learned that space contains huge gas fields heated above 1.8 million°F by shock waves from supernovae, exploded stars that emit vast amounts of energy.

Last year, using telescopes aboard an orbiting satellite, scientists discovered one such field—the largest known object in the galaxy—measuring 1,000 light years across in the constellation Cygnus. This "superbubble," located near the center of the Milky Way (Earth is on the outer edge), and others like it, may be prime engines of star formation, report Cash and Charles, astronomers at the University of Colorado and the University of California, Berkeley.

What process could have created such an object? The gas clouds from supernovae typically measure only 100 light years across. And there are not enough young, massive stars in Cygnus to create such energy, either through collisions with stellar winds or through the emission of ultraviolet radiation.

The authors theorize that, over eons, a series of supernovae near the heart of the galaxy, where stars are thickly clustered, produced the bubble. The shock waves from early explosions struck the Great Rift of Cygnus, a dark cloud of dust 600 by 1,200 light years, containing enough matter (mainly hydrogen) to make millions of stars. The shock waves pushed the material on the cloud's edge into enormous lumps that eventually became stars. Some of the new stars were unstable giants that ultimately went supernova themselves. The expanding remnants of these supernovae together formed the super bubble, which continues both to grow and to "manufacture" new stars.

Previous theories depicted star formation as a much less violent process, resulting from the slow gravitational attraction of cosmic dust. Noting that huge gas fields have recently been discovered relatively near Earth, Charles and Cash believe that superbubbles are sprinkled throughout the galaxy and may contain half the energy in interstellar space. In fact, they say, the sun and Earth were probably created at the edge of a superbubble 4.5 billion years ago.

RESOURCES & ENVIRONMENT

A Nuclear Recession?

"Nuclear Power and Nuclear Bombs" by Amory B. Lovins, L. Hunter Lovins, and Leonard Ross, in *Foreign Affairs* (Summer 1980), 428 East Preston St., Baltimore, Md. 21202.

Nuclear power proponents view the atom as the world's best bet for a cheap, abundant oil substitute. But atomic energy is miscast in this role, and the growing cost of reactors has brought many nuclear programs around the world to a standstill. So write Lovins, British representative of Friends of the Earth; his wife, a lawyer; and Ross, a former California energy official.

Electricity is the only practical form of energy that nuclear power will yield in the foreseeable future, the authors argue. But only 10 percent of the world's oil is so used. The rest goes to make petrochemicals, fuel vehicles, and heat homes and factories. Replacing the West's oil-fired electric plants with nuclear reactors in 1975 would have cut oil use only 12 percent, claim the authors. And the annual growth of electricity demand is slowing (down to 2.9 percent in the United States since 1974); overcapacity will probably hit 43 percent this year. In 1979, the United States reduced by 16 percent the amount of oil burned to make electricity, even as nuclear output fell 8 percent.

The authors contend that nuclear power is also pricing itself out of the energy market. From 1971 to 1978, capital costs per kilowatt rose more than twice as fast for nuclear as for coal plants. Nuclear-generated electricity is already 50 percent more expensive than coal-generated electricity. Managing waste, decommissioning plants, and cleaning up radioactive spills from uranium mining have added billions to nuclear energy's price tag.

As a result, the world is already "denuclearizing." Utility companies in the United States, West Germany, Italy, and Sweden have informally stopped ordering new reactors. And interest has slackened noticeably in once pronuclear Britain, Japan, and Canada, the authors report. Since 1973, worldwide projections of nuclear power output for the year 2000 have fallen five-fold. Third World countries such as Iran and Brazil have sharply cut back ambitious nuclear programs. Even the USSR, which has given plant construction high priority, achieved only one-third of its nuclear power generation goals for the 1970s.

Drought on the Prairie

"Ancient Climes on the Great Plains" by Reid A. Bryson, in *Natural History* (June 1980), American Museum of Natural History, Central Park West at 79th St., New York, N.Y. 10024.

The pioneers who reached the Great Plains in the 19th century marvelled at the sea of "stirrup-high" grass that fed millions of buffalo. But what they saw was only a "snapshot" from North America's volatile climatic history, writes Bryson, a University of Wisconsin climatologist.

Eight hundred years ago, the prairies were dotted with woodlands. The Plains Indians lived in permanent villages, grew corn, and chased deer as well as bison. Then, a 200-year-long drought set in during the 13th century. Wind-blown dust covered the northern plains, and the farmers abandoned their settlements. They were gradually replaced by nomadic hunters of Athabascan stock who moved down from Canada. Drought struck again on a smaller scale during the 1850s, reducing