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0521773512 - Masks of the Universe: Changing Ideas on the Nature of the Cosmos

Edward Harrison

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## Masks of the Universe

Changing Ideas on the Nature of the Cosmos

To the ancient Greeks the universe consisted of earth, air, fire, and water. To Saint Augustine it was the Word of God. To many modern scientists it is the dance of atoms and waves, and in years to come it may be different again. What then is the real Universe? History shows that in every age each society constructs its own universe, believing it to be the real and final Universe. Yet each universe is only a model or mask of the unknown Universe. This book brings together fundamental scientific, philosophical, and religious issues in cosmology, raising thought-provoking questions. In every age people have pitied the universes of their ancestors, convinced that they have at last discovered the ultimate truth. Do we now stand at the threshold of knowing everything, or will our latest model, like all the rest, be pitied by our descendants?

**Edward Harrison** is Emeritus Distinguished Professor of Physics and Astronomy at the University of Massachusetts, and adjunct Professor of Astronomy at the Steward Observatory, University of Arizona. He was born and educated in England, and served for several years in the British Army during World War II. He was principal scientist at the Atomic Energy Research Establishment and Rutherford High Energy Laboratory until 1966, when he became a Five College Professor at the University of Massachusetts, and taught at Amherst, Hampshire, Mount Holyoke, and Smith Colleges. He has written several books, including *Cosmology: The Science of the Universe*, also published by Cambridge University Press, and has published hundreds of technical papers in physics and astronomy journals.

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## Changing Ideas on the Nature of the Cosmos

EDWARD HARRISON

*University of Arizona*

Second edition



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## Preface

In the preface to the first edition of *Masks of Universe* I wrote:

“At first I thought this book would take me only a few months to write. After all, the basic idea was simple, and only a few words should suffice to make it clear and convincing. But soon this illusion was shattered. A few months grew into three years, and now I realize that thirty years would not suffice. But enough! Other work presses, and life is too short.” Here I am, not thirty years but almost two decades later writing the preface to the second edition and struggling again to make clear the “simple idea.”

The idea rests on the distinction between Universe and universes. The Universe by definition is everything and includes us experiencing and thinking about it. The universes are the models of the Universe that we construct to explain our observations and experiences. Beneath the deceptive simplicity of this idea lies a little-explored realm of thought.

No person can live in a society of intelligent members unless equipped with grand ideas of the world around. These grand ideas – or cosmic formulations – establish the universe in which that society lives. The universes that human beings devise and in which they live, or believe they live, organize and give meaning to their experiences. Where there is a society of intelligent beings (not necessarily intelligent by our standards), there we find a rational universe (not necessarily rational by our standards); where there is a universe, there we find a society. The universes are the masks of the Universe. The unmasked Universe itself, however, remains forever beyond full human comprehension.

The Universe is everything and includes us thinking about it. We are, in fact, the Universe thinking about itself. How can we, who

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are only a very limited part or aspect, comprehend the whole? Modesty alone suggests we cannot in any absolute sense. We comprehend instead a universe that we have ourselves conceptually devised: a model of the unknown Universe.

History shows that the Universe is patient of many interpretations. Each interpretation is a model – a universe – a mask fitted on the faceless Universe. Every human society has its universe. The Egyptian, Babylonian, Zoroastrian, Aristotelian, Epicurean, Stoic, Neoplatonic, Medieval, Newtonian, Victorian universes are examples.

Each universe in its day stands as an awe-inspiring “reality,” yet each is doomed to be superseded by another and perhaps grander “reality.” Each is a framework of concepts that explains what is observed and determines what is significant. Each organizes human experience and shapes human thought. The members of a society believe in the truth of their universe and mistake it always for the Universe. Prophets proclaim it, religions authenticate it, empires glorify it, and wars promote it. In each universe the end of knowledge looms in sight. Always only a few things remain to be discovered. We pity the universes of our ancestors and forget that our descendants will pity us for the same reason.

In cosmology in the ancient world philosophical issues dominated. In the Middle Ages theological issues ranked foremost. In recent times astronomy and the physical sciences have taken over and philosophical issues concerning the cosmos now receive scant attention. Yet the clear articulations of modern science have brought into sharper focus than ever before still unresolved philosophical and theological problems.

For example, consider the containment riddle (see *Cosmology: The Science of the Universe*). The current universe (actually any universe), which supposedly is all-inclusive, contains us contemplating that particular universe. But this leads into an infinite regression: the universe contains us contemplating the universe that contains us contemplating the universe that

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contains . . . , and so on, indefinitely. The riddle is solved by stressing the distinction between Universe and universe. Thus: The Universe, which by definition is all-inclusive, contains us contemplating the current universe. There is now no regression for the image does not contain the image-maker. The universe contains only representations of us in the form of bodies and brains, whereas our contemplative minds with their consciousness and free will are of the Universe and make no substantial and explicit contribution to the makeup of our deterministic universes. What is not contained in a universes is not necessarily nonexistent.

The new edition is mostly rewritten and includes two new chapters, one on time (tentatively foreseeing possible future changes in our understanding of time), and the other on the *ultimum sentiens* (a study of who or what actually does the perceiving).

I am grateful to the Institute of Astronomy, Cambridge University, for hospitality, and the University of Massachusetts for a Faculty Fellowship that enabled me to complete the first edition. I am grateful to literally hundreds of people for their valuable comments, and also I am indebted to many old friends, including Vere Chappel, John Roberts, Carl Swanson, Oswald Tippo, and Peter Webster for their comments on certain ideas, and to Michael Arbib, Thomas Arny, Leroy Cook, Jay Demerath, Seymour Epstein, Laurence Marschall, Gordon Sutton, David Van Blerkom, and Richard Ziemacki for their helpful comments on various chapters. Finally, I acknowledge gratefully the insightful comments made by my wife Photeni, son Peter, and daughter June Harrison.