that the "youngest pulsars are the jazziest". He also obtrudes a view on space research: the X-ray observations were "made at truly vast public expense". Colourful presentation, but nothing incorrect. Colour is a strong advantage in places—for example, where the energy of one mosquito is given as a million million electron volts.

The astrophysics is sufficiently complete and correct that one can regret quite small omissions, such as the optical polarisation of the pulsar, and

wish to dispute the conclusions on the birthrate of neutron stars in the Galaxy. The serious reader is encouraged to consult a useful but rather short bibliography. This will certainly not be adequate for astrophysicists, and the index is also far too short. Nevertheless, the book is strongly recommended. □

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Anatomy of a stellar murder

Donald D. Clayton

Stars: Their Birth, Life and Death. By I. S. Shklovskii. Pp. 442. (Freeman: San Francisco and London, 1978.) £10.70.

ARE you a practising astrophysicist unable to keep up with the literature, too fatigued by your own specialty? Are you worried that you are becoming too narrow while an exciting flood of astrophysical discovery flows all about you? Then this book is for you. Or are you a physicist wondering what the physics of modern astronomy is all about? This book is for you too. It is also for the amateur astronomer or the student who wants to hear the real issues of astrophysics from one who wrestles with them and who can also describe them without needless complication on the one hand or sterilising simplifications on the other.

Iosif Shklovskii writes incisively about the full range of what I would call stellar astrophysics. Not addressing extragalactic astronomy or cosmology on the one extreme, nor the origin and evolution of the Solar System at the other, Shklovskii concentrates on "stars, the most interesting and important objects in nature." But what stars! Not the serenely twinkling objects we see above us, but rather the collapsing, masering, exploding, bouncing, pulsing, bursting, spinning, extincting labour of birth and violence of death in the heavens. What makes his "serious popular book" (in the author's own words) so exciting is the closeness of many thrilling discoveries to Shklovskii's own career. His brilliance as a thinker and writer is evident throughout, not at all dampened by what must be a very good translation from the Russian, in which language the book was first published in 1975. This English edition has been updated by the author

to render it even more current, although currency is not the main objective.

Perhaps the book should have been called *Anatomy of a Stellar Murder*, so vividly described are the clues marking the birth, ageing, and death throes of its central character. The reader feels like a detective on the case. The book unashamedly emphasises the newer areas of astrophysics, especially the evidence of birth in molecular clouds and the phenomena associated with neutron stars. Shklovskii correctly credits radio astronomy with the leading role in these discoveries, perhaps somewhat under-representing the contemporary excitement in optical astronomy because it is older and, alas, just as taken for granted as a wife of several decades. It would have been Shklovskian to have paused to conjecture how

different it would all have been had we by accident evolved within an optically opaque atmosphere.

This book is quantitative, but not mathematical, displaying only important equations. A strong point is the presence of the many clarifying figures, which seem almost as abundant as the equations. Not designed as a textbook it would nonetheless fascinate final-year astronomy undergraduates or beginning research students, and could be supplemented by physics derivations in class. I would use it for such purposes without hesitation. In fact, the publisher should for this market consider issuing a separate companion paperback of derivations and problems at this level. This is, however, a personal book with the author as its main attraction. It has no references, except a general list at the end, but Shklovskii is liberal with text credits to pioneering researchers. The fact that half of these salutes are to Russians and to himself seems, in this case, justifiable by the author's own major role and by a general lack of awareness in the US of research in Russia.

The book is in four parts, having a total of 24 chapters. Some of the chapters, especially those on Cosmic Masers, Evolution of Protostars, the Crab Nebula, Neutron Stars and Pulsars, and X-ray Stars, are so fascinatingly written as to be pinnacles of astronomical exposition. Don't tell me that when it comes to writing serious popular books there is no difference between a great thinker and merely a great writer. Shklovskii is in the former league with Fred Hoyle and Carl Sagan. Only in the chapters on normal stars does Shklovskii lose the torch. In discussing white dwarves, for example, he seems to slip from his role as excited guide to that of teacher, beginning to wax pedagogical. Stellar structure and evolution suffers also in comparison, results of calculations tending to supplant discussions of physical mechanisms. Nucleosynthesis in stars is not described at all. A few controversial positions are taken up, such as that the admixture of overlying ³He excesses is the resolution of the solar neutrino problem. But maybe it is only in the eyes of this reviewer that this part of the book seems less stimulating than the mystery of the death screams of the heavenly moribund.

All in all, this is a wonderful addition to the astronomical literature, not only as an introduction to modern issues in stellar astrophysics but also as a chronicle of the way of thinking and the temperament of one of its most colourful practitioners. □

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