

OBITUARY: DONALD EDWARD OSTERBROCK (1924-2007)

On 11 January 2007 the *Journal of Astronomical History and Heritage* lost one of its foundation Editorial Board members and the international astronomical community lost a leading astrophysicist and historian of astronomy when Donald Edward Osterbrock died suddenly in Santa Cruz, California.

With sadness we note the death of Donald E. Osterbrock (Figure 1), one of the leading American astronomers of his generation as well as one of the most influential historians of twentieth century astronomy and astrophysics. Among many other accomplishments, he was a foundation member of the Editorial Board of this journal.

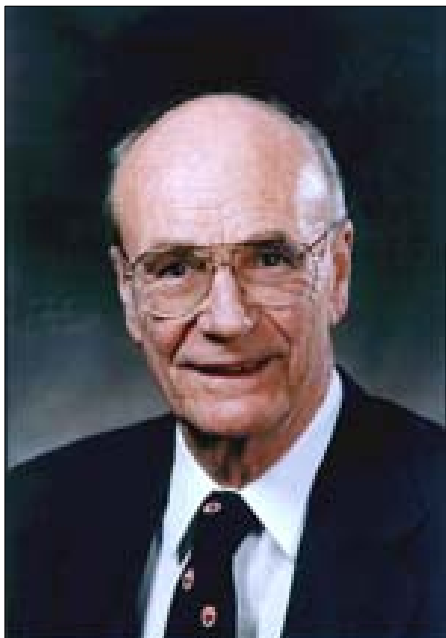


Figure 1: Donald Edward Osterbrock (1924-2007).

Donald E. Osterbrock—‘DEO’ to his students and ‘Don’ to his many professional colleagues and friends worldwide—was born on 13 July 1924 in Cincinnati, then a “... pleasant old southern Midwestern city on the bank of a beautiful river ...” with a predominantly German culture. Don’s father’s own parents and his mother’s grandparents were all German immigrants, and he recalled the culture in which he grew up as one “... in which hard work, education, science, poetry, music, and love of the outdoor life were all positive values.”

Both of his parents worked full-time jobs during high school—his father as a stenographer, his mother as a laboratory assistant in a soap factory—but they completed their educations by attending night school. His father, a great role model for Don, later studied electrical engineering part-time at the city-funded University of Cincinnati while still working full-time in engineering-type jobs; because of his aptitude for physical sciences and mathematics he was hired as an Instructor in Electrical Engineering and later rose through the ranks to teach all the more mathematical engineering courses and to be Chairman of the Department.

Don (Figure 2) attended good public schools in Cincinnati and his interest in astronomy developed

early—by the time he was in high school he was reading all the astronomy books he could lay his hands on in the high school library, including the semi-technical Harvard books on astronomy, which were beginning to appear at the time. His interest in astronomy was greatly fanned by the presence of the nearby Cincinnati Observatory, which had been founded by Ormsby McKnight Mitchel, a gifted popularizer whom Don later described as a nineteenth century ‘Carl Sagan’, as well as by lecturers at the local astronomy club, who, though many of them were quite mundane, included such luminaries as Harlow Shapley and Otto Struve. Don acquired a small second-hand telescope with which he observed the Moon, planets, double stars, and nebulae, and while still in high school became sure that he wanted to follow a career in astronomy.



Figure 2: Don Osterbrock as a young schoolboy.

On 7 December 1941 Don was a high school senior when the Japanese attacked Pearl Harbor. After a few months at the University of Cincinnati, he joined the U.S. Army and completed basic training and an Army/Air Force pre-meteorology school at the University of Chicago, which was a one-year course that included physics and mathematics (but no humanities

courses) with the goal of training weather forecasters for the Air Force. After serving as a weather observer at an Army Air Field in California (Figure 3), Don shipped out to Hawaii for several months and was serving in Okinawa as the war ended. He admitted that he was never in much danger, but after the war he was able to continue his education at the University of Chicago, as a civilian student, on the G.I. bill.



Figure 3: Serving at the AAF Weather Station in Victorville, California.

The University of Chicago was still led by outstanding President Robert Maynard Hutchins, and Don received his B.S. in physics and M.S. on campus before heading to Yerkes Observatory in 1949 to begin working toward his Ph.D. Among his teachers was the nuclear physicist Enrico Fermi, whom he would always regard as the best teacher he ever had, and astronomer Thornton Page, who was "... almost the best." In his last year at Chicago, he attended astronomy courses taught by senior astronomers at Yerkes, including Otto Struve, Subrahmanyan Chandrasekhar, Gerard P. Kuiper and William W. Morgan.

Yerkes was then directed by Struve, and Chandra-sekhar—'Chandra', as he was known to his students—became Don's thesis advisor. Of Chandra, Don later wrote: "All the graduate students who worked with him felt they had learned much from him, and had been fortunate to have been his students. A few thought of him as a god; most recognized him as an exceptional human being." Apart from Chandra, who was the outstanding theoretical astronomer of the day and a master of quantitative modeling of stellar atmospheres, the person who influenced him most during his Yerkes years was Morgan, an observer and the leading expert on stellar classifications. In contrast to Don, whose parents had always actively encouraged his interest in mathematics and science, Morgan's father beat him severely and discouraged him from a career in science. When Morgan was offered a job at

Yerkes by then-Director, Edwin B. Frost, his father violently opposed him, telling him he would "... end up just in a laboratory working for somebody else, and that's nothing." That was the last time Morgan ever saw his father, who left soon afterwards, and Morgan went on to a distinguished career in astronomy.

Morgan's gifts were unique, and his methods were not always appreciated. They were sometimes criticized as being 'qualitative', and one critic even accused him of being nothing more than 'a celestial botanist'. Dimitri Mihalas, who was one of Morgan's later colleagues, noted that "Chandra and Morgan were like two mountain peaks; there was a chasm between them, and everyone else fell somewhere in between." Don was remarkable in that, though he was trained as a theoretical astronomer, he was always an eager observer as well, and he managed to bridge the methodological and personality gap and form close alliances with both of these eminent astronomers.

Because of his military service, Don was an older student, but he achieved success while quite young. He was a graduate student, still in his twenties, when he was involved in one of the outstanding discoveries of twentieth century astronomy: the spiral-arm structure of our Galaxy. Don and Morgan's graduate student, Stewart Sharpless, obtained photographs of HII regions of the Milky Way with the wide-angle Henyey-Greenstein camera, and these photographs contributed to Morgan's identification of the spiral arms. Don later wrote to Morgan: "Let me say that I have always felt a tremendous amount of gratitude to you for including Sharpless and myself as coauthors of that paper ... It was a very generous thing for you to do, and I believe that it had a lot to do with the early recognition I received in astronomy. I will never forget it."

While a graduate student at Yerkes, Don met the love of his life, Irene Hansen, who was a native of Williams Bay and was working as a 'computer' for Morgan. Theirs was a very happy marriage, and they had three children together.



Figure 4: At the monastery, Mt. Wilson, in the spring of 1955.

After Chicago, Don was a Post-doctoral Fellow at Princeton and maintained a career-long association with that institution and the neighboring Institute for Advanced Study. He became an Assistant Professor at Caltech (Figure 4) and then relocated in 1958 to the University of Wisconsin, where he rapidly rose through the academic hierarchy (Figure 5). Although he had made a major contribution to understanding the

internal structure of low mass stars while at Princeton, the work for which he was best known was in the field of gaseous nebulae, which are clouds of gas and dust that can be associated with both very young massive stars and the ejecta from stars like our Sun as they end their active life cycle, becoming White Dwarfs. Don had a superb understanding of quantum mechanics and worked with the University College London physicist, Michael J. Seaton, in establishing how observations of certain emission lines of gaseous nebulae could be used to establish their physical conditions of temperature and density. Later he applied these same techniques to the study of the most luminous objects in the Universe, the active galactic nuclei, developing the standard model for these objects. He summarized the tools and results of this approach in a textbook, *Astrophysics of Gaseous Nebulae and Active Galactic Nuclei*, which recently came out in its revised third edition with Gary J. Ferland as co-author. This text is the standard in the field and has served two generations of astrophysicists. In all, Don had twenty different graduate students and post-doctoral fellows, and he left both a personal and professional legacy as an astrophysicist.

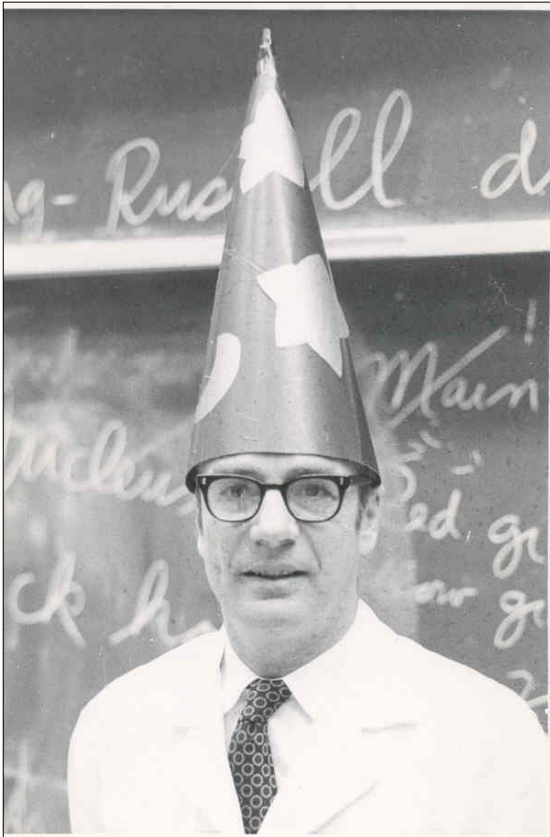


Figure 5: Presenting the Halloween Lecture at Madison in 1972.

Beginning in the mid-1970s, Don began devoting some of his time to the history of astronomy, which became his main focus after his retirement. He once explained that astronomers should work as hard as they possibly can on astronomy while they are young, but "... after you pass fifty, and start getting that nostalgic, family, searching-for-roots feeling, I hope that you will be sure to give your scientific correspondence to your university's, laboratory's, observatory's, or company's

archives for the benefit of future generations of historians." Don's own career developed in this way.

According to his own account, in 1973, when he first came to Lick Observatory as its Director, Mary Lea Heger Shane showed him the Observatory's archives, collected and organized from old files and dusty letter books going back to the days of the Lick Trust which had built the Observatory in the 1880s. Don's astronomical history interest dated from that moment (Figure 6).

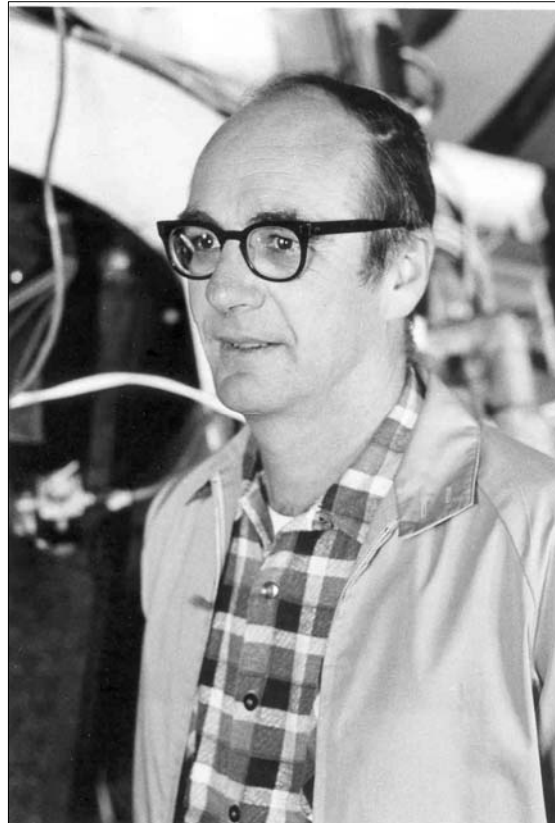


Figure 6: Shortly after becoming Director of the Lick Observatory.

His first major study in the history of astronomy, a series of articles on what he called the 'California-Wisconsin axis in American astronomy', appeared in 1976, when he was fifty-two. One sees the turning of his interests in a quantitative analysis of his bibliography. In the 1970s, he published 39 astrophysics papers and 7 historical papers; in the 1980s, the ratio was 40 to 20; in the 1990s he published 21 astrophysics papers and 29 historical papers; and in the 2000s, 5 astrophysics papers and 20 historical papers. His level of productivity in both areas was outstanding.

Don's knowledge of astronomy and instrumentation was, of course, unsurpassed. He once noted that "... immersion in a field like astronomy makes one better qualified to understand what others have done in that field, and to write about it." It was a necessary but not a sufficient prerequisite. In addition he brought to the job great literary skill, and was also possessed of remarkable psychological insights.

He had, of course, known many of the leading figures of twentieth century astronomy personally, and

he also had participated, as a leader and a researcher, in many of its developments. But rather than writing impressionistic memoirs, as many astronomers have done, he adopted the rigorous methods of historians like Owen Gingerich, William Graves Hoyt, and LeRoy Doggett, all of whom he greatly admired, and did not write anything until he had thoroughly surveyed the primary sources—letters, personal papers, diaries, and other materials—pertaining to the figures or institutions he chose as his subjects. Though he valued oral histories, he realized how hazy or self-serving or selective the memory can be and preferred to anchor himself wherever possible in the facts provided by contemporary documents. He was greatly aided in this work by having ready access to the Mary Lea Shane archives of the Lick Observatory, and he noted that they were "... a tremendous advantage ... I can look up almost any astronomer since 1880 and find letters to him or her there." He also consulted extensively the archival holdings of other institutions, not all of which are as well or lovingly organized and cared for as the Shane archives.



Figure 7: Don and Irene Osterbrock at their home in Santa Cruz in October 2005.

Don had a real flair for character and narrative. He once said that every story needs a hero and a villain (or villains). After writing his first biography about James Keeler—a supremely gifted and unappreciated Adonais-like figure, who accomplished great things and died tragically young—Don showed his versatility by taking up the tremendous figure of George Ellery Hale, who had already been subject of a splendid (if worshipful) biography by Helen Wright. Instead of following in the established paths, he revealed a somewhat darker side to Hale and pitted him as villain against the perfectionistic and persecuted hero of telescope-making, George Willis Ritchey. The result was a breathtaking and paradigm-shifting reappraisal of early twentieth century astronomy. His last book, a biography of Walter Baade, is a warm and intimate tribute to an astronomer he greatly admired, and whom in some respects he resembled. (Like Baade he was an ‘astronomer’s astronomer’—always generous with ideas and willing to support others in their researches.)

In addition to these towering biographies, Don’s other astronomy books are comprehensive histories of the Lick Observatory (with John R. Gustafson and W. J. Shiloh Unruh) for its centennial celebration in 1988, and of the Yerkes Observatory, for its centennial celebration in 1997. A full list of his historical writings is included below.

Don received almost all the awards that it is possible for an astronomer to receive, including the Bruce Medal of the Astronomical Society of the Pacific, the Henry Norris Russell Lectureship of the American Astronomical Society, the Gold Medal of the Royal Astronomical Society (he was one of only a few American astronomers to receive this award), the Hans Lippershey Medal of the Antique Telescope Society and the LeRoy Doggett Prize for Historical Astronomy of the Historical Astronomy Division of the American Astronomical Society. His address on receiving this last award was entitled “History is too important to be left to the historians”, which espouses his strong view that astronomers should write their own histories rather than leave them to the mercy of professional historians.

Don was a member of the National Academy of Sciences, a Past President of the American Astronomical Society, etc., etc.

He offered great encouragement and was a mentor to many. He astounded with his near-photographic memory and ability to call up, seemingly effortlessly, detailed information about the history of astronomy. At times this ability seemed almost beyond the possibility of what the human brain could be expected to accomplish. His intellect was formidable, but he also possessed a charming, down-to-earth manner; he was sociable, interested in learning details about his colleagues’ families and personal lives, and was always warm and genuinely interested (Figure 7).

Although he wrote extensively about the history of astronomy, Don’s published volumes contain only a fraction of the knowledge and wisdom that he carried in his head. He literally died in harness, working right up to the end. His death from a heart attack on 11 January 2007 was unexpected by all who knew him, and occurred as he walked across campus from his office where he had put in the usual morning’s work.

Donald Osterbrock: Full List of History of Astronomy Publications in English

Books:

- Osterbrock, D.E., 1984. *James E. Keeler, Pioneer American Astrophysicist: And the Early Development of American Astrophysics*. Cambridge, Cambridge University Press.
- Osterbrock, D.E., Gustafson, J.R., and Unruh, W.J.S., 1987. *Eye on the Sky: Lick Observatory’s First Century*. Berkeley, University of California Press.
- Osterbrock, D.E., 1993. *Pauper & Prince: Ritchey, Hale, & Big American Telescopes*. Tucson, University of Arizona Press.
- Osterbrock, D.E., 1997. *Yerkes Observatory, 1892-1950: The Birth, Near Death, and Resurrection of a Scientific Research Institution*. Chicago, University of Chicago Press.
- Osterbrock, D.E., 2001. *Walter Baade: A Life in Astrophysics*. Princeton, Princeton University Press.

Research Papers:

- Osterbrock, D.E., 1976. The California-Wisconsin axis in American astronomy. *Sky & Telescope*, 51, 7-14, 91-97.
- Osterbrock, D.E., 1976. The California-Wisconsin axis in American astronomy. *Wisconsin Academy Review*, 23(1), 2-8.
- Osterbrock, D.E., 1977. Su-Shu Huang. *The Astronomy Quarterly*, 1, 261-264.
- Osterbrock, D.E., 1978. First world astronomy meeting in America. *Sky & Telescope*, 56, 180-183.

- Osterbrock, D.E., 1978. Edward S. Holden—the founder of the A.S.P. and the early days of the California-Wisconsin astronomical connection. *Mercury*, 7, 106-110.
- Osterbrock, D.E., 1978. The California-Wisconsin axis in American astronomy. *Transactions of the Wisconsin Academy of Science, Arts & Letters*, 66, 1-24.
- Osterbrock, D.E., 1979. James E. Keeler, pioneer astrophysicist. *Physics Today*, 32(2), 40-47.
- Osterbrock, D.E., 1980. Lick Observatory solar eclipse expeditions. *The Astronomy Quarterly*, 3, 67-79.
- Osterbrock, D.E., 1980. Graduate astronomy education in the early days of Lick Observatory. *Mercury*, 1, 151-155.
- Osterbrock, D.E., 1980. America's first world astronomy meeting: Chicago 1893. *Chicago History*, 9, 178-185.
- Osterbrock, D.E., 1981. Further links in the California-Wisconsin astronomical connection. *Transactions of the Wisconsin Academy of Science, Arts & Letters*, 69, 153-162.
- Osterbrock, D.E., and Cruikshank, D.P., 1982. Keeler's Gap in Saturn's A ring. *Sky & Telescope*, 64, 123-126.
- Osterbrock, D.E., and Cruikshank, D.P., 1983. J.E. Keeler's discovery of a gap in the outer part of the A ring. *Icarus*, 53, 165-173.
- Osterbrock, D.E., 1983. Rudolph Leo Minkowski, 1895-1976. *Biographical Memoirs of the National Academy of Sciences*, 54, 271-298.
- Osterbrock, D.E., 1984. Mary Lea Shane, 1987-1983. *Journal for the History of Astronomy*, 15, 74.
- Osterbrock, D.E., 1984. The rise and fall of Edward S. Holden. *Journal for the History of Astronomy*, 15, 81-127, 151-176.
- Osterbrock, D.E., 1985. James E. Keeler's "prettiest application of Doppler's principle." *Mercury*, 14 (April-May), 46-62.
- Osterbrock, D.E., 1985. Rudolph Minkowski: observational astrophysicist. *Physics Today*, 38(4), 50-57.
- Osterbrock, D.E., 1985. The quest for more photons: how reflectors supplanted refractors as the monster telescopes of the future at the end of the last century. *Astronomy Quarterly*, 5, 87-95.
- Osterbrock, D.E., 1985. The 1910 meeting of the International Union Cooperation in Solar Research. *Mercury*, 14, 152-153.
- Osterbrock, D.E., 1985. The minus first meeting of the American Astronomical Society. *Wisconsin Magazine of History*, 68, 108-118.
- Osterbrock, D.E., 1986. Failure and success: two early experiments with concave gratings in stellar spectroscopy. *Journal for the History of Astronomy*, 17, 119-129.
- Osterbrock, D.E., 1986. Nicholas T. Bobrovnikoff and the scientific study of Comet Halley 1910. *Mercury*, 15, 46-50, 63.
- Osterbrock, D.E., and Seidelmann, P.K., 1987. Paul Herget, 1908-1981. *Biographical Memoirs of the National Academy of Sciences*, 57, 59-86.
- Osterbrock, D.E., 1988. Lick Observatory: the first century. *Mercury*, 17, 34-42.
- Osterbrock, D.E., 1989. To climb the highest mountain: W.W. Campbell's 1909 Mars expedition to Mount Whitney. *Journal for the History of Astronomy*, 20, 77-97.
- Osterbrock, D.E., and S. Vasilevskis, 1989. C. Donald Shane, 1895-1983. *Biographical Memoirs of the National Academy of Sciences*, 58, 489-511.
- Osterbrock, D.E., 1989. Guido Münch: an appreciation. In Tenorio-Tagle, G., Moles, M., and Melnick, J. (eds.). *Structure and Dynamics of the Interstellar Medium*. Berlin Heidelberg, Springer-Verlag. Pp. xvii-xxi.
- Osterbrock, D.E., 1990. The observational approach to cosmology: U.S. observatories pre-World II. In Bertotti, B., Balbinot, R., Bergia, S., and Messina, A. (eds.). *Modern Cosmology in Retrospect*. Cambridge, Cambridge University Press. Pp. 247-289.
- Osterbrock, D.E., Brashear, R.S., and Gwinn, J.A., 1990. Young Edwin Hubble. *Mercury*, 19, 2-15.
- Osterbrock, D.E., 1990. Armin O. Leuschner and the Berkeley Astronomical Department. *Astronomical Quarterly*, 7, 95-115.
- Osterbrock, D.E., Brashear, R.S., and Gwinn, J.A., 1990. Self-made cosmologist: the education of Edwin Hubble. In Kron, R. (ed.). *Evolution of the Universe of Galaxies*. San Francisco, Astronomical Society of the Pacific. Pp. 1-18.
- Osterbrock, D.E., 1992. The appointment of a physicist as director of the astronomical center of the world. *Journal for the History of Astronomy*, 23, 155-165.
- Osterbrock, D.E., 1993. The Canada-France-Hawaii Telescope and George Willis Ritchey's great telescopes of the future. *Journal Royal Astronomical Society of Canada*, 87, 56-63.
- Osterbrock, D.E., Gwinn, J.A., and Brashear, R.S., 1993. Edwin Hubble and the expanding universe. *Scientific American*, 269, 84-89.
- Osterbrock, D.E., 1994. Fifty years ago: Astronomy; Yerkes Observatory; Morgan, Keenan and Kellman. In Corbally, C.J., Fray, R.O., and Garrison, R.F. (eds.). *The MK Process at 50 Years: A Powerful Tool for Astrophysical Insight*. San Francisco, Astronomical Society of the Pacific. Pp. 199-214.
- Osterbrock, D.E., 1994. Getting the picture: wide-field astronomical photography from Barnard to the achromatic Schmidt. *Journal for the History of Astronomy*, 25, 1-14.
- Osterbrock, D.E., 1994. William W. Morgan. *Physics Today*, 47(12), 82-83.
- Osterbrock, D.E., 1994. Franklin E. Roach, 1905-1993. *Bulletin of the American Astronomical Society*, 26, 1608-1610.
- Osterbrock, D.E., 1995. Founded in 1895 by George E. Hale and James E. Keeler: the *Astrophysical Journal* centennial. *Astrophysical Journal*, 438, 1-7.
- Osterbrock, D.E., 1995. Walter Baade, observational astrophysicist (1): the preparation 1893-1931. *Journal for the History of Astronomy*, 26, 1-32.
- Osterbrock, D.E., 1995. An infrared astronomer's early vision of airborne astronomy: Paul Merrill 1920. In Hass, M.R., Davidson, J.A., and Erickson, E.F. (eds.). *Airborne Astronomy Symposium on the Galactic Ecosystem: From Stars to Dust*. San Francisco, Astronomical Society of the Pacific. Pp. 619-622.
- Osterbrock, D.E., 1995. Walter Baade's discovery of the two stellar populations. In van de Kruit, P.C., and Gilmore, G. (eds.). *Stellar Populations*. Dordrecht, Kluwer. Pp. 212-230.
- Osterbrock, D.E., 1996. Nicholas Ulrich Mayall, 1906-1993. *Biographical Memoirs of the National Academy of Sciences*, 69, 189-212.
- Osterbrock, D.E., 1996. Walter Baade, observational astrophysicist (2): Mount Wilson 1931-1947. *Journal for the History of Astronomy*, 27, 301-348.
- Osterbrock, D.E., 1996. Chandra and his students at Yerkes Observatory. *Journal of Astrophysics and Astronomy*, 17, 233-268.
- Osterbrock, D.E., 1997. William Wilson Morgan, 1906-1994. *Biographical Memoirs of the National Academy of Sciences*, 72, 289-313.
- Osterbrock, D.E., 1997. Walter Baade, observational astrophysicist (3): Palomar and Göttingen, 1948-1960 (Part A). *Journal for the History of Astronomy*, 28, 283-316.
- Osterbrock, D.E., 1997. Louis Berman, 1903-1997. *Bulletin of the American Astronomical Association*, 29, 1468-1469.
- Osterbrock, D.E., 1998. Walter Baade, observational astrophysicist (3): Palomar and Göttingen, 1948-1960 (Part B). *Journal for the History of Astronomy*, 29, 345-377.
- Osterbrock, D.E., 1998. Subrahmanyan Chandrasekhar, 19 October 1910-21 August 1995. *Proceedings of the American Philosophical Society*, 142, 658-665.
- Osterbrock, D.E., and Briggs, J.W., 1998. The challenges and frustrations of a veteran astronomical optician: Robert Lundin, 1880-1962. *Journal of Astronomical History and Heritage*, 1, 93-103.

- Osterbrock, D.E., and Briggs, J.W., 1999. The first Alvan Clark & Sons largest refracting telescope in the world. *Journal of the Antique Telescope Society*, 16, 11-13.
- Osterbrock, D.E., 1999. AAS meetings before there was an AAS: the pre-history of the Society. In DeVorkin, D.H. (ed.). *The American Astronomical Society's First Century*. Washington, American Astronomical Society. Pp. 3-19.
- Osterbrock, D.E., 1999. The first West Coast meeting of the AAS. In DeVorkin, D.H. (ed.). *The American Astronomical Society's First Century*. Washington, American Astronomical Society. Pp. 37-39.
- Duerbeck, H.W., Osterbrock, D.E., Barrera, S., and R.Leiva G., 1999. Halfway from La Silla to Paranal – in 1909. *ESO Messenger*, 95, 34-37.
- Osterbrock, D.E., 1999. Seyfert Galaxies. *Astrophysical Journal*, 525, 337-338.
- Sheehan, W., and Osterbrock, D.E., 2000. Hale's "little elf": the mental breakdowns of George Ellery Hale. *Journal for the History of Astronomy*, 31, 93-114.
- Osterbrock, D.E., 2000. A view of the future as seen from the past. *Publications of the Astronomical Society of the Pacific*, 112, 869-872.
- Osterbrock, D.E., 2000. A fortunate life in astronomy. *Annual Review of Astronomy and Astrophysics*, 38, 1-33.
- Osterbrock, D.E., 2000. Dorothy N. Davis Locanthi, 1913-1999. *Bulletin of the American Astronomical Society*, 32, 1677-1678.
- Osterbrock, D.E., 2000. Kandarpa Narahari Rao, 1921-2000. *Bulletin of the American Astronomical Society*, 32, 1684-1685.
- Osterbrock, D.E., 2000. Herman Zanstra, Donald H.Menzel, and the Zanstra Method of nebular astrophysics. *Journal for the History of Astronomy*, 32, 93-108.
- Osterbrock, D.E., 2001. Astronomer for all seasons: Heber D. Curtis. *Mercury*, 30 (May-June), 24-31.
- Osterbrock, D.E., 2001. Don Hendrix: Mount Wilson and Palomar Observatories master optician of Schmidt cameras and large telescopes. *Journal of the Antique Telescope Society*, 21, 2-9.
- Harris, D., Schaumberg, D., and Osterbrock, D.E., 2002. An early photograph of S.W. Burnham at the Clark 18.5-inch refractor of the old Dearborn Observatory. *Journal of the Antique Telescope Society*, 22, 4.
- Osterbrock, D.E., 2002. Young Don Menzel's amazing adventures at Lick Observatory. *Journal for the History of Astronomy*, 32, 95-118.
- Osterbrock, D.E., 2002. In memory of Albert E. Whitford, 1905-2002. *Mercury*, 31 (July-August), 8-9.
- Osterbrock, D.E., 2002. Walter Baade: master observer. *Mercury*, 31 (July-August), 32-41.
- Osterbrock, D.E., 2002. The view from the observatory: history is too important to be left to the historians. In Heck, A., (ed). *Organizations and Strategies in Astronomy*. Dordrecht, Kluwer. Pp. 201-215.
- Osterbrock, D.E., 2003. Albert Edward Whitford. *Physics Today*, 56 (1), 67-68.
- Osterbrock, D.E., 2003. Don Hendrix: Mount Wilson and Palomar Observatories master optician. *Journal of Astronomical History and Heritage*, 6, 1-12.
- Osterbrock, D.E., 2003. The California-Michigan Axis of American Astronomy. *Journal of Astronomical History and Heritage*, 6, 120-136.
- Osterbrock, D.E., 2003. Ernest Hurst Cherrington, Jr., 1909-1996. *Bulletin of the American Astronomical Society*, 35, 1458-1459.
- Osterbrock, D.E., 2004. Albert Edward Whitford, 1995-2002. *Biographical Memoirs of the National Academy of Sciences*, 85, 381-407.
- Osterbrock, D.E., 2006. Early photographs of the distant Sierra Nevada Mountains taken from Lick Observatory. *Journal of Astronomical History and Heritage*, 9, 181-184.
- Osterbrock, D.E., 2007. Frank Ross, his Ross Lens design, and the Lick Observatory 20-inch astrograph. *Journal for the History of Astronomy*, 38, 31-73.

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