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## THE SCIENTIFIC AMERICAN SUPPLEMENT,

 NO. 77,For the Week ending June 23, 1877.







F. ELECTRICITY HIGHT, HEAT, sounD ETC. Electricty in the


- ATRRONOMY-Structure and Orligin of Meteorites; explaning the


BLUE GLASS BLINDNESS
解 glass absurdity have hitherto had a monopoly of wild theo ries on that subject, of which they have invented no lack, to mect the various objections raised, but here is a bluc glass skeptic gravely making assertions fully as baseless as the errors which they are aimed to controvert. The skeptic in question is uone other than our staid contemporary the Eicning Post, of this city: which, in its anxiety to warn it readers against an apparent danger inherent in bluc glass, perpetrates the following:
"That blue glass has any curative properties remains yet
to be proved: but that inlass of that color will concentre to be proved; but that glass of that color will concentrate
the rays of the sun, in a lesser derece, as the common burn ing glass does, was known lee tere tieneral Pleasonton's book ing glass docs,
ias printed and made so much of by the newspapers. gentleman of Brooklyn suffering from weakness of sight
was recently led ly thic advice of well meaning friends to use spectacles of ilue glass, such as certian opticians are
selling just now. The result was thit his cyes selhng just now. The result was that his cyes, already to
weak to be used much in ordinary circumstances, were exposed to a terrible glare and heat, which in less than a week Costirely destroned cd the e ecesight of the sufferer. IIe is now
totally blind. This is a fact, ind the rentleman would doubt totally blind. This is a fact, and the yentleman would doubt.
l less be clad to have other sufferers from weak cyes know less be glad to have other sufferers from weak eyes know
of his case and draw a moral therefrom. $\Lambda$ nother similar
 worth bearing in mind that the only property of blue glas that has been proved is its power to concentrate the rays of ilie sun anc: produce extraordinary heat.
Neither glass stained blue nor glass of any other colo concentrates the rays of the sun as the common burning glass does." $\Lambda$ lens, from the curvature of its surfitue or surfaces, has the property of causing the luminous rays which traverse it either to converge or to diverge. By a burning glass or double convex lens, parallel rays are conveyed to a focus. If bluc glass is made in similar form, it will act similarly; otherwise it will not.
But, as we have repeatedly pointed out, blue glass cuts off a very large proportion of the luminous rays, and the light it transmits is no:hin:g but modified sunlight, or ratlecr sun l.eslit shaded and reduced in intensity: so that, so far from
blue class producing a terrible "s blue glass producing a terrible "glare," it transmits an ex cecdingly mild light. This property was utilized by plo tographers long ago in order to relieve the cyes of thei sitters; while blue spectacles have been worn by
people almost ever since spectacles were contrived.
It is not necessary to discuss the question of whether blue glass becomes hotter through absorption than clear grass, in the absence of any authentic experiments on the subject It is well settled that, as color teaches us nothing regarding the radiation and absorption of non-luminous licat, any conclusions as to its influence may well be wholly delusive. The absorption tleper:d on the particular ahsorptive power
of the coloring substance, and not on its hue. Clear glas is opaque to a considerable degrec to heat rays, and therefore through absorbing them becomes warmed. The only ques tion, then, is whether the coloring matter introduced is capa blo of producing increased absorption sufficient to render the glass hot, and so to cause it to injure the delicate outer portion of the cye through its proximity thercto. In the ab sence of any data determining this point, no positive opinion
can be formed; but it secms probable that the resulting incan be formed; but it secms probable that the resulting in intense to indicate its cause to the wearer of the glasses and induce him to discerre them before the week had clapsed during which the lesion became permanently extended to
the optic nerve. It should be understood, however, that, if the optic nerve. It should be understood, however, that, if bluc glass spectacles are injurious, it is because of the conslitution of the glass, and it docs not

## DRUNK OR DISEASED ?

The sciences of law and medicine are now in direct eon flict on the question of the responsibility of the inebriate. The law holds a drunken person answerable for his acts, and rcfuses to accept intoxication as a plea in extenuation. On
the other hand, one of the highest medical the other hand, one of the highest medical authorities, who has made drunkenness the subject of prolonged and careful study, Dr. D. G. Dodge, late Superintendent of the New York State Incbriate $\Lambda$ sylum in Binghamton, says that "in-
ebricty is a condition of the system exhibiting a class of ebricty is a condition of the system exhibiting a class of
svmptoms resulting from a long continucd and cxcessive use of alcoholic stimulants, which brings the subject to a con dition he is too weak to overcome; and for which he is not responsible." Socicty, it would secm, stands in a dilemma from which it is difficult to perceive any present way of escape.
The question is one, however, which demands specedy settle ment, for laws arc indeed anomalous under which finc-drawn pleas of "cmotional insanity" have securcd immunity for wilful murder, while the wretch who deals a fatal blow while crazed and discased with drink is subjected to the full meed of punishment. Much has been written and said to prove that, when a man becomes a drunkard, it is a volun tary proceeding on his part. This is the legal view-or rather, the legal fiction-relative to the subject. There is no doubt that many do become confirmed inebriates through finding pleasure in their carly use of stimulants; but this is
by no means true of all. Dr. Dodge tells us that, like all hereditary diseases, intemperance is transmitted from parent to child as much as scrofula, gout, or consumption; that it
observes all the laws of trangmitted disease; thatit may even
skip a gencration, and appear in a succeeding one with all its former activity: that the habit seldom culminates until the subject is thirty years of age, and that the disease is often est found among people between the ages of thirty and forty: that certain individuals possess an alcoholic idiosyncrasy, a natural latent desire for stimulants which leads, if indulged, to morbid appetite and a diseased condition of the system, which the patient is powerless to relieve, because the cakness of will that led to the diseasic obstructs its removal These are all well demonstrated facts. Dr. Joseph Parrish says that he has known hereditary drunkenness developed after sixty years of sobricty. Dr. Forbes Winslow, before British Parliamentary Committec, stated that he had observed a list of criminals in which a father was a drunk:ard, grandfather a drunkard, grandmother an idion; and in the whole line the family showed drunkards, criminals, and idiots. All the forms of vice were hereditarily transitted.
The difficulty at once surgests itself of how to distinguish etween the man who gets drunk because he cannot help it and then sins, and him who deliberately becomes intoxicated If we place the drunkard on the same level as the lunatic in regard to irre-ponsibility for crime, we find ourselve brought faca to face with a host of perplexing questions $\Lambda$ man cannot sham lunacy without being reasonably sure detection; but he can get gemuindy drunk, and still have faculties clear enough to execute a purpose of revenge, fo example. Neither law nor medicine can positively say how drunk a man must be to be irresponsible. Neither can we uncarth cvery one's genc:alogy to find out whether his grand father was an incbriate in order to predicate the hereditary lypothesis. It is evident, therefore, that the drunkard-no matter how he became a victim-must be placed in a differ nt category from the lunatic and the criminal who commit crime automatically. $\Lambda$ lunatic is never responsible, society must regard a criminal as always so; but the responsilility of the incbriate depends on a host of circumstances, which maly differ in countless instances. It is obviously as much an error to regard every drunkard as an automaton impelled by irresistible impulse as it is to consider him-as we nor practically do-a fully reflecting being. The problem is to find the just mean which will cover all cases, or to discove a mode of prevention which will simplify the general conditions.
The preventive remedies which have suggested themselve are two: First, the inelriate asyium; second, the represgion of the liguor traffe. The incbriate asylum, though re:lly curative institution, is in the end the means of preventing he spread of inebriation ly hereditary transmission. Intemperance is curable, just as insanity is, in most cases; and, to a certain extent, similar means are used to effect the desired result. The treatment, however, involves skill and thorough acquaintance with the discase in all its forms; and it is therefore of a nature which is best practised in special iusti tutions. The increase in number of the latter may theref or tutions. The increase in number of the latter may therefore
be considered advantageous. As regards the checking of be considered advantageous. As regards the checking of
the liquor traffic, there is ground for much argument pro the liquor traffic, there is ground for much argument pro
and con. $\Lambda$ step in advance which might be taken, and it and con. $\boldsymbol{\Lambda}$ step in advance which might be taken, and it results tested before resorting to prohibition, is the stringen enforcement of enactments against adultcrated liquors Whiskey-or rather a vile decoction of fusel oil-is sold in the slums of this city, at retail, at prices less than the gov nment tariff alone amounts to. Repression of adulteratio ould break up the sale, and place liquor out of the pecuary reach of thousands of people who are now easily able gratify their desires. Pure liquors, ,ay authorities, ar orse as a source of incbriation than the adulterated ones owing to the greater proportion of aleohol present. This is doubtless truc; but at the present time the immense preponderance of liquor sold is adulterated. Enforce the laws to prevent the sale of that, and maintain a high tariff on pure liquors, and it will become an expensive proceeding to get rresponsibly drunk.

## about gravestones.

We have just received a volume containing seventy-four lithographed designs for gravestones, accompanied by a note from the publishers to the effect that the book is regarded as the best modern work on the subject." It is a small volume, and the price is cight dollars, for which sum one might reasonably expect to obtain something new and valu able. The work is no doubt modern, but we fail to discover anything new or especially attractive in the designs. It seems to us-and the idea is one we have long held-that it is about time that a reform in our churchyard architecture was set afoot. We have got into a rut, so to speak, of de signs which have been the same from the period "whereo the memory of man runneth not to the contrars." The visitor to the country churchyard, or our magnificent Greenvood, finds them at every turn; and he may depart wit the fixed impression that, when gravestone makers emanci pated themselves from slabs and tables, the sole decoration of which was the occasional hourglass or impossible cheru bic head, they proceeded as far as the funereal urn and broken pillar and there stopped, a few bolder spirits only advancing to the further point of crouching lambs and knecling angels. Now, these ideas are well enough in their ay, or rather they were so, say fifty years ago, when we bilt our houses like Grecian temples and indulged in othe rchitectural atrocities; but at the present time, we may ruthfully assert that our graveyards possess a full supply of them, and that something new would be a gratifying change.

It is needless to state that we opened the book above re ferred to with these feclings. We need not picture our dismay when nincteen monuments with funcreal urns and five with broken pillars met our gaze; and there was the inevitable lamb. and the invariable angel in the usual uncomforta ble position which it makes our bones ache to contemplate There was not a design which seemed to us to offer any striking originality, save one, and that was a most incomprehensible c ombiatition of a ewer and basin perched on a slab. What connection existed in the designer's mind between those indispensable toilet utensils and the grave, we should much like to have explained. Some of the gravestones de picted are above average merit; but the stigma of conven tionality is upon every one of them. The designers doubt less think they know the publie demand, and aim to supply it in the best possible way; and the public taste and judg. ment perpetuates these trite conceptions, to the exclusion of the new and beautiful designs which an art knowledge, far more advanced than that which originally evolved the former, is capable of producing. We do not refer to lofty and magnificent monuments erected without regard to out lay, because such always are the work of the artist-sculptor and not of the gravestone maker, but to the humbler memorials which mark the thousands of graves in our cities of the dead. There is as abundant opportunity for the application of the principles of true taste and art fecling to these as to the more pretentious piles; and while we are making Nature transform our great cemeteries into beautiful parks and gardens, it would be well if we allowed art to produce forms which would harmonize, and not disagrceably contrast, with Nature's handiwork. Ancient mythology and the tombs and relics of the Old TVorld abound in appropriate emblems which might find more place on the modern gravestones than they now do. What architect or artist will strike out in a new and original line of thought, and give us something better than the upright slab, pillar, or obelisk for marking the graves of the dead?

## HELPING INVENTORS

A co-operative movement, based on the English system first started at Rochdale, has been begun in Indiana and other western States. The organization is on the masonic plan, there being a "Grand Guild" and subordinate "Guilds," the latter of which have for their object apparently the promotion of co-ope:ative enterprises of any legitimate character. Among other schemes, that of an inventors' union has been projected, whereby inventors are assisted ia preparing their devices, a workshop is provided, and othor encouragement afforled.
We are of course beartily in favor of any plan which tends to develop invention; but the i=ventors' union scheme is a very bad one, and it has been many times unsuccessfully tried. There never was and never can be a community of interest am?ng inventors, except so far as all are interested, more than the average run of people, in general progress.
The very nature of the inventor's work impels him to kee; it out of public notice until it is complete 1 , and his right in it secured to him. There are abundant circumstances under which it might. be highly disadvantageous to an inventor's' interest for his neighbor to gain a knowledge of his invention; and there are not many inventors who would risk making their models in a co-operative workshop, no matter to what pledges of secrecy other occupants of the room had been committed. Besides, this is not the kind of help our inventors want. In many cases of invention, not only is something nriginated but the implements for its production must also be contrived. It is impossible to foresee what particular means inventors will use to put their ideas in
practical form; and it is useless to attempt to fit up a special shop for that purpose. The needs of inventors are, first, suggestions of devices required, and information of what others are doing or have done in the way of origination or improvement: in brief, ideas which will keep their minds in a channel which is likely to end in their conceiving some ob ject on which to exercise their genius. Afterwards, after the patent is secured, and the inventor has perfected his device, then he sometimes needs assistance to aid in its introduction. Now the "Guilds" can furnish cither class of help we have indicated, and do good; but we do not believe that they will ever carn much gratitude from inventors by fitting up a shop and requesting people to come in there and invent. They would fi id that good reading rooms-such as we have frequently advocated, and which have been success fully established in many places in accordance with our sug-gestions-will attract thinking people; and if an abundance of mechanical books and pape:s are provided, and discussion on new mechanical and industrial subjects encouraged, inventions will speedily follow. $\Lambda$ s regards assisting inventors in introducing their devices, there is no lack of opportunity; but the guild's part in securing the aid could hardly extend beyond bringing investors and inventors into communication. It is useless to attempt to organize an association which undertakes to push any or all the inventions of its members. Discrimination will be found necessary; and as a rule, it is about as easy to convince an inventor that his that her baby is not handsome.
We are glad to hear of the existence of the muild and can commend their motive in endeavoring to help inventors. But we think that, after a little experience, they will agree with us that it is better for them to furnish means for obtain
ing ideas, and to leave the inventors to work out the proing ideas, and to leave the inventors to w
jects based thereon after their own fashion.

## Lightining rods.

A correspondent of the Country Gentleman writes to the Hor of that paper as follows
Having read the recent article in your journal rela ine inquiries. Given, I venture to propound the follow
 roofed with slate, valleys of copper and conductors of
tin, a rod with points soldered to the tin roof, the lat. ter connected by strips of copper soldered to the copper
valleys, the tin conductors connected by strips or rode Villeys, the tin conductors connected by strips or rods of
copper from the bottom with permanent moisture under ground-is the building protected against lightning y (1)
Would the building be better protectedif the above conduct ors were attached in the building to the gas pipes? (2) Does
the paint on one side of the tin materially ieduce its the paint on one side of the tin materially yeduce its power
of conduction? (3) Is it not an accepted theory that the closer the rods are attached to a building the better? (4) Centennial buildings, as explained in the Scientific amisi CAN of about a month since? ( $\mathbf{5}$ ).
W. H. G.

## To which the editor of the Country Gentleman replies:

1. We do not perceive why this would not make a good ferent connections might be more liable to become detache in the lapse of years than a firm rod, and would need look ing to. In case the points above should prove insufficient to carry off silently the fluid from a heavily charged cloud im mediately above, and there shonld be an explosion a a rar
occurrence in such a case) there would be more linbility to occurrence in such a case, , there would be more liability to
injure the building than if the rod were a foot or two distan injure the building than if the rod were a foot ortwo distan
from the building. 2 . Gas pipes, well connected, would make good conductors, with the same liability as that just mentioned. 3. Paint does not reduce the conducting power.
2. It is better that the rod be a short distance off from the buiding, for the reason already explained. 5. We do no know the mode adopted on the Centennial buildings, and
have not the paper referred to at hand.
Remarks upon the above Answers.-(1) We coincide substantially with the Country Gentleman in respect to the general sufficiency of the above example of protection. The proposed connections above ground are correct; but if there is any deficiency, it is in the underground connections. The terminal metal of the rod, placed underground, in contac with moist earth, should be as extensive in area as possible. We think it erroncous to suppose that lightning rods are a means of silently discharging the electricity of thunder clouds. The latter are generally more than half a mile dis tant above the earth when the discharge takes place; and
while a properly arranged rod, if struck, will conduct the electricity safely to ground, the sudden leap of the lightning through this airspace to the rod sets the air intstremendous vibration, producing sound like the roaring of artillery Only the atmospheric electricity, close to the surface of the earth, is conducted to the ground silently by rods, buildings, ces, otc.
The object of the rod being to conduct off electricity from the building to earth, the rod should consequently be placed in close contact with the building, so that the clectricity may easily reach it; the rod should not be separated a foot or two as our contemporary suggests; the explosion he refers to is the crashing noise, which the rod can neither cause nor prevent
(2) The protection of the building would be improved if the conductors were attachecl, in the building, to the gas pipes. But the attachment of the foot of the rod to the gas pipes, outside of the building, would be more convenientthese connections to be additional to the large metallic ter minals in moist earth, before mentioned.
$\Lambda s$ to inside gas pipes, they are good conductors, and all that is necessary is to bridge over the space between the strect pipe and house pipe, occupied by the meter and its lead pipe, with copper wires. The lead pipe is a poor con-
ductor. By using the copper bridge, if the gas pipes in the house are struck, the electricity will pass off into the earth
(3) We agree with our contemporary.
(4) It is an accepted theory that the closer the rods are at tached to the building the better. The reply of our contem orary is incorrect, for the reason explained under (1).
(5) The mode adopted on the Centennial buildings was $t$ onnect the metallic roofs with the carth, by means of numerous rods soldered at different points to the roof, and car ried directly down into the ground, and there soldered to the extensive system of eight inch underground water pipes. Thus the rods had the closest possible connection with the roof : while the earth terminals of the rods were provided with a very large area of conducting material placed under-
ground-which latter is the essential thing necessary to ren. ground-which latter is the essential thing necessary to ren
der any rod a protection; but is the very thing that the majority of people neglect in rodding their buildings.

## Fulton,s Aecount of th; First Sceamboat Trist <br> bet iveen New York and Albany.

In the Suffolk Gazette, printed at Sag Harbor, on the east end of Long Island, October 12, 1807, is a letter from Rober Fulton to Jocl Barlow, giving an account of the first trip on
the first steamboat on the Hudson River. It is as follows: To Joel Barlow, Philadelphia.

New York, 22d Aug., 1807.
My Dear Friend: My stcamboat voyage to Albany and back has turned out rather more favorable than I had calculated. The distance from New York to Albany is 150 miles; I ran it up in 32 hours and down in 30 hours. The latter is just 5 miles an hour. I had a light breeze against me the whole way going and coming, so that no use was made of my sails; and the voyage has been performed wholly by the power of the steam engine. I overtook many sloops and schooners bearing to windward, and passed them as if they had been at anchor.
The power of propelling boats by steam is now fully
proved. The morning I left New York there were not per haps thirty persons in the city who belicved that the boat would ever move one mile an hour or be of the least utility. And while we were putting off from the wharf, which was crowded with spectators, I heard a number of sarcastic remarks; this is the way you know in which ignerant men compliment what they call plilosophers aul projectors.
Having employed much time and money and zeal in ac omplishing this work, it gives me, as it will you, great pleasure to see it so fully answer my expectations. It will give a quick and cheap conveyance to merchandse on the Mississippi, Missouri, and other great rivers which are now laying open their treasures to the enterprise of our countrymen. And although the prospect of persona? emolument has fen some inducement to me, yet I fecl infiritely more pleas. ure in reflecting with you on the immense advantage that my country will derive from the invention.
However, I will not admit that it is half so important as the Torpedo system of defence and attack; for out of this will grow the liberty of the seas; an object of infinite impor tance to the welfare of $\Lambda$ merica and every civilized country But thousands of witnesses have now seen the steamboat in rapid movement, and they becieve-but they have not seen ship of war destroyed by a torpedo, and they do not believe. We cannot expect people in general to have a knowledge of physics, or power of mind sufficient to combine ideas and reason from causes to effects. But in case we have war, and the enemy's ships come into our water, if the government will give me reasonable means of action, I will soon convince the world that we have surer and cheaper modes of defence than they are aware of

## Yours, ctc.,

Robert Fulton

## Transparent Gold

In the course of a lecture on gold, delivered before the Franklin Institute, on February 2ith last, Mr. A. E. Oute: bridge, Jr., of the $\Lambda$ ssay Department of the Mint in Phila delphia, Pa., gave an account of some experiments he had made, with the view of ascertaining how thin a film of gold as necessaly to produce a fine gold color.
The plan adopted was as follows: From a sheet of copper olled down to a thickness of $\tau{ }^{8}$ s $\bar{\sigma}$ of an inch he cut a strip $2 \frac{1}{2}$ by 4 inches. This strip, containine 20 square inches of surface, after being carefully cleaned and burnished, was weighed on a delicate assay ba:ance. Sufficient gold to produce a fine gold color was then deposited on it by means f the battery; the strip was then dried without rubbing, and re-weighed, and found to have gained one tenth of a grain, thus showing that one grain of gold can, by this method, be made to cover $2 C 0$ square inches, as compared to 75 equare inches by beating. By calculation, based on the weight of a cubic inch of pure gold, the thickness of the deposited film
 the beaten film. $\Lambda_{n}$ examination under the microscope howed the film to be continuous a:d not deposited in spots, he whole surface presenting the appearance of pure gold Not being satisficd, however, with this proof, and desiring to cxamine the film by trannmitted light, Mr. Outerbridge has since tried several methods for separating the film from the copper, and the following one has proved entirely suc cessful:
The gold plating was removed from one side of the copper strip, and by immersing small picces in weak nitric acid for several days, the copper was entircly dissolved, leaving the films of gold intact, floating on the surface of the liquid Three were collected on strips of glass, to which they adhere on drying, and the image of one of them was projected on drying, and the image che one of mene of the gas microscope. It was ob-
on the served that it was entirely continuous, of the characteristic bright green color, and very transparent, as was shown by placing a slide of diatoms behind the film. By changing the position of the instrument, and tirrowing the image of the film on the screen by means of reflected light, its true gold color was seen. Mr. Outerbridge has continued his experiments, and, by the same processes, has succeeded in pro ducing continuous films, which he determined to be only the 1 two million seven hundred and ninety-eight thousandth
 hundred and eighty-four $(10,554)$ times thinner than an ordinary shect of printing paper, or sixty (60) times less than a single undulation of green light. The weight of gold cor ering 20 square inches is, in this case, thirty-five thousandth ${ }^{8850}$ ) of a grain: one grain being sufficient to cover nearly 4 square fect of copper. The film is perfectly transparen and continuous, even in thickness, and presents all the char acteristics of the one shown before. That a portion of the mage appears darker is duc to superposed films, the intensit of the green color being proportioned to the thickness through which the light passes.

## Riches and Reason.

The experience of the late Mr. John Daly, of this city who got riches but lost his reason and committed suicide, points a moral for our time. The case of Dr. Ayer, the ell known millionaire, who is in an asylum for the insanc urnishes a commentary on the failure which some men are making by their appetite for money. There are scores of imilar cages of insanity caused by a too intense application to business. Brains are of more account than bank notes, even in this world, truthfully says the Christian at Worh and it is never wise to risk one's head to accumulate a prop erty for other people to quarrel over.

