Daily Evening Bulletin.

SATURDAY EVENING, DECEMBER 5, 1874.

THE TRANSIT OF VENUS.

Distance of the Earth from the Sun.

Paper Read before the Academy of Sciences August 17, 1874, by Professor Davidson.

So much has been recently written upon the coming transit of Venus that the subject has become somewhat trite, and were it not that new and easily understood illustrations of the two methods employed to solve the problem will make it quite plain, I should not refer to the subject, although urged to do so by many of our members.

There is no mystery in the general character of the problem for determining the distance of the Earth from the Sun, but the refinements required by the mathematician exhibit the difficulties of its details, and place its solution beyond the ordinary means of observation and computation. Stated in its simplest form, it is the determination of the distance of an inaccessible object from a given base, when we measure the angle subtended by that base. In the ordinary operations of the surveyor and navigator this frequently occurs, but not with such "ill-conditioned" triangles and complications of movement and figure as accompany this case. You can appreciate this first difficulty by judging whether, with the unassisted eye, you could estimate to the nearest foot the distance of a fixed object thirty-two hundred feet distant. Here your base-line is the distance apart of your eyes, or two and a half inches. Such an error of one foot in that distance of three fifths of a mile would involve a proportional error of 28,690 miles in the distance of the Earth from the Sun if we commanded a base-line of 6,000 miles on the surface of the Earth.

The problem, *per se*, is one of the most important in astronomy, for upon its satisfactory solution depends our knowledge of every celestial distance and magnitude beyond the limits of the Moon. The means by which the distance of the Moon from the Earth is determined fails at such enormous distances, and the astronomer is compelled to adopt other and more abstruse methods. The transits of Venus across the sun's disc afford the best of these known methods, but they occur at such long periods that if unsatisfactory observations have been made at one transit, a century may elapse before another opportunity arises. Therefore astronomers and governments prepare themselves for the necessary observations by long study of different attitudes, by the manufacture of the best apparatus, and by proper modes of conveyance of parties to the extremes of the earth.

The transits occur in pairs of eight years apart, with the larger intervals of 105½ and 121½ years between the pairs. The pairs of transits occur alternately at the opposite ends of the nodal diameter—in June as Venus descends from the upper to the lower half of her orbit, and in December as she ascends. Thus for the eight transits which have been predicted we have the following dates of their occurrence:

December 6, 1631}
December 4, 1639} an interval of 8 years.
June 6, 1761, an interval of 121½ years.
June 3, 1769, an interval of 8 years.
December 8, 1874, an interval of 105½ years.
December 6, 1882, an interval of 8 years.
June 7, 2004, an interval of 121½ years.
June 5, 2012, an interval of 8 years.

A few words may not be misplaced to indicate why the transits of Venus across the sun's disc are so rare when she is known to pass very nearly between the Earth and the Sun at every synodic revolution of 583.9 days. The length of her year is 365.2 days, and that of Venus 224.7 days. Supposing the orbits of both planets were in the same plane, you can readily understand that if the two planets had started in their orbits from a radius passing through them and the Sun, and that Venus returned to her starting-point in 224 days, the Earth would still be 141 days behind her; at the end of the second year of Venus (449 days) the Earth would have made one orbital revolution and passed its starting-point 83 days; but on the third year of Venus she would overtake the Earth in 219 days after the latter had commenced her second revolution; so that in about 884 days from their starting together they would again be in line with the Sun, and a transit of Venus would be visible.

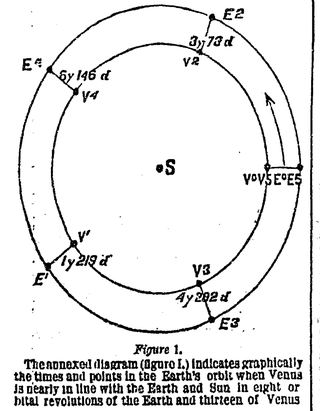
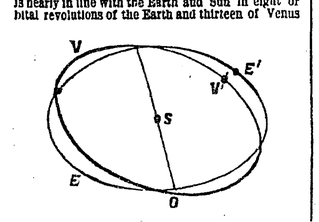


Figure 1.

The annexed diagram (figure I.) indicates graphically the times and points in the Earth's orbit when Venus is nearly in line with the Earth and Sun in eight orbital revolutions of the Earth and thirteen of Venus



station *c*, we can calculate what are the distances between these two natural objects *a* and *b* (supposing the line joining them to be perpendicular to *c a*) would subtend from a station at V. The proportion would be very nearly

723 : 1,000 = 9′50″ : 13′20″.5.

So that if the observer were at V the two points *a* and *b* would subtend an angle of 13′36″.5.

But at V the two lines *c b* and *c a* cross each other, and as the opposite interior angles are shown by geometry to be equal, the angle *cVe* is equal to the angle *aVb*, or 13′36″.5. Therefore, the measured distance of one tenth of a mile between the two points *c* and *e* subtends that same angle at V, and by a simple trigonometrical relation of the sides and angles of the right-angled triangle *ecV* we can compute the distance of *c* from V; thus

$$cv = \frac{0.1 \text{ mile}}{\text{tang } 13'36''.5} = 25.3 \text{ miles.}$$

We had already established by the times of passage of the steamer the relation of the distances between the distant island S and rock V, and the distant island S and the islet E to be as 723 to 1,000. In the same ratio the distance from *c* to V would be 277; but from the observations we have calculated the distance to be 25.3 miles. By means of this actual value, and the above ratios, we obtain the other distances V to S, and *c* to S in the following simple manner:

277 : cv distance by time	25.3 miles actual distance V E	= 723 : time	66.0 miles actual distance V S	

also,

277 : ca distance by time	25.3 miles actual distance V E	= 1000 : time	91.3 miles actual distance E V	

or,

723 :	66.0 miles	= 1000 :	91.3 miles

This method of solving the problem is fundamentally an illustration of the solution of the method devised by Halley to determine the distance of the Earth from the Sun by the transits of Venus; and the derived results represent the millions of miles of the actual planet distance.

Again, suppose two persons upon the islet E. (Figure IV) the distant island S visible as before, but no rock V by which to determine its position in the previous manner.

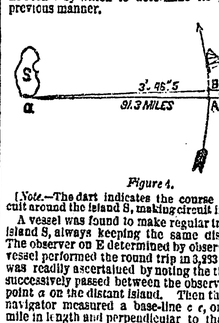


Figure 4.

[*Note.*—The dart indicates the course of vessel in circuit around the island S, making circuit in 3,233 minutes.]

A vessel was found to make regular trips around the island S, always keeping the same distance from it. The observer on E determined by observation that the vessel performed the round trip in 3,233 minutes. This was readily ascertained by noting the times when she successively passed between the observer at *c* and the point *a* on the distant island. Then the shipwrecked navigator measured a base-line *c e*, one tenth of a mile in length and perpendicular to the line joining *c* and *a*, and when the vessel was making her next trip one of them stationed at *c* noted the instant when she passed across the line joining *c* and *a*, while the other observer noted when she passed across the line *c a*. The difference of these times was 0.535 of a minute. Now the trip around the whole circle occupied 3,233 minutes, and this part only 0.535 of a minute, so that in this fraction of a minute the vessel passed over the 1-5,172nd part of the 360° in the circle. This fraction becomes the measure of the arc 3′46″ from the point *a*, and as the lines *a A* and *a B* are straight lines it is evident that the measured distance *a e*, or one tenth of a mile as seen from the point *a* on the distant island S will subtend an arc of 359″.5722 or 3′46″.5 = 3′46″.5. Then by a simple trigonometrical solution we find that

$$ae = \frac{0.1 \text{ mile}}{\text{tang. } 3'46''.5} = 91.1 \text{ miles.}$$

Which is the distance *a* from C, or the quantity sought.

This method of solving the problem is essentially an illustration of the method devised by De l'Isle for determining the distance of the Earth from the Sun by transits of Venus.

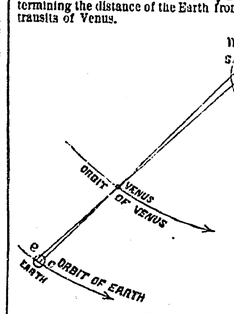


Figure 5.

Now let us apply these methods to the simplest form of solution of the problem of measuring the distance of the Earth from Venus and from the Sun. In figure 5, S represents the Sun, *n b* and *s b* the apparent paths of the planet V over the Sun's disc as seen from stations *c* and *e* on the surface of the Earth.

We must imagine the Earth and Venus to have, with regard to the Sun, no motion during the time of observation; that the plane passing through the stations *c* and *e* and through Venus is perpendicular to the paths *n b* and *s a* of the planet across the Sun; that, as seen from the station *c*, the disc of Venus as projected on the disc of the Sun is a point only; that the stations *c* and *e* are intervisible, with a measured distance apart of 6,000 miles; and that the two planets are at their mean distances from the Sun. It is physically impossible to command these conditions; but we know the relative motions of Venus and the Earth and their pathways, and can correct for any changes of motion that take place during the transit. We can determine the arc distance between the apparent paths of the planet over the Sun's disc from the observed times of the planet's entering and leaving it; and we can calculate the distance apart of *c* and *e* from a knowledge of their geographical latitudes and longitudes.

Without showing how these and other quantities can be determined, we may assume that the angular distance of *a* from *b* upon the Sun, as seen from the station *e* on the Earth, is measured. Suppose this to be 35″ of the arc; then remembering that from the third law of Kepler we ascertained the ratio of the distance of V from S, and of E from S to be 72,333,240 to 100,000,000, we can reduce the arc value which the two points *a* and *b* on the Sun's disc would subtend from the planet Venus by the proportion

7,233 : 10,000 = 35″ : 49″.

But at Venus the two straight lines *c b* and *e a* cross each other, and as the opposite interior angles are

orbit; then 3.86 : 372,968 = 4,310 : 417,300,000 miles, which is the length of her orbit.

Knowing the circumference we deduce the length of the radius, or the distance of Venus from the Sun, 66,420,000 miles.

By means of this actually-measured distance and the ratio of the distances given by Kepler's third law, we deduce the distance of the Earth from the Sun as follows: 72,333,240 : 66,420,000 = 100,000,000 : 91,825,000 miles.

In both these methods there arises a very serious difficulty. On account of the apparently disturbed condition of the limbs of the Sun and of Venus, the most experienced observer will fail to note the exact epoch of either internal or external contacts of the limbs. We have already communicated to the Academy our views upon this subject when reporting the results of our experiments on the Sierra Nevada for astronomical observations at great elevations. We unhesitatingly recommended the adoption of high altitudes for such work, so that we need not revert to the causes of this trouble. But you see from the smallness of the quantities which we observe, and the magnitude of the quantities to be deduced therefrom, how great an error must result in the latter from even the most minute errors in the former, even when all the conditions are remarkably favorable. If you had a lever with the short arm equal to one foot, and the long arm equal to five or ten thousand feet, you can readily understand how a minute error in the movement of the short arm would be multiplied at the extremity of the long arm. The case is analogous to that of our problem.

Of course, all that ingenuity can suggest has been thought of to obviate, as far as practicable, the defects of the methods of contacts, while other artifices have been introduced to get good results should these methods fail from unfavorable circumstances.

These may be only briefly alluded to:

I. *The Photographic Means.*—By commencing to photograph the Sun just before the first contact, and continuing during the progress of the transit to the time of the last contact, we obtain a series of Sun views, in each of which Venus is represented as a partial or full black disc. At the interval, when each view is made, the quick movement of the slide admitting the sunlight through a narrow slit records, by means of a break-circuit chronometer and chronograph, the instant when the view was made. Then, if the proper corrections are made for the small errors in the position of the mechanical part of the apparatus, we can derive the distance and direction of the centre of Venus from the centre of the Sun, which is, in reality, the quantity sought in Halley's method. We shall also be able to derive by proportion the exact instant of the contact of the limbs, which is the quantity sought by De l'Isle's method. Great reliance is placed upon the photographic method, and the outfit of the American parties is complete in that respect. For this purpose a photographic telescope, upon the plan invented by Professor Winlock, of Cambridge Observatory, will be used by our parties. It has an object-glass of six inches diameter, and thirty-eight and a half feet focal length, and is fixed in a horizontal position. The apparatus is firmly mounted on large iron piers, and admits of exact measurement and adjustment of all the parts. In order that the Sun's image shall be projected through the lens, a heliostat furnished with a six-inch plane-glass reflector is placed on the north side of the photographic objective (in north latitude) and the sun's image directed through it to the photographic plate (which is in the dark room to the south), after passing through an accurately reticulated plate almost in contact with the latter. The heliostat is so adjusted and moved by a weight and governor that the image of the sun is rendered in one direction during the whole period of the transit. In our parties sun-views will be taken near the first and last contacts as rapidly as four photographers can work, and for this purpose about six views of only that part of the sun's limb which is in contact with Venus will be taken on each plate. During the progress of the transit the number of views taken will be about two hundred.

Other parties than the American will photograph the image obtained by means of equatorially mounted telescopes. This, however, demands unsteadily instruments and the use of an enlarging lens. Upon a former occasion we exhibited to the academy sun photographs taken by Professor Winlock's method and by the equatorial. The former were more than twice the diameter of the latter and much more sharply defined as to limb and spots, so that they would stand higher magnifying power than the latter. With the equatorial photographic telescope the difficulties of the operations are greatly aggravated by the direction and motion of the body to be photographed, but in Professor Winlock's apparatus the diurnal motion is thrown entirely upon the revolving mirror of the heavily mounted heliostat, so that all the advantages of a fixed horizontal Sun are secured.

II. *The Spectroscopic Means.*—The beautiful manner in which Jansen and Lockyer determined the epochs of totality in a solar eclipse, by means of the spectroscope, can probably be utilized in the phenomena of the commencement and termination of the transit of Venus. You recollect that just outside the solar photosphere, and between it and the chromosphere, there is a stratum of solar atmosphere which exhibits in the spectroscope the radial bright-colored lines or bands which indicate the presence of glowing or luminous vapors or gases. This was discovered in 1870, during the total solar eclipse, when the direct light of the photosphere was cut off by the interposing body of the Moon; but by proper contrivance they can be seen at any time. So long as these short, bright-colored lines are seen there can exist no interposing body; but the instant their brightness disappears, the observer knows that the limb of the planet or some other opaque body has been interposed between the observer and the body of the Sun, and at that epoch is in apparent contact with the Sun's limb. This is the time of the first external contact. The reappearance of these bright-colored lines on the Sun's limb, as the outer limb of the planet draws upon the Sun, announces the instant when Venus has fully entered upon the Sun's disc. This epoch is that of the first internal contact. The same phenomena, in reverse order, occur at the time of the egress contacts.

Several difficulties obtruded themselves for determining the instant of first ingress contact—especially that of knowing exactly at what part of the sun's limb to watch for the phenomenon, although this position can be computed with sufficient accuracy for eye observations. It will be essayed, nevertheless, and probably the ingenious adjustable ring slit devised by Mr. Lockyer will give satisfactory results, if we can induce from the tests to which he is reported to have submitted it. The method will be tried by Jansen in Japan, by Watson in China; and if the necessary apparatus can be obtained in season, by my party in Japan. The American parties have not been outfitted for this method, as the Commission has considered it of doubtful applicability. At any rate, the observation of the last external contact by this method must be very useful as supplementary to the two internal contacts; for, by a comparison of the observed times by the three methods—photographic, spectroscopic, and eye—we should derive some valuable data by which to homologate the various results of all observers.

III. *The Heliometer Means.*—The exact measurement of the distance of the limb of Venus from the limb of the Sun, when the planet has entered up the disc of the latter, enables us to determine the distance apart of their centres at the time of observation. To accomplish this the heliometer will be used by the German and Russian parties and by one English party. It is a very difficult instrument to manipulate, but by the exercise of great care the results must be obtained. Its essential feature is that the object-glass of an equatorially-mounted telescope is divided into halves, so as to form, in reality, two semi-circular object-glasses. A screw adjustment moves one of the semi-circular lenses past the other along their line of division; and a fine scale measures the amount of this movement. When the two semi-

same extent as the former. The Moon revolves in her orbit once in a lunar month, but the point around which she revolves is not the centre of the Earth, but the common centre of gravity of the two masses. And around that centre of gravity the Earth also revolves once in a lunar month. This centre of gravity of the two masses is about one quarter of the Earth's diameter outside its surface, and, of course, toward the Moon.

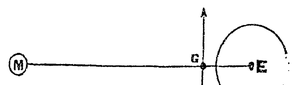


Figure 9.

The effect of the monthly revolution of the Earth in this small orbit causes her to be sometimes in advance and sometimes behind that position in her orbit round the Sun which he would have if unaccompanied by a satellite. This effect is exceedingly minute, but Le Verrier, by the discussion of a vast number of observations, made through many years at the principal observatories of Europe, has derived 91,739,000 miles as the distance of the Earth from the Sun.

This method promises to give, in time, the best results for the determination of our unit of the celestial distances.

In conclusion, it may be incidentally noticed that the eight expeditions of the United States, the most of them having conveyance by naval vessels, will cost less than $200,000, for the greater part of which sum Congress has already appropriated money. [These parties have all reached their destinations, and are hopeful of success.]

In 1882 will occur another transit of Venus, visible throughout the United States, South America and Africa, and the highest mechanical and scientific skill will be evoked by the experience of this year to make the necessary observations exhaustive by every method. And here we place on record our earnest hope that some of the wealthy and liberally-educated citizens of California will fit out private expeditions, not only for the sake of knowledge for itself, but for the credit which must necessarily attach to its historical record. So far as I am concerned, I shall leave no manly means unemployed to induce such desirable action.

FOR THE BONDHOLDERS.

Mr. Haight's Reply to Mr. Felton in the Case of the California Pacific.

At 11 o'clock this morning ex-Governor H. H. Haight began his argument in reply to John B. Felton in the case of the German bondholders *vs.* the California Pacific. He first took up and combated Mr. Felton's objection that a railroad corporation is not liable to the operation of the bankrupt act because it is not a *mongral business* or *commercial* corporation. He contended that a railroad corporation is a commercial corporation. It has to do with the objects of commerce. The Supreme Court, in the famous passenger cases, decided that the word *commerce*, as used in the Constitution, is not confined to the restricted sense in which counsel on the other side would use it. It includes intercourse, and Congress, when it made the bankrupt law, must be supposed to have known and to have had in mind the broad interpretation which the Supreme Court has given to the words *commerce* and *commercial*. Mr. Haight next discussed the question whether a railway corporation is a public or a private corporation. Mr. Felton had assumed that any corporation which performs a public function is a public corporation. But the authorities will not sustain him. Mr. Redfield says that in this country most railways are private corporations. Clearly, according to his definition of the term, the corporation now in court is a private corporation. One of the objections cited by the counsel on the other side is that the exclusion by Congress of the Union Pacific from the operations of the Act makes the Act uniform. Why was that exclusion made? There is room for discussion on this point. It was made because the Act intended that railway corporations in general should be liable to its operations. Mr. Felton dwells very strongly upon the point that the functions of a railway corporation are part and parcel of the sovereign power. But I fail to discover that there is any foundation in common sense for this assumption. The functions of a railroad corporation differ in no respect except, as to magnitude, from those of a stage company or a steamship company. Will it be pretended that these partake of the character of sovereignty?

A great deal is said about the fact that a railway corporation may take land for its use, which is an attribute of sovereignty. But it is absurd to say that the railroads take land for *public* uses. To all intents and purposes, the land is taken for *private* uses, and they are permitted to take it, not because they are a part of the sovereign power, but because the purposes for which they exist are of great public utility. There is no limit to the claims of these grand railroad corporations. They seek even to exempt themselves from taxation. Mr. Haight quoted numerous decisions that railroad corporations are amenable to the bankrupt act. He remarked that the other side had quoted only one decision to the contrary, and that was by Judge Durell, of Louisiana, and they touched this remarkable opinion very gingerly. It has been repeatedly held that any corporation organized for a lawful business purpose is a *business* corporation within the meaning of the bankrupt act, Justice Clifford says that Congress has power to make a bankruptcy law which will apply to private corporations created by the State, and also to private corporations created by Congress. Chancellor Kent has defined the distinction between private and public corporations, but the counsel on the other side go right in the teeth of his position. Indeed, there is this remarkable fact running all through their arguments, that they disregard not only all the decisions of the courts, but also the doctrines laid down in the most elementary books. Justice Clifford puts railroad corporations under the head of commercial corporations. But he also says that even if the Act said nothing about *commercial* corporations, the law would still apply to railroad corporations, because they clearly fall in the class of *business* corporations.

Mr. Felton would limit our system of bankruptcy to the state of civilization which existed when the first bankrupt laws were framed—at a time when railroads, steamboats, and telegraphs were unknown. Because the old bankruptcy system was applied to traders only, it hardly follows that the present system must have the same restricted application. The old admiralty jurisdiction was limited to the ebb and flow of the tide, but the growing commerce on the lakes and rivers of the Western States compelled the Supreme Court to widen the interpretation of the Constitutional provision accordingly.

The Court observed that Mr. Haight need not dwell on this line of argument, as the power of Congress to pass a bankrupt law affecting others than traders was unquestionable.

The usual noon recess was here taken.

DEATH OF JOSEPH CRACKSON.—The funeral of the late

OAKLAND MATTERS.

One hundred and fifty immigrants arrived on the overland train from the East last evening.

Five boxes of fruit-trees and two boxes of flowering plants have arrived at the University, and are being set out.

The winter examinations begin the latter part of next week. The schedule has been prepared and announced.

The agricultural students are to write a description of the Agricultural Department, plants, grass and improvements.

The two-story frame dwelling which was fired, on the corner of Webster and Fourth streets, and partially consumed, is being removed down Third street by Mr. Bachelder, who will repair the same for about $200, in order to make it again tenable.

At the last meeting of the Ladies' Relief Society, the following officers, Managers and Advisory Board were elected: President, Mrs. C. H. L. Palmer; Vice-presidents, Mrs. George Potter, Mrs. General Kirkham; Recording Secretary, Mrs. S. E. Henshaw; Corresponding Secretary, Mrs. F. E. Wadsworth; Treasurer, Mrs. J. I. Spear. Managers—Mrs. G. W. Armes, Mrs. L. Bartlett, Miss Jessie Campbell, Mrs. E. J. Crane, Mrs. R. E. Cole, Mrs. L. G. Cole, Mrs. Judge Chamberlain, Mrs. L. E. Dam, Mrs. L. P. Fisher, Mrs. A. K. P. Harmon, Mrs. S. O. Hunt, Mrs. General Kelton, Mrs. Professor M. Kellogg, Mrs. James Latham, Mrs. H. Livermore, Mrs. E. G. Matthews, Mrs. J. H. McAllister, Mrs. N. P. Perrine, Mrs. J. M. Page, Mrs. W. H. Raymond, Mrs. E. J. Van Vleet, Mrs. M. M. Wedgwood, Mrs. Colonel Woods, Mrs. Henry Raymond. Advisory Board—Elijah Bigelow, Judge Campbell, J. P. Moore, George Potter, A. K. P. Harmon, James de Fremery, General R. W. Kirkham.

The *News* has the following about Alameda county: "With only a population of a little over 8,000 in 1860, she trebled herself in the decade ending with 1870. At the present time she reckons a population of 40,000, with assessable property valued at nearly $40,000,000. Her principal town, Oakland, has, during the present year, put up close upon $2,000,000 worth of buildings and the cry is constantly kept up for more. Livermore, her principal agricultural town, which four years ago was unknown, has a live substantial population of 1,000 souls, and rivaling in rapid growth, Dixon, Watsonville, Salinas and Hollister. New places such as Seminary Park, Melrose, Fitchburg, Sunol, Pleasanton and Berkley, had an existence only in anticipation. Reduction works have been erected at three different points—Brooklyn, Melrose and Fitchburg. A dozen new manufacturing places have sprung up at different points. A ship-yard has been established on our bay front, and the obstruction to our harbor, in the shape of a sand bar, has been removed, while extensive works, with a view to the permanent improvement of the same have been commenced by the United States Government."

TELEGRAPHIC BREVITIES.

The *President* yesterday read his message, though not quite complete, to the Cabinet.

The congregation of the Rev. Mr. Cooper, charged with immoral conduct, have published a card expressing confidence in his integrity and standing.

There is much rivalry between the proprietors of the several hotels in Washington to secure the presence of the King and his suite at their respective establishments during his visit at the Capital.

Superintendent Walling, of New York, yesterday instructed the Police Captains to enforce the law against theatrical and musical exhibitions on Sundays, except in cases or places restrained by injunctions.

CABLEGRAMS.

A telegram from Madrid says there thirty arrests were made in connection with the recent mutiny.

The English Foreign Office has a dispatch stating that Dr. Livingstone's journals have reached Zanzibar.

Twenty rifles and bayonets, with ammunition, have been seized in Cork, Ireland, and one man has been arrested.

Sir Arthur Hamilton Gordon, formerly of Trinidad and Mauritius, has been appointed to the Governorship of the Fiji Islands.

Five fresh cases of small-pox are reported in the Liverpool workhouse, among the steerage passengers of the steamer *Abbotsford*.

The Pope has absolutely refused to recommend Bishops imprisoned in Brazil to resign their Sees as a measure for reconciliation of their differences with the Government.

POLITICAL EXCITEMENT IN GERMANY.

Stormy Scenes in the Reichstag—Bismarck' Foreign and Domestic Policy Denounced—Von Arnim's Case.

BERLIN, December 4th.—In the Reichstag to-day a letter from Bismarck was read, announcing the withdrawal of the appropriation for a formal legation at the Vatican.

The Deputies from Alsace and Lorraine tendered their resignations as members of the Committee on the Loan Bill for their countries. In the course of the debate, Herr Joerg, member of the Clerical party, vehemently denounce Bismarck's foreign policy, saying that in consequence of Russia holding off the Chancellor had made a fiasco of his attempt at Spanish intervention. Bismarck replied, denying emphatically that Federal representatives did not equally protect the rights of the various States. There had never been any idea of intervention in Spain. When apprised of the murder of Schmidt, he said to himself, such a thing would not happen if he had been a British, French, or American citizen. He remembered humiliations formerly imposed on Germans, and considered that the time had arrived to avenge such wrongs. The only way of helping Spain was to recognize those elements in that country which were disposed to restore public order.

Referring to an assertion of Joerg concerning Kullmann, Bismarck made a denial and said, "He clings to your coat-tails." Kullmann told him (Bismarck) that he had tried to kill him because of Church laws and because he insulted his (Kullmann's) party, namely, the Centre, or the Ultramontanes. There was great commotion in the Chamber. The Premier reasserted, "Kullmann belongs to you," when the House cheered continuously. The Ultramontanes gave utterance to the contemptuous exclamation "Pfui." Bismarck said he was not a stranger to such feelings, but hoped he was too polite to express them.

Herr Windhurst said that Bismarck, in a speech at Kissengen, after Kullmann's attack, gave the signal for an attack on the Centre, which was wrong. Without that they were drifting toward war.

Bismarck repelled the assertion and accused the Ultramontane press of making attacks on him.

Lasker declared that Windhurst's remarks were unworthy of a Representative.

The President called Lasker to order.

LONDON, December 5th.—The *Daily News'* correspondent at Berlin telegraphs that the debate in the Reichstag continued until late hour last night, amid scenes of great excitement. The evening papers issued extra editions after dark, a sign of unusual enterprise, giving reports of the proceedings down to the adjournment.

LONDON, December 5th.—It is reported that the Deputies from Alsace and Lorraine were so incensed

LATEST DATES RECEIVED.

Auckland, October	31	Melbourne, October	31
Batavia, September	1	London, December	5
Callao, November	5	New York, December	5
Chicago, December	5	Panama, December	2
Hongkong, November	20	Shanghai, September	21
Honolulu, November	17	Sydney, November	6
Manila, September	17	Valparaiso, November	1
Mazatlan, November	17	Yokohama, November	21

FINANCE AND TRADE.

[For Additional Commercial News see Third Page]

SATURDAY EVENING, December 5, 1874.

Gold closed in New York this afternoon at 111¼; Pacific Mail, 41¾; a decline of two points; Quicksilver, 34; Western Union Telegraph, 83½; U. S. Bonds of 1881, 112½; Sterling, $4 85½@$4 90½.

Legal Tenders here are quiet at 89¼ buying and 90 selling.

The Liverpool Wheat market is given to-day at 9s 10d to 10s 4d for average California and 10s 4d@10s 7d for club.

The whale bark Tugar has discharged her cargo of Oil and Bone, and gone to an anchorage in the stream.

The Kentuck Mining Company have levied an assessment of $1 per share, amounting to $20,000, delinquent January 5th.

The next express steamer for Panama will be despatched on the 16th. The Colima has arrived at Panama, 15 days hence.

Three Wheat cargoes were cleared yesterday, making seven for the first four days of the month, and others are ready to clear.

The ships Matterhorn and Richard Wright, now loading for Liverpool, will take freight in quantities to suit shippers. The River Lune has returned from Vallejo with a cargo of Flour and the Galatea will follow with a similar cargo, to be succeeded by the British King, all from Starr's Mills.

The British ship Remington is reported to have arrived at Liverpool on Thursday. This vessel left here July 15th, with about 1,900 tons Wheat, valued at $50,000, and made the trip in 141 days. This is the fourth cargo of the present season's fleet that has arrived out. Eight to ten other cargoes are fully due, and hereafter the arrivals will be more frequent.

The little German schooner Helene, hence July 6th, has arrived at Hamburg in a passage of 150 days. She carried an assorted cargo valued at $16,500, including 7,500 galls California Syrup, 600 cs Borax and 600 cs Salmon. The German brig Alida is now loading here for the same port with a similar cargo, including 1,200 bbls Syrup, and will sail in about ten days. This German trade is a comparatively new feature in our export trade.

The following steamers will sail from this port during the ensuing week, as annexed:

Date.	Vessel.	Destination.
Monday	Fideliter	Santa Cruz
Tuesday	Macgregor	Sydney
Tuesday	Montana	Mexico
Tuesday	Monterey	Tomales
Tuesday	Santa Cruz	Santa Cruz
Tuesday	Salinas	Santa Cruz
Tuesday	Senator	San Diego
Wednesday	Pelican	Eureka
Wednesday	Constantine	Santa Cruz
Thursday	Arizona	Panama
Thursday	Orizaba	San Diego
Friday	Orinthian	Portland
Saturday	Orizaba	San Diego
Saturday	Vancouver	Honolulu

The past week has witnessed a continuance of the excitement in Mining Stocks, which have been gradually gathering strength for some time. The Virginia Stocks are now the favorites, despite the strenuous efforts to infuse new life into the Gold Hill Stocks. The Belcher and Crown Point mines have done nobly during the past three years, developing a quantity of bullion that has astonished even those most intimately interested, and is certainly unlike anything ever witnessed on the American Continent. It now looks as though these two famous mines were to attract less attention from the public for a time, in consequence of the increased prominence given to mines at the other end of the Comstock Lode. The central claim there is Consolidated Virginia. The history of this mine is very brief. Four years ago it was but little known and of little importance. To-day it outranks all other mines. No longer than three years ago, the stock was disposed of with difficulty at $8 to $12 per share; and there were then only 11,600 shares, whereas there is now 108,000 shares. Two assessments of $1 50 per share each were levied on the stock during the last four months of 1871, amounting to $34,800. During the month of January, 1872, the shares sold at $16 to $28, the whole number being 11,600 shares of capital stock. The developments at the mine began to assume some importance at that time, and the stock increased in favor, suddenly rising during the first week of the following February from $28 to $55, a gain of 100 per cent. in four days. The price subsequently declined to $31 by the end of the same month, under an apprehension that a considerable outlay of money would be needed before the importance of the indications could be fully determined. The anticipated assessment came in the following month at the rate of $3 per share, or double the amount of previous levies of this kind. By this time the stock was in the hands of those who had strong hopes in the value of the mine, and its effect on the shares was unnoticed. The price rose in March from $31 to $44 before the assessment, and the subsequent range for the month was $43@$46. About that time a general excitement commenced in the market, and Consolidated Virginia went up with the rest. The price on the 1st April was $50, and in three weeks from that time, the shares sold at $160, including the assessment, a gain of 220 per cent. During the same interval, Alpha rose from $50 to $170; Belcher from $650 to $1,500; Chollar-Potosi from $70 to $380; Crown Point from $900 to $1,500; Gould & Curry from $270 to $527; Hale & Norcross from $350 to $700; Ophir from $75 to $140; Savage from $280 to $725, and others in proportion. An additional inducement for the advance in Consolidated Virginia during that interval was the pending proposition to increase the number of shares from 11,600 to 23,600, which was adopted about the middle of May. Prior to the accomplishment of that fact, the old issue had receded from $110 to $30, but subsequently advanced to $50. The new stock was put on the market on the 24th May and sold at $20 per share, equal to $60 for the original stock. Three days later the price fell to $30

AMUSEMENTS.

CALIFORNIA THEATRE,
Bush street, above Kearny.
JOHN McCULLOUGH.....Proprietor and Manager
BARTON HILL.....Acting Manager

Triumphant Success of the Popular Favorite,
MR. W. J. FLORENCE!
POSITIVELY LAST NIGHT
Of the new Dickens' drama,
NO THOROUGHFARE!
(LABIME),
With MR. W. F. FLORENCE in his great character of OBENREIZER.
MONDAY EVENING.....DECEMBER 7th
Will be presented Falconer's charming idyl of Irish life and love, entitled
EILEEN OGE!
In preparation—THE COLLEEN BAWN.

OPERA HOUSE,
Bush street, between Montgomery and Kearny.
THOMAS MAGUIRE.....Sole Proprietor
J. R. KEMBLE, Stage Manager | M. STRAUSS, Scenic Artist
Every Evening and Saturday Afternoon.
Emerson Minstrels.
The Greatest Hit of the Season,
LEOPOLD AND GERALDINE!
The most Graceful, Handsome and Skilled Gymnasts.
Continued Success of the original Dancing Spider,
HARRY SEFTON.
Look at the Names of the Great Favorites:
Billy Emerson, Billy Rice, J. G. Russell, J. K. Davis, G. W. Harley, Ben Cotton, Ernest Linden, Billy Arlington, D. J. Sherwood, J. R. Kemble, J. F. Oberle, George Smith,
And the Universal Favorite Minstrel Orchestra.
MAGUIRE'S NEW THEATRE TO RENT by the night or week. Apply at Box Office of the Opera House.

MERCANTILE LIBRARY HALL.
THE NOVELTY OF THE DAY!
COMMENCING THURSDAY EVENING, December 3d, RISLEY'S STUPENDOUS MOVING PANORAMA, called the
MIRROR OF ENGLAND!
OR THE RIVER THAMES AND THE CITY OF LONDO
This magnificent and colossal work of art was painted in London by messrs. Philips, Harre and Telbin, all members of the Royal academy—and embraces all the scenes of interest on the classic River Thames from above Oxford, to and through London, on over 34,000 square feet of canvas, showing for the tedious 25 by 14 feet in size each.
This grand and instructive Exhibition will remain open for a very short time, previous to its departure for Australia.
Admission, 50 cents; Reserved Seats, 25 cents extra. Doors open at 7 o'clock—commence moving at 8 o'clock. For particulars see programme. no30 1wo

SANDERS' DANCING ACADEMY,
New Montgomery street, corner Minna
OPEN EVERY DAY AND EVENING.
SOIREES every alternate Saturday evening.
Hall to let. Music furnished. no24tf

AUCTION SALES.

R. D. W. DAVIS & CO.,
AUCTIONEERS & COMMISSION MERCHANTS,
SALESROOM, 219 SANSOME STREET
Between California and Pine.
THURSDAY,
THURSDAY..... DECEMBER 10, 1874
AT 12 O'CLOCK NOON,
AT SALESROOM,
BY CATALOGUE.
SPECIAL AND PEREMPTORY SALE
OF
FINE OIL PAINTINGS
COMPRISING A COLLECTION OF
16 OIL PAINTINGS
Of Rare Merit and Value,
FROM THE MOST CELEBRATED ITALIAN ARTISTS,
Selected by a gentleman during a long residence in Europe, expressly for the adornment of a private residence, and sold only in consequence of leaving the State. Among the most prominent of them may be mentioned:
MOLIERE READING TO HIS HOUSEKEEPER—painted by Conti; the only copy in America. Superb Florentine Frame.
DIANA—an original, by Conti.
MAGDALENA—after Carlo Dolce.
HOLY FAMILY—after Correggio.
SIBYL—after Raphael.
SORENTO—original, by Fasola.
ITALIAN SHEPHERDESS—original, by d'Artri.
MME. LE BRUN—original in Rome.
CHRIST AT THE WELL; SUNSHINE AND SHADE—perfect gems; originals by Fasola.
RAINBOW—original, by Montelatici.
Catalogues will be ready Saturday next and Pic

INSURANCE.

THE LARGEST CAPITAL!
The Largest Assets!
THE LARGEST ANNUAL INCOME!
Of any Fire Insurance Company in the Country.
LOSSES PAID IN 55 YEARS.....$40,627,757
LOSSES PAID IN 16 MONTHS.....2,000,000
Assets December 31, '73, $5,845,805
Market Value.
CASH CAPITAL.....$3,000,000
GEO. C. BOARDMAN, Manager
HENRY CARLTON, JR., AGENT
SAN FRANCISCO.
OFFICE, 14 Merchants' Exchange
CALIFORNIA STREET, S. F. no23tf

MISCELLANEOUS.

BANK OF BRITISH COLUMBIA.
Incorporated by Royal Charter.
Southeast Corner of California and Sansome Streets.
Head Office.....London.
Branches.

Figure 2.

But the plane of the orbit of Venus (V V′O) is inclined (figure II.) to that of the Earth (E O E′) at an angle of 3° 24′; so that one half of it lies above, or north of the orbit of the Earth, and one half below, or south of it. The line where the planes of the orbits intersect each other is called the nodal diameter, and is the only line common to both orbits. Venus, having the inside track, overtakes the Earth regularly, but ordinarily in some part of the orbit away from this nodal diameter. After the two planets have started, so to speak, in their courses from either end of the nodal diameter, they will be ready to the same line again in 2,920 days, corresponding nearly to eight years of our Earth, and thirteen years of Venus, but Venus will in that period reach the starting-point one day earlier than the Earth. The inclination of the orbit of Venus being known, and the ratio of her distance from the Sun and from the Earth, it can be readily calculated that it is a physical necessity that she must be within one degree and two thirds, or one day and one tenth of a node at the epoch of inferior conjunction, in order that a transit may be possible. Therefore at every node there is an arc of her orbit of a little more than three degrees, or two days, along any part of which Venus, if in inferior conjunction, will be projected upon the sun's disc as seen from the earth; and as there are two nodes, the total range, out of the 360 degrees of her orbit along which transits can occur, is about six degrees and two thirds, or the fifty-fourth part of the whole. If the inclination of the orbit were less there would be a greater range for the occurrence of the transits; and if it were greater a less range for their possibility.

But besides this inclination of the orbit, etc., there are other difficulties that complicate the problem and make the transits so rare. The earth arrives punctually at one end of the nodal diameter in June, and at the other end in December; and thus the first question to be settled is, when will Venus be on that diameter at the same time. Her velocity in different parts of her orbit must be calculated; the attraction of the earth and other planets; and the changing of the nodal diameter in relation with the earth's orbit. After these and other intricacies have been satisfactorily made clear, the exact time of the transit on different points of the Earth's surface is calculated; and the pathway of the planet across the Sun's disc, so that the most important stations may be selected. At these stations the observer is then to note the epochs of the first and second contacts of the limbs of Venus and the Sun at ingress, and the third and fourth contacts at the egress. These, with the exact geographical positions of the stations will furnish the essential data for computing the distance of the Earth from the Sun.

From Kepler's third law the *relative distances* of the members of our system from the Sun are known; but if a plan of the orbits and sizes of the planets were drawn with these relative distances only, it would be very much like a surveyor making a beautiful map of a city or county without knowing the scale upon which it was plotted. Or the draughtsman furnishing the mechanical engineer with an elaborate drawing of a bridge without a scale to indicate what was the length, breadth, or depth of the structure.

When two planets, as the Earth and Venus, revolve in elliptical orbits around the Sun, Kepler announced, after seventeen years of hard, plodding industry, with imperfect observations, that "*the squares of their respective times of orbital revolution are to each other as the cubes of their respective mean distances from the Sun.*" After this discovery Newton demonstrated that this law, as well as the other two, are necessary results of the universal law of gravitation.

Of the quantities involved in this law we have already determined the length of our own year—365.242 days; and that of Venus—224.701 days. If we denote the former quantity by E, and the latter by V, and designate the mean distance of the Earth from the Sun by *e*, and the mean distance of Venus from the Sun by *v*, the foregoing law is expressed algebraically thus:

$$E^2 : V^2 = e^3 : v^3$$

Or

$$\frac{e}{v} = \sqrt[3]{\left(\frac{E}{V}\right)^2}$$

Having the beforementioned lengths of the years of the Earth and of Venus, and also the above ratio involving their distances, we know that if the mean distance of the Earth from the Sun be assumed at 100,000,000 miles, that of Venus from the Sun will be 72,333,240 miles, and, consequently, when they are at their mean distances from that luminary and in the same line with it, the distance between the two planets, reckoned by the proportion above given, will be 27,666,760 miles. It is therefore evident if we can learn the actual value of either of these three distances we can readily compute the other two; and also the distances of all the other members of our system.

The observations of the transit of Venus enable us to ascertain the actual distance between Venus and the Earth. *How* this is done we will endeavor to elucidate; and in order to divest the problem of a multitude of intricate and abstruse conditions that necessarily accompany its complete solution, we propose to illustrate two of the methods by cases which might occur in every-day life and which will be readily understood.

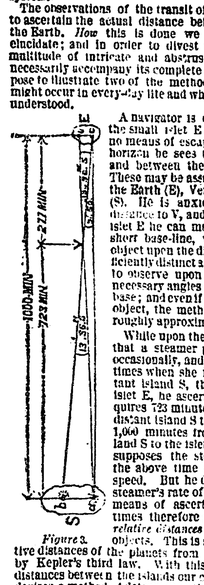


Figure 3.

A navigator is cast ashore upon the small islet E (Figure III), with no means of escape; far off on the horizon he sees the large island S, and between them lies a rock V. These may be assumed to represent the Earth (E), Venus (V), and Sun (S). He is anxious to know the distance to V, and to S, but upon the islet E he can measure only a very short base-line, while there is no object upon the distant island S sufficiently distinct and sharply defined to observe upon and measure the necessary angles at the ends of his base; and even if there were such an object, the method would give but roughly approximate results.

While upon the islet he discovers that a steamer passes the islands occasionally, and by his noting the times when she is abreast the distant island S, the rock V, and the islet E, he ascertains that she requires 723 minutes to pass from the distant island S to the rock V; and 1,000 minutes from the distant island S to the islet E. Moreover, he supposes the steamer to have for the above time a uniform rate of speed. But he does not know the steamer's rate of speed, and has no means of ascertaining it. These times therefore give him only the *relative distances* apart of the three objects. This is similar to the relative distances of the planets from the Sun, as given by Kepler's third law. With this time-ratio of the distances between the islands our seastaway navigator devises a method of determining the actual distances. Upon the distant island S are two objects upon which he can observe, in this new manner. He selects a base-line, between the two points *a* and *c*, one fifth of a mile in length, and perpendicular to the line *c a*, so that from the station *c* the line through V is projected to one of the natural objects (*b*) upon S, and from the station *a* the line through V is projected upon the other natural object (*o*) upon S. The angular distance of these two points *o* and *b* is then measured as accurately as practicable from station *c*; and let us suppose it to be 9°. Now, from our knowledge of the relative distances of the distant island S from the rock V, and the distant island S from the observer's

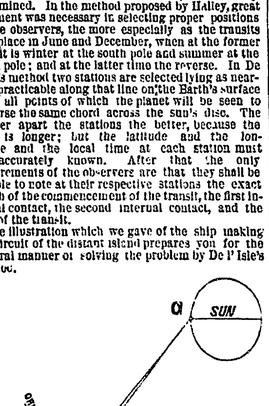


Figure 6.

As in the case of Halley's method, we must imagine the Earth to have no motion with regard to the Sun during the time of observation; that Venus only is moving relatively to a straight line joining the centres of the Sun and the Earth; that as seen from the stations *a* and *e* (figure VI) on the earth's surface, the disc of Venus projected on the disc of the Sun is a point at *a*; and that the stations *a* and *e*, the path of Venus, and the point *a* are in the same plane. Moreover, let us assume the distance between *a* and *e* to be 6,000 miles. Venus, in traversing her orbit, reaches the point A on the line joining the station *e* and the edge of the Sun's disc at the point *a*, and the epoch of that event is noted by the observer at *e*. As she continues in her orbit from A toward B different observers can note at the intermediate stations the time when the planet first touches the Sun's disc, and, therefore, when she is in line between each observer and the point *a* on the Sun's limb.

When Venus has moved to the point B the observer at *e* sees the planet touch the limb of the Sun at *a*, and notes the epoch of the event in the same manner as the observer at *e* has previously done. We thus learn what length of time Venus has taken to traverse the arc A B, and since we already know how long she takes to complete the circuit of her orbit, we can calculate what is the ratio of the observed arc A B to the whole orbit.

We have already assumed the length of the line *e a* to be 6,000 miles, and for simplicity we suppose it perpendicular to *e a*; while from Kepler's third law we know the ratio of the distance of the Earth from the Sun, and of Venus from the Sun; so that by the simple proportion 100,000,000 : 72,333,240 :: 6,000 : 4,340 miles, we determine the actual distance A B to be 4,340 miles.

For the assumed case the time when the planet would appear more directly between the station *e* on the Earth and the point *a* on the Sun would be 3.36 minutes later than the same event would be noted at the station *c*. With this additional datum we can, by another simple proportion, determine the length in miles of the orbit of Venus, and thence her distance from the Sun. We already know that Venus makes a complete orbital revolution in 224 years, 16 hours and 48 minutes, or 222,965 minutes; we have observed that in 3.36 minutes she describes 4,340 miles of that

Figure 7.

I. *By the Parallax of Mars.*—Gond, of Cambridge, had shown how the parallax of Mars could be determined by observation upon that planet at and near opposition. Every fifteen years this planet is at its shortest distance from the Sun at the same time that the Earth is at its greatest distance therefrom (Figure VII); and, moreover, they are nearly on the same line with the Sun. At these times the planets are only 33,000,000 miles apart. The problem consists in

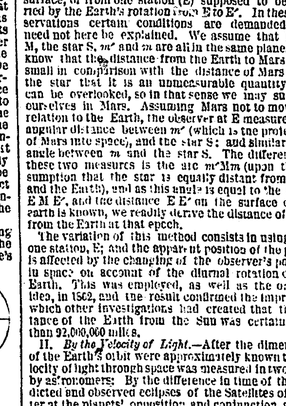


Figure 8.

measuring (Figure VIII) the angle *m Mm*, from two widely-separated stations E and E′ on the Earth's surface, or from one station (E) supposed to be carried by the Earth's rotation from E to E′. In these observations certain conditions are demanded that need not here be explained. We assume that E, E′, M, the star S, *m′* and *m* are all in the same plane. We know that the distance from the Earth to Mars is so small in comparison with the distance of the Earth from the star that it is an unmeasurable quantity that can be overlooked, so in that sense we may suppose ourselves in Mars. Assuming Mars not to move, in relation to the Earth, the observer at E measures the angular distance between *m′* (which is the projection of Mars into space), and the star S; and similarly the angle between *m* and the star S. The difference of these two measures is the arc *m′Mm* (upon the assumption that the star is equally distant from Mars and the Earth), and as this angle is equal to the angle E M E′, and the distance E E′ on the surface of the earth is known, we readily derive the distance of Mars from the Earth at that epoch.

The variation of this method consists in using only one station, E; and the apparent position of the planet is affected by the changing of the observer's position in space on account of the diurnal rotation of the Earth. This was employed, as well as the original idea, in 1862, and the result confirmed the impression which other investigations had created that the distance of the Earth from the Sun was certainly less than 92,000,000 miles.

II. *By the Velocity of Light.*—After the dimensions of the Earth's orbit were approximately known the velocity of light through space was measured in two ways by astronomers. By the difference in time of the predicted and observed eclipses of the Satellites of Jupiter at the planets' opposition and conjunction, and by the aberration of the fixed stars. But neither of these reveals to us the actual velocity of light. It remained for Fizeau and Foucault to solve a problem apparently so intractable where a velocity of 185,000 miles per second is involved. This is not the place to reproduce the method devised by these experimenters; but the result by Foucault's method, which in some respects is superior to Fizeau's, gave a velocity to light in the interplanetary spaces as well as in air, of 185,300 miles per second. From this velocity, applied to the eclipses of Jupiter's satellites, is deduced 91,100,000 miles as the distance of Venus from the Sun.

III. *By a Certain Irregularity in the Moon's Motion.*—This irregularity is due to our satellite being most disturbed by the Sun when between the Sun and the Earth. The law of gravitation declares that the attraction of two masses depends upon the distances between them. The Moon is attracted to the Earth by a force depending upon their distance apart, which is known. When the Moon is between the Earth and the Sun, the latter tends to draw her away, so to speak, from the Earth, more strongly than to draw the Earth from the Moon when the latter is in opposition. A similar tendency exists for all the positions of the Moon which nearer the Sun than the Earth. The effects of these differences of attraction are shown in the acceleration and retardation of the Moon's motion in her orbit, and in the distortion of that orbit, which is thereby elongated in a direction at right angles to the line through the Moon, Earth and Sun, although at first place the reverse would seem to be the effect. In the Moon's motion the slight variation which it receives upon this cause alone can be calculated theoretically. If we knew the exact distances of the Earth from the Sun, and of the Moon from the Earth, the theoretically computed motions of the Moon should agree with the motions derived from direct observations. The perturbations are, of course, very minute, but the observations are so numerous and so sufficiently exact that, in 1854, the astronomer Hansen, of Germany, calculated the tables of the difference, and ascribed it to the true cause. This led to a redescription of the problem of the parallax of Mars, and a reduction of the results. From these results he assign d, in 1863, a distance of 19,000,000 miles between the Earth and the Sun. By this method of investigation we are indebted to La Place, who deduced from it a ratio of the distance very little different from Delisle's results derived from the transit of Venus observations.

IV. *By an Irregularity in the Earth's Orbital Motion.*—This irregularity is due to the Earth revolving around the common centre of gravity of its own mass and that of the Moon. If the Earth had no satellite she would revolve in her orbit with no other than planetary perturbations. There is a variation in her rate of motion, due to the ellipticity of her orbit, but there is also a monthly alternate increase and retardation of that velocity depending upon the existence of the Moon. Although the mass of the Moon is very small in comparison with that of the Earth, yet the latter is perturbed in the same way, but, of course, not to the

ANTIQUARIAN,

At His New Quarters,

Corner Second and Jessie sts.,

n014 8M4pif Near Market.

OLNEYS & MIDDLETON.

AUCTIONEERS.

GRAND CREDIT SALE

—OF—

OAKLAND

—AND—

SAN FRANCISCO

REAL ESTATE.

THURSDAY,

THURSDAY.....DECEMBER 10, 1874

AT 12 M., AT SALESROOM,

No. 310 Montgomery Street,

SAN FRANCISCO,

We will sell, per order of the Trustees of the Estate of

D. GHIRARDELLI & CO.,

BANKRUPTS,

Comprising in Part:

IN OAKLAND.

Brick Store and corner Lot, 75x75, on Broadway and Third street;

Brick Store and Lot, 50x100, on Third street, near Broadway;

Manufacturing property on First street, in four subdivisions, 100x150 feet each, or as a whole;

One highly improved Block, with Trees, Shrubbery, Statuary, etc., and commodious Residence, admirably adapted for a Public Garden;

Five nice Residences, with large Lots, on good streets;

Seventy large Building Lots, on TWELFTH, FOURTEENTH, ADALINE, THIRD, And other streets;

Splendid Villa Lots on the Lake

The finest Residence Property in Oakland. Lots will vary in size from 50x100 to 200x300 feet.

—ALSO—

The Italian Marble Fountain and Statuary.

IN SAN FRANCISCO.

Three fine Blocks and a large Tract of "Outside Lands."

Large Lot on Duncan street, between Sanchez and Church streets, 179 8-12 feet by 114 feet deep; fenced and on the grade.

TERMS.

One-Third Cash,

balance in 18 MONTHS, bearing interest at 9 PER CENT. PER ANNUM; or HALF CASH, balance at 8 per cent., purchasers' option. Further particulars in

MAPS AND CATALOGUES,

which may be had at our office or at the office of OLNEY & Co., 637 Broadway, Oakland.

OLNEY & MIDDLETON,

n0822d Auctioneers.

NOTICE.

THE UNDERSIGNED WILL IN CONNECTION with several gentlemen of this city, place before the public a prospectus for the establishment of a Town (on the "Beecher" principle) of 1,200 Lots, 6x210, and 5 to 10 thousand acres about the Town, cut up in 5, 10, 20 and 40 acre Lots. The situation is close to the city, with easy access by Railroad steamboat. The project will be pushed forward in such a manner that the shares will be ready for delivery on the next new months.

CHAS. H. PETERS.

The New Improved FLORENCE,

Side Feed and Back Feed.

Agency established on the Pacific Coast in 1863. The lightest running most simple, and most easily operated Sewing Machine in the Market. Always in order and ready for work. If there is a Florence Sewing Machine within one thousand miles of San Francisco not working well I will fix it without any expense to the owner. Samuel Hill, Agent, 10 New Montgomery Street, Grand Hotel Building, San Francisco.

n018wsmlmip

VAN WINKLE & DAVENPORT,

IMPORTERS AND DEALERS IN

IRON, STEEL

CUMBERLAND COAL,

Axles, Springs, Blacksmiths' Tools, Etc.

AGENTS FOR PERKINS' PATTERN HORSE SHOES and GLOBE HORSE NAILS.

Nos. 413 and 415 Market street, San Francisco, Cal. d6tf

SALE OF MILL AND MINING PROPERTY.

NOTICE IS HEREBY GIVEN THAT THE Assignee in the Estate of THE COLUMBUS MILL AND MINING COMPANY, Bankrupt, will on the TWENTY-EIGHTH DAY OF DECEMBER, 1874, at the hour of 11 o'clock, at the office of Craig & Meredith, No. 536 California street, in the city and county of San Francisco, state of California, sell at public auction, for cash in United States gold coin, the following real and personal property belonging to said estate, the same to be sold in three parcels as follows:

ITEM—That real property consisting of a tract of land in the town of Colton bounded running at the southwest corner of Bond Main streets, and running thence along the west line of Bond street, southerly 150 feet; thence at right angles westerly 100 feet to A street; thence at right angles northerly along A street 150 feet; thence at right angles easterly along Main street 100 feet to the point of beginning, together with the quartz mill thereon.

Also, that piece of land situate in said town commencing at the northeast corner of A and Main streets; thence running easterly along Main street 60 feet; thence at right angles westerly 20 feet; thence at right angles northerly A street southerly 150 feet to the place of beginning.

Also, that tract of wood land consisting of four quarter sections, more or less, known as the Coats and Levy Wood Ranch, being about 16 miles westerly from said town, together with the appurtenances and roads leading thereto, and the tools, and the wood thereon.

Also, all those certain claims of quartz bearing pieces of land situate in Columbus, Mineral District, as follows: Jackson, Independent, Gold in the Hearth, Sun Rise and Sun Set quartz lodes; also, all the undivided one-half of the quartz lode known as Eastern Lode, the other half belonging to Mr. Hamilton; also, the undivided half of the Columbus Quartz Lode No. 2; also, the undivided half of the Federal Thomas Quartz lode; also, the claims known as the Federal Thomas Quartz lode; also, the claims known as situate on the Northern lode, 1,000 feet in the Black Metallic Quartz; also, the undivided half of the Platina Quartz Lode, said lode being situate on Little Mill creek, also, undivided one-half of Major Tom's mine or location, together with all the ships and appurtenances.

SECOND—That personal property consisting of machinery consisting of 1 Dressing battery, 1 portable engine and boiler, 1 rock-breaker, 5,000 pounds pan castings and 1 pair blocks.

THIRD—That personal property consisting of 1 chest carpenter tools, 1 grindstone, 1 set black smith tools, 1 hot new castings for furnace, 1 lot new castings for battery, 2 clocks, 6 long-handled shovels, 11 pieces furnace tools, 1 set tackle-blocks, 2 iron pans and quicksilver bottles, 11 settlers, 1 set assayers' tools, 8 blacksmith hammers, 2 sledges, 9 pairs blacksmith tongs, 6 pieces gas-pipe, 7 wrenches, 1 small set gas-pipe stocks, 2 jackscrews, 1 cross-cut saw, 50 steel drills, 40 feet rubber hose, 2 platform scales, 2 counter scales, 8 pieces iron pipe, 500 pounds miscellaneous iron, 2 hand-lamps, 250 feet hose, 2 box stoves and pipe, 575 ore sacks, 1 pair vise, 2 anvils, 2 bellows, 1 vise, 2 rock-hammers, 20 feet cine-cut-saw, 5 wheelbarrows, 1 taper press, 1 beam scales, 1 mining car, 1 patent tube-expander, 1 set chain pulleys.

WILLIAM CRAIG,

d6tw Assignee.

THE TERRITORIES.

— Skating is abundant at Lewiston, Idaho.

— A new anti-Mormon paper is to be started at Ogden.

— Logan, Utah, is to have a Liberal paper started next spring.

— Ed. Fordsman, a Mormon, tried to marry his niece, a girl 14 years of age, at Ogden, on Monday, but the Gentiles notified him to leave town, and the arrangement was temporarily interrupted.

— There has been a serious trouble at Bingham, Utah, between a company of miners and railroad employees.

— It is reported that gold placer diggings have been discovered near Salt Lake City.

— A dispatch from Salt Lake says: "Daniel Wood, merchant, of Ogden, Utah, brings suit against the Judges, Judge, Sheriff, and others, alleging that on July 29th, 1874, he was arrested without any process of law and confined in the filthy County Jail for twenty-six days; that he was subjected to cruel and inhuman treatment, and that he was finally set at liberty, no charge having been made against him, and without trial.

— A letter from Corbat, Arizona, November 24th, says the Mexican who killed a countryman there some time ago was himself shot on the 22d by a Mexican named Juan, who followed him on horseback about a mile out of town, and killed him in presence of two men.

— A telegraphic dispatch from Tucson, of the 3d instant, announces that Lieutenant Smith, Superintendent of the military telegraph, started that morning for Camp Apache, to make surveys, etc., for the line of telegraph which is to be built as soon as the material can be got on the ground.

NEWS ITEMS FROM OREGON.

— The Oregon Steamship Company's warehouse at Oregon City is full of wheat.

— The farmers in the Umpqua are shipping wheat to San Francisco *via* Scottsburg and Gardiner.

— Ex-Member of Congress Slater is dangerously ill with pneumonia, at his residence in La Grande.

— Parker & Morris, of Albany, are shipping a lot of about 60,000 bushels of wheat, which they bought last week at 60 cents.

— Mr. Mudge, of Clatsop county, has just gathered a second crop of Bartlett pears from his trees this year. They are all out as good as the first.

— Says the Portland *Bulletin* of November 23th: "A sample of beautiful club wheat has been left on our table by Mr. Shepherd, of Gervais. In 1864 Mr. Folsey, a farmer near Gervais, procured sixty-four grains, and from these few kernels he this year harvested 20,000 bushels.

— The Yamhill *Reporter* says: "During the late cold snap many farmers seemed quite fearful that the crop of fall wh at would be damaged, and the subject was speculated upon so much that we were induced to make inquiries in regard to the matter. We have questioned our farmer friends of different directions, from the dry hills to the soggy bottom lands, and have found that the crop was not in the least injured, and that it is in excellent condition."

— The case of Estrado and Costa, who were condemned to be hanged for murder, is still pending before the Supreme Court upon a petition for a rehearing.

at Bismarck's speech on the 26th ultimo that they threatened to withdraw from the Reichstag and quit Berlin, but their friends induced them to stay.

ARGENTINE REBELLION ENDED.

Unconditional Surrender of General Mitre, with His Army.

BUENOS AYRES, December 4th.—It is officially announced that General Mitre, having been defeated and finding himself closely pursued by Government forces, proposed terms of capitulation, which were rejected. He finally surrendered, unconditionally, with his army, and peace has been restored in the province of Buenos Ayres. Government troops are in pursuit of Drendondo, whose advance guard has been defeated.

Pacific Mail Row among Directors.

NEW YORK, December 4th.—The Pacific Mail row looks as if it had grown out of President Sage's speculations in selling the stock short, on one side, and suspicion on the other that director Osborne, who is the Wall street broker for Jay Gould, had been giving statements to the public from the inside to help Gould bear speculations. Gould's published letter intimates his own supposition that he owned Sage, and that Sage had not behaved like a tractable chattel, but had operated himself, on his inside information, giving out to the public what would help to advance his own interests, and then casting suspicions on Gould's broker director of having done the same for Gould. Evidently the latter got the best of Sage in the fight, but the result does not necessarily satisfy the public that Sage was the greater sinner. Director Alexander, an experienced steamship man, says there has been recently a marked improvement in the company's management. The new steamers, instead of using forty to fifty tons of coal per day, consume only fifteen or eighteen tons; and expenses being curtailed, throughout the business of the company, he regarded it as now in a highly flourishing condition. Its New York business for three months ending November 30th had amounted to more than double that of last year during the corresponding months. The coal on hand was nearly double that of a year ago. The new dock at Canal street would be a great improvement, and when it was completed the office would be removed there, so that instead of paying $11,000 for an office in Wall street, the office rent would be merely nominal. Mr. Alexander denounces the effort to depreciate Pacific Mail stock as the work of speculators, who had fish of their own to fry, and hoped to be able to break down the company. He believed it was, however, on too firm a basis to be affected by such attempts. The only misfortune that the company now had to bear was that too much of the stock was owned in Wall street. This fact, he thought, was the cause of much of the misrepresentation regarding the company, and it would be remedied as speedily and fully as possible. He wanted to get the stock out of the hands of speculators, and have it placed among business men who are trustworthy and above suspicion. A statement of the company's affairs is now preparing, which, he says, will undeceive the public regarding many things of which they have been wholly misadvised.

GRAND ENCAMPMENT OF KNIGHTS TEMPLAR OF THE UNITED STATES.—NEW ORLEANS, December 4th.—The officers of the Grand Encampment of Knights Templar of the United States, elected yesterday, were installed to-day. The question of uniform was left optional with the States. Commanderies now using red in States where black is generally used may change to black if they desire to do so. The place of the next meeting has not yet been determined, but Denver is prominently mentioned in this connection. The procession to-day was a very fine display. Business was generally suspended and the day was observed as a holiday. To-night many of the principal buildings are illuminated, and a number of festivals are given in different halls in honor of visiting Templars.

THE ERIE INJUNCTIONS.—NEW YORK, December 4th.—Some time ago a temporary injunction was granted against the Erie Railway Company on suit of James C. Angell, a stockholder, and to-day a new injunction was granted by Judge Donohue, on suit of *Stephen C. Arnot et als. vs. The Buffalo, New York and Erie Railway Company.* The plaintiff in this case is a stockholder in the Buffalo and Erie Company. Arnot asked for the injunction to restrain the company from issuing or negotiating bonds or stock referred to in the suit of Angell. This afternoon Judge Donohue gave an order to show cause why a receiver should not be appointed.

FATAL ACCIDENT—THREE MEN KILLED.—FALL RIVER, Mass., December 4th.—A terrible accident occurred this afternoon near Slade's Ferry, where the Old Colony Railroad Company is constructing a bridge over Taunton river. While the workmen were engaged in sinking a pneumatic cylinder, which was to form a portion of the pier, the upper flange of the air-lock, to which the lower was secured, together with the cover, was blown off by the pressure of air in the cylinder. Eight men were on the cylinder; three were killed outright, one fatally injured, one seriously hurt, and the other three escaped uninjured.

THE LONGSHOREMEN'S STRIKE.—NEW YORK, December 4th.—A number of longshoremen of Hoboken have gone to work, having accepted the reduction, and others will go to work to-morrow. The Brooklyn labor movement agreed last night to work at the reduction for night-work, but refused to work with non-Society men. This debars them, and trouble is apprehended. A large force of police is on duty on the river-front.

NEVADA COUNTY NARROW-GAUGE RAILROAD—CONTRACT FOR BUILDING AWARDED.—GRASS VALLEY, December 4th.—The Directors of the Nevada County Narrow-gauge Railroad met to-day, for the purpose of receiving bids for the construction of the whole road from Colfax via Grass Valley to Nevada City. The bid of M. Beatty, offering to build and equip the whole road for $600,000, was accepted. The contractor is required to have the road in running order by next October.

THE PROCTOR-MOULTON SUIT—NEW YORK, December 4th.—A formal order postponing the Proctor-Moulton suit till Wednesday was entered in the office of the Clerk of the Circuit Court to-day. It is expected that General Butler will conduct the defense. If the Tilton-Beecher case comes up on Tuesday, the Proctor case will probably go over, as the same counsel are engaged in both cases.

DISASTERS AT SEA.—HAVANA, December 4th.—The Spanish coasting steamer *Thomas Brooks*, from Santiago de Cuba for Guantanamo, struck yesterday morning on Morillo, near Guantanamo, and sunk immediately. About thirty lives were lost.

LONDON, December 5 h.—A ship supposed to be the *Pontiac*, from Sunderland for Bombay, has been burned at sea. Twenty-six of her crew perished.

SYMPATHY WITH THE RECENTLY-FINED WESTPHALIAN COUNTESS.—BERLIN, December 4th.—A deputation of Roman Catholic ladies from England have arrived in Munster to congratulate the Westphalian Countess, who was recently fined for signing a seditious address to the Bishop of Paderborn, sympathizing with him in his imprisonment for resistance to the ecclesiastical laws.

NO POSTPONEMENT OF VON ARNIM'S TRIAL.—BERLIN, December 5th.—The reported postponement of the trial of Von Arnim is incorrect. The application of his counsel for a postponement was refused.

CONSIGNEES.

Per Santa Cruz—L H Allen; W H Alexander; Ballard & Hall; J H Bolten; Cohnhur, Wheaton & Lubrs; J H Heider; A Cerberry; Marshall, Irvine & Hughes; T H Hatch & Co; P Curry; Martin, Feusier & Steffanit; Stewart & Elder; J C Hoag; O F Hanson; Stroufe, Sweeny & Co; Wooster, Shattuck & Co; F Lunde; S Levy & Co; Prechio & Co; J N McCurdy; J McKnight; Stearns & Smith.

Per Constantine—I Friedlander; Littlefield, Webb & Co; Harr & Goodman; M Waterman; F S Spring; Hixon & Curtis; Stuart & Elder; T H Hatch & Co; R C Kirby & Co; H T Holmes; S C Gray; Collins, Wheaton & Lubrs; G K Porter; A Schumacher; Heeht Bros; Stroufe, Sweeny & Co; L Lustig; J Accoulat; Peck & Hanmer; J M Morrison; Martin & Steffanit; Terwilliger & Co; Howe & Hall; J Welch; Forsaith, Tyler & Shaw; J M Sims; A C Towne; S Sharp.

IMPORTATIONS.

TOMALES—Per Santa Cruz—92 bxs apples, 18 do eggs, 31 do butter, 10 do peas, 1 pkg effects, 2619 sxs potatoes.

OLEMA—3 bxs butter, 1 coop chickens

MARSHALL'S LANDING—4 bxs butter, 2 do eggs, 11 sacks clams.

MONTEREY—Per Constantine—2501 sxs wheat, 2237 do barley, 11 bdls hides, 3 bxs butter, 2 do eggs, 6 deer.

SANTA CRUZ—10 bbls flour, 18 sacks hair, 11 bxs butter, 11 do eggs, 30 do apples, 65 rolls leather, 3 coops fowls, 17 cs mdse.

TABLE OF HIGH AND LOW WATER.

Computed by THOMAS TENNENT, mathematical instrument maker, 123 West Tilman street.

DEC.	U. W. SMALL.	L. W. SMALL.	H. W. LARGE.	L. W. LARGE.	SUN RISES.	SUN SETS.	MOON RISES.
6....	11 03 PM	3 22 AM	10 18 AM	4 46 PM	7 07	4 37	5 07

MARINE INTELLIGENCE.

Arrived.

FRIDAY, December 4.

Stmr Santa Cruz, Leland, 8 hours fm Tomales etc; produce, etc. to Goodall, Nelson & Perkins.

SATURDAY, December 5.

Stmr Constantine, Fate, 10 hours from Monterey and Santa Cruz; passengers and mdse. to Goodall, Nelson & Perkins.

Bark Adelaide Cooper, Hawes, 14 days fm Port Ludlow; 290 M lumber, to C L Dunphy.

Br bk Fairrie, McKay, 26 days from Honolulu; 1453 pkgs sugar, 70 bbls molasses, to Jonge & Co.

Sailed.

FRIDAY, December 4.

Stmr Mary Taylor, Peterson, Point Arena.

Schr Emery, Jones, Shoalwater Bay.

Schr Oceola, Lorentzen, Tomales.

SATURDAY, December 5.

Stmr Los Angeles, Sholl, Victoria.

Br ship Conqueror, Tacoma, Liverpool.

Ship Gramper, Deane, Liverpool.

Schr Helen Merriam, Nelson, Albion River.

Schrs Amy Gilmore, Farley, Santa Cruz.

Schr Three Sisters, Cuffey's Cove.

Schr Milton Badger, Hardy, Melbourne.

By Telegraph—POINT LOBOS 3 P. M.

Weather hazy—wind fresh N E.

Outside—Bound In.

Ship Sumner B Mead, Wood, from Baltimore; to C L Taylor & Co.

Ship Jamestown, Call, fm Rio; to Williams, Blanchard & Co.

Spoken.

Sep 25, lat 15 42 S, lon 75 15 W, Br bark Geo Crosbaw, Coe, mdse, July 22, for Liverpool.

Memoranda.

Per Constantine—Left at Monterey, schr Solano; at Santa Cruz, schr Adriatic, J H Roscoe, Caroline Medau.

Domestic Ports.

PORT PLAKELY—Sailed Dec 3—Bark Oak Hill, Grove for San Francisco.

SAN DIEGO—Arrived Dec 4—Schr Vanderbilt, Simms, fm Humboldt.

HUENEME—Sailed Dec 4—Schooner Bill the Butcher, Christensen, for San Francisco.

SANTA BARBARA—Sailed Dec 4—Steamer Ventura, Barlow, for San Francisco.

GAVIOTA—Sailed Dec 4—Stmr Kalorama, Elliot, for San Francisco.

AVILA—Sailed Dec 5—Stmr Kalorama, Elliott, for S F.

PORT TOWNSEND—Arrived Dec 5—Bk Martha Rideout Ford fm Melbourne.

TACOMA—Sailed Dec 5—Bark Samoset, Martin, for San Francisco.

Foreign Ports.

LIVERPOOL—Arrived Dec 5—Br ship Remington, Tuero, hence July 16.