

Nr.	α 1875.0	Praec.	δ 1875.0	Praec.	Ep. d. Beob.	Beob.
3	11 ^h 52 ^m 38 ^s .19	+3 ^s .068	— 4 ^h 4' 30''9	—20''04	1874, Febr. 21	P
	38.30		30.4		März 8	"
4	11 54 4.42	+3.069	— 3 50 53.8	—20.05	1874, April 4	"
	4.40				23	"
	4.20				26	"
5	11 54 14.43	+3.069	— 4 25 25.4	—20.05	1874, März 12	"
6	11 56 35.05	+3.069	— 4 34 11.9	—20.05	1874, März 23	"
	34.99		12.8		April 23	"
	34.86		11.8		25	"
7	11 57 11.61	+3.069	— 4 46 59.4	—20.05	1874, März 2	"
	11.86		61.9		3	"
	11.85				1873, März 28	"
8	11 59 10.87	+3.070	— 5 8 59.0	—20.05	1874, März 10	"
	10.98		59.4		12	"
9	11 59 18.28	+3.071	— 4 59 32.6	—20.05	1874, März 8	"
	18.36		32.6		April 14	"
	18.33				1873, März 28	"
	18.30		37.6		27	"

Sämmtliche obige, am Meridiankreise gemachten Bestimmungen beruhen auf den von der Redaction des Berliner Astronomischen Jahrbuchs herausgegebenen Positionen der in der Vierteljahrsschrift der Astronomischen Gesellschaft, Heft 4 1869, publicirten Sterne.

R als Beobachter bedeutet Rümker, P Herr Dr. Pechüle, L Herr A. Lindstedt.

Die Reductionen sind sämmtlich von den Herren Dr. Pechüle und Lindstedt ausgeführt.

Beobachtung der Sonnenfinsterniss vom 25. Mai 1873.

Eintritt 1873, Mai 25 20^h30^m2^s.2 Mittlere Hamburger Zeit Rümker, Beobachter.

Sternwarte Hamburg, Juni 5, 1875.

Georg Rümker.

Death of Professor Joseph Winlock, Director of Harvard College Observatory.

Professor Joseph Winlock, Director of Harvard College Observatory and Phillips Professor of Astronomy, died suddenly on the morning of June 11th 1875.

Professor Winlock was born in Shelby County, Kentucky, in 1826. Graduating at Shelby College in 1845, he was immediately appointed Professor of Mathematics and Astronomy in that institution. He held this position till 1852, when he removed to Cambridge, Massachusetts, and took part in the computations of the American Ephemeris and Nautical Almanac, at that time under the superintendence of Admiral C. H. Davis. In 1857 he was appointed Professor of Mathematics in the United States Navy, and for several months afterwards, was Assistant in the Naval Observatory at Washington. He was afterwards made Superintendent of the American Ephemeris. In 1859 he took charge of the Mathematical Department of the Naval Academy at Annapolis, Maryland.

86. Bd.

He held this position till the removal of the Academy to Newport, Rhode Island, at the outbreak of the war in 1861, when he was again appointed Superintendent of the American Ephemeris.

He continued to perform the duties of this office till his appointment in 1865, as Director of Harvard College Observatory.

In August 1874, he was appointed by the Secretary of the Navy, Chairman of the Commission established under the act of Congress. „To authorize inquiries into the causes of Steam-boiler explosions.“ He entered upon the study of this special problem with great earnestness, and his preparations were so far completed, that the preliminary experiments were to have been made near the close of the present month.

Of the results of the labours of Professor Winlock, as Director of the Observatory, it is yet too early to speak with a just appreciation. He lived to witness

the near completion of several important undertakings, but death denied him the reward which he would have received, if he had lived to complete the volume of *Annals* in course of preparation.

He had entirely completed the re-equipment of the Observatory. The last plate of the series of *Astronomical Engravings*, instituted by him, came from the artist the week of his death. An extended series of double-star observations had been completed, and the results, occupying 100 pages had been printed. In 1867 he began a series of observations with the meridian circle then in use, for the purpose of supplying a more extended list of accurately determined time stars, to be used in the longitude operations of the United States Coast Survey, with which he was then connected as Consulting Astronomer. As far as possible the stars selected, were separated by an interval of two minutes. The observations were continued from October, 1867 to the end of December, 1868.

The reductions have been completed and the whole work, occupying 86 pages, has been printed. These stars were re-observed with the new meridian circle in 1871—1872. The observations occupying 202 pages are ready for the printer. Beginning with January, 1874, they were observed for the third time, and with January, 1875, for the fourth time; the instrument occupying reversed positions during the two years. Meanwhile, from May, 1872, to the end of December, 1873, he undertook the observation of a Polar Catalogue with a view to facilitate the determination of the instrumental constants necessary in the reduction of meridian observations. The preliminary results of this series, which comprises about 5000 observations, will be published within a few weeks.

In November, 1871, he entered upon the observation of the stars of the zone between the limits of $+50^\circ$ and $+55^\circ$, under the auspices of the „*Astronomische Gesellschaft*“. In the prosecution of this work about 15000 observations have been made, independent of the fundamental stars on which they are to depend. The whole work of observation will be completed in about two years. An extended series of Photometer observations has been completed and awaits publication. In the autumn of 1869, he invented the horizontal photographic telescope of long focus in connection with his experiments in preparation for the solar eclipse of that year. The instrument now in use was ordered of Alvan Clark and Sons, immediately after his return from the eclipse expedition of which he had charge, and since July, 1870, a continuous series of photo-

graphs of the sun has been taken with few interruptions.

It may be mentioned here that during this eclipse, Professor Winlock was the first to photograph in the principal focus, thereby obtaining for the first time a picture of the Corona, while at Jerez, Spain, in 1870, he was the first to use a simple device for recording on silvered plates, the solar lines seen during a total eclipse of the sun.

About the year 1870, he invented the Hygrophant, an instrument for showing without the aid of tables or graphic representation, the percentage of moisture in the air. Finally in 1872, he introduced the system of communicating time for civil purposes to the cities of Boston and Cambridge, and as a matter of fact, to nearly all the large towns of New England. This system — which consists simply in inserting an ordinary „sounder“ into the line running from the standard clock at the Observatory to the City Hall in Boston, and thence to all the railroad stations, the swinging of the pendulum breaking the circuit every two seconds and omitting one break every fifty eighth second — has been in successful operation for three years, and for its purpose, seems to leave nothing to be desired.

Professor Winlock will be chiefly known for his inventions in connection with instrumental astronomy, and for the high order of executive ability exhibited in the thorough reorganization and equipment of Harvard College Observatory. When he assumed the position which he occupied at his death, the only instruments possessed by the observatory were, the great refractor, a small equatorial, an imperfect meridian circle, a Bond clock and chronograph and two chronometers. To these he added; a meridian circle of 8 inches aperture and with circles 30 inches in diameter, a photometer, several spectroscopes, a broken transit made at the workshop of the Pulkowa Observatory the first instrument of the kind introduced into this country and which furnished the model for the instruments constructed for the Transit of Venus-Commission — a Frodsham sidereal clock, a Frodsham sidereal break-circuit chronometer — the first ever constructed, the desirability of which was suggested by him to the elder Frodsham, — a mean time chronometer, a thermometric chronometer, a Bond chronograph, a Bond standard clock with break-circuit attachment for communicating time, and the photographic horizontal telescope of long focus.

All of Professor Winlock's inventions are distinguished by the two qualities of simplicity and effec-

tiveness. In the meridian circle, which differs from any instrument of the kind hitherto constructed in several important particulars, he secured in a high degree, precision of movement, steadiness and working capacity. Since it was mounted in 1870, about 31000 observations have been made with it, and under every test applied, its performance has been most admirable. All the large instruments of a similar class since constructed by Troughton & Simms, have been made on the same plan, including one of the same size for the Cambridge (Eng.) Observatory.

The system of communicating time for civil purposes differs from all others in previous use in two important respects. The time is given every minute of the 24 hours and when the telegraph line is in working order, it cannot be given incorrectly.

The invention of the photographic horizontal telescope was not simply a fortunate accident. In his various experiments in photographing in the principal focus of the great refractor, he found it almost impossible to make the exposure short enough. He also found that it was necessary to cut off a large portion of the light of the sun by a diaphragm over the object glass, in order to obtain good results. Having chosen the long telescope to escape distortion of the image, he concluded from these observed facts, that sufficient light would be reflected from a plane transparent glass reflector, and that it was not necessary to give a uni-

form motion to the mirror by means of clock-work. Hence the instrument constructed, consisted only of a plane glass mirror mounted on a pier, an object glass, having a focus of 40 feet, mounted on a second pier about 10 feet distant from the first and a camera mounted on a third pier about 50 feet from the first, while the tube, touching neither, was used simply to exclude the light.

Freely allowing full credit to M. Laussedat for priority in the actual use of the horizontal telescope in obtaining photographs of the sun during the eclipse of 1860, it nevertheless remains that from July 1870 till the preliminary experiments in preparation for the Transit of Venus in 1872, the only instrument of the kind in actual use was the one mounted at the Observatory of Harvard College. Professor Winlock's invention was made without any knowledge of what had been done by M. Laussedat and differs from his in two essential particulars. M. Laussedat used an ocular to magnify the image, thus introducing the distortion so fatal to photographs designed for precise measurement, and he did not use an object glass of long focus.

Thus, while a portion of the honor of this important invention justly belongs to France, it still remains that, tried by the test of previous construction and use, the method devised by Professor Winlock is as justly entitled to be called the American Method.

Juni 15, 1875. *William A. Rogers,*

Assistant Harvard College Observatory.

Beobachtungen des Coggia'schen Cometen (c 1874).

I enclose a list of the places of Coggia's Comet as determined with the $4\frac{1}{2}$ inch equatorial at the Melbourne Observatory. Up to August 15th the measures were made with an ordinary parallel wire micrometer with bright field, after this date with a parallel wire micrometer whose wires were thick enough to be seen in a dark field. The places are corrected for refraction, but not

for parallax, which can be easily computed by means of the logarithms $\frac{p}{P}$ and $\frac{p'}{P'}$, when P the horizontal parallax has been adopted. All the comparison stars have been observed three times at least with the Melbourne Transit Circle.

Melbourne Mean Time 1874		Name of Com- parison star		$\alpha - \alpha'$	Right Ascens. of Comet α	$\text{Log } \frac{p}{P}$	$\Delta - \Delta$	North Polar Dist. of Comet Δ	$\text{Log } \frac{p'}{P}$	Numb. of Meas.
July	27	18 ^b 26 ^m 11 ^s .6	Lalande 15711	-1 ^m 34 ^s .95	7 ^h 54 ^m 14 ^s .04	-8.7240	+ 0' 57'' 71	104 ^o 25' 35'' 94	+9.7386	4
	28	17 32 32.6	" 15719	-1 7.90	7 54 48.04	-8.7449	+10 39.99	108 28 7.52	+9.7599	5
		18 10 30.9	" "	-1 6.96	7 54 48.98	-8.7382	+17 7.03	108 34 34.56	+9.7270	2
	29	17 39 11.4	" Puppis	+3 57.25	7 55 23.31	-8.7552	-11 34.53	112 20 59.97	+9.7381	4
		18 30 47.2	" "	+3 58.68	7 55 24.74	-8.7388	- 3 36.56	112 28 57.94	+9.6807	2
	30	18 29 6.6	* 7 Mag	+0 57.67	7 56 1.44	-8.7498	-14 54.71	115 59 45.28	+9.6527	7
	31	17 40 38.1	* 8 ¹ / ₂ "	-1 57.03	7 56 38.76	-8.7787	+ 1 30.60	119 5 17.03	+9.6971	4
		18 11 42.8	* 8 "	-1 56.12	7 56 39.67	-8.7694	+ 5 29.66	119 9 16.09	+9.6486	3
Aug.	2	6 3 51.6	B. A. C. 2717	-2 35.22	7 57 36.02	+8.7902	+ 9 10.32	123 23 5.95	+9.7798	3