Abbas Wasim Efendi

Born Bursa, (Turkey), 1689
Died Istanbul, (Turkey), 1760

Abbas Wasim Efendi was a scholar who made many valuable contributions to Ottoman astronomy. These included writing a Turkish commentary on the famous astronomical handbook (Zij) of Ulugh Beg as well as translating Abd al-Ali al-Birjandi’s work on solar and lunar eclipses into Turkish. In addition to being an astronomer, he was also a physician, calligrapher, and a poet, and he was a member of the Khalwatiyya and Qadiriyya religious orders. Besides Turkish, Abbas Wasim Efendi knew a number of languages that included Arabic, Persian, Latin, French, and ancient Greek.

Abbas Wasim Efendi, whose father’s name was Abd al-Rahman and whose grandfather’s name was Abdallah, was known as Kambur (Humpback) Vesim Efendi and as Dervish Abbas Tabib. He pursued his education with eminent scholars; apparently his teachers appreciated his cleverness, aptitude, and open-minded attitude. His studies and research took him to Damascus, to Egypt, and to Mecca and Medina (where he performed the hajj or pilgrimage). Upon his return to Istanbul, Abbas Wasim Efendi opened a pharmacy and a clinic at the Yavuz Selim Bazaar in the Fatih district of Istanbul, where he treated patients for almost forty years. He wrote and translated many works on medicine and pharmacology, incorporating the information he obtained through his many contacts with European physicians coming to Istanbul. From these contacts Abbas Wasim Efendi was able to learn Latin and French, translate Italian medical texts into Turkish, and closely follow advancements in medical science in Europe.

Abbas Wasim Efendi’s main contribution to Ottoman astronomical literature was his translations and commentaries. Without any doubt, his most important work is his Turkish commentary on Ulugh Beg’s Zij (astronomical handbook), which was originally written in Persian and was used as the main reference book by the chief astronomers and timekeepers of the Ottoman State for their astrological and astronomical studies. Abbas Wasim Efendi worked on this book beginning in 1745, at the request of the historian and astronomer Ahmad Misri, who convinced him of the importance of a Turkish translation. Upon completion, Abbas Wasim Efendi presented it to the Ottoman Sultan Mahmut I (reigned: 1730–1754). His commentary is written in clear Turkish, in the same style of Miram Chelebi’s (d. 1525) commentary on the same work. The worked examples given in the book are all based on Abbas Wasim Efendi’s own calculations for the longitude and latitude of Istanbul. He includes findings from ancient Turkish, Hebrew, and Roman Calendars, which were not in the original. He also explains Ulugh Beg’s method for finding the sine of one degree, which was based upon the work of Jamshid al-Kashi. One may deduce that Abbas Wasim Efendi was interested and well-informed on astrology since he dedicates a separate and large section of the book to the subject.

A valuable work on solar and lunar eclipses that Abbas Wasim Efendi also translated into Turkish was chapter ten of Birjandi’s Hashiya ‘ala sharh al-Mulakhkhhas fi al-hay’a (which was a supercommentary on Jaghmini’s elementary astronomical textbook). He titled his book Tarjamat kitab al-Birjandi min al-khusuf wa’l-kusuf. Another astronomical work concerns lunar crescent visibility, which is important for religious observance. Abbas Wasim Efendi also wrote a work entitled Risala al-wafq dealing with prognostication and astrology.

Selected References


Salim Ayduz

**Abbe, Cleveland**

*Born* New York, New York, USA, 3 December 1838  
*Died* Chevy Chase, Maryland, USA, 28 October 1916

A practical astronomer, mathematician, and meteorologist, Cleveland Abbe is perhaps best noted as the father of weather forecasting in the United States, having produced the first storm forecasts while director of the Cincinnati Observatory. Abbe was the son of George Waldo, a dry-goods merchant and broker, and Charlotte (née Colgate) Abbe. The Abbe family emigrated from England in 1635, settling first in Connecticut. The family was prominent in the American Revolution, and the American Civil War.

Cleveland Abbe’s mother presented him with a copy of Smellie’s *Philosophy of Nature* when he was eight years old. This book awakened in the young boy a lifelong interest in the natural sciences. A voracious reader for his entire life, Abbe’s early education was at a private school in New York City. He entered the New York Free Academy (now The City College of New York) at age thirteen, received his B.A. in 1857, and earned a M.A. in 1860.

Abbe became seriously interested in astronomy while he was a tutor in engineering at the University of Michigan in 1860. Inspired by Franz Brünnow, director of the Detroit Observatory, Abbe took up the study of astronomy. However, Abbe’s service at Michigan was interrupted when he responded to President Lincoln’s first call for volunteers for the American Civil War. Unfortunately, after several weeks in training, Abbe was rejected because of his extreme myopia. Instead, Abbe went to Cambridge, Massachusetts, where he assisted Benjamin Gould in the telegraphic longitude work of the United States Coast Survey.

At the end of the war, Gould suggested that Abbe go to Pulkovo Observatory in Russia to study astronomy under Otto Wilhelm Struve. Abbe applied to Struve, who welcomed him with an invitation written in such warm terms that the document became one of Abbe’s most treasured possessions. He spent 1865 and 1866 as a supernumerary astronomer (the equivalent of the modern post-graduate fellowship) at Pulkovo, where the Struves treated him as a family member. Abbe seriously considered settling at Pulkovo and marrying Struve’s youngest half sister, Ämalie. However, Struve rejected Abbe’s petition on the grounds that in the Struve’s German culture, Ämalie, the youngest daughter, was expected to remain at home to care for her elderly stepmother. Within a few weeks, Abbe returned to the United States. He regarded his years at Pulkovo as the highlight of his career.

Upon his return to the United States, Abbe filled a short appointment at the United States Naval Observatory before assuming duties as director of the Cincinnati Observatory. During the nineteenth century, astronomical observatories often served as dispensers of more-general scientific information to the public. In addition to astronomy, the citizens of Cincinnati wanted authoritative information on meteorology, geology, mathematics, chemistry, and physics. Abbe formulated an ambitious plan to embrace all of these disciplines during his tenure. However, he soon focused his activities on meteorology.

While working for Gould, Abbe saw how the telegraph could be a valuable modern tool in making precision simultaneous scientific observations. With the cooperation of the Cincinnati Chamber of Commerce and the Western Union Telegraph Company, he began to collect simultaneous weather observations from over one hundred stations in 1869. Building a database from this information, he was soon able to make weather predictions for the eastern and mid-western United States. Abbe’s work constituted the world’s first large-scale weather prediction system. The predictions were published daily in hundreds of newspapers. The results of the network were so favorable that within six months Western Union took the system over as one of its services. Shortly after that, the United States government assumed control of the operation, assigning it to the United States Army Signal Corps. The service was known as the United States Weather Bureau. Abbe edited weekly and monthly weather reports for the Bureau for 45 years beginning in 1871. The Bureau eventually evolved into today’s National Oceanic and Atmospheric Administration.

Abbe was a man of great modesty, never touting his achievements. He was always willing to give encouragement and advice to those who worked or corresponded with him. He was particularly talented at mediating between the rigid hierarchy of the military chain of command and the more
casual working methods of the scientists. His colleagues noted that he was totally devoid of any hint of envy or jealousy, a rare characteristic for a modern scientist!

Though his primary impact on science was in the field of meteorology, Abbe was also a skilled mathematician, geodesist, chemist, physicist, and engineer. He was active in astronomy for his entire life. Abbe was particularly interested in the effects of the atmosphere on astronomical observations. He was multilingual, and many of his most important contributions were compilations of translated materials on astronomy and meteorology. He was an early advocate of the standard time system, and represented the United States at the International Meridian and Time Standard Congress in Washington in 1884.

Abbe received an honorary Ph.D. from the College of the City of New York in 1891, honorary LL.Ds from the University of Michigan (1889) and the University of Glasgow (1896), and an honorary S.B. from Harvard University (1900). He received many medals, awards, and other honors, including the Franklin Institute’s Longstreh Medal of Merit, the United States National Academy of Sciences’ Marcellus Hartley Memorial Medal, and the American Philosophical Society’s Franklin Medal. He was an Officier d’Académie of the French Republic, and a Fellow of the Royal Astronomical Society.

Intensely intellectual, Abbe continued to work on his papers and correspondence until the week of his death. He was a prolific writer. There are over 5,500 items in his collected articles, papers, and books, which occupy fifteen feet of shelf space in the Library of Congress.

Professor Abbe married Frances Martha Neal (of Ohio 1870), and after her death, Margaret Augusta Percival (1909). He had three sons, Cleveland, Jr., Truman, and William. His brother, Richard, was a prominent New York surgeon who pioneered the use of radium and catgut sutures. Abbe was a devout Christian, and attended services of several Protestant denominations at different periods of his life.

Selected References


Leonard B. Abbey

Abbot, Charles Greeley

Born Wilton, New Hampshire, USA, 31 May 1872
Died Washington, D.C., USA, 17 December 1973

Charles Abbot refined the value of the solar constant and significantly improved the technology of its measurement, but failed in his long term effort to correlate small variations in the solar constant with terrestrial weather patterns. Abbot provided critically needed encouragement and financial support from both institutional and private sources to Robert H. Goddard’s early research and development of liquid-fueled rocket technology.

The son of Harris and Carol Ann (née Greeley) Abbot, Charles studied chemistry and physics at Phillips Andover Academy, Massachusetts and the Massachusetts Institute of Technology, receiving an M. S. degree in 1895 for a thesis on osmotic pressure.

Though he knew nothing about astronomy at the time, Abbot was employed following his graduation by Samuel Langley, director of the Smithsonian Astrophysical Observatory [SAO] and secretary of the Smithsonian Institution. Abbot’s work as Langley’s aide at the SAO was focused on determination of the solar constant, a measure of the amount of energy received per unit area of the Earth’s surface. Langley’s preoccupation with this measurement reflected his intent to detect not only variations in that important physical parameter, but also to establish correlations between variations in the solar constant and changes in the Earth’s weather if possible. Towards that end, Langley had developed the bolometer and other measurement devices and made preliminary measurements of the solar constant, establishing a value of 3 calories per square centimeter per minute.

Abbot replaced Langley as the SAO director upon the latter’s death in 1905 and continued his mentor’s research programs until his own retirement in 1944. An ingenious experimenter, Abbot developed a series of highly specialized instruments...
for measuring and characterizing solar energy reaching the Earth, and deployed these instruments at stations located on several continents. His first efforts in the city of Washington concentrated on eliminating sources of error in the measurement of the solar constant through improvements in the measuring device, which Claude Pouillet had named the pyrheliometer. Measurements with a refined pyrheliometer from Mount Wilson and Mount Whitney, both in California, led Abbot to reduce Langley's value to 2.1 calories per square centimeter per minute in 1907, with an eventual further reduction to 1.94 calories per square centimeter per minute after several decades of refined measurements and analysis of the data. Abbot recognized that daily measurements were essential to establish any correlation with weather, and further that measurements had to be made in elevated locations with a maximum of cloudless days and atmospheres clear of any pollution. This led to establishment and operation of a series of SAO stations on mountains in Chile, Mexico, Algeria, South Africa, and the Sinai desert as well as in New Mexico and California, USA.

Although Abbot's program of data gathering was endorsed at various times by distinguished scientists, including astronomers George Hale, William Campbell, and Walter Adams, as well as physicists Robert Millikan and Karl Taylor Compton (1887–1954) and meteorologists C. F. Marvin and H. H. Clayton, there was little agreement that his efforts to correlate small variations in the measured solar constant with weather patterns showed any significant results.

Abbot also developed powerful spectrographs with Langley's bolometers as sensitive radiation detectors. Using these spectrographs, Abbot mapped the solar spectrum in significant detail. Based on his results, by 1911 Abbot had concluded, correctly, that the continuous spectrum of the Sun could only be attributed to gas under high pressure, and further that the opacity of that gas would account for the apparent sharp edge of the solar photosphere. Abbot's finding contradicted a previous widely held belief that the photosphere consisted of incandescent solids and liquids.

In 1928, Abbot accepted additional administrative responsibility as the Secretary of the Smithsonian Institution, which he undertook without yielding his position as director of the SAO. Abbot's tenure as Secretary was dominated by the financial uncertainty endemic in all such institutions during the world economic depression and later in World War II. As a result of both these financial problems and to some extent from Abbot's benign neglect in favor of solar research, development of the Smithsonian was largely stagnant during his service as Secretary.

During these years, however, Abbot managed to arrange limited financial support for the rocket research of Robert H. Goddard, who had first contacted the Smithsonian in 1916. Working both with Smithsonian funds and with private support from philanthropist John A. Roebling, Abbot managed to eke out sufficient funds to support Goddard's research until military as well as scientific applications of the liquid-fueled rocket became attractive. Goddard served as a director of Roebling's foundation, The Research Corporation, in New York City from 1928 to 1945.

The practical aspect of Abbot's abilities was revealed in his record of inventions. He patented at least sixteen inventions, many of which involved applications of solar energy. Abbot actively promoted the use of solar energy in his popular lectures and popular writing. His commitment to popularizing science was also reflected in the publication of the Smithsonian Scientific Series of popular books on science and technology.

In 1915 Abbot was elected to membership in the National Academy of Sciences, having received the Academy's Draper medal in 1910. He was honored by his peers in the American Academy of Arts and Sciences [AAAS] with their Rumford medal in 1916 and by election as an AAAS Fellow in 1921. Abbot was the recipient of honorary doctorates from a number of universities including D.Sc.s from the University of Melbourne (1914), the Case School of Applied Science (1930), and George Washington University (1937), and an LL.D. from the University of Toronto (1933). In 1897, Abbot married Lillian E. Moore, who died in 1944. He was survived by his second wife, Virginia A. Johnston, whom he married in 1954.

Selected References


Thomas R. Williams
Abbott, Francis

Born Derby, Derbyshire, England, August 1799
Died Hobart, Tasmania, (Australia), 18 February 1883

Francis Abbott's important contributions to Tasmanian and Australian astronomy and meteorology were overshadowed by his controversial claim to have observed shrinkage of the η Carinae nebula that he believed was evidence of the evolution of a stellar system like our Solar System.

Abbott, the son of John and Elizabeth Abbott, was baptized on 12 August 1799. Trained as a watch-maker in Derby, he established his business there and, in 1825, married Mary Woolley; they had seven children. In 1831 Abbott moved to Manchester where he ran a successful business manufacturing clocks, watches, and astronomical machinery until 1844 when he was found guilty of obtaining two watches under false pretences. Sentenced to penal servitude, he arrived in Hobart in June 1845, and after four years obtained his ticket-of-leave and set up as a watch- and clock-maker in Hobart. With the passage of time his business expanded to include photography and the supply and repair of optical and other instruments. Despite his less than auspicious arrival in the colony, Abbott and his family (who arrived in 1850) became respected members of Tasmanian society, three of his sons rising to positions of prominence.

During the 1840s Hobart lacked an astronomical observatory, but it did boast a geomagnetic and meteorological observatory. While still a convict Abbott became involved in the Rossbank Observatory's meteorological program. When the observatory closed at the end of 1854, Abbott—by now a free man—immediately established a private observatory at his home in Hobart and continued his meteorological observations. For the next 25 years he authored monthly reports on his thrice-daily readings, and six monographs that documented Hobart's weather from 1841 to 1879 inclusive. These volumes were published, with funding from Government, by the Royal Society of Tasmania [RST]. Apart from its full suite of meteorological instruments, Abbott's private observatory included a small transit telescope and an astronomical clock. For nearly thirty years he provided a local time service.

Abbott's observatory was best-known for its astronomical output. With the aid of three small refracting telescopes (the largest with an aperture of about 13 centimeters), he observed a succession of comets and current phenomena including the variable star η Carinae. Abbott published 35 papers in *Monthly Notices of the Royal Astronomical Society, Papers and Proceedings of the Royal Society of Tasmania*, and the *Astronomical Register* on the 1861 and 1868 transits of Mercury, the 1874 transit of Venus, sunspots and aurorae, a lunar occultation of Jupiter, meteors, the open cluster Kappa Crucis, and a number of comets. Apart from providing invaluable data on the Great Comet of 1861 (C/1861 J1), which was discovered by John Tebbutt, Abbott also wrote three papers about the Great Comet of 1865 (C/1865 B1), of which he made an independent discovery—although he is generally not given credit for this.

In contrast to his comet work, it was his observations of η Carinae that brought Abbott international notoriety. He began recording the declining magnitude of this enigmatic variable star in 1856. However, in an 1863 paper in *Monthly Notices*, Abbott postulated that the nebulosity surrounding the star had changed in shape and size since Sir John Herschel first observed the region in the 1830s. Abbott's claim ran counter to the prevailing wisdom and elicited objections from Herschel and other distinguished northern-hemisphere astronomers, including Astronomer Royal George Airy. Abbott continued to press his claim in thirteen further papers published until 1871, when the respected astronomer-popularizer, Richard Proctor, was asked to adjudicate on the matter. Proctor's report was damning: "Mr. Abbott has supposed the dark spaces (shown in Sir J. Herschel's Monograph) to correspond to the lemniscate, which would unquestionably imply a complete change in the whole aspect of the Nebula. [But] On the scale of Mr. Abbott's drawings, the lemniscate would be about 2-5ths of an inch long; it would, in fact, be a minute and scarcely discernible feature." In spite of Proctor's finding Abbott published two further papers on the topic before finally bowing to international pressure. Although he did record one of the contact times for the 1874 transit of Venus, the unfortunate η Carinae episode all but terminated Abbott's credibility. After 1873 no further papers by him appeared in European astronomical journals.

Instead, Abbott turned his considerable energy and enthusiasm to the popularization of astronomy. In quick succession he published three short booklets privately to bring recent international developments in astronomy before an Australian audience. Spectroscopy in general and astronomical spectroscopy in particular feature prominently in the first two works, while the third booklet highlights Sir William Herschel's important overall contribution to astronomy. In view of the aforementioned η Carinae controversy, it is interesting that this star is scarcely mentioned in any of the booklets. Abbott resisted introducing any semblance of a local flavor into these booklets, not mentioning either his own astronomical endeavors or those of Tebbutt and some of Australia's leading professional astronomers.

Apart from his prominence as a maker of public clocks, from 1855 to 1880 Abbott served as Tasmania's de facto Government Astronomer and Meteorologist. It was only when advancing age made him relinquish this gratuitous role that the Royal Society of Tasmania argued for the urgent need for a colonial observatory. As a result, the Government opened the Hobart Observatory.


Wayne Orchiston


Born Mashhad, (Iran)
Died Kūtahya, (Turkey), 1434

6 Abd al-Wājid was a mudarris (teacher) who wrote several works on astronomy that indicate that he was greatly influenced by the astronomical educational tradition of the Marāqa circle of scholars (including Ṭūsī and Shirāzī). He traveled to Anatolia from his native region of Khurāsān in Iran, and became a student of Muḥammad ibn Ḥamza al-Fanārī (died: 1431) during the reign of Germiyānoğlu Suleymān Shāh (1368–1387). 6 Abd al-Wājid later settled in Kūtahya and taught at the Wājidiyya Madrasa (known as the Demirkapı Madrasa during the Ottoman Period) until his death. The influence of the Marāqa circle had previously been felt in Anatolia due to Shirāzī, who had also worked at various centers and schools there.

Local traditions indicate that the Wājidiyya Madrasa was a place where astronomical observation and instruction took place, often associated with 6 Abd al-Wājid in the fourteenth century. According to its foundation inscription, this madrasa was built in 1308 by Mubāriz al-Dīn ibn Sāwjī. 6 Abd al-Wājid must have been a very prominent professor at this madrasa inasmuch as it seems to have been renamed in his honor; clearly he was not one of its founding professors. Because 6 Abd al-Wājid had astronomical interests and was the author of several books on astronomy, the local tradition connecting the school with astronomy gains some credibility. This probably consisted of astronomical instruction and some practical applications. It is unlikely, though, that there was a large-scale observatory, such as those at Marāqa and Samarqand, associated with the school.

Among 6 Abd al-Wājid’s works on astronomy, Sharḥ al-Mulakhkhas fi al-hay’ā is a commentary on Ḡaghmīnī’s famous astronomical textbook; 6 Abd al-Wājid dedicated it to Sultan Murād II (1404–1451). Sharḥ Si fašl is a commentary on Ṭūsī’s Persian work on practical astronomy, which consists of thirty chapters. This text was translated into Turkish by Ahmed-i Dā’ī, but it cannot be precisely dated. Ma’ālim al-aqwāt wa-sharḥīhū is a work about the astrolabe and its uses. It was written in verse and consisted of 552 couplets. It was dedicated to Muḥammad Shāh (died: 1406), the son of 6 Abd al-Wājid’s teacher al-Fanārī.

Selected References


Hüseyin Topdemir
Biographical Encyclopedia of Astronomers
Editor-in-chief: Hockey, Th. - Trimble, V.; Williams, Th.R.;
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