Correspondence.

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

The Vienna Exposition.

To the Editor of the Scientific American:

The epidemic of personal abuse which has pervaded the country for the past few months seems, at last, to have reached the office of your journal.

From an article under the above heading, in your issue of November 16, I extract the following: "Then there is General Van Buren, the United States Commissioner for this show, who will also come in for emolument. At present his office is purely honorary; he draws no pay and knew this when he accepted its functions. But of late, he has been very arduously engaged in his exhibition duties, stumping eloquently around the country to urge the election of General Grant, and the administration will of course be expected to provide for his trip to Europe." But once before has any personal assault been made upon me in connection with my official duties, and that was in a communication to one of our daily papers, from a person to whom I had refused the appointment of assistant commissioner. I am not aware of having similarly disappointed any gentleman connected with the SCIENTIFIC AMERICAN, and am therefore at some loss to know to what to attribute the paragraph I have quoted.

While glancing at your article, my eye was caught by certain prominent figures at the head of your editorial columns, which advise the public that your journal is furnished to subscribers at three dollars per year. And, upon turning the page, I find, as the frontispiece, a very excellent representation of a weaving loom attended by an attractive young woman. I might perhaps; be considered personal if I should suggest that your paper was a "show paper," notwithstanding its high sounding title, and that you published it for "pay" and not in the interests of science. And if further I should say that, in your opposition to the International Exhibition at Vienna, you had been moved by a desire to commend your paper to American inventors as the especial champion of their interests, with a view to increasing your circulation and drawing to your net applicants for patents, and thus add to your incoming wealth, I should doubtless find many who would credit the assertion, whatever might be said of my taste in making it. If, in addition, I should announce that you had labored zealously to secure the election of Mr. Greeley to the Presidency, your judgment would probably, in many quarters, be criticized, but your right as a citizen to do even this would not be questioned.

Now, with these comments, let me at once admit the truth of your statement that my office is without pay, and that I knew this fact when I "accepted its functions;" but permit me to add that I did not seek the position, and I only assumed its duties when made to believe that I could thus render some service to the country. And, further, let me say that I have no intention of going to Vienna and giving a year more of my time and exertion at my own expense, and, in addition, pay out of my own pocket the expenses of the Government. If you have any disinterested individual connected with your editorial department who is anxious to do all this, send him along, and he can take the position at once. Neither can I well see why I should thus devote myself to public interests by taking charge of, what you are pleased to term, "a show" at Vienna, where American inventions are exhibited and their superiority established before the whole world, while you demand hard cash for publishing what *I* may please to call a *show paper* to a limited number of subscribers. Your assertion also that I have been "stumping eloquently" for the election of General Grant I will not deny, but when you say that I have in that way "been arduously engaged in my exhibition duties," thus insinuating that I have neglected my official duties and taken to the stump with a view of having a claim for compensation as commissioner, you invent a foul calumny which I respectively insist even newspaper editors have no patent right to do.

Ever since the formation of the Republican party, I have taken an active part in its contests, and, while I believe in its principles, I shall continue to do so. While doing this I have never neglected more important duties, nor have I ever been the hired advocate of any committee or clique, for I have uniformly refused compensation and paid my own expenses. As commissioner to the International Exhibition at Vienna, I have labored zealously for the past four months to make the American Department a success. I have done this to the entire exclusion of my own personal business, and without reference to my own interests, or as to whether I should continue in the commission and go to Vienna or not. While thus engaged, I have earnestly striven to secure a convention and treaty in the interests of our inventors. The Governments of Austria and the United States have ratified a treaty upon trade marks which goes far to secure the rights of our citizens, but I have desired farther to procure an abrogation of certain obnoxious requirements of the Austrian patent laws, and I have caused to be prepared and sent to Washington a draft of a treaty to that end; such a treaty the SCIENTIFIC AMERICAN has professed to be strongly in favor of. If its assistance is to be of the character of the articles thus far published in its columns upon the subject, I may be pardoned for saying it will not prove valuable.

I take pride, in this connection, in stating that all my applicants for space thus far have expressed their determination to send their goods to the exhibition if they have to do it at their own expense; and that in no instance have they asked that their board bills be paid by Uncle Sam.

It may be witty to call the International Exhibition "a show," and to insist that exhibitors are only so many advertisers who ought to pay for their advertisements. "This world is all a fleeting show;" and yet there are many people who are foolish enough to be exceedingly interested in its affairs; and I fully believe that our country will see something more in the grand collection of the industries of all nations at the Austrian capital than a great advertising agency.

I regret that one of our leading scientific journals should take so narrow a view of it, and would fain believe that the editorial in question was the offspring of a bad dyspepsia, or an election bet lost on the late "tidal wave."

I will not do you the injustice to express a doubt of your giving this communication a place in your columns.

THOMAS B. VAN BUREN.

United States Commissioner for the Vienna Exposition of 1873.

The Bursting Strain on Cylindrical Boilers.

To the Editor of the Scientific American:

The SCIENTIFIC AMERICAN holds the position of the leading scientific and mechanical paper of the most influential nation on the face of the globe. By constantly reading it, more practical and useful knowledge can be obtained with less effort than from all other periodicals and books combined. As such, I have time and again recommended it to young men generally, and to mechanics particularly. As one holding these views, I wish to offer a suggestion.

Every paragraph appearing in your paper, although it be a correspondence for which the paper is "not responsible," bears a *quasi* endorsement as having been found worthy to enter your columns, being selected from among a number, the majority of which are rejected.

In your issue of October 19, 1872, page 244, is an article on "Cylindrical Boilers," which I supposed to have been inserted for the purpose of being refuted. The error it contains is made plausible, and stands endorsed therein by Fairbairn, "so extensively known in scientific engineering." A mere expression of difference of opinion was likely to go unheeded as against such endorsement. Therefore, in my communication to you on the subject, I used ridicule to show more strikingly the absurdity of the position taken. This went into the "basket," and the error asserted by Bakewell still stands in your columns unrefuted, teaching to my young friends, whom I have advised to examine the SCIENTIFIC AMERICAN for knowledge, that which is totally erroneous.

Imagine my surprise when to-day, in your answers to correspondents, I perceived that my communication, intended to ridicule Bakewell's proposition by showing its absurdity, could have been understood as expressing my own belief, you putting down your "constant reader" for so many years as a believer in perpetual motion—"the unkindest cut of all."

The pressure in any vessel cannot be greater in one direction than in the opposite direction. Hence, I chose, as strikingly illustrating the error, the semi-circular shape on one side, and a diameter or flat side on the other. On the latter, Mr. Bakewell will hardly contend, unless he irretrievably belongs to the perpetual motion school, that the pressure is greater than at the diameter. How, therefore, can he claim that on the semi-circular portion it can be any greater? His mode of reasoning by "resolution of the radial forces into horizontal and vertical," and again, "of vertical forces so obtained into horizontal," etc., at once points out the error in his mode of reasoning.

Believing that with your great experience and knowledge you always admit an oversight, and set your columns right, I continue your appreciating and constant reader,

ROBERT CREUZBAUR.

[We printed Mr. Creuzbaur's answer on page 298, and called his attention to Mr. Bakewell's letter, which did not state that there was a greater pressure on the convex part of a boiler than on the flat. His assertion was that the bursting strains of boilers vary as the semi-circumferences, and not as the diameters. We shall publish next week a letter, which is to the point in Mr. Bakewell's theory.—EDS.]

Transmission of Motion.

To the Editor of the Scientific American:

I have read the criticisms by Mr. James Garland on a lecture delivered by Mr. Coleman Sellers on the above subject, and I am surprised to find even a comparative advocate of the plate coupling.

When, two years ago, I first became acquainted with American mechanical engineering, there appeared to me nothing in this country more strikingly superior to English mechanical engineering than the American or specially Sellers' way, here generally adopted, of constructing shafting, coupling, hangers and all appliances connected with the transmission of motion.

Mr. Garland is perfectly correct in saying that, in England and elsewhere, the way to keep shafts in the plate coupling in line is to let one shaft enter the opposite part of the coupling a short distance, but I have also known engineers in England who advocate and practice the mode described by Mr. Sellers, of true-fitting bolts in preference to fitting the end of a shaft in the coupling of a shaft of different diameter.

There is no doubt that a worse contrivance than a true-fitting plate coupling, or the one Mr. Garland saw fifteen years ago, may be invented; but the advantages of the double cone coupling, as compared with the former, appear to me to allow of no dispute. If Mr. Garland is correct that it is not considered good practice in England to enlarge the shafts for the reception of couplings, then there is certainly a great amount of bad practice in England. I have seen not only the ends of the shafts for the reception of the couplings, but also the seats for the pulleys, enlarged, and this I would call good practice, if it were not for its costliness. I have had for years the best opportunity to become acquainted with English and Scotch engineering, through personal visits to the engineering establishments in those countries; but to give Mr. Garland other authority, I refer him to any of the English publications on engineering practice.

Philadelphia, Pa. L. SCHUTTE.

Shifting Belts on Pulleys.

To the Editor of the Scientific American:

S. W., in the article on the transmission of motion, page 292 of the present volume, suggests an idea that may be a valuable one. The same idea occurred to me long ago, but without trying it, I had not thought it practicable to shift a belt from a pulley not in motion. Will J. W. please inform us if he has seen an actual trial of it?

A plan that I have tried somewhat, and which works well, is to make the loose pulley smaller than the tight one, so as to relieve the strain of the belt and the pressure on the bearing when the belt is on the loose pulley. Where the tight pulley is of wood, so that the edge can be beveled, a difference of an inch in the diameters is no hindrance to the shifting of the belt.

Good authorities say that the adhesion of a belt is as the square of the amount of circumference enveloped by it. Then it seems to me that it is a good policy to cross belts where it is possible, for the gain in adhesion must, in most cases, be more than the extra wear by crossing.

Buchanan, Mich. W. G. BLISH.

An Invention wanted for Dressing Ramie.

To the Editor of the Scientific American:

A machine is now wanted by the agricultural industry which will largely pay the trouble of inventing it. That fine plant called ramie or China grass (*Urtica tenacissima*), is being cultivated in Louisiana, Texas, California, Mexico and Cuba, but the planters find that the way to a large production is obstructed by the want of an efficient and substantial machine for extracting the valuable fiber, and what is most desirable, for extracting it in large quantities.

I wonder that this machine has not been invented in the true land of useful inventions, although Mr. Lefranc, of Louisiana, has tried and succeeded to a certain extent, in extracting the fiber, but only at the rate of 250 to 300 pounds a day. I am sure that the man who should make such a gift to the pioneers of the ramie culture in those States would be amply remunerated by the selling of hundreds, if not of thousands, of such machines.

Havana. A PLANTER OF RAMIE.

The Stow Pavement.

To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN of October 19, in an article on wood pavements, you state that the Stow pavement on Sixth or Seventh avenue is wearing out. I will inform you that there never has been a single foot of the Stow foundation pavement laid down on either of those avenues in the city of New York. Will you please correct your statement in the next issue of your valuable paper?

Buffalo, N. Y. HENRY M. STOW.

[The pavement alluded to should, we believe, have been mentioned as Stafford's.—EDS.]

The August Shower of Meteors as seen in Texas.

To the Editor of the Scientific American:

In regard to the shower of meteors of August 10, I would state to you that on the morning of the 11th, between 12 and 1 o'clock A. M., I beheld the finest display of meteors that I ever saw in my life. They were in the west, at about an angle of 45° from where I stood, and were of many sizes, from the smallest speck up to the largest sized star, and very thick.

Bryan, Texas. P.

[For the SCIENTIFIC AMERICAN.]

ABSURD COSMICAL THEORIES.

BY W. T. ROBINSON, A. M.

Dr. Carpenter is not in advance of the SCIENTIFIC AMERICAN in ascribing great importance to common sense as a test for scientific theories. This rule, when applied to certain cosmical hypotheses, shows them to be too thin for any practical purposes.

For instance, Dr. Hickok, in his late work on "Creation," claims that matter results from three forces: antagonistic, diremptive and revolving." Antagonistic forces collide, neutralize and form lumps of matter. But what is this force that he freezes into matter? Heat, light, electricity and sound are examples of it. What is sound? It is nothing more than a jarring or vibration of the air or other substance. The "force" or vibration jars the auditory nerve, and produces the sensation of hearing. In like manner, the waves of light impinge on the optic nerve and produce vision. Heat acts in a similar way. But heat is not an entity in itself; it is merely an abstract name for molecular motion. A ball lying still represents no force; start it down hill and it has force proportioned to its velocity; when it strikes at the bottom, its mass motion is converted into molecular motion, or heat; hence, heat and motion are convertible terms. But this motion is not anything in itself; it is simply an abstract name for the process of a substance changing position; and, as all the forces of Nature are merely varieties of motion, it follows that without matter there can be no force, because motion is nothing more than the action of matter. Force is therefore really nothing in itself. Now, common sense rebels at the idea of the learned Doctor bringing two nothings into collision and begetting something, for every effect must have an adequate cause, every bairn a dad!

La Place's nebular theory, as now understood by various cisentists, supposes that matter in the beginning was diffused throughout space, and that, through the action of the laws of matter, all the celestial machinery was developed by a process of evolution. But these evolutionists do not admit that matter was created; if not, then it had no beginning, hence no starting point. Go back as far as mathematics or imagination can reach, and there is still an eternity beyond. The theory is, therefore, not accordant with common sense, because it assumes a condition which could not possibly have existed.

Because our little world, and probably all other matter in the Universe, is revolutionizing, it does not follow that this change is evolution. Plants, animals, races revolve and die; meteors and comets are thrown into chaos, probably suns and systems are "knocked into everlasting smash;" but as the Universe can have no limits, there is no possible chance for a grain of matter or a vibration of force to drift off into the regions of nowhere. So that new suns and systems may arise from the fragments of the old ones, just as new plants grow up from the humus of defunct vegetation. Thus we have all things succeeding in endless rounds, vast, eternal, incomprehensible.

Council Bluffs, Iowa.

FIRE.

Professor C. F. Chandler, of Columbia College, recently delivered an interesting lecture at the Stevens Institute of Technology upon the very timely subject of "Fire." Beginning with general definitions, the lecturer explained the phenomena of combustion, and illustrated the reciprocal nature of combustibles and supporters of combustion by burning oxygen in ammoniacal gas, at the same time causing the latter to ignite in the air. Oxygen was also shown to burn in hydrogen and in an atmosphere of ordinary street gas. After explaining oxidation and the gradual combustion of bodies by decay, Dr. Chandler called attention to the manner of

AVOIDING FIRE,

and executed several experiments with carbonic and sulphurous acid gases. He then explained the principle of fire extinguishers, showing how they contained carbonate of soda in solution, to which, by turning a handle of the apparatus, sulphuric acid is added, thus generating carbonic acid gas, besides forcing out the stream of water. The construction of a well known invention of this kind was detailed, and its mode of operation shown. The lecturer then gave an excellent plan for

RENDERING LIGHT FABRICS FIREPROOF,

and astonished the audience by calmly setting fire to one of a pair of thin window curtains. He then applied a blaze to the other, which refused to be kindled. A similar experiment was made with two children's dresses of thin material: the first burst into flame the instant the lamp was applied, the second, though made of precisely the same fabric, could not be ignited. This effect was caused by mixing with the starch with which the articles were prepared the tungstate of soda, a crystalline and not very costly salt. Dr. Chandler suggested that a fireproof starch, properly prepared with this or some other suitable chemical, would be a very valuable invention.

The greater part of the discourse was devoted to the means of preventing fire.

STATISTICS OF FIRES,

recently compiled, show that 76,000,000 dollars was lost through isolated conflagrations in the United States, Chicago and Boston not being considered, within a space of two years. Investigations into the causes show that although the largest number of fires was due to incendiarism, no less than 12 per cent owed their origin to accidents with kerosene. Examinations, made by the Fire Marshal of New York city, also proved that 18 per cent of the fires occurring within the limits of one year were due to a similar cause. The lecturer then proceeded to explain the manufacture of kerosene, its nature and how it is adulterated. He stated that nearly all the

KEROSENE

sold in the city is unsafe, and instanced how he purchased 700 samples, out of which only 28 were not dangerous, and 37 were extremely bad. A very lucid description was given of the method of testing the oil, and the varieties of apparatus used were exhibited. The flash point and not the burning point should be considered, as, of course, the vapor of the oil must ignite before the liquid can kindle. One hundred degrees Fahr. was stated to be the commercial standard for the flash point, but Dr. Chandler considered that this should be raised to at least 130°, so as to preclude all possibility of the oil arriving at the flashing temperature while in the lamp. A strong denunciation was delivered against the manufacturers who sell unsafe kerosene and thus imperil human life. It is a common trick to delude customers by setting a little of the oil on fire in their presence to prove that it is non-explosive. If kerosene ignites at ordinary temperatures, it is a sure sign that it is extremely dangerous. The oil never in any case explodes, but its vapor when mixed with air does so. Kerosene which is almost pure gasolene is now sold in New York. One variety is known as "Safety Gas," so called to evade the law. It is sold by one Smith, at No. 40 East Broadway; (we give the individual the benefit of the gratuitous advertisement). To prove the inflammability of this compound, the lecturer poured a little on an old coat hung on a frame. On touching a light to the garment, it instantly burst into a fierce blaze, which continued a sufficient time to burn the wearer, if any there had been, to death. This oil was stated to be as dangerous as gunpowder, and should never be used. The properties of a really safe oil were then explained, and samples of various kinds shown. Among others were the products of several well known firms, the best being mineral sperm oil, which Dr. Chandler stated flashed only at 250° Fah., and was practically as safe as whale oil. Taking a specimen of this liquid, he heated it to a temperature of 212°, lit some cotton waste saturated with it, and actually extinguished the flames in the boiling oil. The same material, when poured on a garment, could not be ignited. Good oil is necessarily more expensive than the inferior qualities, but the very best only costs one half cent per hour, while the worst cannot be sold at a lower rate than one quarter of a cent, for the same period.

LAWS REGARDING THE USE OF OIL

should, said Dr. Chandler, be rigidly enforced; and he called attention to the late English enactment on the subject. The various state laws hitherto passed are virtually inoperative, their principal defect being that their execution is left to inspectors, who can be approached and so caused to neglect their duty. Selling or making dangerous kerosene should be legally made a crime, punishable by heavy fine for every offence. In case human life is sacrificed, the manufacturer should be indicted for manslaughter. Inspectors should be abolished and the evidence of every citizen taken as competent to prove the manufacture or sale of bad material.

CARBONIC ACID AS A PREVENTIVE.

Dr. Chandler alluded to a company which at one time was started in this city for the purpose of introducing carbonic acid gas through pipes into all the houses, so as to have a means of extinguishing fire ready at hand. This, he said, would be extremely dangerous, because in event of a leak in the pipes, the same could not be discovered, and the escaping gas would suffocate the inmates of the dwelling. It was proposed at one time to compress this gas into a liquid and furnish it in iron casks to vessels, so that, when there was danger of fire, the gas might be set free.

STREET GAS

was also discussed. A common cause of fires is the habit of running over a gas pipe with a light in order to detect a leak. This is highly dangerous and often causes explosions. How to use gas was also explained. People complain of their gas when the fault is in the burner. A very large amount of money is yearly wasted simply because gas is improperly consumed. Iron burners are bad because they become rusty; brass are better, and those of soapstone or lava, as they are known in the trade, are the best. The most effective burner is the "argand" and the best the lecturer had ever seen was known as "Sugg's London Burner," made in England. This is an argand burner constructed of soapstone.

FIREPROOF BUILDINGS

were next taken up. Mansard roofs were strongly condemned and also the practice of using inflammable materials in buildings. Pine wood is so cheap in this country that it is employed for house carpentry almost to the exclusion of other kinds, while it is the most dangerous in existence. Dr. Chandler then proceeded to explain the French mode of building, which he said was almost absolutely fireproof. Floors consist first of a number of thin iron beams, much thinner than are used in this country, placed some two feet apart. Across these are laid a number of rods of hoop iron, and across these again more of the same material, until a network with interstices of about a foot in size is formed. A flat platform is then brought up underneath, and liquid plaster is poured over. As soon as this sets, the platform is removed and the floor remains, a solid mass of plaster and iron. Walls are constructed after a similar fashion; a few light scantlings are put in position to give shape and, boards being temporarily placed on either side, liquid plaster is poured in and allowed to harden. All walls and floors therefore are perfectly solid, and consequently fireproof. Dr. Chandler then gave a very entertaining account of a fire in the Palais Royal, in Paris. He said that the inmates of other parts of the house did not manifest the slightest unconcern nor move a single article. Of the Paris Fire Department, he gave an amusing description, saying that it was but a single garden engine and a line of men passing buckets. This, though seeming ridiculous at first, really showed the sense of the people, who, instead of paying immense sums for an elaborate organization, spend their money in rendering their houses incombustible. A fire in one room in a French house spreads no further. It is only necessary to close the doors and let the articles contained in the apartment burn up. No other damage can be done.

In great cities every house should be, by law, fireproof Our so-called fireproof warehouses are manifestly easily consumed, a fact shown by the immense number of windows which are always constructed in them and which offer no resistance to the fierce blasts of hot air from an adjacent burning edifice. All windows should be provided with iron shutters, not swinging, as these are easily curled up by heat, but enclosed and sliding in the wall. Shutters should, however, be double, so as to leave an air space between them.

Dr. Chandler spoke at considerable length on fireproof construction, strongly advocating wide streets and isolation of buildings, and concluded his discourse, which was loudly applauded throughout by quite a large audience, by an appropriate quotation from Schiller's "Song of the Bell."

IT is said that a copper mine has been discovered in Jackson county, Ill., of extraordinary richness, at a depth of only ten feet. Experts, they say, pronounce the ore to contain ninety-five per cent pure metal, and in consequence all the inhabitants of the county have dropped their ordinary occupations and gone to sinking wells in hopes to strike a "lead."

Chemical News Translations from *Comptes Rendus, Journal de Pharmacie, Neues Jahrbuch* and *Revue Scientifique.*]

Formation of Corrosive Sublimate in Powders containing Calomel.

The author has instituted a series of experiments to ascertain the correctness of the assertion that calomel when mixed with other powders becomes converted into corrosive sublimate; the results of these researches may be summarized as follows: No corrosive sublimate is formed within twenty, four hours when calomel is mixed with saccharum album-saccharum lactis, magnesia usta, magnesia hydrico-carbonica, and natrium bicarbonicum. After three months no corrosive sublimate is formed in mixtures of calomel with magnesia usta, magnesia hydrico-carbonica, and any kind of refined sugar or milk sugar, but faint traces are formed in mixtures containing calomel, natrium bicarbonicum, and refined lump sugar. By treatment with water, corrosive sublimate is only formed in such mixtures of calomel as contain magnesia usta and bicarbonate of soda. Rather large quantities of sublimate are formed in powders composed of calomel, sugar, and bicarbonate of soda, if the mixture becomes damp and is kept for a long time. No sublimate is formed when a powder consisting of calomel and bicarbonate of soda is digested with water acidulated with hydrochloric acid. Pepsin does not favor the formation of corrosive sublimate.—*G. Vulpius.*

Pure Hydrochloric Acid.

The crude hydrochloric acid of commerce is first diluted, by the addition of water, to a specific gravity of from 1·14 to 1·13, and it is next treated with sulphurretted hydrogen gas until it smells strongly of the gas. The liquid is next filtered and then poured into a tabulated retort and heated until the sulphuretted hydrogen is eliminated. The test of solution of corrosive sublimate having been applied, the bulk of the acid is distilled over at a gentle heat, a few fluid ounces only being left in the retort, so that any chloride of iron left in the acid may be retained.—*Th. Diez.*

Starch in Potatoes.

A tabulated form contains the record of experiments with sixty-one different varieties of potatoes, in which the author had estimated the total percentage of dry substance and the total quantity of starch. It appears from this research that the percentages alluded to vary, for dry matter, from 15·64 to 34·25, and the percentage of starch from 8·79 to 26·09.—*Dr. Raab.*

Mejillones Guano.

This material occurs native and in large quantity near the Bay of Mejillones (Bolivia). In 100 parts, this substance consists of—lime, 30·6636; magnesia, 7·9193; peroxide of iron, 0·1466; alumina, 0·0047; potassa, 0·5051; soda, 1·4532; phosphoric acid, 35·86803; chlorine, 2·2250; sulphuric acid, 1·6036; silica, 0·0459; carbonic acid, 1·5956; water driven off at 100°, 7·6858; non-nitrogenous organic matter, 6·5189; nitrogen, 0·7675; granules of granite, insoluble in HCl, 2·2830; loss, 0·7249. The author states that this guano occurs in pulverulent sandy state, and that it is readily acted upon by carbonic acid and water, and thus rendered available for plants, while, in consequence of its high percentage of phosphoric acid, it may be used with advantage for the preparation of phosphate of ammonia and other phosphatic preparations.—*H. Vohl.*

Economical Preparation of Hydrogen.

By first reducing to the metallic state a peculiar kind of iron ore found at Chateauroux (France) by means of oxide of carbon, finely divided iron is obtained, which is used to prepare hydrogen, which thus costs only ½d. per cubic meter (35·31 English cubic feet) and may be used for various heating, illuminating, and air balloon filling purposes.—*M. Giffard.*

Applications of Sulphurous Acid Gas.

The author proposes to apply sulphurous acid gas—obtained in the usual way from pyrites or burning sulphur—for the purposes of saturating urine, the contents of *fosses d'aisance,* ammoniacal gas water, the waste soap water from woolen and other industries, partly for disinfection, but more particularly for obtaining valuable products by evaporation; the sulphurous acid gas is forced into the liquids by means of blowing fans or force pumps.—*M. Chaudet.*

Why the Fire Spread so Rapidly.

All the accounts agree in attributing the fearful spread of the conflagration in Boston, to the presence of the "Mansard" roofs, which proved to be simply huge wooden boxes, mounted upon the summit of granite walls, far above the reach of the firemen. Mr. H. S. Oakley, President of the National Board of Fire Underwriters, New York, cautioned the Boston Board of Underwriters in relation to this very matter more than four years ago, and asked them to use their influence toward suppressing the erection of these immense frame structures above the cornices of their business houses and dwellings. The building in which the fire originated he was well acquainted with, as he had given it his personal examination, and he feared that it and similar structures would at some time or other entail a great loss on the community. It was 60 by 100 feet, and the Mansard was from 20 to 30 feet high, without a break—a great wooden structure surmounting the masonry. The second building ignited stood on the opposite side of the street, and the street was sixty feet wide. It should, however, be stated that if iron framing and iron covering plates are used in the construction of these roofs they are then made perfectly safe. It was a Mansard-roofed building that arrested the spread of the fire in Boston on its recurrence from gas explosions. Doubtless the authorities of Boston will hereafter require the use of iron.