astronomy chapter of *Mikhail Vasilievich Lomonosov: His life and work* by G. E. Pavlova and A. S. Fedorov (in English, 1984, available from Imported Publications, 320 W. Ohio St, Chicago, IL 60610–4175, for $7.95 plus $1.00 shipping). Kulikovsky, however, does not fall into the attitude of hagiography that is present in the other work.

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MORE ON OLBERS'S PARADOX

Darkness at Night: A Riddle of the Universe. Edward Harrison (Harvard University Press, Cambridge, Mass., 1987). Pp. 263. £19.95.

In a provocative *Nature* article (cccxxix (1987), 213–14), entitled "Whigs, prigs, and historians of science", Edward Harrison accused modern science historians of over-reacting to the sins of the Whig Historians, who evaluated the past in terms of the present. This new "anti-whig interpretation", Harrison writes, "makes a virtue of ignorance [of modern science] and discards from the present what contributes nothing to the past. By making a virtue of ignorance, anti-whiggery becomes a form of priggery ... narrow-minded superiority." Harrison grants that professional scientists often make a hash of history: "They reconstruct situations and make connections with outrageous abandon. They perpetuate whig abridgements of history that attribute too much to too few individuals ...." But he feels a balance can be found, and a history written that combines a knowledge of the latest science – which would allow a comparison of past and present ideas and permit one to see how the present world-view arose – with the anti-whig's scholarly attention to the detail of the particular period studied.

Darkness at night, a popular-level history of Olbers's Paradox, is Harrison's attempt to strike a balance between Whiggery and Priggery in a branch of cosmology to which he himself has made important contributions. He almost succeeds: his discussion of the physics underlying the paradox is by far the clearest I have ever seen, even in the professional astronomy journals, and at a level easily understood by a layperson, to boot. Furthermore, in a scholarly search of the primary sources, he has made a number of important purely historical discoveries: for instance, he has unearthed Lord Kelvin's previously unknown paper calculating that the stars are not old enough to generate a bright night sky.

Alas, even Homer nods. I think Harrison has occasionally been guilty of the very crimes he accuses other scientists of committing when writing history. He has also been somewhat priggish in failing to mention the implications for Olbers's Paradox of the very latest cosmological models.

As an example of making "connections with outrageous abandon" and attributing "too much to too few", consider Harrison's treatment of Halley's two papers to the Royal Society on Olbers's Paradox, the first read 9 March 1721. These papers are rightly regarded as the first clear discussion of the

paradox, the inspiration for the later work of both Chéseaux and Olbers. However, in the first of these papers, Halley introduces the paradox with the words: "Another Argument I have heard urged...." Thus an outstanding historical question for many years has been, from whom did Halley get the idea that immortal stars in an infinite universe would give rise to bright night sky?

Michael Hoskin has recently given strong evidence (*JHA*, xvi (1985), 77–112) that Halley's source was William Stukeley. But in the text of *Darkness at night*, Harrison merely says (p. 77): "The argument he had heard urged *presumably* [my emphasis] stemmed from Kepler's work." In a footnote (pp. 236–7) Harrison mentions Hoskin's work, but dismisses it: "*Not impossibly* [my emphasis] the fashions of thought... had influenced Stukeley's recollection of... the conversations held thirty years previously." But Hoskin dealt with this objection in his paper. Stukeley was a diarist who made contemporary records of many of his conversations, and the detail in the surviving document of the key conversation indicates it was taken from such a record. Furthermore, we have a 1727 source for the conversation (Hoskin's reference 15). Another telling point made by Hoskin is that Halley used the word "heard" in his paper. We "hear" arguments made to us by living people; Halley could not have "heard" anything from Kepler, who was long dead by 1721. In any case, "presumably's" and "not impossibly's" are not acceptable historical arguments. Great scientists like Kepler are not the originators of *every* important idea. Thus Harrison's discussion of Halley's work constitutes a very superficial treatment of a crucial period in the history of Olbers's Paradox. I have elsewhere (*JHA*, xix (1988), 45–48), pointed out that Harrison incorrectly attributed the modern resolution – the Universe of stars has a beginning – to Edgar Allen Poe, and that it should be attributed to Johann Heinrich Mädler, whom Harrison doesn't even mention.

I also found rather superficial Harrison's discussion of the "ether voids" resolution of Olbers's Paradox. This idea – there is no ether between finite "universes" of stars, and therefore we cannot see the very distant stars because light cannot propagate in an etherless region – was quite popular in the nineteenth century. Harrison attributes the idea to Newcomb and Gore, but the famous British thermodynamicist W. J. M. Rankine was using the equivalent – "ether walls" – much earlier to solve cosmological problems (*Philosophical magazine*, iv (1858), 358).

Interestingly, these ether barriers of the nineteenth-century physicists are strikingly similar to the "domain walls" of the modern cosmologists, and Harrison's failure to point out this similarity is symptomatic of another great weakness in his book: the cosmological model which he uses to guide his history of Olbers's Paradox appears to date no later than the 1970s. The inflation revolution of the early 1980s – an event which drastically changed cosmologists' views of the classical problems – has no influence on Harrison *qua* historian. This weakness is important because it leads Harrison priggishly to distort his analysis of the steady-state Universe. He regards the steady-state universe as a mere historical relic, but in fact many versions of the inflationary universe envisage our visible universe as a single island among many in a steady-state background. (See Section 9.5 of my book with J. D. Barrow, *The Anthropic Cosmological Principle* (Oxford, 1986) for a discussion. I also disagree with

Harrison that it is the redshift that solves Olbers's Paradox in the steady-state universe. I think it is due to the steady-state universe's null incompleteness.) Domain walls bound these islands, and in the not too distant future, the resolution of Olbers's Paradox may *not* be the finite age of the universe or insufficient energy at present (the latter is Harrison's own preference, which I think ignores the problem of *why* the density of stars and the energy density of the cosmic background radiation is *now* so low. An anthropic explanation of this 'why' is required). The explanation may be rather another idea "...diachronically cascading from earlier periods" (*Nature*, *loc. cit.*).

Probably no one could achieve Harrison's ideal of balance between up-to-date science and accurate history. By trying to do so, Harrison has made in *Darkness at night* an important contribution both to cosmology and to history.

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CHARLES PIAZZI SMYTH

The Peripatetic Astronomer: The Life of Charles Piazzi Smyth. H. A. Brück and M. T. Brück (Adam Hilger, Bristol and Philadelphia, 1988). Pp. xii + 274. £29.50.

William Henry Smyth was a distinguished naval officer who retired from the navy in 1824 to become one of the talented and industrious amateurs who graced the astronomical scene in mid-nineteenth-century England. He was President of the Royal Astronomical Society and recipient of its Gold Medal, and one wonders if his omission from the *Dictionary of scientific biography* was intentional. His second son, who *is* in the *DSB*, was born in 1819 when his father was serving in the Mediterranean, and he was named Charles Piazzi; the great Sicilian astronomer Giuseppe Piazzi, though a Catholic priest, stood godfather to him in the Anglican Church in Naples.

In his early manhood Charles's surname was pronounced simply as if it was Smith. Later he adopted the pronunciation of the long vowel sound, and preferred to be addressed as "Piazzi Smyth" or simply as "Piazzi" — one can see his point. When he was only sixteen Smyth was invited by Thomas Maclear to be his assistant at the Royal Observatory, Cape of Good Hope, and there for ten years he was immersed in the drudgery of routine observations. Then, in 1844, came the untimely death of Thomas Henderson, first Astronomer Royal for Scotland. Mail to the Cape took a long time to arrive, and so Piazzi's father took it upon himself to enter his son for the vacant position. The first Piazzi knew of all this was when he received the letter of appointment!

Piazzi occupied the position and the related posts for some 43 years. Now, for the first time, his life and scientific achievements are the subject of a major biography, based on the vast archives he left, and written by one of his successors, H. A. Brück, and Mrs Brück. As the title implies, Piazzi's tenure was as notable for what he did outside Scotland as for what he did within. In particular, he was the first to campaign for high-altitude observatories, and he