power, not only the same but much stronger currents than those which Mr. Paine asserts to be sufficient "to drive the largest ship afloat."

I propose, therefore, that Mr. Paine will use one thousand part of his 67,000,000 foot pounds obtained from the 3 grains of zinc, or 67,000 foot pounds (if used in one minute it is nearly two horse power), and employ this to run some large magneto-electric machine, producing thus a current equivalent to that obtained by the consumption of three pounds, or nearly 23,000 grains of zinc per hour, and therefore not only equal but much stronger than that originally obtained from merely 3 grains of zinc, which then may afterward be dispensed with; the stronger current thus obtained again acting on Paine's electric engine will cause it to run much faster than could be done with the 3 grains of zinc used at the starting; this faster motion again acting on the magneto-electric machine will, of course, cause a stronger current (the strength of the currents, as well known, increases in these machines with the velocity of rotation), this stronger current will again cause Paine's electro-motor to run faster, and so on, and so on; consequently he has not only obtained perpetual motion—no, "instead of this miserable small result," he will have obtained a motion possessing in itself the elements of a creative increase, so as finally to obtain "a velocity only limited by the strength of the frame of the" machine.

Mr. Paine says: "I am no tyro." The public is aware of this; but when he adds: "I am the peer of any authority you may quote," it gives a suspicion that after all he is not thoroughly acquainted with the investigations in electro-magnetism of Casselman, Bunsen, Joule, Wiedemann, and, above all, Dubb, the labors of all of whom are immense, and of much more special importance to the subject in question (electromagnetic motive power) than those of the authorities he quotes. Their investigations relate chiefly to the subject of the correlation of forces in general. Only Faraday stands among them as a great discoverer in electrical science. I ask: What is proved by the fact that Mr. Paine calls himself the peer of a man like Faraday? If it does prove anything at all, it surely does not prove his assertions. Drive your large ship, Mr. Paine, and leave it to others to call you "the peer of any man of science;" or, what is better still (as it would in a short time make you richer than Commodore Vanderbilt or A. T. Stewart), I advise you, if you are so sure of success, to manufacture small electro-magnetic engines, producing 67,000,000 foot pounds per day, at the expense of three grains of zinc; this would be equivalent to about 20 horse power, at an expense of two ounces of zinc per year costing, with the acids, from two to three cents per year, in place of about $1,000 for coal, and more than $1,000 for labor, as is now the case; do this, Mr. Paine, such machines would sell, drive all steam engines out of the market, and your fortune is made, which is much better than fighting the old theory of the conservation of forces, or of bothering yourself and the public with blowing about what you are going to do.

I recommend to all others interested in this subject to study the labors of Casselman in regard to the unit of chemical intensity of the galvanic current, then the subsequent labor of Weber in regard to the unit of the absolute electro-magnetic effect as depending from the unit of chemical intensity, and the practical investigations of Dubb; when then applying all these to the laws of electro-dynamics, discovered long before by Ampère, the matter becomes settled. I came long ago to a final conviction in regard to the subject, after having studied it practically as well as theoretically, from the year 1837 (I had already, in 1839, an electromag netic motor in operation, turning my lathe).

Mr. Paine says the gentlemen associated with him in this enterprise suppose that they are "fully competent to judge of the facts in the premises," and that they "are men that you nor I cannot mislead."

Well, in the recent Franco-German war, Napoleon III., his generals, and the French people at their back, were satisfied that they were fully competent to judge for themselves, that they could whip the Prussians, and would never have abandoned the idea without practical trial; and I believe that Mr. Paine and "the gentlemen associated with him" will have to go through the ordeal of a practical trial also, before their eyes can be opened to the truth. The only difference between them and the French is, that the latter had some chance of success, as the results of war depend, to a certain extent, on luck or good fortune, while for obtaining 67,000,000 foot pounds out of only 3 grains of zinc there is not a ghost of a chance.

The unfortunate thing in all this and similar cases is that the denial of an anticipated success does not pay, while the stubborn assertion of an ultimate triumph, may be made to pay, when a man is no tyro, and only knows how.

New York city. P. H. VANDER WEYDE, M.D.

Humboldt.

Alexander von Humboldt was the corypheus of physical science and a man of universal culture; a man also, of "society," and of courtly life. He kept up his intellectual work to the last, laboring mostly while the world around him slept. It was his most substantial life. He lived about ninety years, and crowded into them centuries of the life and work of ordinary men. On the 3d of May, 1859, the journals of Berlin announced that "Alexander von Humboldt has been confined to his bed the last twelve days; his strength has been gradually failing; his mind retains all its clearness." In three days more as the sunlight poured into his window, he exclaimed, "How grand those rays! they seem to beckon earth to heaven!" and died. For twenty years or more, the time in which men are usually said to be beyond the "allotted period of life," and during which they usually mentally decay from day to day, he was writing the greatest work of his life, the greatest of his generation, the "Cosmos." He laid down his pen, his task splendidly finished, but a short time before he laid himself down to die. The "Cosmos" kept him alive, mentally and physically.

Brain work is sanitary work. Nay, it is a necessary condition, more or less of it, of health in advanced life, a necessary preventive of cerebral decay. Not only moral purification, but growth in intelligence, in wisdom, is the divinely appointed result of human life as a probation; and nature deals out her penalties for the neglect of the latter, as well as for the neglect of the former.—*Abel Stevens, in Hearth and Home.*

Dream Workers.

Those cases in which the brain is hard at work during sleep, instead of being totally oblivious of everything, may be called either dreaming or somnambulism, according to the mode in which the activity displays itself. Many of them are full of interest. Some men have done really hard mental work while asleep. Condorcet finished a train of calculations in his sleep which had much puzzled him during the day. In 1856, a collegian noticed the peculiarities of a fellow student who was rather stupid than otherwise during his waking hours, but who got through some excellent work in geometry and algebra during sleep. Condillac and Franklin both worked correctly during some of their sleeping hours.

The work done partakes in many cases more of the nature of imaginative composition than of scientific calculation. Thus, a stanza of excellent verse is in print, which Sir John Herschel is said to have composed while asleep, and to have recollected when he awoke. Goethe often set down on paper during the day, thoughts and ideas which had presen ed themselves to him during sleep on the preceding night. A gentleman one night dreamed that he was playing an entirely new game of cards with three friends; when he awoke, the structure and rules of the new game, as created in the dream, came one by one into his memory; and he found them so ingenious that he afterwards frequently played the game. Coleridge is said to have composed his fragment of Kubla Khan during sleep. He had one evening been reading Purchas's Pilgrim; some of the romantic incidents struck his fancy; he went to sleep, and his busy brain composed Kubla Khan. When he awoke in the morning he wrote out what his mind had invented in sleep, until interrupted by a visitor, with whom he conversed for an hour on business matters; but alas! he could never again recall the thread of the story, and Kubla Khan remains a fragment. Doctor Good mentions the case of a gentleman who in his sleep composed an ode in six stanzas, and set it to music. Tartini, the celebrated Italian violinist, one night dreamed that the devil appeared to him, challenged him to a trial of skill on the fiddle and played a pi ce wonderful for its beauty and difficulty; when Tartini woke, he could not remember the exact notes, but he could reproduce the general character of the music, which he did, in a composition ever since known as the Devil's Sonata. Lord Thurlow, when a youth at college, found himself one evening unable to finish a piece of Latin composition which he had undertaken; he went to bed full of the the subject, fell asleep, finished his Latin in his sleep, remembered it next morning, and was complimented on the felicitous form which it presented.

Still more curious, however, are those instances in which the sleeper, after composing or speculating, gets up in a state of somnambulism, writes the words on paper, goes to bed and to sleep again, and knows nothing about it when he wakes. Such cases, the authenticity of which is beyond dispute, point to an activity of muscles as well as of brain, and to a correctness of movement which is marvellous when we consider that the eyes are generally closed under these circumstances.

Dr. W. B. Carpenter mentions the case of a somnambulist who sat down and wrote with the utmost regularity and uniformity. "Not only were the lines well written, and at the popular distances, but the i's were dotted and the t's crossed; and in one instance the writer went back half a line to make a correction, crossing off a word, and writing another above it, with as much caution as if he had been guided by vision." The young collegian, adverted to in a former paragraph, got out of bed in his sleep, lit a candle, sat down to a table, wrote his geometry and algebra, extinguished the light, and went to bed again; the lighting of the candle was a mere effect of habit, for his eyes were shut and he was really not awake. About the begining of the present century a banker at Amsterdam requested Professor van Swinden to solve for him a calculation of a peculiar and difficult kind. The professor tried it, failed, and submitted to ten of his pupils as a good mathematical exercise. One of them, after two or three days work at it, went to bed one night with his mind full of the subject, and fell asleep. On waking in the morning he was astonished to find on his table sheets of paper containing the full working out of the problem in his own handwriting; he had got up in the night and done it, in his sleep and in the dark. The first French Encyclopædia narrated the case of a young ecclesiastic at Bordeaux who was in the habit of getting out of bed in his sleep, going to a table, taking writing materials, and writing a sermon. He was often watched while doing this, and an opaque screen was cautiously placed between his eyes and the paper; but he wrote on just the same. One example of mental discrimination displayed by him was very remarkable, showing how strangely awake even the reasoning faculties may be during somnambulistic sleep. He wrote the three French words, "ce divin enfant;" then changed the "divin" into "adorable;" then recognized that "ce" would not suit before an adjective commencing with a vowel; and finally changed it into "cet." On another occasion the paper on which he was writing was taken away and another sheet substituted; but he immediately perceived the change. On a third occasion he was writing music, with words underneath. The words were in rather too large a character, insomuch that the respective syllables did not stand under their proper notes. He perceived the error, blotted out the part, and wrote it carefully again; and all this without real vision, such as we ordinarily understand by the term.

The Irrational House.

A house is as much a necessary of life as a loaf; yet this article of necessity has been lately raised to a fancy price by the trade conspiracies of the building operatives—not so much by their legitimate strikes for high wages as by their conspiring never to do for any amount of wages an honest day's work—and the fancy price thus created, strikes the householder first in the form of rent. But this excessive rent, although it is an outgoing, is taxed as income; its figure is made the basis of all the imperial and parochial exactions that crush the householder. One of these is singularly unfair; I mean "the inhabited house duty." What is this but the property tax rebaptized and levied over again, but from the wrong person? The property tax is a percentage on the rent, levied in good faith, from the person whom the rent enables to pay that percentage; but the inhabited house duty, is a similar percentage on the rent, levied, under the disguise of another name, from him whom the rent disables.

In London the householder constantly builds and improves the freehold: instantly parochial spies raise his rates. He has employed labor, and so far counterbalanced pauperism; at the end of his lease the house will bear a heavier burden; but these heartless extortioners cannot wait the end of the lease; they bleed the poor wretch directly for improving parochial property at his own expense. At the end of his lease the rent is raised by the landlord on account of these taxed improvements, and the tenant turned out with a heavier grievance than the Irish farmer; yet he does not tumble his landlord, nor even a brace of vestrymen. The improving tenant, while awaiting the punishment of virtue, spends twenty times as much money in pipes as the water companies do, yet he has to pay them for water a price so enormous that they ought to bring it into his cisterns, and indeed into his mouth, for the money.

He pays through the nose for gas.

He bleeds for the vices of the working classes; since in our wealthy cities nine tenths of the pauperism is simply waste and inebrity. He often pays temporary relief to an improvident workman, whose annual income exceeds his own, but who will never put by a shilling for a slack time.

In short, the respectable householder of moderate means is so ground down and oppressed that, to my knowledge, he is on the road to despondency and ripening for a revolution

Now, I can hold him out no hope of relief from existing taxation; but his intolerable burden can be lightened by oth er means; the simplest is to keep down his bill for repairs and decorations, which at present is made monstrous by original misconstruction.

The irrational house is an animal with its mouth always open.

This need not be. It arises from causes most of which are removable—namely, 1st, from unscientific construction; 2nd, plaster ceilings; the want of provision for partial wear; 4th, the abuse of paint; 5th, hidden work.

Under all these heads I have already given examples. I will add another under head 3. The dado or skirting board is to keep furniture from marking the wall; but it is laid down only one inch thick, whereas the top of a chair overlaps the bottom an inch and a half. This the builders do not or will not observe, so every year in London fifty thousand rooms are spoiled by the marks of c iair backs on the walls, and the owners driven to the expense of painting or paper ing sixty square yards to clean a space that is less than a square foot, but fatal to the appearance of the room.

Under head 4 let me observe that God's woods are all very beautiful; that only fools are wiser than God Almighty; that varnish shows up the beauty of those woods, and adds a gloss; and that house paint hides their beauty. Paint holds dirt and does not wash well; varnish does. Paint can only be mixed by a workman. Varnish is sold fit to put on. Paint soon requires revival, and the old paint must be rubbed off at a great expense, and two new coats put on. Varnish stands good for years, and when it requires revival, little more is necessary than simple cleaning, and one fresh coat, which a servant or any body can lay on. 5. Hidden work is sure to be bad work, and so need repairs, especially in a roof, that sore tried part; and the repairs are the more expensive that the weak place has to be groped for.

I have now, I trust, said enough to awaken a few householders from the lethargy of despair, and to set them thinking a little, and organizing a defense against the extraordinary mixture of stupidity and low instinctive trade cunning of which they are the victims; for a gentleman's blunders hurt himself, but a tradesman's blunders always hurt his customer; and this is singularly true of builders' blunders; they all tend one way—to compel the house holder to be sending for the builder, to grope for his hidden work, or botch his bad work, or clean his unscientific windows, or whitewash his idiotic ceilings, or rub his nasty unguents off God's beautiful wood, and then put some more nasty odoriferous unguents on, or put cowls on his illcleaned chimneys; or, in short, to repair his countless blunders at the expense of his customer.

Independently of the murderous and constant expense, the bare entrance into a modest household of that loose, lazy, drunken, dishonest personage who has the impudence to call himself "the British workman," though he never did half a day's real work at a stretch in all his life, is a serious calamity to be averted by every lawful means.—*Charles Reade.*

Improved King Bolt for Carriages.

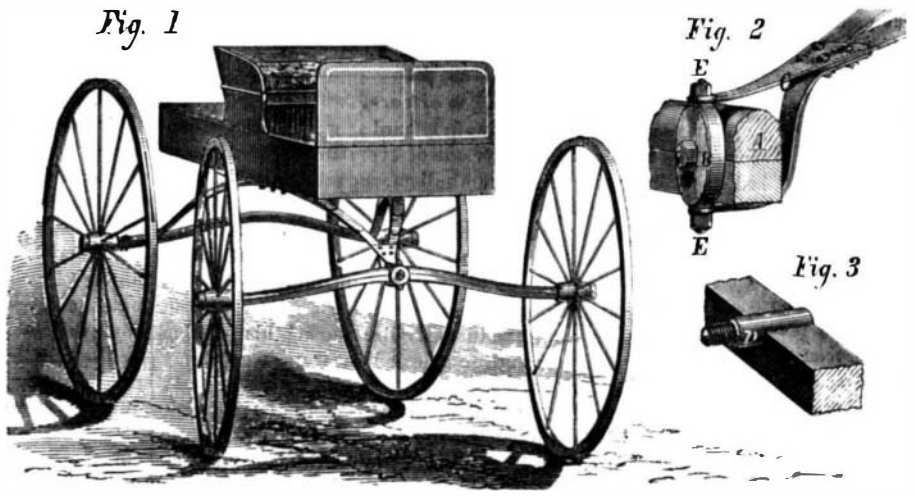
Our engraving shows an improved king bolt for carriages. By its use, the necessity for a fifth wheel, and many other attachments, is entirely obviated.

Fig. 1 is a perspective view of a buggy wagon with this improvement attached. Fig. 2 is a vertical cross section through the middle of the axle and the bolt; and Fig. 3 is a detail rear view of the middle of the axle.

In Fig. 2 the improvement is shown most distinctly. The body of the wagon rests upon two elliptic springs, placed lengthwise under the box, their front ends being brought together and joined, as shown at C, Fig. 2, forming what might be called a spring perch.

A bent piece is attached to the joined ends of the springs, and brought under the axle as shown. The bifurcations of the perch thus formed are pivoted to a plate, B, as shown at E. The plate, B, is also pivoted to the axle, A, as shown in Figs. 2 and 3. This not only allows of the horizontal radial motion of the axle in turning or cramping the wagon, but also permits a vertical motion of the axle on the pivot, D.

This improvement was patented through through the Scientific American Patent Agency, March 29, 1870, by William Clark. Address, for further information, Clark Pivot King Bolt Co., Johnsville, N. Y.



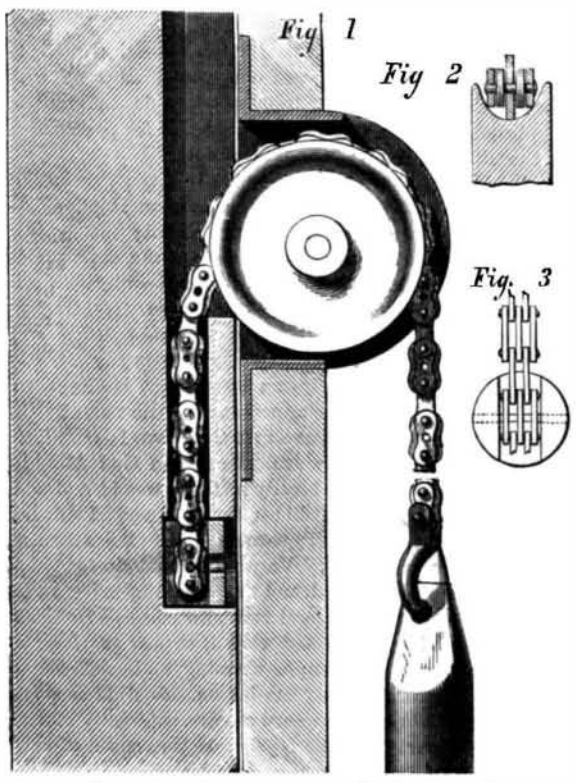
CLARK'S KING BOLT FOR CARRIAGES.

MAGRATH'S CHAIN FOR HANGING SASHES.

Every housekeeper knows the trouble attending the use of hempcord for suspending weights of sashes. A chain, as a substitute for the ordinary cord, has recently been patented, which is designed to obviate the trouble arising from the constant breaking of the latter. The chain can be applied to any window, without change in any of the parts, it being so made as to run smoothly on the ordinary grooved pulley. For heavy windows it is specially applicable.

Fig. 1 is a view of a sash with chain and weight attached. The peculiar construction of the chain is shown in the detailed engravings, Figs. 2 and 3. As will be seen, every alternate link is composed of three blanks, punched from sheet metal. Each blank has a hole through the center, as well as at the extremities. The object of this is to enable the chain to be cut off at any required length, and be readily fastened, at one end to the sash and at the other end to the weight, by the insertion of a pin or rivet.

The triple blank links are connected by links made of two blanks, as shown. The middle blank of each triple link is made wider than the two outside ones, as shown in Fig. 3. This enables the link to adapt itself to the curvature of the groove in the pulley, as shown.



In attaching this chain to the sash, the latter is grooved or recessed along the edge, as shown in Fig. 1, so as to receive the chain. At the lower end of the groove is formed a vertical hole, which extends from the open groove down to a hole bored in the edge of the sash at right angles thereto. A metal plug or stop, of a size to fit the last named hole, is inserted therein. This stop is recessed on its face to receive the links, as shown in Fig. 2. The chain is secured to the stop by a rivet or pin, as shown in Fig. 1. The weight is attached to the end of the chain by a hook.

Patented, March 21, 1871, by Michael Magrath, whom address for further information, 74 Irving Place, N. Y.

Steam Nut Crackers.

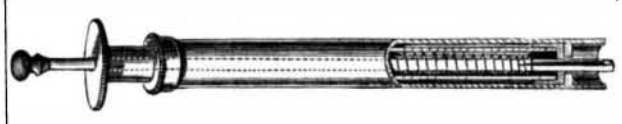
In the manufacture of palm oil, it has been very desirable to get rid of the shells which envelop the kernels in a speedy and effective manner. An English inventor proposes to do this by an apparatus of his devising, as follows:

The nuts are raised up to the second floor of the building by means of hoisting apparatus, and are fed into a hopper, which delivers them into a shake or spout, the bottom of which is perforated to allow parts of the husks or other foreign matters to escape. The spout delivers the nuts into the upper end of a revolving perforated cylinder, which is placed in a slanting position. The nuts in passing down this cylinder are agitated to remove portions of the husks and other foreign matters, which are carried off by the shoot. The nuts drop from the end of the cylinder into a hopper, which delivers them to the machinery by which they are broken.

This machinery consists of a drum with blades or projections on its circumference. This drum revolves at a high velocity in a casing, and the shells are broken without breaking the kernels by the rapid action of the blades on the revolving drum striking the nuts. The broken shells and kernels discharged by the centrifugal force of the drum are delivered into the upper end of a perforated cylinder, which is also placed in a slanting position, so that in revolving it carries the shell and kernels to the lower end, whence they fall into a separating cistern. The small particles of shell and husk drop through the perforations of the cylinder into a discharge shoot. The cistern contains a solution of common salt and water, or any other solution the specific gravity of which is rather greater than that of water, in order that the kernels may float on the top of the solution, while the shells sink and drop on to an endless belt or creeper, which in traveling along conveys the broken shells towards and into the right hand end of the cistern, from whence they are discharged continuously by a spout. The outlet from the cistern is provided with a sliding valve, the position of which can be regulated by a lever. The lower part of the spout consists of open rods or a perforated plate, through which the solution escaping from the cistern with the broken shells is discharged on to the floor or into a suitable receptacle.

ARTIFICIAL LEECH.

This instrument is the invention of Frederick Wolff, of New York city. It consists of a lancet, or puncturing device, and a suction piston, the lancet acting independently of the



piston in making its puncture, and then both the lancet and piston being withdrawn, the body of the instrument is filled with blood. The instrument operates precisely on the general principle of first puncturing and then sucking, employed by the natural leech.

Disease and Carelessness.

There can be no doubt that carelessness is the origin of most diseases. Medical men also hold that foolish people who follow their own whims have hardly a chance of recovery when visited by serious disease. Nine tenths of the doctor's work would be done if people were only consistently prudent and cautious. Only it is so hard to be habitually cautious. On abundant occasions a man may be most elaborately prudent, and then, to his utter astonishment, he dangerously imperils his health by some startling impropriety. When he has used every imaginable pains, he is always amenable to the force of accident. There is another plausible theory, antagonistic to the one we have named, to the effect that every man has the seeds of some particular disease in his constitution, and some trifling accident will come, sooner or later, which will have for him the same effect as a match falling upon gunpowder.

Medical men explain this on theories of constitutional tendencies, or of some poison latent in the system. The fatal accident to one man is the merest accident for another. Two men while walking get well soaked by the rain. One man shakes off the water pretty much as a dog or a duck might do, and rather enjoys his shower bath than not. The other man is taken ill of inflammation of the lungs, and probably dies. The doctors cannot explain the different issues, and they would also be very much puzzled to give a satisfactory account of the phenomenon itself. They will, indeed, generally explain theories more or less plausible, and practice has been built upon theory, and theory has, no doubt, sacrificed a number of lives. Yet medicine must have its dogmatic system, and without it medicine becomes little better than empiricism.

COMMON salt is recommended for the extermination of ants.

Snbterranean Electrical Disturbances.

A few minutes before and after the earthquakes of the 17th March last, says *Nature*, powerful positive electrical currents were rushing towards England through the two Anglo-American telegraph cables, which are broken near Trinity Bay, Newfoundland. Mr. C. F. Varley, C.E., who informed us of the fact, broaches the novel speculation that some earthquakes may be due to subterranean lightning. He imagines that as the hot center of the earth is approached, a layer of hot dried rock may be found which is an insulator, while the red hot mass lower down is a conductor. If this conjecture be true—and there is plausibility in it—then the world itself is an enormous Leyden jar, which only requires charging to a very moderate degree to be equal to the production of terrific explosive discharges.

The French Atlantic cable was disturbed at the same time, and so were many of the English land lines, but the only observations as to the direction of the current were made by means of the Anglo-American telegraph cables.

A number of Mr. Varley's charts about earth currents were published in the Government Blue Book of 1859–60, showing that the direction of these currents across England was in a very notable degree determined by the contour of the coast, and that the same auroral discharges would often produce currents at right angles to each other in direction, in different parts of Britain.

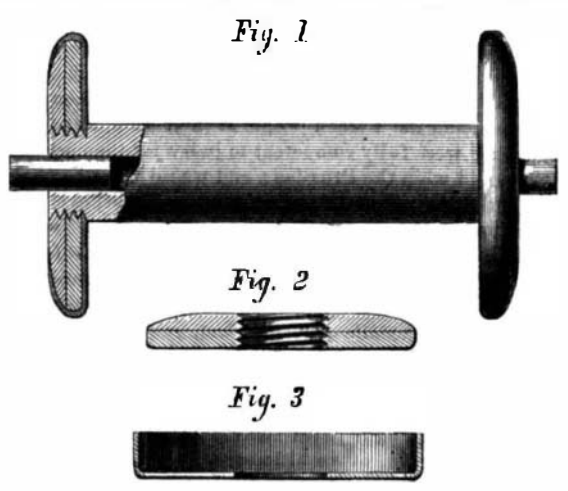
Necessary Rules for Sleep.

There is no fact more clearly established in the physiology of man than this, that the brain expends its energies and itself during the hours of wakefulness, and that these are recuperated during sleep. If the recuperation does not equal the expenditure, the brain withers—this is insanity. Thus it is that, in early English history, persons who were condemned to death by being prevented from sleeping, always died raving maniacs; thus it is also that those who are starved to death become insane, the brain is not nourished and they cannot sleep.

The practical inferences are three: 1st. Those who think most, who do the most brain work, require the most sleep. 2d. The time "saved" from necessary sleep is infallibly destructive to mind, body, and estate. 3d. Give yourself, your children, your servants, give all that are under you, the fullest amount of sleep they will take, by compelling them to go to bed at some regular, early hour, and to rise in the morning the moment they wake; and within a fortnight, Nature, with almost the regularity of the rising sun, will unloose the bonds of sleep the moment enough repose has been secured for the wants of the system. This is the only safe and efficient rule; and as to the question how much sleep any one requires, each must be a rule for himself—great Nature will never fail to write it out to the observer under the regulation just given.

METALLIC LINED SPOOL HEAD.

The object of this improvement is to overcome the difficulties experienced in the use of the ordinary wood spool heads, both for cotton yarn, and woolen roving on jack spools. The wood heads, after being used a short time, become rough on the edge, and this roughness catches and breaks the yarn, causing much unnecessary stopping of machinery. On jack



spools, much waste is made by the outside strands of the roving adhering to the surface of the head, and it is frequently the case that the strands next to the head have to be run off, and cannot be spun, making considerable waste which would be saved by the use of a smooth head, such as this improvement offers. It consists in covering the inner surface and outer edge of each head with sheet metal, which is firmly pressed on with dies, binding the two thicknesses of wood firmly together, preventing them from breaking and the edges from splintering, making a strong and durable spool, and giving at all times a perfectly smooth edge and surface for the yarn to run from, saving much of the breaking of the yarn, and enabling the machines to do more and better work. They have, we are informed, been in successful use nearly one year, by some of the first manufacturers in the country, and have given entire satisfaction. Patented May 10, 1870. All communications, either from manufacturers or spool makers, should be addressed to Stillman & Carmichel, Westerly, R. I.