



Barry Lawrence Ruderman Antique Maps Inc.

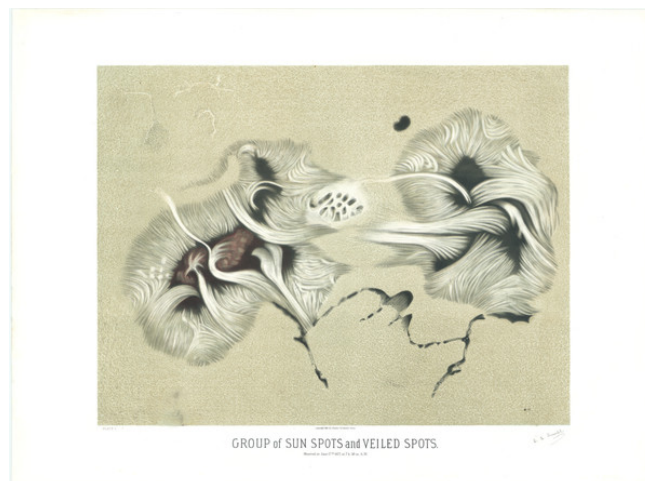
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Group of Sun Spots and Veiled Spots

Stock#: 68387
Map Maker: Trouvelot
Date: 1882
Place: New York
Color: Color
Condition: VG+
Size: 38.2 x 28.4 inches
Price: SOLD



Description:

The Sun's Dark Spots Portrayed by the Audubon of the Sky

A rare chromolithograph of Sun Spots and Veiled Sun Spots from Etienne Leopold Trouvelot's original work depicting celestial bodies, published in 1882.

Trouvelot's portfolio is a work of artistic brilliance far ahead of its time; many of the plates are redolent of the most dramatic and engaging modernist paintings of the following century. In addition to its aesthetic qualities, it is a scientific work of great importance; Trouvelot's magnum opus stands a superlative celestial atlas and one of the most impressive American color plate books ever published.

The plates were lithographed by Armstrong and Company of Boston under Trouvelot's personal supervision. Some of the plates can be directly attributed to the lithographic artist E. Boyd Smith. An estimated 300 sets of the prints were sold as a portfolio for \$125, although in a recent census only four complete sets of plates were found in institutions (see note on rarity). Trouvelot combined to a rare degree the qualities of an excellent observer and the skill of an accomplished artist. Solon Bailey stated: "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 rare artistic ability."

As noted by Backhus and Fitch (p. 12):

To ensure exactness with his drawings, Trouvelot used a grid system positioned at the prime focus of his observing telescope. As a testimony to his accuracy relative to star positions, one analysis concludes that Trouvelot's drawings of star positions near the Orion nebula were



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within 6 arc seconds of actual star positions 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.

Historian B.G. Corbin points out that an early form of astronomical photography became available during the time when Trouvelot was working, but that the artist rejected the idea of switching media, arguing that "the camera could not replace the human eye" when it came to capturing the subtleties of structure and configuration. Trouvelot himself noted:

Although photography renders valuable assistance to the astronomer in the case of the Sun and Moon... for other subjects, its products are in general so blurred and indistinct that no details of any great value can be secured. A well trained eye alone is capable of seizing the delicate details of structure and of configuration of the heavenly bodies, which are liable to be affected, and even rendered invisible, by the slightest changes in our atmosphere. (Trouvelot 1882, p. v).

The Dictionary of Scientific Biography notes:

Except for Rutherford's wet-plate photographs of the sun and moon, made in 1865, Trouvelot's drawings were considered the most accurate pictures of celestial objects available until the perfection of dry-plate photography. (DSB XIII, 472)

His artistic genius received wide acclaim, with examples of his drawings appearing for public display. For example, several drawings were displayed at the United States Centennial Exhibition in 1876 in Philadelphia as part of the Naval Observatory exhibit. It became apparent that the best way to reach a wider audience was to seek a publisher to produce a printed selection of his monumental works. Trouvelot decided to bring his drawings to the New York publisher Charles Scribner's Sons to be transformed into chromolithographs, a process he supervised closely.

Sunspots, Evidence of a Mutable Heavens

Known to Chinese astronomers since 800 BC, sunspots are one of the most easily visible features of the sun. Galileo performed extensive work on this phenomenon, showing that they were, in fact, part of the sun's surface, and changed through time. This would be one of his most important discoveries, as it showed that the heavens beyond the moon were, in fact, mutable, and was a source of major controversy at the time.

Sunspots are large swaths of the sun where convection has been halted by the concentration of magnetic



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field flux. This leads to a cooler surface and a darker relative color, though they still reach temperatures of thousands of Kelvins. The physics behind them is complicated, and some questions remain as to their nature. They are closely associated with solar flares and coronal mass ejections. The pairing of sunspots as seen on the presented image is common, and the two are almost certainly of opposite polarities.

Trouvelot describes the work and phenomenon as follows in his *Trouvelot Astronomical Drawings Manual*:

The background shows the sun's visible surface, or photosphere, as seen with a telescope of high power at the most favorable moments, composed of innumerable light markings, or granules, separated by a network of darker gray. The granules, each some hundreds of miles in width, are thought to be the flame-like summits of the radial filaments or columns of gas and vapor which compose the photospheric shell. The two principal sun-spots of the group here represented show the characteristic dark umbra in the centre, overhung by the thatch-like penumbra, composed of whitish gray filaments. The penumbral filaments are not supposed to differ in their nature from those constituting the ordinary photosphere, save that they are seen here elongated and violently disturbed by the force of gaseous currents. Both spots are traversed partly or wholly by bright overlying faculæ, or so-called luminous bridges, depressed portions of which, in the left-hand spot, form the gray and rosy veils commonly attendant upon this class of spots. In each of these spots, also, the inner ends of projecting penumbral filaments have fallen so far within the umbra as to appear much darker than the rest. At the right of the upper portion of the left-hand spot, is a mass of white facular clouds, honey-combed by dark spaces, through which are seen traces of the undeveloped third spot of the triple group first observed. If seen upon the sun's limb, this would have presented the appearance of a lateral spot. Above the right-hand spot is a small black "dot," or incipient spot, without distinct penumbra. Their regular dark rift below the two large spots and connecting them is a spot of the crevasse type, with very slight umbra, a still better example of which is seen in a westward prolongation of the penumbra of the left-hand spot. In the upper left-hand corner of the Plate are seen several small faculæ, appearing as irregular whitish streaks amongst the granules. In the pear-shaped darkening of the solar surface below and at their left, is seen a veiled spot, two of which attended this group.

Rarity

Trouvelot's prints were originally intended for the astronomical and scientific community and most of the larger US observatories purchased copies of the portfolio. In 2002, B.G. Corbin undertook a census to determine the number of surviving copies of the complete set of 15 prints and was only able to confirm the



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existence of 4 complete sets.

Detailed Condition: