

1980: No shortage of people

The dawn of the 1980s finds the world population growing at a slower rate than that of a decade before but still increasing by 74 million a year, or one million every five days. "Far from being defused, the population bomb is still ticking," reports the Population Reference Bureau, Inc., in Washington, D.C.

Population growth reached its peak of about 2 percent annually in the mid-1960s and is now down to 1.7 percent, according to statistics from a study conducted by the bureau. Global population is more than 4 billion, compared with 2 billion 50 years ago; by the year 2000, the total is expected to be close to 6 billion and the annual increase more than 90 million, despite an expected drop in the growth rate to about 1.5 percent.

"Progress toward the two-child family is mixed," reports the study, entitled "Our Population Predicament: A New Look." Childbearing is close to or below this level in most developed countries. The U.S. rate is 1.8 children per woman, the researchers report. "However, births still outstrip deaths by well over a million a year in the U.S.," they note.

While birth rates have started to decline in many developing countries, "mortality declines are leveling off as the easiest-to-control diseases are conquered," the report states. "As a result, the huge gap between annual births and deaths in the Third World, which set off the post-World War II population explosion, is now narrowing." The report points to China — which contains more than one-fifth of the world's population — as a "bright spot," where the growth rate has been cut from 2.3 to 1.2 percent in the years from 1971 to 1978.

No sympathy for cholesterol

Various studies have suggested that overactivity of the sympathetic nervous system plays a role in elevating an individual's serum cholesterol level. Now researchers in Oakland, Calif., and Israel have tested the use of transcendental meditation over an 11-month period with 12 "hypercholesterolemic" subjects.

When compared (after fasting) to a control group of non-meditating sufferers of high cholesterol, the 12 subjects "showed a significant reduction in . . . serum cholesterol levels," report Michael J. Cooper of Kaiser-Permanente Medical Center in Oakland and Maurice M. Aygen, director of the Toor Heart Institute in Petach Tiqvah, Israel. "These results suggest that the regular practice of a relaxation technique may contribute, most likely through reduction in adrenergic activity, to the amelioration of hypercholesterolemia in certain subjects," the researchers report in the December *JOURNAL OF HUMAN STRESS*.

The big sleep project

In what HEW officials term a "growing public and professional concern about the diagnosis and treatment of insomnia and sleep disorders and the use and misuse of sleep medications," the Public Health Service is initiating a new research and education program. Entitled "Project Sleep: National Program on Insomnia and Sleep Disorders," the program will aim at improving diagnosis and treatment of insomnia and other sleep problems, promoting better prescribing practices and identifying "gaps in scientific knowledge which require further research."

An estimated 50 million persons in the United States have sleep problems; about one-fifth of those cases are serious enough to warrant at least one doctor's visit during a given year, according to Charles Krauthammer of the Alcohol, Drug Abuse and Mental Health Administration and the new program's director. In addition to HEW, participating in the project will be private researchers, the pharmaceutical industry and other health professionals.

Did mud make Martian channels?

The huge Osceola Mudflow, triggered down the slopes of Washington State's Mt. Rainier about 5,000 years ago, is one of the largest volcanic mudflows on earth, extending for as much as 100 kilometers. It is believed to have resulted from the sudden liquefaction of water-saturated, clay-rich material by magmatic heat at the glaciated summit of the volcano. According to Harry Glicken and Peter H. Schultz of the Lunar and Planetary Institute in Houston, in work reported at the recent American Geophysical Union meeting in San Francisco, such a process may also have played a role in creating some of the channels on Mars.

Water from magmatic melting of permafrost has been suggested by a number of scientists as a possible cause for the Martian channels, but volcanic mudflows, known as lahars, have been largely discounted, the LPI researchers aver. The reason, they say, is that previous studies of the Osceola Mudflow have identified only limited signs of erosion at the base of the flow; for example, says Schultz, one can still find traces of original vegetation directly beneath where the mud later passed. The answer, however, the authors suggest, may simply be that "the eroding parts of the flows do not leave an identifiable deposit." Recent fieldwork on Mt. Rainier, in fact, has confirmed that the material remaining in the lahar's path did not come from the summit, but that it was picked up and relocated farther along the way by what amounts to an erosive process.

It has also been suggested that the lower gravity of Mars may allow lahars to have greater erosive force than they do on earth, since clay particles contributing to the erosion would tend to remain suspended in the flowing liquid for a longer time. If such a process was at work on Mars, says Schultz, it could mean that less water need be invoked to explain the observed amount of channeling.

The mysterious darkness of Venus

Although the atmosphere of Venus appears generally featureless in observations by visible light, it reveals marked contrasts in the ultraviolet. The dark markings were first reported from earth-based UV observations more than half a century ago, and have since been seen close-up by the Mariner 10 and Pioneer Venus spacecraft. Yet the source of the contrast, representing differences in the amount of solar UV absorbed by different parts of the atmosphere, remains unclear. Of various proposed UV absorbers, says Larry W. Esposito of the University of Colorado, "the most popular was certainly solid sulfur," but that fails to match some of the Pioneer Venus particle measurements "without contradicting the known spectral reflectivity of the planet or the net radiative flux in the atmosphere." A more recent suggestion has been sulfur dioxide, and it does offer a somewhat better spectral fit, but, says Esposito, SO₂ alone is not enough to fill the bill.

A key part of the task lies in identifying atmospheric constituents that can produce the large amount of UV contrast noted between the bright and dark regions. One suggestion has been an atmospheric haze that stretches the contrast by essentially brightening the bright parts. But still, Esposito says, this is not enough, particularly at wavelengths beyond 3,000 Angstroms. There is, he says, some yet-unknown UV-absorbing component that also darkens the dark parts. Esposito's studies suggest it consists of particles rather than gas, lying in a thin layer below the SO₂. Polarization data indicate that the absorber does not simply appear where higher clouds move away to expose it. More likely, Esposito says, is that it forms below the clouds, rises, and is then destroyed by photodissociation or other processes, with the observed variations perhaps due to local changes in the amount of vertical mixing. But what is it?