

SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XXX.—No. 11.
(NEW SERIES.)

NEW YORK, MARCH 14, 1874.

[\$3 per Annum,
IN ADVANCE.]

NEW AND GIGANTIC TELESCOPE.

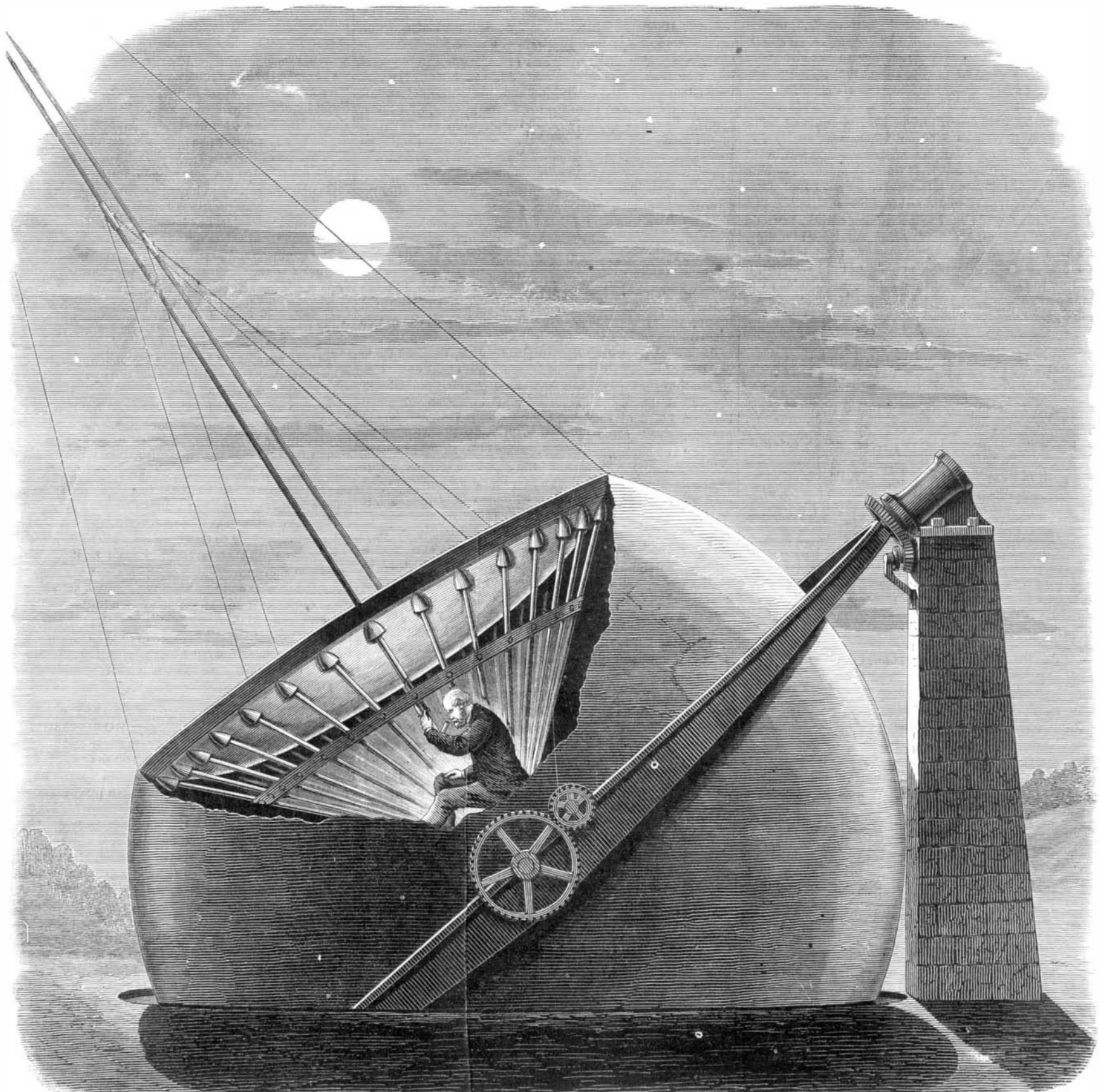
Among the many ideas which have been elicited by the discussion in these columns regarding a gigantic or "million dollar" telescope, we have recently had submitted to our examination one which seems to us quite novel, ingenious, and, although untried, not unpractical. It is a scheme for a huge instrument, to be built on either the Gregorian or Cassegrainian system, in which the image is first received on a large parabolic mirror located in a position diametrically opposite to the objective in a refracting telescope, thence reflected back to a secondary mirror, which, in accordance with the respective systems, is either concave or convex, and by the last re-reflected to the eyepiece, the tube of which passes through an orifice in the center of the large glass. It is hardly requisite to explain the immense labor and, in fact, almost insuperable difficulties which would be encountered in constructing a reflector of the proposed size—ten or fifteen feet in diameter—of metal, and mounting the same. The great mirror in the telescope in Melbourne, Australia, though but 3·8 feet in diameter and weighing 3,498 pounds, required 1,270 hours of continuous labor to bring it into the last polishing stage, while its adjustment and mounting exacted the

nicest engineering skill. In brief, it may be safely asserted that a metallic mirror, of the large size above noted, supposing it could be successfully constructed, would, from its great weight but far more on account of its consequent flexure, be practically useless.

Mr. Daniel C. Chapman, of this city, who is the originator of the plan we are about to describe, suggests both a mode of making a mirror of light weight, and also a method of supporting the same. The reflector, he says, may be constructed of glass. A mold of clay, metal, or cement, of the required shape, is carefully formed and placed in a suitable furnace, cavity upward. Over the latter a huge plate of glass is disposed, and the heat applied. At a certain temperature, the glass begins to soften, and in such state may be bent, fitted into the mold, and subsequently annealed. The whole is then removed and placed on a plane. The glass is taken from its bed, disposed convex side up, and a backing of cement or plaster, the composition of which is previously determined by experiment so that it shall have the same coefficient of expansion as the glass, is applied, to several inches in thickness. The mirror is next inverted, placed on a turning table, and carefully ground or finished within, into

the exact form necessary. But little labor, comparatively speaking, will here be required, as an approximate or very nearly true curve will, it is believed, be taken by the glass in fitting itself to the mold. The reflecting face is, lastly, silvered by Dr. Draper's process, a solution of Rochelle salts and nitrate of silver being applied, which very quickly deposits a fine uniform metallic surface. It will be noted that the inventor thus obtains a reflector of light plaster and glass, the weight of which is necessarily quite small.

Next, for its suspension, and this will be rendered clear by the large engraving on our front page: On the rear of the plaster backing are made a number of projections, arranged with sockets to receive the ends of any number of braces. The latter are of wood, strong and well seasoned, and covered with some preserving material. These, extending from various points on the back, meet at the center of a huge copper sphere, which incloses the entire apparatus except the mirror, and then, intersecting, spread again to abut against the interior periphery of the globe. The mode of arranging these stages is, of course, a matter of engineering detail, and will depend greatly upon local



NEW AND GIGANTIC TELESCOPE. DESIGNED BY DANIEL C. CHAPMAN.

circumstances. The shell of the sphere comes, as shown in the engraving, just to the edge of the mirror, but has nothing to do with its support, the braces being solely for this purpose. The secondary mirror is held by two stays, which extend from the circumference of the reflector and meet at a calculated distance from the same. It is not necessary that the reflector be placed at the surface of the globe, but it may be placed at or near the center, leaving an opening of the same size in the globe, with perpendicular sides, thus requiring little or no counterpoise. The standards and stays holding the small mirror may be attached to the extreme external surface of the globe, thus giving a larger base and greater steadiness. The stays toward the poles are so arranged that the lower one is detached when nearing the horizon, in case it should be desirable. By this method there is nothing, as far as we can now see, to prevent the successful constructing and using of a telescope of very large size.

Through the center of the large glass is made an opening, and in this is a telescope tube, suitably jointed and terminating in an eyepiece within the globe at the observer's seat. The situation of the latter is clearly shown in the illustration, and it is suitably supported so as to be always vertical. By this arrangement the observer is constantly located in the right position; and by placing a partition of some non-conducting material between him and the backing of the reflector, so as to leave an intermediate space of four or five inches, a warm room to work in may be gained, and a means of keeping the braces dry provided.

The great sphere pivots in a ring, the axis of which is inclined to point to the pole, and is pivoted at one side in the cap of a single heavy pier. Below the globe is a vault filled with water or other liquid, in which it floats and from which it receives its principal support. It is evident that the motion of the apparatus will thus be susceptible of easy regulation, and may be effected by simple mechanical appliances arranged with counterpoises and governed by the observer. As our object is not to enter into the minor details of this plan, but rather to exhibit the idea upon which it is based, further explanation is deemed unnecessary.

The inventor thinks that a mirror of fifteen feet diameter may be constructed and mounted as we have described. As compared with a refracting telescope with an objective of corresponding size, and a focal length of 200 feet, the refractor would give a sun picture 20 inches in diameter; the reflector, having 100 feet focal length, would show an image 10 inches in similar dimension. In point of quantity of light, compared with Herschel's reflector, which was nearly five feet in diameter, the focal distance being still 100 feet, a 15 foot mirror would gather nearly 14 times as much. For photography, a great reflecting telescope could not be advantageously employed, as it would fail to give sufficiently fine definition of the object; but for spectroscopic work, it would be very useful and especially valuable for heat investigations with the thermopile. As a searcher for faint comets and double stars, from the large amount of light received, it would lead to results of great importance, and enable us to examine and resolve nebulae before which the highest magnifying power now existing fails.

Scientific American.

MUNN & CO., Editors and Proprietors. PUBLISHED WEEKLY AT NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

TERMS.

One copy, one year... \$3 00
One copy, six months... 1 50
CLUB RATES: Ten copies, one year, each \$2 50... 25 00
Over ten copies, same rate, each... 2 50

VOLUME XXX, No. 11. [NEW SERIES.] Twenty-ninth Year.

NEW YORK, SATURDAY, MARCH 14, 1874.

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LAKE TITICACA.

This is the most singular and interesting lake in the world. Situated on the crest of the Andes, it is the highest large body of fresh water; and as concurrent traditions point to it as the spot where Manco Capac, the first Inca, appeared and woke the aboriginal tribes from their long sleep of barbarism and ignorance, it is the historic center of South America. Humboldt called it the theater of the earliest American civilization. On an island within it are the imposing ruins of the Temple of the Sun, and all around it are

monuments which attest the skill and magnificence of the Incas. There are also, as at Tiahuanaco and Silustani, the remains of burial towers and palaces, which antedate the crusades, and are therefore pre-incarial.

Lake Titicaca is about the size of our Ontario, shallow on the west and north, deep towards the east and south. The eastern or Bolivian shore, being backed by the lofty range of Sorata, is very high and precipitous. The lake never freezes over, although the temperature of Puno is often 18° at sunrise. Two little steamers of 100 tons each do a trifling business. Steam is generated by llama dung, the only fuel of the country; for there are no trees within 150 miles. The steamers actually cost their weight in silver; for their transportation (in pieces) from the coast costs as much as the original price. A steamboat company has just asked from Bolivia the exclusive privilege of navigating Titicaca and the Rio Desaguadero to Lago Pampa, with a guaranty of six per cent cost on the capital and a share in all new mines discovered.

Professor Orton, the latest traveler in that region, calls attention to the fact that Lake Titicaca is not so high as usually given in geographical works by about 300 feet. Its true attribute is 12,493 feet, and in the dry season it is four feet less. This fact has been revealed by the consecutive levelings made in building the Arequipa railway just finished, which reaches from the Pacific to Lake Titicaca. The road rises from the sea to Arequipa, 7,550 feet; thence to the summit, 14,660 feet; and then descends over 2,000 feet, to Puno on the west shore of the lake, a distance by the track of 325 miles from the ocean. Pentland's estimates of Sorata, Illimani, and other peaks of the Andes, having started from the Titicaca level as a base line, must come down full 300 feet.

SWINDLING PATENT SELLERS.

We have received of late a great number of letters calling our attention to the rapid growth and extension of the frauds perpetrated upon inventors by inducing the latter to forward sums of money, as pretended fees, to certain agents who pretend to sell patent rights. Some time ago, we had occasion to show up these knaves, and warned our readers to beware of them, mentioning an instance of some scamps in the West receiving not only money but models, the latter of which they either left in the express office or behind them in a loft when they decamped from the town, while they, of course, applied the funds to their own benefit. We are led once more to revert to the subject by the reception of several queries regarding a "Mississippi Valley Manufacturing Company," doing business in Vicksburgh, Miss. One correspondent, among the many, favors us with a copy of the letter received by him, which reads as follows:

(Handsome letter head of buildings, etc.)

Mississippi Valley Manufacturing Co. January 13, 1874.

Mr. Dear Sir:—Will you, upon receipt of \$1,200 cash, allow us to have your coupling for gas and water mains manufactured to supply the trade of the South and West, for the term of two years upon a royalty of \$5.00 per dozen made? If you desire to dispose of your invention in this manner, send \$5.00 to pay part of the attorney's fees for examining title, etc. Upon receipt of same, we will make the necessary inquiries at the Patent Office, and also have your invention examined before a board of competent judges, when, if everything proves perfectly satisfactory, we will remit the amount by draft on any bank you name, the same to be subject to your order upon the receipt by us of the necessary transfer. Our arrangement will not prevent you from selling any State you may receive offers for. Comply at once with our terms, if you wish us to take hold of it. Yours truly,

MISS. MANUFACTURING CO.

This swindle is so very palpable that one is almost at a loss to understand how any person can be so foolish as to be deceived by it; and yet another correspondent, who has interviewed an official at Vicksburgh regarding the subject, says that large numbers of letters are constantly sent to the above address. Inquiries, made as to the business location of the recipients of these missives, revealed a little room in a "decayed part of the city," the whole contents of which would not exceed twenty dollars in value. The parties are young men who are leading a fast and dissolute life on the money thus fraudulently obtained. The inventor rarely receives an answer to his letter enclosing the funds. The Vicksburgh Herald has also investigated the matter, and remarks: "We have only to say, for the protection of people everywhere, that we have never heard of any such company, and that it exists only in the imagination of the swindlers who are trying to defraud the public." So much for the Mississippi Valley Manufacturing Company. Still another correspondent asks for information concerning the Western Michigan Patent Agency, Grand Rapids, Mich. This very enterprising firm wants only ten dollars and a model, to make the inventor rich. The writers ask if these gentry are related to the scoundrels who were located in Albion, Mich., some time since, and who flourished under another name.

It is curious to note with what alacrity people will risk good money for the chances of a large profit. The same feeling which induces the ignorant to stake funds in lotteries, where the probabilities are all against them, impels others to transmit their cash to persons of whom they know nothing in the hope of thus securing some enormous gain. It may be laid down as an infallible rule that an invention that is really valuable can always be disposed of privately and readily for its full worth, and the owner of the right, fully appreciating this fact, is never beguiled by such dazzling

baits as are offered by these swindling agencies. We are perfectly well aware that it is about as hard to show an inventor that his device, when once patented, is of small utility and value, as to convince a mother that her baby is ugly, and both individuals usually resent the imputation in about the same manner. It is these very inventors, however, who, having exhausted every plan to dispose of their rights, snap at the allurements artfully held out to them, and of course are fleeced. The world gives little sympathy, for it laughs at their veridancy in being so readily deceived; but when the trials, the labor, and expense, which these men incur to carry out their cherished ideas, be reflected upon, the subject becomes more one for pity than for derision.

We would once more warn the people against not only the attempts to defraud, above exposed, but against every other they may receive that even appears of similar nature, particularly against specious parties who, for a certain sum, agree to sell a patent and advertise it in some patent journal or other obscure circular or sheet. It is very rarely that these men ever effect a sale; and if they be swindlers, they dare not announce the fact, if they have done so. Indeed, if any of our readers desire to prove for themselves the genuineness of the offers of their correspondents, they have only to write to the latter for the names of reputable persons whose patents have been sold through their agency; and if any be returned personal investigation will soon determine the question of authenticity.

FAILURE OF THE NEW TELEGRAPH LINE BETWEEN EUROPE AND AMERICA.

We are sorry to know that the new enterprise which was intended to secure the opening of telegraphic communication between the old and new worlds at reduced prices, has, according to the latest advices from London, become a failure. The money paid in has been returned to the stockholders. The title of the organization is the Light Cable Telegraph Company, and they have for some time been engaged in winding the wire preparatory to sinking an ocean cable from Great Britain to our coast of New Hampshire, via the Azores, Newfoundland, and Nova Scotia. The charge for messages was to have been 50 cents a word, the present rates being one dollar per word.

The capital of the company was \$2,000,000. The cable was to have been much lighter and cheaper than any ocean cable of equal length. The conducting wires were protected by a simple covering of tarred Manilla hemp, which has been found by experience to be almost indestructible in salt water. The weight of the new cable was only a little over 700 lbs. to the mile, or 150 lbs. per mile in water. Messrs. Mitchell & Co., Newcastle, Eng., have lately completed a new steamer of 5,000 tons burden, specially intended to receive and submerge the new cable, the laying of which was expected to commence about the middle of June next.

The engineer and electrician was Mr. Robert Sabine. Sir Samuel Canning was the consulting engineer. We still hope that a reorganization may be effected on a basis that will insure the laying of the cable.

RELATIVE RIGHTS OF EMPLOYERS AND WORKMEN IN RESPECT TO INVENTIONS.

If there were likely to be any permanency or reliability in the official decisions of the Patent Office, the case of interference which we publish herewith, on another page, would be of interest and value. It exhibits in a tolerably clear light the relative rights of employers and employees in respect to the ownership of inventions. The doctrine now held by the Patent Office is that the inventor has the right to avail himself of the mechanical skill of those whom he employs to put his invention into practical form. If the inventor gives general directions to his workman to produce a certain machine, the combination of parts or arrangement so produced belongs exclusively to the inventor, and the workman has no patentable right therein. This should be distinctly understood and remembered by workmen. But when a workman himself suggests and invents an improvement, without previous direction from his employer, the invention belongs to the workman, and the employer has no claim thereon, although the device may have been made in the shop of the employer, with his tools, and during time belonging to him. This should be distinctly understood and remembered by employers.

THE OIL DEPOSITS OF THE GREAT WEST.

About eight hundred miles west of Omaha the line of the Union Pacific Railroad crosses Green River, and the approach to the river is for a considerable distance through a cutting, of from 20 to 40 feet in depth, made in rock. During the construction of the road, some workmen piled together a few pieces of the excavated rock as a protection for a dinner fire, and soon observed that the stone itself ignited. The place thereafter became known as Burning Stone Cut.

The general superintendent of the road, Mr. T. E. Sickels, has caused analyses and experiments to be made with this substance, which proves to be a shale rock, rich in mineral oils, which may be produced by distillation in abundant quantities, say thirty-five gallons to the tun of rock, at the cost of a few cents only per gallon. The oil thus obtained is of excellent quality and comes over in two or more grades one suitable for burning and one for lubrication. Its abundance and cheapness of production is such as to render it certain that the markets of the Pacific coast, and all places west of the Mississippi, will ere long be wholly supplied from these deposits. The oil can be distilled, delivered, and sold at the points indicated, at cheaper rates than the Pennsylvania and West Virginia oils can be transported to the Mississippi.

The deposits in question are supposed to cover an area of territory one hundred and fifty miles long and fifty miles