Italian mind which in many directions and forms is so evident."

Correspondence.

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

Proposed Industrial Fair at Washington.

MESSRS. EDITORS:—There is now in the Treasury of the United States more than $500,000 of money received through the Patent Office in excess of expenses. The average amount of such surplus that may be calculated upon hereafter will not be less than $200,000 per annum. All the other bureaus are maintained entirely at the expense of the Treasury. But Congress intended that the Patent Office should be in the main self-sustaining, and to the special tax necessary for that purpose the inventors of the world—for whose benefit the Office was created—consent. It seems reasonable, however, that the taxes thus paid by them should be appropriated for their benefit, and that they should not be diverted to other uses, so long at least as there were wants of their own to the relief of which the money might properly be applied.

Now the models which are required by law are of great and daily importance, and should not be dispensed with unless from necessity. But the space provided for them is already mainly occupied, and about 5,000 square feet of additional shelf surface is required every year. It would also be of great advantage to the supporters of the Patent Office if opportunity were afforded to exhibit working machinery as well as manufactures and other products.

Two years ago it occurred to me that this surplus, which was then said to be of about half its present amount, might with propriety and advantage be applied to the commencement of a structure that would meet present wants and be capable of indefinite expansion. An eminent architect expressed the opinion that such an undertaking would be perfectly feasible. It was believed that from moderate beginnings the present wants of the Office and its patrons might thus be supplied by an institution that would grow into proportions commensurate with the growing requirements and capabilities of the American people, that international rivalries might also be invited—that it might thus at length become developed into a permanent world's fair, at the same time that it subserved the legitimate purposes of the Patent Office.

Circumstances prevented an effort to carry out that project then, but other circumstances have revived the intention now. At least it has seemed proper that the idea should be presented and discussed, and, if deemed expedient, adopted and urged to its consummation.

An effort is now being made by the people of this district to hold a World's Fair in this city at no distant day. Nearly half a million of dollars have already been subscribed for that purpose, and it is confidently believed that this amount may be increased to $1,000,000. Especially if, instead of being a temporary undertaking, it is made one which contemplates permanency.

Now if these two projects were united, could they not be worked up into what might prove a great mutual as well as general advantage? There is competent authority for saying that with $1,500,000 a permanent structure of iron and glass might be made of a capacity at least equal to that of the entire Patent Office building. Sufficient space for the arrangement and preservation of models would thus be provided as well as for manufactures and machinery of all descriptions. A permanent temple would thus be erected to human ingenuity to which men of genius from all quarters would resort to give and receive new inspiration.

I hope the thought will not be deemed extravagant that under the united influence of the Smithsonian Institution, the Patent Office, and the Agricultural Department, this establishment might at length become the chief center of the arts and sciences of the civilized world.

As far as has been yet ascertained the matter as thus presented meets with favor among those under whose auspices the project of a World's Fair here has been inaugurated. Before making any serious effort on the subject, however, it is thought expedient to know the views of inventors and their friends on this subject. Your position and character render your opinions of great moment, and on that account I now address you.

It is not proposed to ask the appropriation of a single dollar by Congress. All that would be expected from that quarter would be a permission to appropriate funds which rightfully belong to the Patent Office to aid in carrying out the common enterprise which is mainly for its benefit.

I am fully conscious of the fact that, in a mere financial point of view, the "Exposition" would prove a much greater success, if held in some large commercial city. But that is not the question now. The enterprise is already undertaken. It will be carried through, as I am assured. Whether it prove a financial success, or otherwise, to the stockholders is not an element in our present calculation. It is only here that the Patent Office could, with any propriety, connect itself with such an undertaking, for it is only here that this undertaking could yield those advantages that would justify the connection and expenditure. Besides, Washington is not the commercial rival of any other city, and the jealousy that might be excited against most other plans of like magnitude would interpose no obstacle here.

Washington. D. C. CHAS. MASON.

Magnetic Action of Wind Currents.

MESSRS. EDITORS:—I have been making some experiments for the past three months, which, I think, will interest some of your readers. The instrument used consists of a wind vane made of a thin board some four inches long by one twentieth wide, and as thick as a sheet of commercial note paper. In one end are placed four magnets, so arranged that the south poles point down and perpendicular to the vane, which turns freely on a pivot. The instrument is placed in a box so that the air cannot disturb it.

It sounds singular to hear of a wind vane protected from the wind, but, so it is, and I have never, during the entire course of my experiments, found it at fault in indicating the quarter the wind comes from, and that some little time before it comes. The final experiment was made to-day. I placed the instrument at right angles to a meridian traced on the floor, and left it to itself for one hour. When, on returning, I found it had changed its position, and pointed to the southwest. I timed it, and found that in fifteen minutes the wind came from the southwest (number 1 of the Smithsonian table). There had been nothing of note, in a meteorological point of view, for over one week, so that the magnetic currents could not have influenced the vane. ERNEST TURNER, C. E.

Philadelphia, Pa.

Suggestions about Steam Navigation and Steam Boilers.

MESSRS. EDITORS:—One of the greatest benefits your valuable journal confers is, that its columns afford a means of ready communication between all classes of inventors—those of the hand as well as those of the brain; and thus the floating, useless visions of the theorist meet, fructify, and utilize the barren through vigorous growth of the man of practice alone. The mechanic sets his wheels and gear, and calls for assistance; a spirit is breathed upon them which animates the mass. Encouraged by such reflections, I venture to send you some of my random ideas for publication. They *might* be flint to some ones steel. Concisely and briefly, then, in regard to steam navigation:

Robert Stevenson said, the problem here was how to diminish the friction of the vessel and the water; not how to increase the power of engines. Among others, two systems might accomplish this: The discovery of a new instrument, or new application of the old; or a change of naval construction.

First—taking it for granted, I am not quite sure, that the resistance is as the square of the depth, then a lessening of depth in the water, with same power, would increase speed. We need, therefore, as it were, to raise the vessel. If gas raises a balloon, it should raise a ship, and naturally suggests itself as the means. A ship contrived by the aid of gas, to draw only one, or a few feet of water, with a powerful engine, would seem, in theory, to solve Stevenson's problem. My objection is, the vast bulk of gas; but my calculations may be wrong. I suggest the use of gas, in this manner, as a subject for reflection.

I believe ships are now modeled after the fish because nature is supposed to have suggested it. They are made sharp and deep. I suggest, ships do not go through the water like a fish, but over the water like a duck. The water fowl is nature's model for those things which go over the water, flat, broad, and rounded. The objection of the effect of waves is futile. The center of gravity is at our disposal.

Another problem is to lessen the consumption of fuel. Now, a steam boiler consists of water in a metal vessel. When fire is applied, the metal absorbs a vast amount of heat, radiates, deflects, and otherwise destroys the effect of the fuel on the water. This is entirely due to the material of the boiler. What we want, then, is some agent which will hold the steam and water, while it will allow the direct action of the fire on the water—a substance which shall pass rays of heat as fully as glass does the rays of light—a heat-glass. Rock salt does so perfectly, so far as the heat is concerned, but is soluble and combustible. Can not some chemist give us a silicate of sodium which will answer? GEO. R. PHELAN.

Memphis, Tenn.

The Tidal Wave.

MESSRS. EDITORS:—The SCIENTIFIC AMERICAN, of November 13th, contains an article on this subject, copied from the London *Spectator*, and your readers are admonished editorially against overwhelming you with remarks on the same. It is, therefore, with hesitancy that I venture the following.

The drift of the paper quoted, is to show that by the tidal action, the rotation of the earth on its axis is retarded in consequence of the friction of the water, following the wave in its westerly and opposing direction to the earth's rotation. This is substantially the sum of the proposition.

Since the friction of the water is the retarding cause, how would the case stand if there were no water, or if solidified, and itself became friction, leaving a dry earth.

Trivial as this assigned cause, friction, appears, to disturb the precision of the earth's rotation, remaining undetected for ages, does it even exist, in an appreciable degree, or if so, is not its tendency to accelerate the rotation?

If we start with a swell or wave under the moon, the western course of her attraction would keep up the swell from the advancing or western side, and the eastern side would be constantly receding, *i. e.*, the source of renewal to the swell would be drawn from the advance and its decline eastward, by the retiring attraction of the moon. Hence, the friction of the water, both to and from the swell, would be in favor of acceleration. THOS. W. BAKEWELL.

Pittsburgh, Pa.

RAT POISON.—Recent experiments have shown that squills is an excellent poison for rats. The powder should be mixed with some fatty substance, and spread upon slices of bread. The pulp of onions is also good. Rats are very fond of either. —*Journal de Chimie.*

[For the Scientific American.]

THE SPECTROSCOPE AND AURORA BOREALIS.

BY DANIEL KNODE WINDER.

In a report of the proceedings of the Royal Astronomical Society, published in May last, there is a record of several interesting observations, concerning the spectrum lines of Aurora, which it is interesting to compare with several observations made on this side of the Atlantic Ocean. These observations promise to be useful in aiding us to determine the nature of the Northern Light.

In the report alluded to, Mr. Plumber tells us, that in the spectrum of Aurora, he saw one bright line in the green, near E.

Mr. Angström saw it as one bright line in the yellow, near D, and several faint bands, near F.

Mr. Struve observed one bright line, near D, and traces of two others in the green.

Professor Winlock has seen six lines, the brightest of which was near E.

The writer has frequently seen one bright line in the yellow, near D (coincident with one of a group of lines which appear in the solar spectrum, when the sun is near the horizon), and one faint line in the green. On one occasion there was visible one additional line in the red.

It has always proved a difficult task to determine, with certainty, the position of the spectrum lines of Aurora, and as the value of observations with the spectroscope rests principally upon our ability to do so, I am glad to find that the locations of eight lines have been announced.

The wave length of M. Angström's bright line is 556·7.

The lines seen by Mr. Winlock, he determines, micrometrically to be as follows: the bright line 1474, the other five lines, 1280, 1400, 1550, 1680, 2640, Kirchoff's scale.

The bright line seen by myself I found to be very nearly 557.

Now we learn from these observations: First, that the light of Aurora gives a spectrum consisting of bright lines; secondly, that the same number of lines are not always seen; thirdly, that the lines are fixed in their positions; fourthly, that the same line is not always the brightest; lastly, that one line in the spectrum of Aurora is coincident with a dark line, which appears in the solar spectrum, when the sun is near the horizon.

I was much pleased to find in No. 15, current volume, SCIENTIFIC AMERICAN, an interesting letter from Professor Vander Weyde, criticising the conclusions reached by M. Angström, and, also, those resulting from my own observations. To the objections which he urges against my hypothesis I will reply briefly, and, I trust, in the same kind spirit which he has shown in his criticism.

First, he objects because the spectrum seen by me is different from the spectrum of oxygen.

I reply, that this is a weighty objection to the opinion I have expressed, that Polar light is principally incandescent oxygen. But I have been led to this conclusion from the coincidence of the bright line in Aurora, with a line in Solar light, which I think it probable, is produced by oxygen, because of the density of that gas. The difference between the spectrum of oxygen and that of Aurora, does not seem necessarily to prove my opinion incorrect, for it is a well-known fact, that the spectra of elements vary according to the circumstances under which they are produced. For illustration, potassium usually gives a spectrum of only three of the seventeen lines of which it is known to consist. Again, the position of the hydrogen line, F, in the spectrum of Sirius is changed by the movement of the star, as it recedes from the earth. Again, carbon gives six differing spectra, according to the circumstances under which they are produced, and in these the same line is not always the brightest.

Secondly, Professor Vander Weyde objects, because of the presence of a line, in the spectrum, that has not been identified. I confess that I am at a loss to comprehend this argument, as I have only expressed the opinion that Auroral light is, principally, not exclusively, incandescent oxygen.

Lastly, he objects to my explanation of the change of the bright line to a black one. I reply, that I accept the common theory, explaining the change of solar lines from bright to dark ones; I never, for a moment, doubted it; but the line under consideration is not an ordinary solar line, but one that is seen only when the sun is near the horizon. and, therefore, seems to require a different explanation, and as it is not seen at midday, I conclude that it is darkened by absorption in its passage (morning and evening) through the earth's atmosphere.

I am happy to find so many distinguished scientific gentlemen interested in the subject of the nature of Aurora Borealis, and I entertain a hope that the observations made before the present season of Auroral displays shall have passed away, will enable us to explain more fully the nature of its phenomena.

Toronto, Ont., Nov. 15, 1869.

A NEW WHITEWASH FOR WALLS, recommended by the Boston *Journal of Chemistry*, is as follows: Soak one fourth of a pound of glue over night in tepid water. The next day put it into a tin vessel with a quart of water, set the vessel in a kettle of water over the fire, keep it there till it boils, and then stir until the glue is dissolved. Next put from six to eight pounds of Paris white into another vessel, add hot water and stir until it has the appearance of milk of lime. Add the sizing, stir well, and apply in the ordinary way while still warm.

"Paris white" is *sulphate of baryta*, and may be found at any drug or paint store.