In order to help make it possible for the people who live on this planet to see and understand the Universe in which we live, we set up our telescopes in the shopping malls or on the sidewalks of the cities so that people may see the planets and moons of our own solar system. We even have fail-safe sun telescopes for seeing the spots on the Sun. When possible we take our larger telescopes to national parks and monuments, Indian reservations, and even abroad, where people can see more distant objects through skies unlit by city lights.

You are welcome to join. A quarterly newsletter containing information about events across the U.S. and other countries is available for a $15 annual membership fee. Cosmology and telescope-building classes are offered by John Dobson annually at various locations around the U.S.

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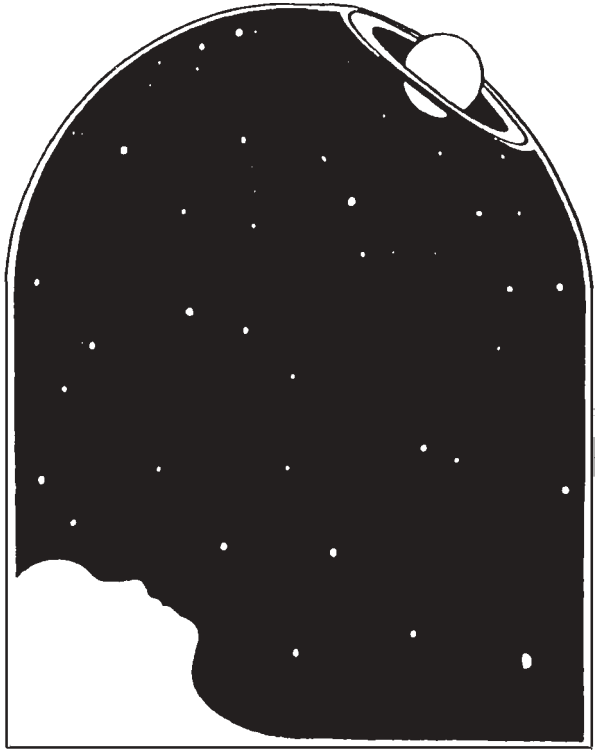
To order tapes of John Dobson's 1992 da Vinci Days "Origins" lecture or Ed Joyce's radio interview with Mr. Dobson, contact Audience Services at Oregon Public Broadcasting: 503-293-1982.



Watchers of the Skies

One of the problems of human knowledge is that the world which we see from the surface of this planet on a sunny day bears almost no resemblance to the Universe at large. Our Earth is made of iron and rock, but the Universe as a whole is mostly hydrogen. The actions which we see on the surface of this Earth run mostly on sunlight, but the Universe runs on gravity. What we see here are continents, oceans, rivers and lakes, mountain ranges, forests, tundra and prairies. But the Universe at large is mostly gas, partly condensed by gravity to galaxies and stars, and lightly sprinkled, here and there, with interstellar dust. The dust is made from hydrogen in the bellies of the stars, and is scattered through the galaxies

by the explosions and the stellar winds of stars much bigger and much hotter than our Sun. But the dust is scarce, and, like our bodies, the rock on which we live is made of these dusts. It is a collector's item. The heavier elements, such as iron, have sunk to the center, overlaid with the rocks of the mantle and the crust and a thin veneer of water and gas. Since the age of this museum piece is pushing five billion years, by now the water-soluble compounds of the surface rocks have leached into the water layer, making the oceans salty. The saltiness of our blood is the saltiness of the ancient sea, some four hundred million years ago. That is when our scaly ancestors, on stumpy fins, crawled out across the land in search of other water and the sight of other fish. Descended as we are from them, we can think of our bodies, even now, as little bags of sea water, hung out on clotheslines of bone, gulping oxygen directly from the gas layer above us, and shambling out across the rocks to gaze with starry eyes, through the blackness of night, at the vast expanse of the Universe beyond.

Even the oxygen that we breathe is freed by sunlight through the instrumentality of our photosynthetic relatives, first by the blue-green algae in the sea, and now by the green leaves of the rain forest. Even the rain is driven by sunlight. But the Universe at large has a reducing atmosphere, and it is without rain and without sunlight. It is very cold, very dark, and very lonely, trying desperately to fall together by the seemingly inexplicable attraction of the particles for each other. Even the radiation of the Sun is driven by this attraction which has pushed the central temperature of the Sun up to some fifteen million degrees Celsius. And it is only because its gravitational collapse has been slowed by the nuclear fusion at its core that the Sun has bathed our Earth with its warming rays for nearly five billion years. Only this delay has made possible our long genetic development till we were able to climb out of the water and gaze in wonder at the starry sky of night. Although we, as living organisms, owe both our existence and our long genetic development to the Sun, its dazzling brightness prevents us from seeing the Universe by day. The blueness of the daytime sky is not the color of the air, but simply the shorter wavelengths scattered from the sunlight by the gas layer above us. And that gas layer by night, unlit by the Sun, is sufficiently transparent so that through it we may gaze into the far reaches of the Universe.

But seeing alone is not enough. It is only the beginning. We must also understand what we see, and that has a history. Understanding rests on a foundation of concepts and information coming down to us from the past, albeit not the very distant past. It is not from the first few hundred million years after we came ashore in the swamps to look around, because in those distant days and nights the concepts which we framed, and the information which we gained, could not be transmitted from generation to generation. We lacked a mechanism to transmit it. It is not transmitted genetically, and there were then no words. Written words, by which concepts and information are largely transmitted in what we proudly think of as the "Age of Science," are only a few thousand years old. And vocal speech itself is fairly new. It was probably forced upon us by the failure of our body language in the surf when we, as brachiating primates, marooned on an island in northeast Africa, were driven by drought from the jungles to the beach, not more than ten or fifteen million years ago. And even the body language common to the great apes, and easily understood by the orangs, the gorillas, the chimps and ourselves, is less than fifty million years old. Our great gain in those earlier times was in our genetically transmitted capabilities. By the early demise of those with poorer eyes, we gained our visual acuity, and by the early demise of those with smaller brains, we improved our capacity to understand. It is that capacity which sets us apart amongst watchers of the skies.

— John L. Dobson