



Harvard University
Collection of Historical
Scientific Instruments

Science Center
Cambridge, Massachusetts 02138
617 495-2779

10th September, 1997.

Dear Owen,

Here is a first draft
of the labels for the
H.C.O. exhibition. Please
let me know if any
changes / embellishments
should be made.

Best wishes,

Will.

+ clock drive

Trouvelot drawing

* photometer 1870s

clock 1870

transit 1890s

* Tail piece 1890

millionaire 1910

Draper's 28" Cassegrain Mirror

After Léon Foucault in Paris demonstrated how to silver glass telescope mirrors in 1856, Henry Draper of New York became one of the pioneers in the new procedure. In 1864 he published his report on the silvering of a 15½" mirror, and by 1872 he perfected the 28" glass mirror shown here. Draper used it to photograph stellar spectra, a project that paved the way for a major spectral classification effort at Harvard Observatory, *The Henry Draper Catalogue*.

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Inventory no. 5005

Chronograph

Soon after Morse invented the telegraph, Harvard College Observatory director William Cranch Bond devised this telegraphic system for recording the time of star transits. Impulses from a clock produced ticks every second on the paper wrapped around the drum, while a key at the transit telescope could send additional signals to record when stars crossed the meridian. This example is from around 1900.

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Inventory no. 1996-1-0333

"The Millionaire" Calculator

For several centuries astronomers held first place as the leading consumers of numbers, and they quickly modified their procedures as mechanical computers were invented. "The Millionaire" was the first true commercially available multiplying machine, entering the market in 1899. When equipped with an electric motor drive, as shown here, it could multiply two eight-digit numbers in 6 or 7 seconds.

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Inventory no. 1997-1-0252

Tailpiece of the 24" Bruce Doublet

In 1893 Harvard Observatory director Edward C. Pickering ordered a short-focal-length four-element refractor from Alvan Clark & Sons in Cambridge. Installed at Harvard's southern station in Arequipa, Peru, this telescope took the plates of the Magellanic Clouds on which Henrietta Leavitt discovered the key period-luminosity relation of cepheid variables. In 1927 Harlow Shapley moved the telescope to South Africa, where it photographed more galaxies than any other telescope prior to the Palomar Schmidt instrument.

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Inventory no. 1998-1-1669

Polarizing Photometer

E. C. Pickering's massive campaign to obtain stellar magnitudes began in 1877 when he developed his first photometer that employed a calcite crystal to divide the starlight into two polarized beams and a rotating Nicol polarizing prism to adjust the brightnesses of the images. The double prism on the track brings the orthogonally polarized images of the variable and standard stars side by side. The sole surviving Harvard photometer displayed here was originally made for the 15" refractor, and later transferred to the polar equatorial.

Collection of Historical Scientific Instruments

Inventory no. 1991-1-0007

William Bond & Sons Regulator

A regulator is a clock designed specifically to keep accurate time and thereby serve as a standard by which other timekeepers may be regulated. At the observatory such clocks were kept in a lead-lined cellar just to the west of the 15" refractor dome. This example from around 1880 is one of four with a marble case, and has an unusual six-legged gravity escapement (visible in the mirror). The first in the series was sold for \$500 in December, 1879, to Francis Blake, one of the pioneers of telecommunications.

Collection of Historical Scientific Instruments

Inventory no. 2502

Student Transit Instrument

In its early days Harvard Observatory distributed accurate time to businesses and railroads, and for this purpose maintained a row of large transits. These were employed to observe the exact moments when stars crossed the meridian in order to establish the local time. The instrument shown here, dating from around 1897, was used in the student astronomical laboratory, and later at Agassiz Station.

Collection of Historical Scientific Instruments - "Stackpole & Brother, New York" - Inventory 1989-4-2

Photometer

Not signed , but possibly made by Alvan Clark
and Sons, Cambridge, MA
U.S.A., ca. 1877

A photometer is an instrument used for measuring the brightness, or magnitude, of stars, thereby allowing them to be categorized according to the difference in their light intensity. Photometric observations were begun at the Harvard College Observatory between 1871 and 1875 by Charles S. Peirce. When Edward C. Pickering was appointed director in 1877, the observatory became a center for a systematic and extended study of photometry. This instrument, which was designed for use with the large 15-inch refracting telescope, employed a moveable double-image prism and a revolving Nicol prism: when two adjacent stars were observed, a double image of each was formed by the double image prism; the brightness of one could then be reduced to match the other by rotating the Nicol prism. The true relative magnitude of the stars was determined by the angle through which the Nicol had been turned.

Inv. 1991-1-007

Regulator

marked "William Bond and Sons, Boston, No. 370"

U.S.A., *ca.* 1880

A regulator is a clock designed specifically to keep accurate time and thereby serve as a standard by which other timekeepers may be regulated. This example is one of four with a marble case and an unusual five-legged gravity escapement: the first in this series, No. 367, was sold for \$500 in December 1879 to Francis Blake, one of the pioneers of telecommunications.

Inv. 2502

Transit Instrument

Marked "Stackpole & Brother, New York, 1598"
U.S.A., *ca.* 1897

Transit instruments were used to observe the exact moment that a star or other celestial body crossed the meridian in order to determine accurately a star's celestial longitude or the local time. This instrument was used at Agassiz Station in Harvard, Massachusetts.

Inv. 1989-4-2

"The Millionaire" Calculator

Marked "H. W. Egli, Zurich, No. 6215"
Switzerland, *ca.* 1915

"The Millionaire" was patented by Otto Steiger in 1893 and first marketed by Hans Egli in 1899. The early models were fitted with a handle, one turn of which was required for each figure of the multiplier. This example, which came from the Aiken Laboratory, is equipped with a DC electric motor, which facilitated the task of making long, complicated calculations. A machine of this type was used at the Harvard College Observatory.

Inv. 1997-1-0252