SAFES AND VAULTS.

"The experience of the late fire affords much information regarding the relative merits of safes and vaults for the preservation of papers or other valuables. The work of digging out safes from the ruins, which was begun as soon as the heat of the smouldering piles would admit, resulted in proving the fact that safes, however well constructed, would not, under all circumstances, preserve their contents unharmed. Those placed in wooden buildings, as a rule, held papers and books in good condition; the materials of which such buildings were composed burned so quickly and entirely, leaving nothing remaining to smoulder and retain the fire, that safes did not become heated through. But in buildings of brick and stone, the result was more unfortunate. The safes fell among masses of material which burned steadily and gave forth intense heat for days after the first fire, and thwarted any attempts made at removal. The safes lying in the midst of such heaps of fire became intensely heated throughout, and when efforts to remove and open them were finally successful, their contents were found in many cases to be ruined. Books, papers, and bank notes still retained their form, but had changed to black in color, and, upon the slightest touch, crumbled into powder. In almost an exact proportion to the length of time they had been forced to remain in the burning ruins, safes were found to have preserved their contents uninjured or partially or totally destroyed. It is evident that, while a well constructed safe will hold, uninjured, books and papers, for a time, yet, if remaining in the fire for a long period, no one yet made will fulfil its purpose.

"With vaults the result proved entirely different. In nearly every instance well built vaults held their contents intact. Bricks and mortar proved excellent non-conductors of heat; and upon the opening of large vaults which stood for some days in the midst of fire, their interiors were found scarcely warm.

"These discoveries will doubtless have the effect of introducing more largely the construction of vaults in buildings devoted to business uses; and the disasters resulting from their faulty construction, of which the one in the Custom House furnished a notable example, will perhaps induce more care in building. A vault badly built is worse than a poor safe, for the latter does afford a degree of protection to what is within it, while the former gives no protection at all.

It must not be inferred from the statements made above that the safes buried in the ruins of the late fire did not accomplish a great degree of good. Property of immense value was preserved through their agency, and, where not exposed to heat of the most intense character and for a long time, the safes generally stood the severest test well, and reflected credit on the makers, and must continue to be used, even where vaults exist; for, to secure perfect safety, valuables must be placed in a safe surrounded by a vault; and, for ordinary fires, safes have proved themselves equal to all requirements. But for such occasions as the late fire, only vaults can afford the perfect security needed."

DOWN IN THE CAISSON OF THE EAST PIER OF THE ST. LOUIS BRIDGE.

(From the Railroad Gazette.)

The grand entrance is a brick shaft dropping vertically to the iron girders, and thence is finished in iron through the air chamber. The steps descend spirally; you find yourself hemmed in by the circular walls of the well. On each side of you are iron doors, about 18 inches square and 30 inches from the floor. The place is damper than a parlor, but drier than a well 60 feet below water surface should be. This you notice while a man who is sweeping the floor tells you that one of the doors will be open in a moment. There is a sound as of a whistling of air through pipes, and soon a door does open, and a man within beckons you to step through, which you do, into an iron bandbox, say 6 feet in diameter and about 9 feet high, containing several pipes with air cocks upon them, and a seat. As your companion has a candle, you observe another similar iron door opposite to the one by which you entered. Your companion now closes the latter and turns one of the cocks, when there comes in, with a sharp, loud hiss, an atmosphere which is destined to arrive at a normal pressure of about 40 pounds to the square inch. Directly you feel a severe pain in one ear. Your guide asks you concerning it, and directs you to perform the motion of swallowing, which you do and are relieved. After this you swallow involuntarily. The guide now tells you, speaking in a key above the hissing of the entering air, that the strength of 40 men could not open the door through which you have just passed, and that the opposite one will shortly be loosened. Soon this occurs, and you slip upon a floor of loose sand, which, illuminated by the candles of the workmen, looks like bright yellow sugar just turned out fresh from the hogshead. You walk through it with great freedom, and even when passing through one of the log girders, which divide the chamber into three compartments, longitudinal with the pier, by an aperture about 18 inches square, you step deep into a loose pile of it; you step out with little apparent effort. A little to your right and extending downwards from the ceiling is a pipe with a loose valve hanging to the end of it and palpitating like the tongue of a hot dog. This and others around supply the apartment with air. Upon your left a man is shovelling sand into a trough of water. Into this trough is encased the lower end of an iron pipe which drops from the ceiling. Near the top of this another pipe, which comes through the masonry parallel with it, turns into it and a little upwards. This is the sand pump. All the sand which the man throws into the trough is sucked up by the vacuum, created by a stream of water which comes down the second pipe, and is projected upwards through the first. And so this goes on regularly for days: the sand being excavated, the caisson with its load of stone sinking, and the masonry added continually until the rock is reached. Then men say that "another engineering epoch has occured. The east and largest pier of the St. Louis Bridge has safely reached the rock through a depth of ninety feet."

Still walking around, you notice that the peculiar bright appearance of the sand comes from the fact, that although the air pressure has driven all the free water from its interstices, a film surrounds each grain, retained there by an adhesion superior to the pressure, which brightly reflects the yellow light from the candles.

Now talking of candles reminds us of the Chief Engineer's remarks upon the danger of fire, in this triply compressed air, and his experiments thereon. These, moreover have been noticed as not agreeing with the experiments made by Dr. Frankland (Philosophic Transactions, 1861). As this subject must become of importance, in view of the increased use of compressed air in hydraulic construction, it may be well to lightly compare the two series of trials, and show that there is no discrepancy, but an actual agreement. Captain Eads plainly speaks of the danger of fire, and instances several cases where the clothes of the men had actually caught the flame, as showing the increased combustion arising from the increased supply of oxygen.

Dr. Frankland, in the above mentioned memoir, on the contrary, shows that from the rarefied air upon the top of Mont Blanc to the laboratory condensation of three atmospheres, there was no more tallow consumed and therefore no more combustion in the one case than in the other, and that the quantity agreed precisely with the quantity of material consumed under the normal pressure. The discrepancy, however, is explained by the very reasons deduced from his experiments, which he gives as the decreased mobility of the atoms of oxygen arising from the increased condensation. It is plain enough that, other laws being equal, the mobility of the particles may be in exact inverse ratio to the density, in which case the combustion will remain the same through all changes of pressure.

But would Dr. Frankland's experiments, if, instead of being conducted in a bell glass practically air tight and the pump stopped as soon as the desired pressure was obtained, made with a bell glass leaking at every pore, so that the pump would constantly have to supply the deficiency, with moving figures flitting from place to place, always in motion and constantly breathing, with the test object—the candle—continually changing its position, and sometimes blown upon with a strong blast from the lungs, with the figures violently agitated when the fire touches them—would, we say, his experiments have given the same result? It would seem not; for then the mobility of the oxygen particles would not have been decreased with their density. The action of leakage, the effect of moving bodies, would have restored the mobility, and we should have three times the oxygen with nearly the same, and not one third, the mobility, and consequently nearly three times the combustion.

There is, therefore, great danger from fire in compressed air, and a strong light, which could be retained in one place where the air is still, is a desideratum.

But we have now visited the subfluviatile chamber and seen its wonders, and so returning through the air lock, where the letting off of pressure does not affect the ear, we are at the foot of the spiral staircase.

Here comes the tug of war. Your strength which has been increased by the compression, has now fearfully diminished. You are weary and without nerve for the ascent. You feel, indeed, as a wet rag might feel if suddenly brought to a consciousness of its limpness. So with sloth you drag your weary way to the top, and finding the air still bleak, and wet, and Novemberish, and that when you get upon the streets your umbrella is twisted in every direction by the wind save the direction from which the rain comes, you wish you were back again deep under the river, with a plentiful supply of tempered air, strengthened with oxygen, and a steady umbrella over your head capable of turning aside the northwest wind and the full flow of the Mississippi River.

Sardines, Where They Come From and How Preserved.

There are few delicacies so well known and so highly esteemed as the sardine. The delicious flavor of the fish when the tin is first opened, and the sweetness of the oil (always supposing a good brand), print their charms upon the memory. It will be unwelcome news, however, to many to be told that anything good in this way is exceedingly scarce this season. Unfortunately, it was the same last year. Then the destroying demon of war took away the fishermen from the villages, and, added to this, the fish were scarce, so that more were contracted for than could be delivered. This year it is worse. Few fish of any size have been caught (except some very large), least of all those of the finest quality. The consequence is, that the French manufacturers are again unable to carry out their contracts.

The fishery, says the London *Grocer*, is carried on generally from July to November, all along the west coast of France. Two of the largest stations are at Douarnenez and Concarneau. Fleets of boats go out some few miles and spread out their nets, by the side of which some cod roe is thrown to attract the fish. The nets are weighted on one end and have corks attached to the other so that they assume a vertical position—two nets being placed close to each other, that the fish trying to escape may be caught in the meshes. Brought to land, they are immediately offered for sale, as, if staler by a few hours, they become seriously deteriorated in value, no first class manufacturer caring to buy such. They are sold by the thousand. The curer employs large numbers of women, who cut off the heads of the fish, wash, and salt them The fish are then dipped into boiling oil for a few minutes, arranged in various sized boxes, filled up with finest olive oil, soldered down, and then placed in boiling water for some time. Women burnish the tins; the labels are put on, or sometimes enamelled on the tins, which are afterwards packed in wooden cases, generally containing 100 tins, and then are ready for export.

It does not always seem to be remembered that the longer the tin is kept unopened the more mellow do the fish become; and, if properly prepared, age improves them as it does good wine. But if they are too salt at first, age does not benefit them—they always remain tough. The sizes of tins are known as half and quarter tins. There are two half tins, one weighing eighteen ounces and the other sixteen ounces gross. The quarter tin usually weighs about seven ounces, but there is a larger quarter tin sometimes imported. Whole tins, and even larger ones still, are used in France, but seldom seen here.

As is well known, the sardine trade is an important branch of industry, very large quantities being consumed in France; and the exportation to England and America is truly wonderful.

Proposed Ship Canal in Russia.

Under the heading of "Internal Navigation in Russia," *Le Moniteur des Interêts Matériels*, published in Brussels, gives the following article, which we translate:

"Since the completion of such immense works as the piercing of the Isthmus of Suez and the Mont Cenis, simply and easily done in a few years, none of the gigantic enterprises which our ancestors dreamt of, and for many years considered impossible, are likely to frighten engineers or capitalists. The union of the two seas in the south of Russia, has been, as is well known, ever since the time of Peter the Great, the "holy wish" of the Government of Russia. Of what importance to the great empire would a canal, permitting her to send her fleets into all the ports of Persia, and giving a support to her power in the East, be! And what an accession of power would result from the possibility of carrying, to one destination, the united fleets of the Black and Caspian Seas!

"From commercial and industrial points of view, we might predict a great future for such a canal; for a sea, hitherto closed, would be open to all maritime nations; and their vessels could, without discharging cargo, penetrate into the heart of Asia, and also carry to the West all the products of Persia and Central Asia. Russia has only too many reasons to favor such an enterprise; and accordingly the Czar instituted, in 1864, a commission charged to consider the feasibility of the project. The chief of this commission, M. Blums, believes the plan to be practicable; and, if we study the map with a little attention, the immensity of such an enterprise reduces itself to proportions comparable to those of the Isthmus of Suez Canal.

"The distance which separates the Sea of Azov from the Caspian is about 650 or 700 Russian versts, or 700 kilometers (about 441 miles). The Isthmus of Suez is 150 kilometers across. But two important rivers, the Manitscha and the Kooma, both take their rise in the Caucasus, and empty their waters respectively into the two seas; and using their streams would permit a considerable abridgment of the labor. The engineering difficulties will probably be greater than at Suez, where the highest rise in the level was only 20 meters. It will be necessary to leave a much larger margin for contingencies, and it is well known to what an amount these came in the earlier work. Still other new problems present themselves. Here, however, are the figures given by the engineers of the abovementioned Russian commission:

"A canal can be constructed from one sea to the other for 81,000,000 silver rubles (about $60,750,000). The measurement of the soil to be removed will amount to 550,000,000 cubic meters (about 720,000,000 cubic yards).

"The Russian Government cannot, at present, hope to see other nations concurring in this enterprise. Foreign commerce will naturally prefer the shorter and better canal of Suez; but the junction of the Sea of Azov to the Caspian is of such importance to the Russian empire, both from political and commercial points of view, that the Government will not shrink from a considerable expenditure. And it would be in Russia itself that the greater part of the needed capital must be sought; and it would there be possible to obtain it, by insuring, as has been done to the railway enterprises, a sufficient interest for the money. It would be easy, moreover, to promote, in the countries which the canal is intended to unite, the creation of banks and other commercial establishments, by the concession of lands and of facilities of transit. The question is of permanent importance to Russia, and from the present state of public opinion in that country, and from the spirit attributed to the Government, it will probably be answered in a sufficiently short time."

A Square Toed Plan for Making Money.

A Boston boot and shoe firm, which has an extensive Northern reputation by reason of its loyalty, lately hit upon an ingenious plan to push their trade in the South. They invented a sort of a square toed boot, on the leg of which was imprinted the likeness of Gen. R. E. Lee, and this was to go into the general Southern market. A finer boot was then made with the picture of Stonewall Jackson, also imprinted on the boot leg, and this was intended especially for Virginia dealers. The firm then applied for a patent on their trade mark. The Examiner to-day decided that the application could not be granted on the ground that these trade marks tended to encourage disloyalty in the South. The firm have taken an appeal to the Commissioner.

Comparative Merits of Narrow and Regular Gage Railways.

Mr. Silas Seymour, the well known consulting engineer, was lately applied to by Mr. Marshall O. Roberts for his opinion on the subject of narrow gages for great trunk lines of railroad. Mr. Roberts, as President of the Texas Pacific Railroad Company, had received from the chief engineer of that company, General G. P. Buell, a report in favor of the narrow gage of three feet six inches, the reasons for recommending it being, first, that, in the construction of the road bed, the difference of cost will be 30 per cent in favor of the narrow gage; second, in the construction of the superstructure, the difference of cost will be 45 per cent in the same direction; third, with proper construction of rolling stock, a speed of thirty-five to forty-five miles per hour can be attained with perfect safety on the narrow gage; fourth, the construction of rolling stock will cost 50 to 55 per cent less; and, fifth, in loaded trains of mixed freight and cars on the 3 foot 6 inch gage, the percentage of dead weight to load will be about 47-100, while in a similar train on the broad gage it will be about 75-100.

Mr. Seymour does not agree with General Buell either in his premises or his conclusions, and proceeds to take up his "five reasons" and dispose of them one after another. After speaking of the difficulty of making any practical comparison he takes up the matter of the cost of the road bed. The side slopes and embankments, side drains, bermes, wings, end walls, and coping of culverts, he says, would cost the same in both cases, as would also truss bridging, as that used on the broad gage road is as narrow as will allow of the requisite lateral bracing to keep the bridge in perfect line and adjustment. The difference in cost then he declares to be, at the most liberal estimate, only the cost of a strip in the middle about a foot and two inches wide, which would be less than 10 per cent of the whole. The saving in the cost of the superstructure, he then proceeds to show, would be only the value of one foot and two and a half inches in length cut from the middle of each tie, as the same weight of rails is required in each case for trains of the same weight, and any advantage to be gained by multiplying trains and using lighter engines is equally applicable to both kinds of road. In the matter of cars, he claims that fully as much is lost by the necessity of using a larger number as is gained in the lower cost of smaller cars. The cost of locomotives, providing the same power is used, will be no greater for the wide than for narrow gage; and if there is a difference, it will be in favor of the larger engines. In dealing with the third reason of General Buell, Mr. Seymour declares that he does not think that "thirty-five to forty-five miles per hour with perfect safety" can be attained on any road, and that it is generally conceded that "in the ordinary condition of our roads and rolling stock a wide gage is the safest for high rates of speed."

The fifth and last reason of the chief engineer of the Texas Pacific, in favor of narrow gage, is characterized as the weakest of all the arguments advanced in its favor. There is no means, says his critic, for making any satisfactory test in this matter, but he ventures the opinion that a platform ten feet in width, of the same proportionate strength as one of the same length and five feet wide, will be found to be of less than twice the weight, and that less than twice the power will move it. The same is true of box cars and saloon coaches to a greater degree, and the conclusion is that the disadvantage of a greater proportion of dead weight is wholly imaginary. Mr. Seymour declares that all the advantages claimed for narrow gage roads can be realized with greater economy and safety by using the same character of rolling stock on the 4 foot 8½ inch roads, and that the slight additional cost of construction of the road would be more than over-balanced. The advantages which he claims for the 4 foot 8½ inch gage over that of 3 foot 6 inch he sums up as follows:

1. If commercial advantages are to be gained by exchanging cars with connecting lines, you would be in a condition to secure them.

2. A train, like a wagon, may be hauled much easier with wheels of large than small diameter. This width of gage allows of considerably larger wheels, under its ordinary roll ing stock, than are admissible upon the narrow gage; but with this proposed reduced hight of cars upon the wider gage, the wheels may be made so much larger that a very material saving will be effected in power.

3. Having a greater base of track in proportion to the hight and width of your cars, the irregularities in the track would be less apparent; and you would certainly make as fast time with greater safety, or faster time with equal safety than you could upon the narrower gage.

4. The hight and width of train being less than that in general use upon the wider gage, the atmospheric resistance would also be proportionately less; and you could make faster time with the same amount of power than is made upon the ordinary 4 foot 8½ inch railroads.

5. You would relieve the entire question, or at least the wider gage portion of it, from the enormous load of extra dead weight which it has heretofore been compelled by its adversaries to carry, because under this arrangement it would evidently be reduced to merely the weight due to the extra length of axles.

6. If time and experience should happen to demonstrate that your chief engineer is wrong in his present convictions upon this subject, you could correct the mistake hereafter at much less expense than you could if the grading, masonry, superstructure, rolling stock, etc., were all adapted to the narrow gage.

The subject, as presented to the mind of the engineer, naturally divides itself into four general propositions; First, comparative cost; second, comparative facility and economy in packing or loading; third, comparative economy in hauling; fourth, comparative advantage of a gage common to connecting lines. As to the first, he admits that the advantage is slightly in favor of the narrow gage, but to nothing like the extent claimed by the advocates of the extreme narrow gage theory. As to the second, he claims that the advantages are so greatly in favor of the wider gage as to far outweigh the additional cost of construction. He believes that rolling stock for the wider gage can be constructed cheaper and of less weight in proportion to its comfort and capacity than rolling stock of the same relative width, strength, and durability adapted to the narrower gage, and that it can be used for equal rates of speed with greater safety. He believes that there is a great deal of unnecessary and non-paying weight carried, and a good deal of useless friction to overcome on all railroads, but does not think it altogether chargeable to the width of the roads. He concludes by recommending for the Texas Pacific Road a 5 foot gage as better still than the 4 feet 8½ inches. Mr. Seymour fortifies his views by a liberal citation from the arguments of other eminent authorities on the subject.

Chills and Fever.

Hall's Journal of Health, for November, has the following seasonable article on the above subject. Chills and fever and bilious fevers have prevailed to an unusual extent in the vicinity of New York this season, as well as in many other parts of the country.

Dr. Hall says: It very generally prevails in the fall of the year over large sections of country. Scattering cases are liable to occur anywhere. These arise from individual indiscretions; but where large numbers of persons in communities are attacked, there some general cause must prevail. This cause has been attributed for ages to "miasm," an emanation from the earth so subtle in its character, that for more than a century the greatest skill of the ablest chemists was not able to detect its nature or define its quality. A bottle of air taken from the most deadly localities was submitted to the most careful and searching analysis without the detection of anything solid, gaseous, or liquid; nothing could be found in the bottle but air, thin air. But the microscope has come to the aid of the alembic, and has discovered in this, the miasmatic air, multitudes of living things. When bottles of this air were taken from the banks of a Southern *bayou*, and placed in the chamber of a man in Chicago by Dr. Salisbury, he was taken with chills and fever in a few days, and these living things were found on his tongue and within his mouth; while not a single one was to be found all over the city, except in that one man's mouth, in his chamber, and in the bottles. Whether this life is animal or vegetable, is a matter of dispute, yet it seems capable of producing chills and fever; but whether animal or vegetable, the laws which regulate the action of miasm on the human system remain the same, and the mode of production, or the causes of the generation of this miasm, remain unchanged; and these laws have been determined and described with wondersul accuracy. This miasm results from warmth, moisture, and vegetation combined; if one is absent, miasm is not formed; vegetable matter will not decay unless there is moisture, it will dry up; it will remain under water a thousand years without decay, as witness the wooden piers of ancient bridges, as sound to-day as when they were driven by Adam's grandson, or somebody else who lived a long time ago. The heat must act on the moisture before miasm becomes a product. This miasm, to be injurious, must be taken into the system by breathing into the lungs, or by swallowing into the stomach. But cold, as the "first frosts" which are everywhere known to make it innocuous, condenses this miasm, makes it so heavy that it falls to the surface of the earth, and can be neither breathed nor swallowed; on the other hand, heat so rarefies the air in which this miasm is contained, that it carries it up towards the clouds, where it is no more breathed than if it laid immediately on the surface of the earth. Hence heat and cold are antagonistic to the disease-producing effects of miasm on the human body. To freeze it out is expensive, but to antagonize it by heat is possible, is everywhere practicable.

From an hour after sundown to an hour before sunrise, the cold causes it to settle on the surface of the earth. An hour after sunrise and until an hour before sunset, as a general rule, it is too high above our heads to injure us, in consequence of the heat of the weather.

As the heat must be over eighty degrees for several days to generate miasm, it follows that the time, during which we are required to battle with it, is at sunrise and sunset during the spring and fall months. But to make it safe from the first blade of grass in spring until the killing frosts of autumn, dress by a cheerful blazing fire, and take breakfast before going outside of the door; come home before sundown, take your supper before its setting, by the same cheerful blazing hearth, then go and do what you please. You may sleep under a tree, or on a swinging limb, and defy fever and ague for a century, if you only keep warm, abundantly warm.

Val de Travers Asphalte a Failure.

We see, the London *Building News* says, that the shopkeepers and others of the Strand and other parts of London are petitioning to have certain thoroughfares paved with asphalte. Now, considering the many advantages attending the use of this material for paving purposes, we are not surprised at the growing feeling in its favor, and particularly just now after a summer's experience. But we entreat all who are asking for its more extensive application to pause a little. Let them have the experience of winter as well as summer before they decide. When passing through Leicester square yesterday (October 19) about mid-day, we saw that hundreds of people had collected. We thought at first that some procession or other spectacle must be coming. We were, however, soon undeceived, for the horses while passing over the asphalte pavement were falling down so fast as to excite a great deal of public attention and curiosity. Though we were not present more than a few minutes, several horses slipped and fell during the time, and others that did not fall were in peril of falling while passing over the pavement. Some cabdrivers as soon as they got on the asphalte cautiously turned back again, others turned away at the very first turning, and all that passed over had to do so slowly and with extreme care. We don't know whether the same kind of pavement in other parts of London is so dangerous during humid weather as that recently laid in Leicester-square: if so, the demand for tearing it up will very soon be stronger than that for laying it down. No doubt Val de Travers asphalte is very good for Continental cities, but for London and other large English cities, during winter, it will be found altogether unsuitable.

Lequesne's Commutator.

The elements of an electric pile can be grouped according to three classes, that of tension, of quantity, and of series. When, with the same battery, successively different effects are produced, or when the action lasts long enough to show a sensible decrease of energy, the groupings of the elements can be changed according to the variations of power or of resistance. The change involves a marked loss of time when it is necessary to produce it by manœuvring the wires of the electrodes. But one can obtain the commutations for obtaining various grouping by the simple movement of a handle. M. Lequesne is the inventor of a commutator of this kind, and M. le Comte du Moncel states, in his report to the *Société d'Encouragement*, that it is more complete and more efficient than the similar apparatus already in use. M. Lequesne gives to his special commutator the name of Voltaméreiste. It is composed essentially of a cylinder, to the surface of which is applied a series of metallic plates, divided up in a particular manner with regard to the various systems of groupings of the battery, and of two systems of rubbing plates, bearing on the cylinder and in contact with the divided plates and two different generators.

The one of this series is directly in connection by wires in the positive poles of the different elements of the battery, the other with the negative poles, and it is only necessary to turn the cylinder, in such a manner as to place under the rubbing plates such combinations of the divided plates, to obtain immediately the desired grouping of the battery.

To obtain the element of quantity in the battery, it will be sufficient to bring, under the two series of rubbing plates, two continuous metallic plates of a length equal to that of the two series of rubbers. The battery will then work as if it were composed of a single element, with a surface equal to that of the whole of the elements.

To add all the elements in tension, it is necessary to have a number of metallic plates equal to half the number of the elements of the battery, all ranged on the same generator of the cylinder, and of a width sufficient for the plates of the two series to be applied simultaneously, two by two.

Lastly, to obtain a series, that is to say, to obtain from a battery of 24 elements the current which should give, for example, a battery of 8 elements of threefold the surface, it is necessary that the divided plates alternate from the one to the other series of rubbers as many times as there are series of elements, for instance, eight times, in the examples given above.

M. Lequesne constructs the apparatus for 24 elements, and combines them together when he operates with batteries of a greater number of elements. He places in his cylinder eight series of plates, permitting eight groupings by series, that form a battery of 24 couples.

Speed of Carrier Pigeons.

The Newark *Advertiser* gives the following: The wonderful flight of the carrier pigeon Tempest to Montclair, N. J., was noticed some time since. We have now to record the still more extraordinary time of two other birds sent home. The following notes were found on them on their arrival:

DEAR FATHER—Sept. 15, 1871—Lat. 27 deg. 10 N., long. 79 deg. 30 W., 1,004 statute miles from Montclair, N. J.,—I will let the male bird Tornado go with this note at exactly nine o'clock A. M., New York time. I let the bird Tempest go on the 10th. She rose up about 500 yards high, and then made one tremendous plunge to the North, and was out of sight about as quick as a flash of lightning.

HARRY C. BLEECKER.

DEAR FATHER—Sept. 21, 1871—Lat. 26 deg. N., long, 93 deg. 5 W., 1,596 statute miles from Montclair, N. J.—I will let the old bird Typhoon go with this note at exactly eight o'clock A. M., New York time. He is a powerful bird, but he has a fearful job on hand. He must go through it or perish. All well.

HARRY C. BLEECKER.

The bird Tornado arrived at Montclair the same day at three o'clock and seven minutes P. M., making over 196 miles an hour. Typhoon arrived the same day at three o'clock and fifty-four minutes P. M., and fell dead on his arrival, but he brought the note in the unprecedented time of 202 miles an hour.

ELECTRIC LIGHTS FOR SHIPS.—M. Marten suggests the plan of attaching to sailing vessels a screw propeller, the motion of which shall be obtained from the movement of the ship. The author proposes to utilize the power so obtained, in giving motion to an electromagnetic apparatus, from which such vessels may be supplied with the convenience of an electric light, thus dispensing with the use of oil, and gaining besides the advantage of the greatly increased illumination.