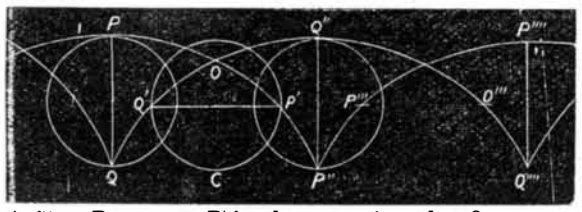
Correspondence.

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

Comparative Velocities of Different Points on a Driving Wheel.

To the Editor of the Scientific American:

As some of your readers have asked for information on this subject, I send the following for the benefit of A. P. C., and others:



1. Since P moves to P′ in the same time that Q moves to Q′, their average velocities will be respectively as the distances, namely, the average velocity of P, is to the average velocity of Q, as distance PP′, is to distance QQ′. But PP′$=2r\sqrt{2}$, and QQ$=2r(2-\sqrt{2})$, r being the radius of wheel; therefore, vel. of P : vel. of Q :: $\sqrt{2} : 2-\sqrt{2}$ :: 1·414 : ·586. It will be seen that the average velocity of P, thus far, is more than double that of Q.

2. At P′ and Q′, the velocities are equal.

3. The average velocity of P, from P′ to P″, is to the average velocity of Q, from Q′ to Q″, as ·586 is to 1·414.

4. The average velocity from P to P″ is the same as from Q to Q″.

5. The velocity at P, Q″, P‴, etc., is a maximum; at Q, P″, Q‴, etc., a minimum.

6. The velocities are the same at P and Q″, at Q and P″, at Q′ and P′, at O; and at any two points on the same horizontal line.

7. The velocity of P is inversely the same as that of Q; or, in other words, P ends with the velocity at P″ that Q starts with, and P starts with the same velocity that Q ends with at Q″.

8. While the center moves a distance equal to $2\pi r = 6{\cdot}283 \times r$, the point P moves over a distance equal $8r$.

J. T.

Indiana University.

Remarkable Astronomical Phenomenon.

To the Editor of the Scientific American:

On Friday, December 13, 1872, there was a brilliant display on the surface of the sun, of the hidden forces within. The sky was cloudless, and at a little past ten o'clock, A. M. I was observing the sun with one of my transit instruments, for the purpose of adjusting the lens, when there appeared streaming forth from the western limit of the sun something similar to the flashes of the aurora, which obscured so much of its advancing edge that I could not proceed with the adjustment until matters became more quiet. Some of the flames reached to a distance, outward from the surface, equal to one eighth of the diameter of the sun, which would amount to over 100,000 miles. These appearances subsided in about 15 minutes after I first noticed them.

For the last five years there have been but very few clear days in which I have not spent more or less time in similar observations, but have had no good evidence of any such disturbance before, and had no reason to look for such things, as I only employ one lens, and that is of very low power. I hope the astronomers at some of our observatories were fortunate enough to be at their eyepieces at the time; if so, I trust we shall, from some of them, have a full description of this interesting phenomenon. EDWARD PREVEAR.

Leominster, Mass., December, 1872.

The New Ships for the Pacific Mail Company.

To the Editor of the Scientific American:

In your issue of December 14, in an article entitled "Revival of American Ship Building," you inform the public that the two steamers for the Pacific Mail Steamship Company have lately been launched at Wilmington, Delaware.

The Colon was built by the Delaware River Iron Steamship and Engine Works, situated at Chester, Delaware Co., Pennsylvania, (John Roach & Co's. yard), and launched Nov. 16, more than a week prior to the launch of the Acapulco at Wilmington, Delaware, on which account the Colon gets the engines which are being or were built in Scotland for the one that should be first launched. The Delaware River Iron Steamship and Engine Works have the sister ship nearly ready for the water and are preparing to lay the keels for two more ships for the Pacific Mail Company, which are to be 420 feet over all; which, when done, will be the largest vessels ever built in this country. I do not like the Scientific American to be in error; I quote it too often. N. RULOW.

Chester, Pa.

The Antiquity of Man. Letter from Professor Kirkwood, LL.D., of the Indiana State University.

To the Editor of the Scientific American:

Your paper of October 12, owing to some unusual delay, did not reach me till this morning. It is not proposed to renew the discussion on "Theology and Science." To most of your readers any further agitation of the subject would perhaps be undesirable. In a scientific paper, however, facts should not be given without careful scrutiny. I beg therefore to correct the following statement of a correspondent on page 228 of your current volume:

"The greatest age of human antiquity, if theology is true, as maintained to-day is less than six thousand years, beginning in the days of Adam and Eve. Yet the Chinese records in astronomy go back twenty thousand years. The eclipses and conjunctions of planets in the days of Fedo, 10,000 years ago, have been recalculated by Baily and other astronomers, and they have mathematically demonstrated the truthfulness of the Chinese astronomical records, showing a difference of time of but fifty-one seconds."

Now the earliest eclipse of which the date has been preserved occurred in the twenty-second century before the commencement of our era. This is recorded in the Shoo King, "which is considered by the Chinese as the most ancient of their books." See Chambers' Descriptive Astronomy, page 198, the Memoirs of the Royal Astronomical Society, vol. XI., page 47, and the Monthly Notices of the Royal Astronomical Society, vol. XXIII., page 238.

The statement quoted in regard to planetary conjunctions is no better sustained. The most ancient account of an occurrence of this kind is found, it is true, in the Chinese annals. Its date, however, was but 2,449 years before the Christian era. See Observations of Comets, extracted from the Chinese Annals, translated by John Williams, F. S. A., one of the Secretaries of the Royal Astronomical Society, and first published during the past year.

In regard to the antiquity of man I express no opinion. But a cause, however good, cannot be permanently promoted by a loose statement of facts. DANIEL KIRKWOOD.

The November Meteors.

To the Editor of the Scientific American:

Since November 27, I have looked in vain for some notice of an unusual meteoric shower that took place at that time. I first noticed it at seven o'clock, P. M., and called my wife to see the celestial display. By facing in opposite directions, we were able to count more than three hundred meteors, of various sizes and degrees of brightness, in half an hour. Had the sky not been partially obscured by clouds, we doubtless could have counted many more. From the decrease in the frequency of their fall, we inferred that the finest part of the display had escaped our notice. They radiated in all directions from a point in the constellation *Perseus*.

D. B. MOAK.

Norwood (near Cincinnati), O.

Condition of the Patent Office.

The Secretary of the Interior, in his recent annual report, says: The number of applications for patents, including reissues and designs, during the year ended September 30, 1872, was 19,587; the number of applications for extension of patents, 284; the number of applications for the registering of trade marks was 589. During the same time were issued 13,626 patents, 233 extensions, 556 certificates of registry of trade marks, and 3,100 caveats have been filled. This shows a small increase over the number of the preceding year. The fees received during the same period, from all sources, amounted to $700,954.86, and the total expenditure to $623,553.90, making the receipts in excess of the expenditures to the amount of $77,400.96.

Over 200,000 applications for patents have been filed since 1836, and about 133,000 patents have been granted. The drawings, models, and files accompanying these applications must be so classified and arranged as to facilitate access to them, otherwise there would be constant danger of duplicating patents upon the same invention, and each year's accumulation adds largely to this danger.

The Commissioner urges the importance of a separation of the Patent Office from the Department of the Interior. The matter is embraced in the bill now pending before Congress for a reorganization of the Bureau.

The work of the Office has been conducted in the most satisfactory manner during the entire term of the present Commissioner (General Leggett), and I most cheerfully attest his efficiency and capacity for its manifold and delicate duties.

Researches on Santonine.

Santonine is the active principle of the *semencontra*, and for some years past has been prepared on a large scale for therapeutic purposes. M. de Saint Martin, says in *Les Mondes* that if santonine is, as claimed, really a phenol, its formula, $C^{30}\ H^{18}\ O^6$, indicates that, by its methodic reduction, there should be obtained, 1st, a diatomic phenol, $C^{30}\ H^{18}\ O^4$; 2d, a monatomic phenol, $C^{30}\ H^{18}\ O^2$, and 3d, a carburet of hydrogen, $C^{30}\ H^{18}$. This last carburet would present the composition of a homologue of napthaline, isomeric or identical with amyl-naphthaline. The author states that he has prepared monatomic phenol $C^{30}\ H^{18}\ O^2$ and designated it by the name of *santonol*. In a crystalized form, it resembles the stearine which separates itself in fatty bodies. Liquid santonol is a very alterable substance, turning brown under the influence of air.

A Stolen Lens Recovered.

The object glass of the Alleghany Observatory, at Pittsburgh, Pennsylvania, which was mysteriously stolen on a dark night some time ago, has been found and restored to its place in good order. Its value was $4,000. It was carried off by an intelligent sort of a thief who probably expected that a reward would be offered for its return, enabling him to make a little money by the operation. He deposited it in a stable, and his pal stole it from him. But it finally came into the possession of the police and it was carried home.

WE are desired to direct attention to the advertisement in another column addressed to the Board of Managers of the American Institute.

Aniline Inks--Interesting Experiments.

The beauty and variety of aniline dyes has, for a long time, induced manufacturers to use them for the making of inks. Formerly, red inks were prepared from cochineal and ammonia, and blue inks from Prussian blue and oxalic acid; but an exceedingly cheap red ink may be made by simply dissolving a little gum in a very diluted solution of aniline red. This ink may be immediately used, and the solution must not be too strong, or the complementary color (green) will appear. Violet and blue inks, with and without a greenish tint, are now much used. The so-called *bleu soluble* is readily available for making them. It is prepared like red ink, and the same is the case with the "patent violet." Aniline dyes may also be employed for the preparation of sympathetic inks, which formerly were very much in vogue. Letters written with aniline red will disappear when exposed to the vapors of ammonia, in which case we obtain the colorless rosaniline, which is scarcely or not at all visible. After some time, especially if warmed a little, the letters appear again in their original beauty. Nicholson's blue yields a still more beautiful sympathetic ink. To produce it the blue is dissolved in a solution of borax, to which a little gum is added. When used, this ink is scarcely perceptible, but when exposed to the vapor of muriatic or acetic acid, the characters appear in dark blue; but they disappear if exposed to the vapors of ammonia.

The following is an interesting experiment, and may be of interest to popular lecturers on chemistry: White flowers, made of paper, and white silk ribbons may be variously colored, without any one recognizing how it is done. It is a well known fact that if an aniline dye, in the state of a very fine powder, is spread over a sheet of paper, and the loose dust removed, there remain imperceptible particles, which, however, are sufficient, if dissolved, to intensely color the whole sheet. To this end it is only necessary to moisten the paper with strong alcohol, or with a solution of alcohol and acetic acid. This experiment may be carried out by making roses or other flowers from paper. White roses, if covered with fuchsin in the form of dust, when immersed in spirits of wine or other proper solvent, are immediately changed to beautiful red roses. Silken ribbons may be treated in a similar manner. By dropping a few grains of aniline dyes into wine glasses and adding a solvent, variously colored liquors may be obtained by means that few persons are able to detect. A white liquid may be colored red, and decolored by adding ammonia. In fact, many interesting experiments can be performed with these dyes.

The Freezing of Water.

Dr. G. Krebs has devised a very simple arrangement, by which it is possible to show to an audience that water may be cooled considerably below 0° C. without freezing. He takes a tube 18 centimeters long and 1 centimeter wide, made of thick glass, closed at one end and furnished with a bulb. After thoroughly cleansing by heating sulphuric acid in it for some time and rinsing repeatedly with distilled water, he draws out the upper end to a long point. This point is kept dipping in distilled water, which has been boiled for some time. Every time the bulb is heated and allowed to cool, a little water enters. This is repeated until the tube is full clear up to the point. Then the point is made to dip into purified mercury and heat is applied to the bottom of the tube until the water reaches only half way up in the bulb, when the point is quickly sealed up by melting.

Placed in a freezing mixture, say of water and nitrate of ammonia, side by side with water in an open tube, it can be taken out and handled after the latter is frozen, without being congealed by the agitation. After the water in the open tube is completely frozen, that in the closed tube will freeze suddenly, if it is strongly shaken up and down once.

Experiments on Certain Points of the Physiology of the Pneumo-Gastric Nerves.

MM. Legros and Onimus, says *Les Mondes*, have studied the influence upon the movements of the heart, in warm and cold blooded animals, caused by excitement of the pneumogastric nerves, according to the intensity and especially with reference to the number of excitations given at a time.

The number of necessary excitations in order to lead to the stoppage of the heart varies considerably in the two kinds of animals. While from 15 to 20 intermittances per second are necessary in the case of a warm blooded animal, two or three are sufficient for one of cold blood, especially in a state of hibernation. With the latter, less excitement is necessary to arrest the action of the heart, in proportion as the animal is weakened. With a warm blooded animal, whatever may be the intensity of the excitements or the number of intermittances, the complete cessation of the heart's motion has never been attained in less than from fifteen to thirty seconds. After the motion has ceased, there supervene, in spite of the continuance of the excitation, contractions, few it is true but strong and progressively augmenting in number.

A DISPATCH from Tripoli (Syria) announces the arrival in that city of several engineers sent from Constantinople by M. Pressel to construct the railroad proposed by Midhat Pasha. This line will connect the Mediterranean and the Persian Gulf. It will pass by Palmyra, cross the Euphrates, Mesopotamia, the Tigris, and will terminate in Bagdad, where it will meet the road, already begun, from the Persian Gulf.

AT the Imperial Arsenal at Constantinople, an iron-clad war vessel is ready for launching. This is the first ship of this kind that has ever been constructed in Turkey after Turkish plans with Turkish material and by native workmen.