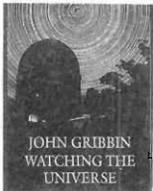


Watching the Universe

Chanda J Jog



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John Gribbin

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234 pages, Rs 140

This is a popular science book, and it consists of a collection of 17 articles all of which had earlier appeared from mid-1970's to mid-1990's in the *Griffith Observer*. The articles cover a vast range of topics in the areas of earth sciences, astronomy, and cosmology – this is the order in which the author has arranged the articles, and he has written an introductory paragraph for each.

The writing style of the author is clear, concise and inspiring, which makes it enjoyable to read the book. Each article is informative and on reading it, it makes the reader curious and on reading it, it makes the reader curious to want to know more about the topic. The author manages to convey his own enthusiasm about the various topics and ideas explored in the book.

Some of the articles cover straightforward astronomical topics such as 'How galaxies form', and 'Stardust memories' about production of heavy elements in supernovae with a particular reference to SN 1987A. There are also stories of discovery – particularly gripping are the articles on 'Puzzling pulsars' about the discovery of

pulsars, and 'The man who proved Einstein right' about the light bending observations during the solar eclipse of 1919 by Eddington.

On the other hand, several articles are fairly speculative, which may leave a newcomer to the field with the wrong notion of the problem at hand. For example, in 'How normal is our Sun?', the author suggests that the low flux of neutrinos from the Sun could be attributed to the accretion of dust as the Sun passed through a spiral feature in the Milky Way some 20000 years ago.

The first two articles deal with topics which are staple of science fiction, such as the kind of extra-terrestrial life possible. However, unlike in science fiction where strange creatures are common, the author makes an interesting point that a water-rich, earth-like planet around a star like the Sun is the most likely place for a stable life form to arise and to flourish; and that such life forms will be bipedals with 8-10 digits or fingers in the limbs.

An interesting and recurring point that is brought out in the various articles is the key role played by astronomy in shaping such apparently diverse phenomena on earth as – the earth's climate, the recurring ice ages; and indeed, the very formation of life on earth, which would not have been possible without the heavy elements produced in supernovae.

The main criticism I have about the book is that the material in some of the articles is

outdated, since there have been significant changes in astronomy in the past 20 years due to new observations. Further, the date for the initial appearance of an article in the *Griffith Observer* is not given. For example, the picture of galaxy formation and structure formation in general has changed substantially after the COBE observations of 1992. A more detailed revision (than given by the author) or a postscript giving the changes in the field since the article was written would have been useful to bring the articles up-to-date where necessary.

The other criticism is that there are some factual errors. For example, the author says in 'The air we breathe' that most stars like the Sun have planetary systems like our solar system; whereas it is well known that most

solar-type stars form a part of a binary or a multiple system of stars. Hence a direct analogy for the planetary system may not be valid. In fact, the observational detection of planetary systems around other stars using the Hubble space telescope has just begun.

In summary, given that this is a popular science book, it satisfies the broad objective of the book well, except for a few shortcomings as mentioned above. The book is ideal for young students who are generally curious about science. The price, as for the other titles by the Universities Press, is reasonable. Certainly it would make a valuable addition to the library of any college.

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The Origin of Bottled Ale

The English method of making ale has not changed very much since it was first discovered. Barley grains are soaked in water and kept in a moist atmosphere at a suitable temperature until they sprout, that is germinate, and form a substance known as malt. The malt is then heated to stop germination, put in hot water and flowers from the hop plant are added. The hot liquid is then cooled and yeast added to it. The cold liquid soon begins to bubble, because carbon dioxide is produced in the liquid. Because the liquid appears to be boiling this bubbling process is called fermentation (from the word *fervere* to boil); during fermentation the alcohol is formed.

The events in the story of bottled ale take place shortly after the idea of adding hops to the brew had been introduced into England. Hops give the liquid a bitter taste, and in time the 'hopped ale' became known as beer. Today the two names, ale and beer, are often used for the same kind of drink.

Stories from Science
Vol.4, A Sutcliffe and A P D Sutcliffe