

# **Masks of the Universe**

Changing Ideas on the Nature  
of the Cosmos

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# I     **Introducing the Masks**

The theme of this book is that the universe in which we live, or think we live, is mostly a thing of our own making. The underlying idea is the distinction between *Universe* and *universes*. It is a simple idea having many consequences.

The Universe is everything. What it is, in its own right, independent of our changing opinions, we never fully know. It is all-inclusive and includes us as conscious beings. We are a part or an aspect of the Universe experiencing and thinking about itself.

What is the Universe? Seeking an answer is the endless quest. I can think of no better reply than the admission by Socrates: "all that I know is that I know nothing." David Hume, a Scottish philosopher in the eighteenth century, in reply to a similar question, said "it admits of no answer" for absolute truth is inaccessible to the human mind. Logan Smith, an expatriate American living in London, expressed his reply in a witty essay *Trivia* (1902), "I awoke this morning . . . into the daylight, the furniture of my bedroom – in fact, into the well-known, often-discussed, but to my mind as yet unexplained Universe."

The universes are our models of the Universe. They are great schemes of intricate thought – grand belief systems – that rationalize the human experience. They harmonize and invest with meaning the rising and setting Sun, the waxing and waning Moon, the jeweled lights of the night sky, the landscapes of rocks and trees, and the tumult of everyday life. Each determines what is perceived and what constitutes valid knowledge, and the members of a society believe what they perceive and perceive what they believe. *A universe is a mask fitted on the face of the unknown Universe.*

\*     \*     \*

Where there is a society of human beings, however primitive, there we find a universe; and where there is a universe, of whatever kind, there we find a society. Both go together, the one does not exist without the other. A universe unifies a society, enabling its members to communicate and share their thoughts and experiences. A universe might not be rational by our standards, or those of other societies, but is always rational by the standards of its own society. Our universe, the universe in which we live, or think we live, is the modern physical universe.

The conscious mind with its sense of free will belongs to the Universe; the physical brain with its neurological structures belongs to the physical universe. By failing to recognize the difference between Universe and universe, and by believing that the physical universe is the Universe, we are left stranded with no recourse other than to discard mind and freewill as fictional hangovers from past belief systems. They have no place in the physical scheme of things, and in the natural sciences we consciously deny the existence of consciousness.

The Universe is everything and includes us struggling to understand it by devising representative universes. One might say the universes are the Universe seeking to understand itself. René Descartes, a philosopher in the seventeenth century, doubting everything except the existence of his doubts, announced "I doubt, therefore I think. I think, therefore I am." The reality of everything else was left in doubt. He saved the day by invoking God as an infallible arbiter of reliable truth. An alternative and more inclusive ontological argument might state, "I think, therefore I am. I am part of the Universe, therefore the Universe thinks. The Universe thinks, therefore it is." To doubt the Universe, is to doubt our own existence.

Friedrich Nietzsche, a German philosopher of the mid-nineteenth century, said "God is dead," and like many others despaired of the universe having any ultimate meaning. But like others he confused the universe that he thought he lived in with the Universe. Albert Einstein, foremost twentieth century scientist, once

said: "The most incomprehensible thing about the universe is that it is comprehensible." We may complement Einstein's remark by adding: "The most comprehensible thing about the Universe is that it is incomprehensible." A universe – any universe – is comprehensible because it has been shaped by the human mind. Whereas the Universe is incomprehensible if only because we can never grasp the entirety of a reality of which we are only a part or an aspect. The Universe may comprehend itself, but not by means of finite human minds.

\* \* \*

Cosmology is the study of universes. It is a prodigious enterprise embracing all branches of knowledge. Naturally, cosmologists occupy themselves primarily with the study of the contemporary universe. One universe at a time is more than enough. Why bother with the universes of the past when they were all wrong? Why try to anticipate the universes of the future when the present universe, apart from a few loose ends, is already the correct and final model?

The realization that universes are impermanent conceptual schemes comes from the study of history. This aspect of cosmology is rarely stressed and might come as a surprise. Automatically, we tend to regard the universes of earlier societies as pathetically unreal in comparison with our own. It is disconcerting to be told that our modern physical universe is the latest model that almost certainly in the future will be discarded and replaced with another and possibly more resplendent model.

We cannot understand our universe and see it in full perspective without heeding the earlier universes from which it springs. Through the historian's eyes we see the past as a gallery of grand cosmic pictures, and we wonder, is our universe the final picture, have we arrived at last at the end of the gallery? We see the past as a procession of masks – masks of awesome grandeur – and we wonder, will the procession continue endlessly into the future? And if there is no end in sight to the gallery of pictures, no end to the mockery of masks,

what are we to make of the contemporary universe in which we live, or think we live? This book is my search for an answer.

\* \* \*

Throughout history the end of knowledge has always loomed in sight. A few things always remain to be discovered, a few problems to be solved, then everything will be crystal clear. Either we shall have attained the throne of God, acquired the philosopher's stone, genetically reinvented ourselves, explored other star systems, discovered extraterrestrial life, converted everybody to our own brand of religion, made global our political system, or found the theory that explains everything. Always this or that subject of burning interest is said to be the final frontier. Pity the people of the future! What will they do when all knowledge has been discovered? This oldest of human conceits, which confuses universe with Universe, is alive today as much as at any time in the past. We are afflicted with the hubris that denies our descendants the right to different and better knowledge.

As a society evolves, its universe also develops and evolves. Then, within an ace of understanding everything, the old universe dissolves in a ferment of social upheaval and a new universe emerges, full of promise and exciting challenge. Universes rise, flourish for a decade, a century, or a millennium, and decline. They decline because of the assault of an alien culture, or revolutionary ideas refuse to remain suppressed, or old problems reappear and take center stage, or for no other reason than the climate of opinion changes.

\* \* \*

Often we pretend not to live in the universe, knowing that we pretend. We alternate between no pretense, when we live in the "real" world of our society, and double pretense when we pretend to live in a pretended world and "all that we see or seem is but a dream within a dream." It is the natural way a sane person lives. We withdraw into counterfeit worlds of fiction and fantasy when the reality of the universe becomes too much. On returning, we put down the book, turn off

the television, come home from the play, feeling entertained, knowing that we have lived in a counterfeit world.

But those individuals lost and tragically betrayed by the universe, who cannot alternate between no pretense and double pretense, who find sanctuary in a private world of pretense, unaware of its pretense, they, we deem, are the insane.

But what of the universes that betray not just a few but most members of their societies? These are the mad universes created and ruled by sick minds. In the annals of history they are many. We may mention, as examples, the witch universe that terrorized the Renaissance, the pathological universes of societies engaged in bitter religious and political wars, and the oppressive universes of totalitarian societies. Mad universes impose termite uniformity, suppress freedom, exalt the authority of the state, rule by fear, and often, but not always, are blessedly short-lived. Sooner or later the societies of mad universes are eliminated by the intricate processes of natural selection.

\* \* \*

In the garden, as I write, hosts of golden daffodils are fluttering and dancing in the breeze. You and I live in that world out there of hills, lakes, trees, and daffodils with its multitude of things and torrent of events, and the overarching picture we share is the physical universe.

Most of us understand very little about the physical universe, about atoms, cells, and stars. Some of us may even dislike the physical universe. But unlike the members of earlier societies, we drive automobiles while listening to the radio, communicate worldwide by internet and telephone, fly in planes to distant lands, watch television, use computers, depend on modern medicine, and use electricity in a myriad ways. We may not understand the physical universe, and we may not like it, but we depend on it, and we believe in it. Only an insane person totally disbelieves in the physical universe.

People in earlier societies had other outlooks. The Babylonians, Egyptians, Minoans, Ionians, Mayans, Iroquois, Maori, . . . , lived

in universes all different and none was like the modern physical universe. In the Babylonian universe the flowers danced and fluttered in the breeze, the Sun rose and set, the Moon waxed and waned, the constellations wheeled across the night sky, and a rock was a rock and a tree a tree. But the meaning of these things was greatly different from what we now deem is natural. The Babylonian, Egyptian, . . . universes, so unlike our own, were in harmony with the cultures and modes of thought of their societies.

Common sense tells us that the out-of-date and discarded universes of the past, going back hundreds of thousands of years, were all much mistaken in their general and detailed view of things. But, and here comes the rub, it does not take much thought to realize that the people in the past believed in their universes, just as strongly as we now believe in our modern physical universe. This is a fact we tend not to dwell upon because of the disconcerting implications. People in the past strongly believed in the truth of their universes, and because they were so greatly mistaken, might not we be a little mistaken also, and if a little, why not a lot? We dismiss the thought on the grounds that our knowledge is greatly superior. But knowledge guarantees neither wisdom nor truth, and the thought persists. The early people of a hundred thousand years ago had brains as large as our own, thirty thousand years ago some had brains even larger, suggesting that the universes in which they lived, or thought they lived, were possibly as richly elaborate as those of more recent societies.

If the past is a guide to the future, our modern beliefs might also be greatly mistaken, and one day a new universe might arise, grander than our present model. Those living in the future will look back in history and see our universe as out-of-date like all the rest. In a hundred thousand years they might wonder what we were doing, or not doing, with our large brains.

\* \* \*

Thomas Huxley wrote in 1869 for the first issue of the now widely read science journal *Nature*, "It seemed to me that no more fitting preface

could be put before a Journal, which aims to mirror the progress of that fashioning by Nature of a picture of herself in the mind of man, which we call the progress of Science." I paraphrase Huxley by saying that the Universe, through us, fashions pictures of itself that we call universes. They are not fancy-free inventions "begot of nothing but vain fantasy," and we are not dreamy playwrights spinning "insubstantial pageants" and "baseless fabrics out of thin air." Each universe is but one of the numberless realities of the Universe.

George Berkeley, an Irish philosopher and bishop in the early eighteenth century, argued that only our mental experiences are real, minds and God alone exist, and the external world is an illusion emanating from God. James Boswell in his biography of Samuel Johnson wrote, "We stood talking for some time together of Bishop Berkeley's ingenious sophistry to prove the non-existence of matter. . . . I shall always remember the alacrity with which Johnson answered, striking his foot with mighty force against a large stone, till he rebounded from it – 'I refute it thus'." Few persons would disagree with Johnson's impressive demonstration of the concreteness of the external world. Although the facts of the external world are certainly more than mere ideas, yet they are rarely as solid and secure as they seem. "Where," asks Morris Kline in *Mathematics in Western Culture*, "is the good, old-fashioned solid matter that obeys precise, compelling mathematical laws? The stone that Dr. Johnson once kicked to demonstrate the reality of matter has become dissipated in a diffuse distribution of mathematical probabilities." The facts are far fewer, the ideas dressing the facts far more, than we normally suppose.

Arthur Eddington, a scientist who leaned toward philosophy and wrote fascinating books that lured the youth of my time into physics, once said, "We have found a strange footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last we have succeeded in reconstructing the creature that made the footprint. And lo! it is our own. . . . The mind has but recovered from nature what the mind put into nature." Eddington took the view that our minds shape our knowledge

of nature. This makes sense if *nature* has two meanings: universe and Universe. Our minds shape our knowledge of the Universe in the form of a universe.

A Leibnizian view that has some appeal, despite its vagueness, is that the Universe is an all-encompassing Mind (whatever that means) that contains our individual minds, and the universes are our minds perceiving and seeking to understand the Universe. But this tentative view is no more than a model, barely deserving the name universe.

\* \* \*

The *Masks of the Universe* divides into three parts. Chapters in the first part cover some universes of the past: the magic, mythic, geometric, medieval, infinite, and mechanistic universes. These chapters are brief case studies of the cosmic belief systems of earlier societies, chosen for their historical interest and contribution to modern cosmology.

I start with a speculative account of the magic universe that I imagine arose hundreds of thousands of years ago when *Homo sapiens* had acquired advanced linguistic skills. The magic universe, which began as an animistic world actuated by psychic elements, developed into a living world, vibrant with ambient spirits motivated by thoughts and emotions mirroring the thoughts and emotions of human beings. Mankind's inner world was projected into the outer world. Hosts of spirits of every kind pervaded the magic universe and conformed to codes of behavior resembling the primitive social codes regulating human behavior.

The word "magic," as used here, does not mean the miraculous. It denotes whatever in the external world manifests human characteristics and mimics human behavior, such as apparitions, angels, ghosts, fairies, and the like. In the magic universe, the inner mental world is projected into the outer world, and humanlike motives and impulses serve as the activating agents. Perhaps nobody in the last ten or so thousand years has known what it is like actually to live fully immersed in the magic universe.

Across the span of hundreds of millennia the magic universe evolved into a constellation of magicomythic universes. The ambient spirits of the magic universe were swept up into the empires of potent spirit beings who personified the phenomena of the external world. Many of the multivalent magicomythic universes survived until recent times in out-of-the-way places of the globe.

The mythic universe (mythic because its elements now fail to fit naturally into the modern physical universe) arose less than twenty thousand years ago. It was an enlarged universe ruled by powerful gods who controlled and created all that existed. This new and unified world view reached an advanced stage in the delta civilizations of Mesopotamia, Egypt, and India, and attained its highest forms in the Zoroastrian and medieval universes.

The mythic universe was purchased at a high price. The world of matter – of clouds, rocks, plants, and animals – became spiritless and dead. In an enlarged and transfigured world, riven by the dualities of good and evil, soul and flesh, fate and free will, the timeless tales of the mythic universe tell of the tyranny of divine kingship, of incessant sacred wars commissioned by gods, of appeasement of the gods by human sacrifice, and of the massacre and enslavement of people worshipping other gods.

In the Hellenic world of classical antiquity we see the rise of scientific inquiry and its rejection of the gods as the proper agents of explication. Out of the Ionian, Pythagorean, and Eleatic schools emerges the influential Aristotelian, Epicurean, and Stoic world systems.

The medieval universe – incorporating Zoroastrian, Hebraic, and Aristotelian elements – arose in the high Middle Ages. This magisterial universe, dominating the historical skyline, was surely the most satisfying world system ever devised by the human mind. Here was an age of scholarship and high adventure in which social and technological revolutions culminated in a style of life unique in history and laid the foundation of modern Western society that has spread worldwide.

Scholars in the high and late Middle Ages formulated notions that opened the way for the development of the Cartesian and Newtonian universes. These world systems, particularly the Newtonian system, rose to eminence in the Age of Reason in the eighteenth century (the century of progress), flourished in the Victorian era in the nineteenth century (the century of evolution), and ushered in the physical universe of the twentieth century that overturned the mythic world of dead matter.

Chapters in the second part of the book deal with the physical universe. I discuss those aspects on which our ideas have changed and are still changing. My intention is to stress what seems most interesting, and to weave into the narrative strands from earlier themes. Beneath the surface of the physical universe lie forms of magic more bewildering than ever before. Science reawakens the dead matter of the mythic universe with an inlay of vibrant activity, and the physical universe is now akin in some ways to the old magic universe. But the coruscating agents of explication dance more brilliantly and intricately than ever before. Much of modern science consists of magic disciplined by a calculus of mythic laws.

In the third part I alight on miscellaneous topics of cosmological interest. I start with the witch universe that arose in the late Middle Ages and terrorized the Renaissance. It serves as a pathological case study of a mad universe. It illustrates a basic point that all universes are verified in accordance with their own rational principles. I then turn to other topics such as containment, consciousness, and learned ignorance.

Cosmology plucks fruit from all branches of knowledge. Wonderful and strange are "the universes that drift like bubbles in the foam upon the River of Time," wrote Arthur C. Clarke in the *Wall of Darkness*. The universes, wonderful and strange, reveal mythic and mechanistic vistas, all constrained in scope by their own criteria distinguishing what is real from the unreal, what is true from the untrue.

One important issue concerns the Universe and God. Both are unknown and unknowable in any absolute sense, both are fundamentally inconceivable, and both are all-inclusive. Is it therefore possible they are one and the same thing, and the distinction that we attribute lies only in the models (the masks of God and the masks of the Universe) that we create? I discuss this in Chapter 18, "The Cloud of Unknowing".

From history we learn that the fate of every belief is eventual disbelief. Some thinkers have therefore turned to skepticism and denied all truth. There is one belief, however, that must always endure: belief in a reality veiled in mystery and beyond comprehension. The mystic who wrote *The Cloud of Unknowing* in the fourteenth century came to the conclusion that ultimate reality lies beyond understanding, and was saved from skepticism by reverence of the mystery of existence. The cloud of unknowing is the Universe, and the many universes are our visions of the Universe.

The Universe lies beyond the reach of human comprehension; whereas the universes, which we believe we live in, are comprehensible and rational by their own standards. By distinguishing between the Universe and universes we gain insight into the basic difference between mind and brain, between free will and determinism. The mind with its consciousness and free will, having no natural place in our comprehensible and rational universes, belongs to the Universe.

