expense, may be extended through any building. This system is extensively used in New England, and so valuable is it considered, that many of the insurance companies in that section will not insure a manufactory unless it is put in.

We know of several instances where large buildings, containing hundreds of thousands of dollars worth of property, have taken fire, but it was instantly extinguished by simply letting on the water. We call to mind no instance where the apparatus has failed. It puts out a fire in as many minutes as are often required in hours by the ordinary fire engines.

In our opinion, the Hall system of perforated piping ought to be placed in all large stores, warehouses, and buildings containing much inflammable material.

Where there is a proper supply of water, the use of this system comes about as near to perfect safety against fire as we can reasonably expect to attain.

THE PROPOSED EXHIBITION OF VIENNA, IN 1873.

We have been inclined to believe that the Exposition of Paris, 1867, was destined to be the last that the world would ever see of exhibitions, planned and accomplished on so gigantic a scale: but it seems that the Austrian Government is ambitious of trying its hand at the expensive luxury, and, as our readers are aware, has issued its prospectus for a great international exhibition, to be opened on the 1st of May, 1853.

It has been our rare good fortune to visit every one of the World's Fairs, in London, in 1851 and 1862, in Paris, in 1853 and 1867, in New York, in Dublin, and in Munich, and at each we have been astonished at the magnitude of the preparations and the importance of the results.

We observe that the Austrian Government intend to introduce several important new features, and to outstrip all of the preceding efforts of other countries. They propose to bring out, in special magnificence, specimens of the almost inexhaustible resources of the Indian Empire. This will be the strong point of the exhibition, as Eastern nations have never been fully represented, and there is great curiosity to see what they can produce. Another new feature is the intention to present the productions of all countries in groups corresponding with their geographical position. It is also proposed to represent a history of inventions, a history of prices, a history of industry, and a history of natural productions, "so that the world's progress in arts, science, industry, and natural products will thus be brought into contrast." The classification, of the objects to be exhibited, we have given in a former number, to which we must refer to avoid repetition.

Our object now is to call attention to the exhibition, and to impress upon inventors the importance of being well represented on an occasion that bids fair to attract a larger multitude of people than was ever collected together on any similar occasion. At the Paris Exhibition we were very poorly represented in quantity, but admirably in quality. The few articles sent over from this country attracted great attention; nearly every one received a commendatory notice, and it would be interesting to know how much business grew out of this small show. Americans felt that there were many omissions, and, for the credit of this country, as well as for the good of society, they were sorry to observe this want. The mistakes of 1867 ought not to be repeated in 1873. We ought to begin at once in the organization of committees and commissions to take the matter in charge, so that, by circulars and special effort, a majority of our best things may be forwarded to Vienna. We doubt if any good article need be brought back, and it is impossible to predict the extent of trade that is likely to grow out of such an extensive notice as the Fair will give to all exhibitors.

The inhabitants of the populous countries of the East will be present in large numbers. It is notorious that they have great need of many mechanical contrivances; and as, on the seaboard and in large cities, they have already called for a large number of steam engines, they will be apt to order many minor articles for the interior, and offer their own rich wares in return.

We remember what crowds of people gathered around the sewing machines at the Paris Exhibition of 1855. It is almost incredible that the woman to work the machine had to be sent out from America, as there was no one in Paris who understood its management, and yet it is true. The sewing machine was seen by several hundred thousand people, and out of this Exhibition has grown an enormous industry.

American pianos took the prize over all others, in 1867, and the consequence has been heavy orders from Europe. But it is in the thousand and one little inventions adapted to supply the wants of every day life that we excel. Such articles appear to be too insignificant to be sent abroad, and yet they are exactly what they need in Europe. If the preparation of a list of desirable objects to be sent were to be entrusted to a proper committee, some system could be thrown into the selection of objects, and there would be less danger of important omissions. A central advisory board, composed of twenty-six experts, representing the groups into which it is proposed to divide the Exhibition, could be organized in New York, and they could cull out the best articles in each department. The labors of such a commission would be productive of much good, and we dare say that a sufficient number of desirable men could be found willing to work in so good a cause.

At the time of the last Paris Exhibition, an advisory committee was organized in New York, and all of the articles to be forwarded were examined and passed by them; this committee also induced several manufacturers to send forward their inventions for the sake of doing credit to our country.

It may be more difficult to send bulky articles to Vienna than it was to Paris, but we have no doubt that the Austrian Government will seek to obviate this disadvantage by granting peculiar facilities to all persons who send from a great distance.

The experience we acquire in getting ready for the Vienna Exhibition will be of service in preparing for the great centennial celebration, to take place in Philadelphia in 1876.

It is the characteristic of the age that good things are not hidden away, and the chief benefit of international fairs is to make known what one people produces and what another wants. The Vienna Fair will be a grand opportunity for advertising our good things, and it ought not to be neglected.

FIREPROOF BUILDINGS FOR PRESERVING PUBLIC RECORDS.

The insecurity of public documents and records is one of the painful reflections forced upon us by the recent fire in Chicago. Our readers will find in another column an account of the character of the public buildings that were destroyed in that ill fated city.

The building that contains the records in the city of New York is, though nominally fireproof, only so by virtue of its isolation from other structures, and no doubt the majority of such buildings throughout the country are equally insecure.

In connection with the statements of the Chicago *Tribune*, relating to the shabby character of the Post Office, Custom House, and Sub-Treasury buildings that burned, we may profitably consider some statements in regard to the New Record Office, in London, and to methods of fireproofing buildings employed in Europe.

The Record Office, in London, is built wholly of iron and stone. It has no room larger than seventeen feet by twenty-five feet, and seventeen feet high. None of these rooms communicate with any other in the building. Each opens into a vaulted hallway. The doors are iron. The contents of any one room might burn without endangering those of any other in the building.

The use of wood in building for such a purpose ought to be strictly prohibited; then, if partitions were made sufficiently thick, and they were generally constructed on the plan of the London Office, the public records would be probably as nearly safe from fire as it is possible to make them.

How many more severe lessons are necessary to teach us wisdom? There are ways and means, cheap and available, for making buildings that will resist the progress of a fire, even if they will not withstand such heat as was generated by the united burning of the wooden buildings of Chicago. The French have a way of filling in the spaces between timbers, in partitions, with rubble and plastering. There are, in this way of building, no passages for flames through walls. In a very common way of constructing partition walls in this country, with lath and plaster upon studs, the whole building is a series of flues through which flame will rush the moment the plaster wall is crumbled by the heat.

The French method of filling partitions is employed in other parts of Europe. Houses thus constructed are almost as fireproof as if built of brick throughout.

We need not allude here to the many patented devices, calculated to increase security against fire, which have been described in our columns, since they have thus been rendered familiar to our readers. The plain truth is that, with plenty of resources, we have been building throughout the country in a manner disgraceful to a nation whose progress has been so rapid in other respects. Let the lessons we have received teach reform in this matter, and the pecuniary damage sustained will be in great measure compensated for.

SCIENTIFIC INTELLIGENCE.

CONTRIBUTIONS TO OUR KNOWLEDGE OF CARBON.

Berthelot states that the specimen of meteoric iron from Cranbourne, near Melbourne, Australia, contains, among other foreign constituents, fragments of pyrites and amorphous carbon, which latter is generally called graphite. The author concludes, from the behavior of this carbon to nitric acid, or to a mixture of this acid and chlorate of potash, that it is identical with the so called graphite contained in cast iron, but not with native graphite. All of the oxidation products of the meteoric carbon exhibit the same properties as the products of the oxidation of cast iron carbon, differing, however, from what can be obtained from graphite. He infers that the carbon of the Cranbourne meteorite was dissolved in the fused mass of iron, and separated on rapid cooling. From the coincident occurrence of pyrites, he concludes that the carbon comes from the decomposition of bisulphide of carbon by the glowing iron, and not from carbonic oxide. And he sustains this conclusion by acting, upon carbon thus prepared, with nitric acid and chlorate of potash, and finding that it is almost entirely dissolved, the same as the carbon from cast iron. From these experiments, it appears to follow that the native graphite cannot have been originally separated from iron, because it differs entirely from the carbon thus prepared. It is equally improbable that the natural graphite originated from anthracite or from the decomposition of organic substances, as the carbon thus produced does not yield graphitic acid. The author states that true graphite can be obtained by acting upon bisulphide of carbon at a high heat. If his conclusions are correct, the carbon from cast iron is not the same thing as graphite, and we must look to the decomposition of some such compounds as the bisulphide of carbon, or possibly of cyanogen, if we wish to discover the probable origin of graphite. Berthelot some time since prepared the compound of carbon with hydrogen, known as Marsh gas, by passing a mixture of bisulphide of carbon and sulphuretted hydrogen over metallic copper contained in a porcelain tube heated to redness. It would be well for future investigators to employ the method for the determination of carbon, described in the October number of the *American Chemist* by Mr. Cairns, of the Columbia College School of Mines, namely, by oxidizing directly with chromic and sulphuric acids.

A NEW CONSTANT BATTERY.

Figuier recommends, for the construction of a constant battery, a special preparation of the carbon which will work with one liquid, namely, dilute sulphuric acid. The carbon pole is coated with a thin layer of porous platinum or of silver. To accomplish the first operation, the carbon is brushed over with a solution of chloride of platinum, dried and exposed to red heat. To coat with silver, the carbon is soaked in a solution of nitrate, then suspended in an atmosphere of hydrochloric acid gas, and heated to free the chloride of silver thus produced. This chloride is subsequently reduced by the hydrogen gas that is evolved. Carbon thus prepared is said to give a constant current in dilute aulphuric acid.

CHEMICAL ACTION OF LIGHT.

M. Morren advances, as the result of numerous experiments, the following hypothesis: All chemical reactions occasioned by sunlight can be divided into two classes; the first class, characteristically represented by sulphuric acid, includes those bodies which are chiefly formed by the heat rays; the second class, represented by hydrochloric acid, includes such compounds as are produced by the action of chemical rays. The research is an important one, as the action of heat in determining chemical reactions is not sufficiently understood. The practical application of our knowledge of chemical rays to photography has led to a closer study of this branch of the subject; by the same industry, applied to heat rays, we may arrive at heat pictures and other interesting applications of this department of physics. A good many hidden changes in chemical compounds may possibly be traced to the action of the thermal rays of light.

VEGETABLE CEMENT.

A good vegetable cement may be prepared by mixing gum arabic with nitrate of lime. The latter is prepared by dissolving an excess of marble in nitric acid, and filtering. The filtered solution will contain 33·3 per cent nitrate of lime, which may be dried by evaporation. For the cement, take two parts by weight of the nitrate of lime, twenty parts of pulverized gum arabic, and twenty-five parts of water. The mixture can be further diluted to adapt it to the uses to which it is to be applied. In the manufacture of artificial stone, a cement of a similar character has been found to serve a good purpose. Something of the kind is used in the Frear stone, but in the *Béton-Coignet* no additional binding material is found necessary.

PRESERVATION OF MEAT.

By repeatedly immersing the meat in hydrochloric acid, subsequently drying, it is sufficiently cured to keep for a considerable time. When required for use, the acid must be neutralized by a little carbonate of soda, by which it will be salted. The strength of the hydrochloric acid must be determined by experiment.

PRESERVATION OF WOOD.

Armand Muller has instituted some interesting experiments upon this interesting subject, and arrives at the conclusion that the phosphate of baryta, formed by the mutual decomposition of phosphate of soda and chloride of barium in the pores of the wood, is one of the best preservative agents available to chemists. For the purposes of the experiment, Muller took twelve pieces of green oak wood, four inches long and one and a half inches in diameter, which he buried for twelve months, after suitable impregnation, in constantly moist earth, near a manure pit. One piece was left without any protection, for purposes of comparison.

No. 1, coated with tar, showed signs of mold and decay.

No. 2, impregnated with a mixture of light and heavy tar oils, containing three to four per cent of creosote, was only tolerably protected.

No. 3, with chloride of calcium, worthless.

No. 4, with chloride of barium, badly decayed,

No. 5, in a solution of borax, and afterwards in a solution of chloride of barium, was covered with mold and decaying.

No. 6. Soak the wood five days in a seven per cent solution of phosphate of soda, and after drying, suspend in a thirteen per cent solution of chloride of barium for seven days. The author thinks that wood thus prepared will withstand the action of moisture better than with any other preparation. The chief obstacle to the use of such chemicals is in their cost. He found the test piece of wood nearly as hard and unchanged as if it had not been buried at all.

No. 7 was separately soaked in solutions of sulphate of iron and soluble glass; result, tolerable.

No. 8. Soda, soap, and sulphate of copper. The wood was perfectly well preserved. This result suggests experiments upon ships' bottoms with such a mixture, as the poisonous effects of the copper would kill the boring worm, while it preserved the wood from decay.

No. 9. Soda, soap, and hydrated chloride of aluminum (chloralum); wood tolerably preserved.

No. 10. Chloride of zinc; this is well known to be one of the best wood preservers.

No. 11. Sulphate of copper, also well known.

No. 12. Corrosive sublimate; same as the last. Mercury salts have long been used as antiseptics.

No. 13, without any preparation, was entirely rotted and useless.

The best results appear to be attained whenever two antiseptic mineral salts mutually decompose each other in the pores of the wood, coagulate the albumen and exclude the water; and in searching for good wood-preserving material,

this reaction should always be kept in view. Phosphate of soda and chloride of barium, alternately applied, appear to yield, upon the whole, the most satisfactory results.

EXTRACTION OF OIL BY PETROLEUM.

The extraction of oil from seeds, by some volatile solvent instead of the usual hot or cold press, is constantly receiving more attention, partly because the yield of the extracted oil is found to be greater, and partly because the quality of the oil is better, without any diminution in the value of the cake for fodder. The light oils of petroleum appear to have certain advantages over bisulphide of carbon for the preparation of table and lubricating oils. In the treatment of the cacao bean, as the theobromine is not soluble in petroleum, all of the butter is removed without destroying the aroma, and the broma remains in the residue. Petroleum can be applied to the removal of fat from bones, and it leaves the bones perfectly clean and white, in which condition they are admirably adapted to knife handles, and take colors more readily. The oil and fat can at once be applied to the manufacture of soap or candles without further purification, and the yield of glue is increased. Several patents have been taken out for contrivances for extracting oils by means of petroleum, napththa, and bisulphide of carbon; but they do not appear to be well known, as the fat boiling nuisance still continues. It is a curious spectacle to witness the wasteful and disgusting method, of recovering fat, pursued in large cities, when a cheaper and more economical way is at hand. So also in pressing linseed, a large amount of oil remains in the cake, which would be saved if the extraction were to be conducted in a chemical way. We again call the attention of inventors to this important subject.

RECENT PATENT DECISIONS.

In the matter of the application of Timothy F. Taft for the extension of letters patent No. 18,025, for shears for cutting metal, granted him August 18, 1857.

The decision first prepared in this case was as follows:

The invention sought to be extended consists of shears for cutting metal, so constructed that the upper edge of the movable blade constitutes the inclined plane on which the wheel travels, while the wheel itself is compelled in its movement of translation to follow a horizontal direction by means of a horizontal plane in the opposite side of its circumference, and a supplementary wheel interposed between them. The bearing surfaces of the two wheels and two planes are plain, and, to avoid slipping from want of proper traction, the wheels and planes have severally cogged plates attached to them which mutually interlock.

Affidavits have been filed of three intelligent and apparently disinterested persons, as well as the affidavit and statement of the patentee, and they all agree in representing the machine in question as enabling a man to accomplish one third more work in a given time, and as doing the work better and with more ease than any other machine with which they are acquainted.

The examiner in this case reports:

"After a careful examination of the application, it is believed that the invention was new at the time the patent was granted; that it is valuable, and important to the public; that the patentee has not been reasonably remunerated, and that his failure to be so remunerated has arisen from no fault or neglect on his part."

From the examination of this case, I am satisfied all the requirements of the law have been complied with, as relates to extension, and accordingly the prayer of the petitioner is hereby granted.

Subsequently this decision was recalled, for reasons which appear below, and a new one rendered, as follows:

LEGGETT, Commissioner:

Upon the hearing of this case, it appeared, upon the records of the Office, that the patentee, Timothy F. Taft, had assigned all his interest in and to said patent, *including the extension, if granted,* to one Lucius W. Bond, by assignment, dated November 22, 1867.

I called the attention of the attorney to this matter, and informed him that the Office would not extend patents for the sole benefit of assignees, and could not, under the law. He then said that said assignment was given to Bond in the nature of a mortgage, to secure borrowed money, and that on June 13 last, Taft had settled the matter, and on that day the patent was reconveyed to Taft; but that he had neglected to have the reassignment recorded. The attorney then took the reassignment from among his papers, and had it put upon record, and assured me that it was a *bona fide* document, and that the whole title was then in Taft, and upon this assurance and belief the decision extending the patent was made.

As soon as the decision was made, the attorney took from his pocket another assignment from Taft to Bond, also bearing date June 13, 1871, and filed the same for record, thereby falsifying the statement that the title in the extension was in Taft, and further showing the reconveyance to Taft was a mere fiction to deceive the Commissioner of Patents.

The records of the Office further show, that on the 22d June, 1871, Taft also assigned all his right, title, and interest in the extension, to one Elizabeth H. Taft. He comes to the Office for an extension, and assures the Commissioner that he has, in his own right, the entire interest in the extension, while, in fact, the records of the Office show that, in June last, he sold for a merely nominal price to two distinct persons, by two separate assignments, all his interest in the extension, if granted.

In view of these facts, the former action of the Office granting extension in this case is revoked, and the extension is refused.

DAVID H. MORRISON'S PATENT.

In the matter of the application of David H. Morrison for letters patent for an improvement in iron bridges.

CARTTER, Chief Justice:

In the case of the petition of David H. Morrison for improvement in iron bridges, on appeal to this court from the decision of the Commissioner of Patents, the court have come to the conclusion to grant him a patent. The whole case is to be found in one consideration outside of the opinion of the Commissioner of Patents; or rather, is to be found inside of it.

"The applicant originally presented four claims," says the Commissioner, "and exception was taken to the first and fourth. The fourth was erased, and the first is now the only one in controversy. It reads as follows: 'The construction of the arch or top chord of the bridge by the use of the iron I beam, when arranged therein with its double flanges in vertical plane, substantially as described, for the purpose specified.' This claim was rejected by the primary examiner upon references which the board of examiners-in-chief do not think pertinent; but they go on to declare, in effect, that, the I beams having been used in bridges or other structures with double flanges in horizontal planes, it did not involve invention to arrange them with the flanges in vertical planes."

The Commissioner proceeds:

The applicant suggests certain advantages which will arise from his new arrangement, among others that the frames and truss work can be more readily attached to the arch or top chord, and especially by this arrangemen the tendency to lateral flexure is resisted without the necessity of cross timbers, while the tendency to vertical flexure, being less considerable, is not increased.

These advantages, I am of opinion, are substantial, especially the latter; and if the applicant was the first to obtain this result, the improvement might well be construed to be not for turning an I beam upon its side, but for the construction of the arch or top chord of a bridge, with a broad horizontal web to resist lateral flexure. This, if new, is useful, and I think patentable. It is, however, not new.

The arch exhibited in the withdrawn application of Penniman & McGlacklin shows a broad, horizontal web, which possesses the advantage of applicant's beam, and differs in nothing from his, except the fact that the upper flanges on each side are wanting. The web and lower flanges, as represented, perform the precise office of the same part in applicant's. The upper flanges merely strengthen the whole structure, and this reference anticipates the principle which is supposed to underlie the alleged invention, and, as the idea itself is old, reduces it to a mere application of an old device to an old purpose.

Now, the Office or the Commissioner disposes of everything connected with this patent except one reference, and that is the reference of the rejected application of Penniman & McGlacklin. He says that, inasmuch as the invention is anticipated in the one referred to, which was rejected, it is not new.

Now, this question of identity, or of difference, is a question of fact—a question in mechanics—and one to be determined by inspection. There is no other way of reaching it. The model of the rejected patent has been before us, and it has been fully examined and considered by us. From such examination, which was a careful and a thoughtful one, the court have come to the conclusion that it is not like the one for which a patent is now being sought, either in form or principle, or indeed in the mode of manufacturing. The only resemblance between the two consists in the former being made to perform, under a different arrangement, the same office that this arch is made to perform.

In the first place, the reference made here is a reference to a cast iron bridge—a bridge that could not be made of wrought iron. It is not an I beam in any sense, and could not be tortured into one. It is not the web of the I beam. Instead of the web between the flanges on either side, it is an open chamber, with links connecting it. It is not uniform in its size. The principle of that arch is a broad base at either bearing with a view of preventing lateral flexure, with a gradual withdrawal of the base until you arrive at the center of the arch. So that this support, the support of the vertical position of the arch, is designed to be maintained by this gradual spreading out of the arch to its base. Here the arch is uniform, and does not depend on such contrivance for its support.

Again, that is an arch, made in the form in which it is made, that could not be forged out of wrought iron. No machinery could make it; at least, the rolling process, by which wrought iron is reduced to shape in the I beam, could not be applied to it. It is not in the power of mechanics to roll out wrought iron in a diverging or expanding form; and grooves and dies of the roller must necessarily be uniform. Neither in the material, the form, the conception of the arch, nor the design of its peculiarities, is it identical with the contrivance in the application before us.

And that disposes of the whole case, for the Office enlightens us that, in every other particular, this application is worthy of a patent; and in this particular the Commissioner, although a very able man, an experienced patent lawyer, and a sharp, quick observer, must have come to this conclusion without looking at the reference that brought him to it.

The decision of the Commissioner is reversed, and a patent ordered to issue.

A Talking Machine.

The old talking machine of Faber is again on exhibition at Philadelphia, and is thus described in the *Post* of that city:

Previous to an experimental illustration of the wonderful powers of the machine, Dr. J. Solis Cohn delivered an exhaustive lecture upon the anatomy of the vocal organs and the formation of sound, the structure of the machine, and concluded with an historical sketch of the invention.

It was originated about thirty years ago by the uncle of Professor Faber, and exhibited at the time in that city. The present Professor Faber improved it wonderfully, although it took a great while to arrive at the present perfection. Seven years were necessary to arrive at the production of the sound of the letter "e." The exhibition last night consisted of the pronunciation of all the letters of the alphabet and elementary sounds of our language. Phrases of six and eight words in length were spoken in the English, French, and German languages. The voice is a shrill, monotonous, and unnatural one, but in the majority of instances startlingly correct. It was operated by a German lady, who does not understand a word of English, and produces the sounds simply through phonetic translation.

The happy pronunciation of a word or phrase was received by the audience with applause. If there is, in our estimation, any sound that is slurred in the slightest, it is the sound of the letter "i." It must be remembered that the basis of speech of this machine is the sound system of the German language, and that all the English words are spoken with a German accent. The machine is constructed as follows:

The machine consists of a gilded table, highly ornamented beneath which appears a bellows and a lever to put it in motion. Upon the top a lifeless face, with clammy eyes, stares on you, and behind it is arranged a mass of wires, strings, delicate wooden levers, rubber tubes, and pipes, which make up the speaking apparatus. By a compression of the bellows, the air is forced through a narrow aperture into an iron windpipe, and thence into an artificial glottis, from which it passes through a vent representing the human mouth, with movable jaws and rubber tongue. There are fourteen levers, which gives each a distinct utterance, and when moved in concert they produce the sound of any desired syllable. A separate lever causes a peal of laughter, which would be natural enough except for a slightly grating noise.

Are the Andes Sinking?

It is a singular fact that almost every successive measurement of the Equatorial Andes gives a reduced altitude. Thus:

Quito, according to		La Condamine	(1745)	is	9,596 feet.
"	"	Humboldt	(1803)	"	9,570 "
"	"	Boussingault	(1831)	"	9,567 "
"	"	Bureau des longs.	(?)	"	9,540 "
"	"	Prof. Orton	(1867)	"	9,520 "
"	"	Reiss and Stübel	(1870)	"	9,350 "
Pichincha	"	La Condamine	(1745)	"	15,606 "
"	"	Humboldt	(1803)	"	15,922 "
"	"	Prof. Orton	(1867)	"	15,827 "
"	"	Reiss and Stübel	(1871)	"	15,704 "
"	crater "	Moreno & Wisse	(1844)	"	13,600 "
"	" "	Prof. Orton	(1867)	"	13,300 "
"	" "	Reiss and Stübel	(1870)	"	13,175 "
Antisana hacienda	"	Humboldt	(1803)	"	13,465 "
"	"	Boussingault	(1831)	"	13,356 "
"	"	Prof. Orton	(1867)	"	13,300 "

This shows an apparent subsidence of Quito of 246 feet in 125 years, and of Pichincha, 218 feet. Its crater has apparently subsided 425 feet in the past twenty-six years. Antisana has subsided 165 feet in sixty-four years.

The Recent Discovery in the Arctic Regions.

A fortnight since, we informed our readers that the long cherished idea of the existence of an open sea surrounding the North Pole had been verified by the German explorers. The travelers Payer and Weyprecht have reached this region, in accordance with the suggestion of Captain Bent, by pursuing the course of the Gulf Stream, the warm current of which, he supposed, would lead to the gate of the frozen regions.

The scientific world will look eagerly for detailed accounts of this prodigious event in the history of the physical study of our globe. In the meantime, Captain Hall, in the *Polaris*, is pursuing the investigation through another channel, and, by our last accounts, was progressing rapidly towards his object

Answers to Correspondents.

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

ALL reference to back numbers must be by volume and page.

J. H. P., of N. Y.—There have been stories about the late shifting of the Gulf Stream, but no such stories have been authenticated.

E. V. N., of Ohio.—General George B. McClellan, 348 Broadway, New York, is the Chairman of the New York State Commission on Erie Canal Navigation.

HEATING SURFACE OF BOILERS.—A. H. G. can apply the rules for measuring cylindrical surfaces (which the SCIENTIFIC AMERICAN has recently given with such generous profusion) to his own particular case. A slight knowledge of arithmetic only is required.—D. B., of N. Y.

FISH IN LIMESTONE WATER.—Trout thrive well in limestone water, and if A. B. wishes to stock his pond and keep the fish in good condition, he is fortunate in having a never failing stream such as he describes. The brook trout will not do well unless the water be constantly running.—D. B., of N. Y.

SHAMPOOING THE HAIR.—H. L. J. will find, if he will break an egg into his hair, and shampoo his head with it, just before going into the bath tub, that it will cleanse his scalp better than any shampoo mixture that is sold. I have used eggs for washing the hair for fifteen years. F. S. C., of Mass.

FIREPROOF PAPER.—In answer to C. G. A., query No. 2, Nov. 4, newspapers can be rendered fireproof by dipping in diluted 25° B. soluble glass, by first neutralizing the alkali by diluted muriatic acid of 10° B, while hot, and drying by the atmosphere. Fire cannot then destroy the texture of the paper. C. G. A. may be sure of success with a little care.—J. W. F., of N. Y.

FIREPROOF CLOTH.—In answer to C. G. A., query No. 3, Nov. 4, tents, awnings, canvas, etc., can be made fireproof as well as waterproof by the careful application of soluble glass. First dilute it with boiling water to 25° B. by hydrometer, before thoroughly dry, immerse in a solution of sulphate of alumina (alum cake) and sulphate of copper (blue vitriol) consisting of one part of each to ten parts of water. The fabric cannot be impaired by slowly drying by atmosphere.—J. W. F., of N. Y.

SOLUBLE GLASS.—In answer to W. J., query No. 6, No. 4; The article you purchased in San Francisco was the silicate of soda or liquid quartz, only used by soap boilers for cheapening and hardening their grease. The right article is soluble glass (water glass or liquid silex), of a sirupy consistency (40° B.), of clear, transparent straw color, used expressly for cements, stone, etc.—J. W. F., of N. Y.

CLEANING BRASS.—I saw in the last number of the SCIENTIFIC AMERICAN several methods for cleaning brass. I have seen no smoother, brighter brasses than those on our locomotives, and they are cleaned thus: Rub first with a piece of dirty cotton waste, and polish with clean waste and soot from the furnace door. We use bituminous coal. For the dirty waste, use that first used to wipe the dust and oil from the engine. If G. N. K. will try this, he can have bright smooth brasses at small cost. All emery and such substances scratch the brasses and destroy the hard, smooth surface which is the very thing required to be maintained.—W. C., of W. Va.

DRYING ROOM FOR CLOTHES.—J. J., page 282, No. 18, current volume, can easily and cheaply improve his drying room as follows: If there is an unused chimney flue in the room, cut an opening into it, of the full size of the flue, about one foot high from the floor. If there is no chimney, make a draft flue of wood, tin, or stovepipe, the larger the better, and the higher the better, but let the opening be low down in the room. At or near the level of the floor, introduce the fresh air, by any convenient opening sufficiently large to supply the draft pipe fully. This is preferably placed near the heating pipe. The lower down the heater is placed, and the cold air is admitted, the better. The fresh air, being warmed, has an increased capacity for moisture; it rises to the ceiling, is diffused there, and forces down the cooler particles of air in the room, cooling itself and being forced down in turn, and escaping, laden with moisture, through the draft pipe, as may be easily seen by holding the flame of a candle at the opening. It is a common error to make the opening of the escape flue, near the ceiling, whenever ventilation is intended to get rid of either carbonic acid gas or moisture; but in this case the hot air travels in a direct current, escaping before half its work is done, and out of the direct current, scarcely doing any work at all.—J. H., of O.