M. Lommel fixed the brass rod in a certain position, and moved the ebonite plate up and down under it, taking figures at each position. He also used an ebonite plate with an aperture, allowing the brass rod to pass through it. He shows how the various figures are related to the original two. The cause of the Lichtenberg figures is to be found (he thinks) in a peculiar state of motion of the air about the conducting body, and this is simply imaged on the ebonite plate.

TURBINE WATER WHEELS.

BY S. W. ROBINSON.

A look at the numerous turbines on exhibition in Machinery Hall, and their elaborate catalogues, giving lists of the thousands which have been introduced in this country, gives evidence of a thriving and extensive business; and one can hardly realize that thirty years ago the turbine was scarcely recognized as a motor.

The first wheel of this kind was made in France by a Frenchman named Burdin, in 1827 or 1828, but the real merits of the wheel were not generally accepted till some five years after. Soon after this it began to receive the attention of American engineers; and the first of these wheels of importance was constructed by Uriah A. Boyden, in 1844, and introduced into the Appleton Company's cotton mills at Lowell, Mass. Tests of these wheels gave remarkable results, the maximum being 92, and the mean maximum 88, per cent of useful effect from the power of the water.

This extraordinary figure is supposed to be due to the engineer's extreme precaution in polishing the surfaces of the apparatus, using Russian iron guides and floats, and in giving such form to the flume as to impart to the water, as it approached the guides, such a spiral-like rotation as to cause it to enter the guides without resistance. The trials which gave the above percentages decided the great superiority of the turbine over the old breast wheel, and engineers at once saw that, for perfecting water motors, their attention must be turned into a new channel.

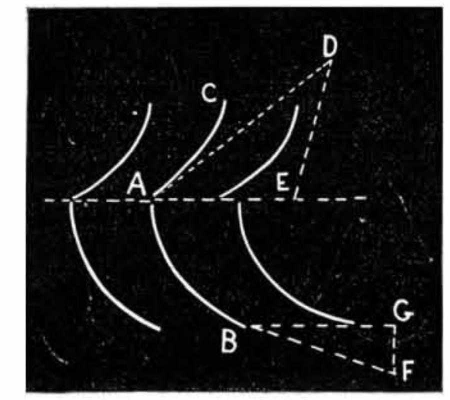
The breast wheel was at once summarily dismissed, and the turbine adopted for reasons unmistakably in its favor, some of which are the following: 1. Increase of percentage from five to fifteen. 2. Greater compactness. 3. Perfect freedom from back-water annoyance. 4. Perfect adaptation of given wheel to all heads. 5. More convenient speed of running. 6. Much less subject to fluctuations of speed. 7. Convenience of installment, and for shipment ready made. Advantages of breast wheel, none.

Some of these point are self-evident, but others, such as Nos. 1, 3, 4, and 6, may not be. To help this, and also for the reason that the correct theory of the turbine wheel is but poorly comprehended, as evinced by the forms given the parts in existing ones, the following descriptive exposition of the main theory is given with the hope that practical builders may thereby receive a benefit.

First of all, water wheels must receive power from the water by reducing its velocity, and water engines by action of its pressure. These points are believed to be sufficiently evident from observation. It is therefore obvious that, for a maximum of effect, the water should have the greatest possible velocity due to head in approaching the wheel; and in leaving, the motion should be entirely destroyed. To illustrate, suppose a flat disk be placed square against an isolated jet of water. If stationary, the water will be thrown in all directions without much change in velocity, and no power is developed because standing still. If it moves with the water the stream is not disturbed, and also no power developed. At half the water velocity, the vane receives its greatest power, but the water is projected laterally, and for this reason the motion of water is not destroyed, and the maximum of effect is known by hydraulic engineers to be only half the power stored in the moving jet. But this is what may be styled a fair example of percussion, and hence builders of wheels who operate on this principle must expect low returns.

Next, suppose the vane be in the form of a hollow half cylinder, and placed so that the jet strikes it tangentially at one side. While stationary, the water is sent around the smooth surface, and escapes, with velocity unchanged, in a direction differing by 180°: and of course we have no power. Giving the vane the velocity of the jet, we get no power again, but with half the velocity of the stream it receives the water with a relative velocity, one half its absolute, and passes it to issue at 180° unchanged, at which the absolute velocity of the water is zero. Now multiplying the motion of vane by the pressure against it, the result is found to be equal to the whole power of the water. In this example we see that the water is delivered upon the float without shock or percussion, and leaves it without velocity, which principle has long been known in theory as the necessary condition for high percentages. As this has regard to the power of the jet only, the latter should, of course, be made the maximum, by giving the water the highest possible velocity of projection. Of the forms of orifice of projection, the one known, from experiment, to give the greatest velocity is that formed in a thin wall, whose coefficient, or realizable percentage of the theoretic velocity, is about 97. Rapidly converging adjutages give very nearly this, say upwards of 92, while prismatic adjutages give only 82 per cent. Hence a turbine, whose chutes have parallel sides, can only return a percentage of 82, provided the wheel otherwise be absolutely perfect. It is therefore evident that the form of chute is of no whit less importance than the wheel.

Again, in turbines there should be a certain adaptation of chutes and floats to each other, and certain forms of wheel passages and exits. The forms most consistent with theory are best explained by aid of the accompanying diagram, which may be regarded as a side view of a Jonval turbine. Let A B represent a float of the wheel, and A C a guide. Let D A represent the direction and velocity of the affluent water, and B F the same for the issuing water. Take A E or B G for the velocity of wheel, which must be equal, from the nature of the case. The point, D, should be found by making D E equal to A E, and the direction of D E the same as the first elements of the floats. Then we have D E = A E = B G.



Now if a particle of water moves from D to A, while a point on the wheel moves from E to A, the direction and velocity of the water, relatively to the wheel, will be D E, and hence will enter tangentially upon the float with entire freedom from shock. Compared with the cylindrical vane above, the water will move along the curved float, A B, without change of velocity, and issue with a velocity, B F, equal to D E. But as D E = B G, then B G = B F, and the absolute velocity of the water will only be G F. If the water could be made to issue tangentially, G F would be zero, as required for a percentage of 100. Though in practice G F must have a magnitude, it should be reduced to the minimum. The water has also been regarded as having uniform velocity from A to B. That this be possible, the transverse sections through the inter-float passages should be the same at all points. Hence, that the exits be thin, requires them to be long from crown to crown. And again, in order to deliver the water on wheel in direction, D A, the last elements of the guides should have the direction, D A; otherwise the form should be favorable for high velocity of projection.

Now this diagram may be greatly varied, and still these principles hold equally well. It is only necessary that D E = A E = B G = B F; last element of guide have direction D A; first element of float have direction D E; and inter-float passages be uniformly large from beginning to exit. The velocity of wheel will be to that of the water as A E is to A D. When the first elements of float, for instance, are perpendicular to A E, the guide direction, A D, should be 45°. For float direction, A D, 60° to the right, guide direction will be 60° to the left, and A D E will be an equilateral triangle. Indeed A D E is always an isoceles triangle.

In designing a wheel it is very important that there be no interference to free passage of water in the curbing or penstock, or in the vent from wheel; and hence these should be large and unobstructed.—*Polytechnic Review.*

THE BLACK KNOT.

There are many things in Nature seemingly so insignificant that we consider them unworthy of our notice; yet they have the power of doing us great benefit or harm according to their habit. The mold, upon bread, cheese, and on most other neglected vegetable matter, is well known to be a plant growth of a low order. It is a fungus, and of the same nature as our common mushrooms. The potato disease, which is causing so much anxiety in England and on the continent of Europe, is also the result of a fungous growth. These plants are now receiving considerable study from botanists on account of both their practical and their scientific interest.

In this country, and peculiar to it, the black knot, as it is called, on plum and cherry trees has recently been proven to be another fungus. Dr. W. S. Farlow, of Harvard University, has presented, in the *Bulletin of the Bussey Institution*, a most important paper as the result of his researches on this subject. The black, warty excrescences on plum trees and on all kinds of wild and cultivated cherries have been noticed by every one from early time, and have long been the bane of fruit growers. For the most part, these have been attributed to the work of insects; and this has not been without considerable shadow of reason. Insects are not unfrequently found there, and in old knots insects or their remains are generally found. The curculio often pierces the knot in its young state, and deposits within it its eggs, which soon hatch out. The young live in the knot, and may be found there in the various stages of their development. Insects also of different species have been found within these knots.

But it is now conclusively demonstrated that the unsightly knots are not of insect origin. Though, till very recently, the subject has been almost entirely neglected by botanists, it now seems certain that they have determined its true character. The knots are not like galls, made by a known insect; and when young, they are most frequently entirely devoid of insects. Again, the fact that the insects are not all of one species, and the very same are also found on trees which are never afflicted with knot, would be quite conclusive against this assumption. On the other hand, the knot has never been found without the presence of the specific fungus (*sphæria morbosa*), which is now accepted as its origin; and this fungus is not known to exist except in connection with the knot. The mycelial threads, however, of the fungus are found in the slightly swollen stem long before any real semblance to a knot has appeared; but the growth of these may be traced till the knot has attained its full size, and the fungus has shown all its phases of life.

Dr. Farlow has considered the life history of the fungus, whether the disease is the same on plum and cherry trees, and the means of preventing its ravages.

The knots vary in size from a few lines to several inches in length, and average about two inches in circumference. They seldom entirely surround the branch, and often cause it to bend or twist into unsightly shapes. The vegetative portion first appears in the form of very minute threads (mycelium), twisted together and extending from the cambium—or inner—layer of the bark towards the outer portion of the stem. "The fungus first reaches the cambium either by the germination of spores on the surface of the branch, or by the mycelium proceeding from a neighboring knot." Hence the Professor concludes that the growing layer of tissue is where the fungus commences its work of destruction. During the growing stages of the knot—which continue to the flowering time of its victim—it is of a greenish color and solid or pulpy throughout. When it has attained its maturity, it turns black; and in the winter it often becomes cracked, broken, worm-eaten, and hollow. The outer shell contains the perithecia, which are small pits or sacs containing the sexual spores. These, always eight in number, are borne in *asci* or cells. These cells grow slowly during the winter, and the spores in them ripen from the middle of January to the end of February. Those ripening in February germinate in from three to five days, if sufficiently moist.

Microscopic investigation proves that the knots on plums of all sorts, and on cultivated, wild, and choke cherries, are identical: though, to the naked eye, they differ slightly in general appearance, owing probably to the more favorable circumstances for their growth in some species of the genus *prunus* than in others.

The remedy against this contagious disease is a very obvious one: simply to cut off and burn the knots and swollen branches when and wherever found. This should be done in autumn as soon as they become plainly seen by the falling of the leaves. It is not sufficient to cut them off, for some of the spores which do not ripen till late in the winter have been carefully observed to ripen after the branches were cut from the tree and not afterwards burnt. Professor Farlow recommends the complete destruction of choke cherry, bird cherry, and wild plum trees, since they furnish means for the rapid propagation of the knot, and are themselves of little value in comparison with the cultivated cherries and plums. "Concert of action is what is needed in this matter, and not only by attending to one's cultivated trees, but to the wild plums and cherries that frequent our fence rows and woodlands as well: as in very many instances the latter prove to be pest houses where the contagion is propagated and sent forth to carry desolation over many a thriving tree, dear to the eye of its owner." The wild plums are the most abundant in the Western States, and the wild and choke cherries in the Eastern. These, in their habitats therefore, require special attention.

This is a matter of vast importance to fruit growers; and to institute vigorous measures, against this destructive fungus, will be a great source of profit to fruit producers and merchants, as well as an equally great source of comfort and enjoyment to the consumer. S. H. T.

The American Reports on the Vienna Exposition.

We have received the four volumes of reports of the United States Commissioners to the Vienna Exhibition of 1873, which have just been published, under authority of Congress, at the Government Printing Office, at Washington, D. C. The work possesses a double interest: first, in that it is a tangible result of the expenditure of $200,000 of the people's money, and of the labors of certain paid scientific commissioners and eight practical artizans: second, in that it is a valuable record of the Vienna show, edited with much ability and discriminating judgment.

Professor Thurston devotes volume first to an introductory description of previous world's fairs, following which is a complete account of the organization of the Vienna Exposition. Copious extracts from the reports of the commissioners from other nations upon the United States exhibit are given; and a report on forests and foresting, by J. A. Warder, M. D., and one on sheep and wool, by J. R. Dodge, close the volume. In volume second are collected all the reports on scientific and educational subjects. Volume third is mainly occupied by the editor's own report on machinery and manufactures, to which are added Mr. William Watson's paper on "Engineering and Architecture," that of Mr. Fairfield on "Sewing Machines," and that of Mr. Charles Davis on "Hydraulic Engineering." Volume fourth contains reports on buildings, wood and stone industries, metallurgy, and a copious general index, which greatly adds to the value of the work as a book of reference. There is a lavish profusion of maps and engravings, and the general appearance of the book is superior to the usual official productions of the government printer. We shall, as opportunity offers, lay before our readers such abstracts from the work as appear interesting. Meanwhile, and in advance of the public verdict, we can warmly commend Professor Thurston's labors. He has accomplished a task of great magnitude, with a thoroughness which will secure wide and favorable recognition, and he has given us probably the best set of reports ever based upon a world's fair.

Science in America.

The following passage taken from the opening address of Professor Sir William Thomson, on assuming the chair of the section of physical science at the Glasgow meeting of the British Association, will be read with interest as showing the impression made upon an English student of Science by our progress in discovery and practical science:

"Six weeks ago, when I landed in England after a most interesting trip to America and back, and I became painfully conscious that I must have the honor to address you here today, I wished to write an address, of which Science in America should be the subject. I came home indeed vividly impressed with much that I had seen, both in the great exhibition at Philadelphia and out of it, showing the truest scientific spirit and devotion and originality, the inventiveness, the patient, persevering thoughtfulness of work, the appreciativeness, and the generous open-mindedness and sympathy from which the great things of Science come.

"I wish I could speak to you of the veteran Henry, generous rival of Faraday in electromagnetic discovery; of Peirce, the founder of high mathematics in America; of Bache, and of the splendid heritage he has left to America and to the world, in the United States coast survey; of the great school of astronomers which followed—Newton, Newcomb, Watson, Young, Alvan Clarke, Rutherford, Draper, father and son; of Commander Belknap, and his great exploration of the Pacific depths by pianoforte wire, with imperfect apparatus supplied from Glasgow, out of which he forced a success in his own way; and of Captain Sigsbee, who followed with the like fervor and resolution, and made further improvements in the apparatus, by which he has done marvels of easy, quick, and sure deep sea soundings in his little surveying ship Blake; and of the admirable official spirit which makes such men and such doings possible in the United States naval service.

"I would like to tell you, too, of my reasons for confidently expecting that American hydrography will soon supply the data from tidal observations, long ago asked of our government in vain by a committee of the British Association, by which the amount of the earth's elastic yielding to the distorting influence of sun and moon will be measured; and of my strong hope that the compass department of the American navy will repay the debt to France, England, and Germany, so appreciatively acknowledged in their reprint of the works of Poisson, Airy, Archibald Smith, Evans, and the Liverpool compass committee, by giving in return a fresh marine survey of terrestrial magnetism to supply the navigator with data for correcting his compass without sight of sun or stars. I should also tell you of 'Old Prob.'s' weather warnings, which cost the nation $250,000 a year, money well spent, say the western farmers, and not they alone; in this the whole people of the United States are agreed, and though Democrats or Republicans playing the "economical ticket" may, for half a session, stop the appropriations for even the United States coast survey, no one would for a moment think of starving 'Old Prob.'; and now that 80 per cent of his probabilities have proved true, and General Myer has, for a month back, ceased to call his daily forecasts probabilities, and has begun to call them indications, what will the western farmers call him this time next year? The United States naval observatory is full of the very highest Science, under the command of Admiral Davis.

If, to get on to precession and nutation, I had resolved to omit telling you that I had there, in an instrument for measuring photographs of the transit of Venus shown me by Professor Harkness (a young Scotchman attracted into the United States naval service), seen, for the first time in an astronomical instrument, a geometrical slide, the verdict on the disaster on board the Thunderer, published while I am writing this address, forbids me to keep any such resolution, and compels me to put the question: Is there in the British navy, or in a British steamer, or in a British land boiler, another safety valve so constructed that, by any possibility, at any temperature, or under any stress, it can jam? and to say that if there is, it must be instantly corrected or removed. Can I go on to precession and nutation without a word of what I saw in the great Exhibition of Philadelphia? In the United States government part of it, Professor Hilgard showed me the measuring rods of the United States coast survey, with their beautiful mechanical appliances for end measurement, by which the three great base lines of Maine, Long Island, and Georgia were measured with about the same accuracy as the most accurate scientific measures, whether of Europe or America, have attained in comparing two meter or yard measures. In the United States telegraphic department I saw and heard Elisha Gray's splendidly worked-out electric telephone, actually sounding four messages simultaneously on the Morse code, and clearly capable of doing yet four times as many with very moderate improvements of detail; and I saw Edison's automatic telegraph delivering 1,015 words in 57 seconds—this done by the long-neglected electro-chemical method of Bain, long ago condemned in England to the helot work of recording from a relay, and then turned adrift as needlessly delicate for that.

"In the Canadian department I heard 'To be or not to be' —'there's the rub,' through an electric telegraph wire; but, scorning monosyllables, the electric articulation rose to higher flights, and gave me passages taken at random from the New York newspapers: 'S. S. Cox has arrived' (I failed to make out the S. S. Cox), 'The city of New York,' 'Senator Morton,' 'The senate has resolved to print a thousand extra copies," "The Americans in London have resolved to celebrate the coming Fourth of July.' All this my own ears heard spoken to me with unmistakable distinctness by the thin, circular disk armature of just such another little electromagnet as this which I hold in my hand. The words were shouted with a clear and loud voice by my colleague judge, Professor Watson, at the far end of the line, holding his mouth close to a stretched membrane, such as you see before you here, carrying a little piece of soft iron, which was thus made to perform in the neighborhood of an electromagnet in circuit with the line motions proportional to the sonorific motions of the air. This, the greatest by far of all the marvels of the electric telegraph, is due to a young countryman of our own, Mr. Graham Bell, of Edinburgh and Montreal and Boston, now becoming a naturalized citizen of the United States. Who can but admire the hardihood of invention which devised such very slight means to realize the mathematical conception that, if electricity is to convey all the delicacies of quality which distinguish articulate speech, the strength of its current must vary continuously, and, as nearly as may be, in simple proportion to the velocity of a particle of air engaged in constituting the sound?

"The Patent Museum of Washington, an institution of which the nation is justly proud, and the beneficent working of the United States patent laws deserve notice in the section of the British Association concerned with branches of Science to which nine tenths of all the useful patents of the world owe their foundations. I was much struck with the prevalence of patented inventions in the Exhibition; it seemed to me that every good thing deserving a patent was patented. I asked one inventor, of a very good invention: 'Why don't you patent it in England?' He answered: 'The conditions of England are too onerous.' We certainly are far behind America's wisdom in this respect. If Europe does not amend its laws (England in the opposite direction to that proposed in the bills before the last two sessions of Parliament), America will speedily become the nursery of useful inventions for the world. I ought to speak to you too of the already venerable Harvard University, and of the Technological Institute of Boston, created by William Rogers, brother of my Glasgow University colleague, Henry Rogers, the Cambridge of America, and of the Johns Hopkins University of Baltimore, which with its youthful vigor has torn Sylvester from us, has utilized the genius and working power of Roland for experimental research, and, three days after my arrival in America, sent for the young Porter Poinier to make him a Fellow. But he was on his death bed in New York, 'begging his physicians to keep him alive just long enough to finish his book, and then he would be willing to go.' Of his book, 'Thermodynamics,' we may hope to see at least a part, as much of the manuscript and kind and able friends to edit it are left; but the appointment of a fellowship in the Johns Hopkins University came a day too late to gratify his noble ambition. But the stimulus of intercourse with American scientific men left no place in my mind for framing or attempting to frame a report on American Science."

THE LATEST NEWS FROM THE SUN.

There are not many persons living who, with the reverend Director of the Observatory of the Roman College, can lay claim to have minutely examined the face of the sun every day for the past ten years. Father Secchi, moreover, as an astronomer is the peer of Lockyer, Huggins, or Young, and as such his conclusions are worthy of the highest respect. The new edition of his work on the sun, which has lately been published in Paris, embodies the results of his most recent investigations, as well as of those which have extended over long periods of time, and hence it may be regarded as one of the latest dicta of Science regarding the physical constitution of our luminary.

Father Secchi's theory of the sun spots is that they are phenomena of eruption. They result from the upheavals which take place in the solar mass, and form, in the photosphere or luminous envelope, cavities more or less regular, surrounded by brilliant projecting ridges. The depth of these cavities rarely exceeds 3,600 miles—generally it is less —and the hollows themselves are filled with dark vapors which absorb and so cut off the luminous rays emitted by the strata beneath. The physical constitution of the solar mass, and the true nature of the incessant motion of which it is the seat, have been little understood. Now, however, we are in possession of a spectroscopic method of distinguishing the different currents which cross and mingle, of discerning the jets of hydrogen and of incandescent metallic vapors, and observing the rose-colored protuberances which formerly could not be studied, except during a total eclipse, when the bright light of the radiant disk was intercepted. Father Secchi has determined the closest relations between the spots and the protuberances seen on the solar edge.

If the results of a series of observations of solar rotations be considered, it appears that the spots, the most brilliant faculæ, and the eruptive protuberances (those which contain metallic vapors) appear as a rule in similar regions on the the solar disk, that is to say, in the two zones near the equator and comprised between the 10th and 30th parallels of latitude, and that the majority of these phenomena occur at the same epochs. When a number of individual observations of spots and protuberances are thus compared, this conclusion is often at fault; but this is to be expected, because the protuberances can be seen only on the edge, while the spots and faculæ are visible on the face, of the sun. On the other hand, the parallelism of the three orders of phenomena becomes manifest when the results are considered in the aggregate. Moreover, whenever a considerable protuberance rises on the oriental side, it is almost certain that a spot will appear next day in the same place.

Father Secchi therefore considers that without doubt the spots and protuberances are correlated phenomena, and that the spots are a secondary effect of the eruptions which are revealed to us by the protuberances. It is necessary, however, to note that the latter do not always appear to be true eruptions, as they are often simple jets of incandescent hydrogen which rise from the photosphere like fires from a forge. Such flames cannot produce the absorbent vapors which form the spots. Hence a distinction must be made between eruptive protuberances characterized by the presence of metallic vapors, and hydrogen protuberances where such vapors are not manifest; but, the author adds, traces of the metallic spectroscopic lines are almost always discernible at the base of the hydrogen jets. The difference between the two kinds of protuberances, therefore, while existing, is not clearly defined. Often the metallic lines of the protuberances are visible on the solar disk, and are prolonged as far as the nucleus of a spot near the edge, affording irrefutable evidence that the metallic vapors have their origin near the nucleus. Beyond the 40° parallels, true spots and eruptions are rarely encountered.

The eruptions are probably violent crises produced by chemical combinations which occur at a certain depth below the solar surface. The cooled products of the reactions unite in thick clouds, like those clouds arising from sulphur volcanoes, which fall by virtue of their weight when condensed, and bury themselves in the luminous envelope, while they in turn are quickly invaded by the ambient matter of the photosphere. From all sides tongues of fire penetrate the interior of the spot, and, joining it together in places, divide it into segments. These luminous filaments give to the penumbra its radial structure, and then, becoming as it were dissolved in the obscure mass, lose their brilliancy by cooling. The spot then assumes quite a regular rounded form; a period of calm succeeds the fierce effervescence and the tumultuous and discordant movements which characterize the formative processes. Above the dark nucleus, less intense emanations occur of short and slightly luminous flames, in which the spectroscope is no longer able to recognize the lines of metals. Then, little by little, the spot diminishes and finally totally disappears.

This theory is believed to account for all the phenomena hitherto observed; and it will be seen that Father Secchi is no adherent of the whirlwind theory, which he somewhat brusquely dismisses as a "fiction destitute of all reality." Out of several hundred spots which he has closely observed he says that but seven or eight show a spiriform structure. This even disappears in a day or two, and often the rotary movement, after becoming slower, is rendered in the opposite direction. The motion, he affirms, is no essential property of the spots.

The physical constitution of the sun, our author sums up as follows: The sun is formed of a fluid incandescent mass, enveloped in a highly luminous photosphere, above which there is yet an atmosphere of less density. The photosphere is a fiery mist, probably of gases which have become luminous through the effect of high temperature and high pressure. Immediately above this, a very thin envelope of metallic vapors mixed with those of hydrogen is encountered. This is the chromosphere, and its thickness is from 10 to 15 seconds of arc. Beyond the chromosphere again there is a vast envelope composed of hydrogen and of two unknown substances which produce the yellow spectrum line D_3 and the line 1,474, and to one of which the name "helium" has provisionally been given. During total eclipses of the sun, the outer envelope becomes visible and produces the phenomenon of the corona. Finally the vast eruptions throw forth jets of hydrogen to hights equal to one fourth the solar diameter, 224,400 miles, and with such tremendous velocity that it is believed that the hydrogen may at times leave the sun and pass into the interstellar space.

Look Out for Him.

A correspondent from Springfield, Mo., sends us a receipt signed R. Allen, for one year's subscription to the SCIENTIFIC AMERICAN.

The writer states that the person to whom he paid his $3.20 was a modest, retiring sort of an individual, and represented himself to be a special correspondent of the paper. It is likely that the same party has swindled others out of their money, in Springfield and other places in the vicinity.

We warn our friends in all parts of the country against subscribing and paying money to any one unknown to them, on our account. No traveling agents are employed; and if any stranger claims to be an authorized agent for soliciting subscriptions, denounce him as a swindler wherever you find him, and keep your hand on your pocket so long as the person remains.

Naval Engineer Corps Gazette.

September 29. Chief Engineer John B. Carpenter and Assistant Engineer C. P. Howell were detached from the United States steamship Alaska, and placed on waiting orders.

Passed Assistant Engineer Julien S. Ogden has been ordered to duty at the Navy Yard, New York.

October 4. Chief Engineer O. H. Lackey was ordered to duty as member of the board at Annapolis, Md., for the examination of midshipmen for promotion to the grade of ensign.

Passed Assistant Engineer Robert Crawford has been ordered to temporary duty at the Naval Academy, Annapolis, as an instructor in the department of steam engineering.

FOR the protection of workmen handling lead and mercury compounds, M. Melsens, of Paris, France, recommends small daily doses of iodide of potassium. This salt, he says, dissolves the lead or mercurial compounds, and effects their removal.