Library and Information Services in Astronomy V
ASP Conference Series, Vol. 377, 2007
S. Ricketts, C. Birdie and E. Isaksson (eds.)

Etienne Leopold Trouvelot (1827–1895), the Artist and Astronomer

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Abstract. The French-born artist Trouvelot arrived in the United States in 1855. His interest in astronomy began with his observations and sketches of spectacular auroras in the 1870s. This work drew the interest of Harvard College Observatory astronomers and he was invited to join the staff. Using Harvard's 15-inch refractor and other telescopes, Trouvelot made many drawings of celestial objects. He was invited to Washington in 1875 to use the Naval Observatory's 26-inch Equatorial, at that time the world's largest refractor. In 1881 Charles Scribner's & Sons agreed to publish a portfolio with 15 of his best drawings as chromolithographs. He returned to France in 1882 to work with Jules Janssen at the Meudon Observatory. Unfortunately, in the United States, Trouvelot will always be remembered not for his astronomical art but as the person who introduced the gypsy moth into the country.

1. Arrival in the United States, Interest in the Natural Sciences and Astronomy

Etienne Leopold Trouvelot was born in Guyencourt, Aisne, France, on December 26, 1827. After the coup d'état in 1852 when Louis Napoleon seized power, he left France. It is not clear if he fled or was exiled. In 1855, he arrived with his wife Adelaide in Cambridge, Massachusetts where both his children, George and Diana, were born. He supported his family as an artist and nature illustrator. In both the 1860 and 1870 census, his occupation is listed as lithographer (Spear 2005, p. 10). With his great interest in the natural sciences he became acquainted with the famous Swiss-born 19th century naturalist, Louis Agassiz (1807–1873) and became active in the Boston scientific community. He was a member of the Boston Society of Natural History and read papers on insects he was studying at their meetings. He showed an interest in silk worms soon after his arrival in the U.S. and began experimentation.

After observing several spectacular auroras in 1870, he began making astronomical drawings. Later, he contacted the astronomers at Harvard College Observatory (HCO) to show them his drawings. They were impressed with the detail and excellence of his work, and Joseph Winlock, HCO Director, invited him to join the staff. Using Harvard's 15-inch refractor, Trouvelot made hundreds of drawings of celestial objects. Winlock and Trouvelot chose 35 of these drawings to appear in Volume 8 of the *Harvard Annals* as "Astronomical Engravings from the Observatory of Harvard College" which was published in 1876 and lithographed by J.H. Bufford and Sons. He also used his own 6-inch refractor at his home for making observations and drawings. Winlock said that

Trouvelot "combined in rare degree the qualities of an excellent observer with the skill of an accomplished artist." Solon Bailey (1931) stated that "Trouvelot made beautiful drawings of various other celestial objects, including total eclipses of the Sun, the surface of the moon, planets, comets and nebulae. These drawings show a rare artistic ability." An example of his artistic eye is shown in his description of Saturn: "The equatorial belt has always appeared to me to be slightly tinged with a delicate carmine red, very much like the equatorial belt of Jupiter; only the pink color of the former is much fainter. In no instance could I compare the color of this band to 'brick red', as it is commonly described." (Proc. 1876, p. 183) Trouvelot's first astronomical paper was published in 1875 in the *Proceedings of the American Academy of Sciences* on the topic of veiled solar spots.



Figure 1. Etienne Leopold Trouvelot. Mary Lea Shane Archives, Lick Observatory

2. Observations with the 26-inch Great Equatorial at the U. S. Naval Observatory

Trouvelot was invited to Washington in 1875 to use the Naval Observatory's 26-inch Great Equatorial, at that time the world's largest refractor. While in Washington he began his work on the Great Nebula in Orion. Three of his original sketches, probably made using the 26-inch, are still at the Naval Observatory. They are the Swan Nebula (dated Sept. 1875), Saturn and the Great Nebula in Orion. In 1876, 15 of his pastel drawings were displayed with the Naval Obser-

vatory's exhibit at the Philadelphia Centennial exhibition. A detailed report by Prof. E. S. Holden on the observations and drawings which Trouvelot did at the USNO during September 1875 can be found in the Observatory's Annual Report appearing in the *Annual Report of the Secretary of the Navy for the Year 1875* (1876).

Although astronomical photography had been achieved a number of years earlier and dry plates were being introduced in the 1870s, Trouvelot felt the camera could not replace the human eye. "A well-trained eye alone is capable of seizing the delicate details of structure and configuration of the heavenly bodies, which are liable to be affected, and even rendered invisible, by the slightest changes in our atmosphere." It is estimated that he worked on over 7,000 astronomical drawings.



Figure 2. The Swan Nebula, original drawing. U. S. Naval Observatory Library

3. Preparation and Publication of the Trouvelot *Astronomical Drawings*

Trouvelot wished to reach a larger audience with his drawings and approached the important New York publisher, Charles Scribner's & Sons, who agreed to publish his work. He chose 15 plates he considered among his best work for the portfolio. To make sure the color and detail would be accurate in the reproductions, he had them printed as chromolithographs, and supervised the preparation of the stones. Armstrong and Company of Boston lithographed the plates, some of which were prepared by E. Boyd Smith, a lithographic artist (L. Armstrong Wheeler undated, p. 32). Chromolithography, which reached its

height in the 1880s, is color printing done with several lithographic stones where each main color is printed by a separate stone. Scribner's had published watercolors of game birds and water fowl by Alexander Pope Jr. in 1877–1878, so they had experience with this type of printing. Perhaps the best known chromolithography publisher was Currier and Ives while others were Louis Prang (Boston) and J. Hoover (Philadelphia).

The set of 15 drawings (each 28.4 by 38.2 inches), accompanied by a descriptive manual written by Trouvelot, was published in 1882, decades before the advent of color photography, with the title *The Trouvelot Astronomical Drawings*. It is not known how many sets were printed although it is estimated there were 300. The set sold for $125, quite a large sum for that time. Trouvelot was later awarded the Valz Prize of the French Academy of Sciences for this work. In 1881 he achieved the high honor of election to the American Academy of Arts and Sciences possibly as a result of the portfolio and his body of other work up to this time. These prints were meant for the astronomical and scientific community, and it is assumed that most of the larger U. S. observatories purchased copies of this portfolio. In a survey done by the author in 2002, 42 libraries in the U. S., listed as owning the set, were contacted via email and asked if they still had both the manual and portfolio. Of the 24 libraries who replied, 12 libraries had both the portfolio and manual, but only 4 libraries held the complete set of 15 plates. The other 12 libraries held the manual only, and most reported their records showed the portfolio "missing" or "not found on shelf."

What happened to the portfolio drawings which were formerly in libraries and observatories? One can only assume that some were thrown away or disappeared during renovations. Perhaps observatories looked for more modern items to hang on the walls and the plates were put in storage and eventually thrown away. Probably some were stolen from collections. One example of their fate is seen in a letter written by W. H. Wright (Lick Observatory Archives 1937) to Prof. Pio Emanuelli (Specola Vaticana) dated May 15, 1937 where he writes "The Lick Observatory originally had a full set of the drawings, but they were of little scientific value and were finally relegated to a store room."

4. Current Value of the *Drawings* and Preservation Efforts

The value of the portfolio has been climbing through the years. In 1986, a bookseller offered 14 plates without the manual for $3,750. In 1990, the Smithsonian purchased a set for the Smithsonian Astrophysical Observatory for $18,000. There was also a set available from another bookseller around the same time for $7,700, but this set had been washed and the colors were faded. A London dealer had a set available in 2002, but no reply was received to several inquiries as to its price or if it was sold. In 2004, a complete set of plates was offered with a facsimile of the manual for $75,000. In May 2006, the bookseller who offered this set gave the following reply to an inquiry by the author: "We did indeed sell the set you reference as well as another set shortly before that. Both sets were purchased by private collectors in the U.S., one in the mid-West and the other on the West coast. Both sets will ultimately be gifted to institutions." (Satin 2006) It was later indicated that the set offered for $75,000 sold for 'a bit less' than $60,000, but the price of the other set was not revealed. It is quite clear that

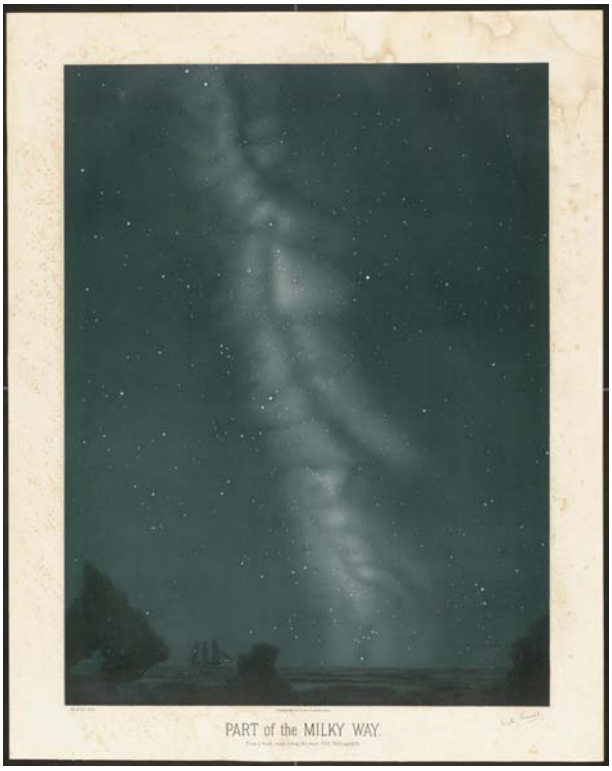


Figure 3. *Trouvelot Astronomical Drawings.* Pl. XIII

art collectors have now discovered the Trouvelot plates and value them as works of chromolithographic art of the period rather than lovely visual depictions of astronomical objects.

Donna Coletti, Librarian at the Wolbach Library, Harvard/Smithsonian, requested that Harvard's Preservation Department scan, at a very high resolution, the plates in *Harvard Annals*, Vol. 8, which contains Trouvelot drawings. They did so, and the outstanding results can be found online.[1]

The author began efforts to preserve the U. S. Naval Observatory (USNO) portfolio set in 2005 before her retirement. End of year funding was sought and granted to scan all portfolio plates and 3 original pastel sketches at a very high resolution as well as produce print copies of the scans so that the originals could be put away in the Rare Book Vault. As the set has gained so much in value, it is important to safeguard the original plates. The author retired before the work could be finished, and the current USNO librarian, Sally Bosken, saw it to completion. The resulting prints are excellent and very difficult to tell from the originals. The USNO Library has been missing two of the portfolio plates for many years but will receive scans of these from the Smithsonian.

[1] `http://pds.harvard.edu:8080/pdx/servlet/pds?id=2820663`

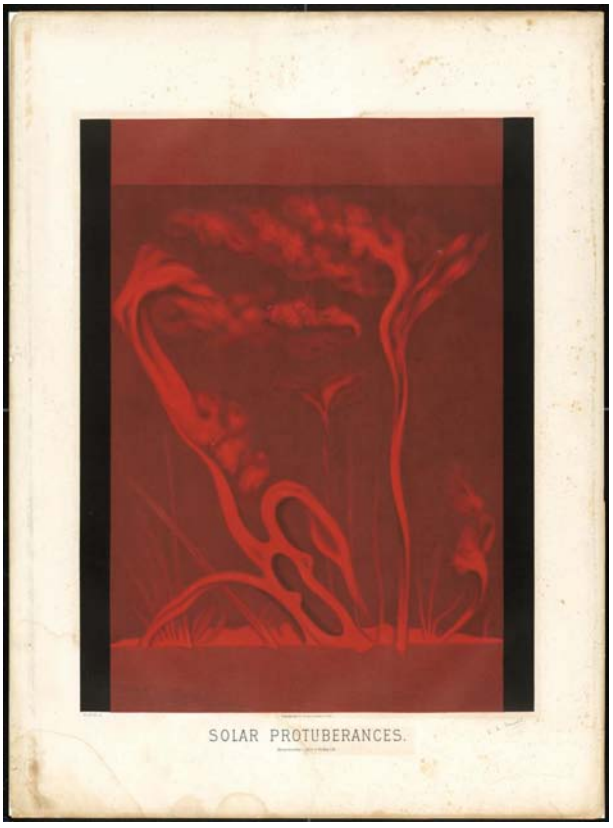


Figure 4. Trouvelot Astronomical Drawings. Pl. II

5. Return to France

In 1882, Trouvelot left the U.S. to return to France. Recommended by Flammarion, he was offered a position at the newly created Meudon Observatory working under Jules Janssen, a leading solar astronomer of his time. Trouvelot was always fascinated with the Sun and made many solar observations at Harvard. In 1878, he and his son George traveled to Creston, Wyoming Territory, to observe the total eclipse of the Sun on July 29. His drawing of that eclipse became one of the plates chosen for the published portfolio as well as one on solar protuberances. In Meudon, he found the skies less welcoming. In a letter to E.S. Holden, dated Dec. 8, 1885 (Lick Observatory Archives 1885), he writes: "Since my return to France I have accomplished but very little in the way of observations on account of the sky, which is most always cloudy or vaporous." *The Observatory* (1895) reports that he was with the party that traveled with Jules Janssen to the Caroline Islands to observe the total eclipse of 1883, "where he and Professor Palisa undertook a search which, it is needless to say, was fruitless, for an intra-Mercurial planet." This undiscovered planet was also referred to as Vulcan.

Trouvelot died on April 22, 1895 in Meudon. At his death, he was working on a monograph of Mars. His son George writes to Pickering in a letter dated August 7, 1896 (Harvard University Archives 1896) concerning "the immense number of drawings & observations which my father left and are my property." George hoped to find a publisher for these drawings of Mars, but apparently this did not happen. One must wonder what happened to all the drawings as Trouvelot had written to Pickering on April 7, 1888 (Harvard University Archives 1888), "in the case of Jupiter alone now amount to nearly 900 drawings." In earlier research done by the author for an article in 1986, the Bibliothèque Nationale stated they had found an elderly gentleman who was a relative. He knew of his ancestor but had not received any drawings nor did he know of any family member who did. Neither the Observatoire de Paris nor Meudon holds the bulk of the drawings which were his personal property in France. Unfortunately, one assumes that these drawings were eventually thrown away.



Figure 5. *Trouvelot Astronomical Drawings.* Pl. VIII

In recent years, 10 original pastel drawings and 6 photographs have been "rediscovered" at Meudon. An inventory of these items is held by the Paris Observatory (Bobis). Francoise Launay (2003) wrote about 8 of these drawings. She also noted that great animosity arose between Trouvelot and Janssen after his return to Meudon, and these troubles were even reported in the press. This controversy continued even after Trouvelot's death.

An excellent online exhibit, *"Heavens Above: Art & Actuality"*[2] is mounted by the New York Public Library, Science and Business Branch. The exhibit features all 15 plates in Trouvelot's portfolio, 19th century astronomical pho-

[2] `http://www.nypl.org/research/sibl/trouvelot/`

tography and contemporary NASA photographs. The exhibit allows the viewer to compare his drawings with photography of the same objects. It is quite amazing what Trouvelot's eye could pick up at the telescope and translate to the drawing of each object. It also features a copy of the full article, "Trouvelot: From Moths to Mars" (Herman & Corbin 1986) which appeared in *Sky and Telescope*.

6. Introduction of the Gypsy Moth into the United States

Trouvelot published over 50 papers in astronomy and a lunar crater was named in his honor. He was widely respected for his excellent astronomical art. However, the United States still remembers him mainly for another reason... the introduction of the gypsy moth into the U.S. As noted earlier, he had a great interest in the natural sciences. Soon after his arrival in the U. S. he developed an interest in silk worms and began experimentation with American varieties. Hoping to improve silk production in the U.S., he went to Europe in late 1866 and returned to Massachusetts in early 1867 with eggs for the gypsy moth, *Porthetria dispar* but known today as *Lymantria dispar* (Spear, p. 21). He housed the eggs in his large back yard at 27 Myrtle Street in Medford, MA. Realizing the gypsy moth could cause damage, he housed the eggs/caterpillars/moths in his yard under netting. The story goes that an egg mass accidentally escaped in a storm in 1869 and he searched for the eggs to no avail. It is also reported that he warned his neighbors and authorities about the escape, but no one paid much attention. However, newer research reports that his story may not be totally accurate (Spear, p.25) as Trouvelot had earlier reported holes in the netting large enough for robins to get through and eat his American caterpillars, so the escape of the gypsy moths might have been gradual, not all at once. However the eggs or moths did escape, the rest is very unfortunate history. As the gypsy moth has no natural predator in the U.S., the devastation to forests has been immense. Etienne Leopold Trouvelot will indeed be remembered, especially in the United States, for his introduction of the gypsy moth rather than his astronomical research and superb astronomical drawings.

Acknowledgments. Thanks to Gregory Shelton, U. S. Naval Observatory Library (USNO), for his assistance with the survey done in 2002, obtaining some of the articles needed for this research and also checking other references; to Sally Bosken, current USNO librarian, for her willingness to carry out the Trouvelot preservation project; to CDR Charles Schilling (USNO) for funding the Trouvelot scanning project; to Francoise Launay, Paris-Meudon Observatoire, for sharing her research on Trouvelot in his later Meudon years; to Laurence Bobis, Observatoire de Paris Bibliothèque, for information about the inventory of the Trouvelot works in their collection, and to Ilena Satin, Donald Heald Booksellers, New York City, for information about recent sales of the Trouvelot portfolio.

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