

Quality of life: Malaise or divine discontent?

"There is nothing in the world which is absolute waste. 'Waste' under one condition may be valuable under different ones."

—The Peking Review, Feb. 5, 1971.

"The developing countries would like to have just one percent of America's gross national pollution."—Margaret Mead.

"The reason we are here is a sense of dissatisfaction we don't know how to measure."—Simon Teitel, Inter-American Development Bank.

Many people in the "developed" nations have a growing sense of social and spiritual malaise, or more optimistically, of a ferment the outcome of which cannot be predicted. Scientists, even in the social sciences, have tended to view the malaise as "subjective" and thus not in their ken except insofar as they can measure "objective" facts such as crime and mental illness rates and the growing Gross National Product. One thing remarkable about last week's AAAS meeting was the willingness of many scientists, traditional and not-so-traditional, not only to look at the empirically measurable facts in new ways, but also to go beyond them.

Margaret Mead's remark, quoted above, was made at a symposium on Thursday called, "Can We Develop an Index for Quality of Life." Her implication is clear: In nations where industrialization has just begun, pollution abatement is a luxury that cannot be afforded. But a fellow anthropologist, Frank Kehl of Columbia University, after a visit to the People's Republic of China last year, feels differently. Pollution, he and fellow panelists in a Tuesday symposium called "A Radical Approach to Ecology" agreed, is largely a product of social attitudes rather than of industrialization, per se. The Chinese, he said, whatever the other shortcomings of their society, have an attitude which although not specifically anti-pollution, has the same effect; eliminate waste and you also eliminate pollution. Incidentally, adds Kehl, whose approach was matter-of-fact and non-polemical, the Mainland Chinese are a happy people.

That members of societies with advanced industry and technology are often unhappy was underlined again and again at the two symposia. Marie Wilson, director of the Equal Employment Opportunities Commission, said at the Thursday symposium that there is a great sense of discontent revealed in letters to her agency. "There is a feeling," said Uriel G. Foa, a Temple University psychologist, "that there is something basically missing in our society." Simon Teitel, economic and scientific director of the Inter-American Develop-

ment Bank, quoted economist Kenneth Boulding at the same symposium: "Consumption is decay." The Thursday panelists spent much time dealing with ways they might find to classify the malaise and measure it—such devices as the subtraction of "diseconomies" from the Gross National Product (as well as the addition of "imputations," or goods not now calculated in the GNP).

The Tuesday panelists were far less concerned with finding new techniques of measurement as with simply opening eyes to what they see as the realities of modern life. Their near unanimous conclusion: The way society is ordered today, pollution and the erosion of human values are inevitable. Capitalism of the kind that prevails in the United States, as well as the "State Capitalism" (as one participant called it) of the Soviet Union, based as they are on hierarchies, egotism and incentives, are untenable in a world that demands ecological and humanistic approaches if the human race is to survive.

The Tuesday session centered on the automobile as what panelists said was the prime symbol, as well as a destructive reality, of modern capitalism. "As a consumer of raw materials, the automobile has no equal in the history of mankind," Charles Kettering of General Motors boasted in the 1930's, according to Marty Liebowitz, a Washington University sociologist. The truth of Kettering's remark is finally coming home to roost, asserted Liebowitz. The United States, he said, is increasingly faced with two alternatives: Either

mine low-grade domestic ores with great damage to the environment, or continue to rely on foreign imports to meet the nation's mineral requirements—a major percentage of which are for the automobile.

And the United States auto companies are now looking to the affluent 10 percent of the populations of underdeveloped countries as a new market, says Liebowitz.

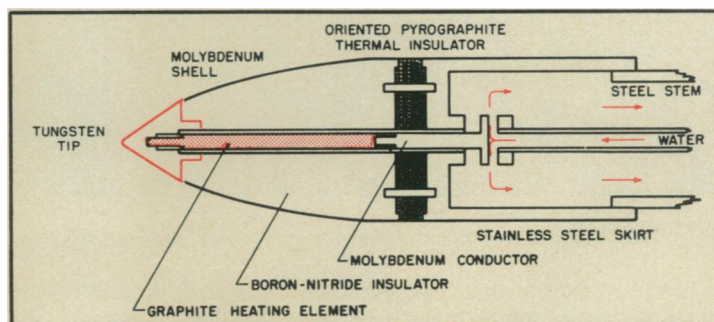
He and Kehl stressed that the last thing developing countries need is automobiles. A French writer who has visited China several times since the revolution thought during earlier visits that the absence of automobiles there was a sign of backwardness. But on his last visit, in 1971, the writer realized, said Kehl, that the Chinese want it that way; the absence of automobiles is a sign of progress. And, added Kehl, the Chinese appear to practice their theory of converting waste to usable products; the result, he says, is a remarkably clean and serene environment.

Kehl and Margaret Mead appeared to disagree on the inevitability of pollution, but she displayed an attitude toward the West and its practices perhaps as optimistic as any at the two symposia. If there is a malaise in the West, she suggested, the source of it may be in an increasing awareness by Westerners, created by rapid and pervasive communications, that "all human beings are one species and that some portions of humanity should not any longer be relegated to a subspecies." Such a change could be, instead of malaise, a kind of divine discontent. □

Tunnel technology and the hot-hole digger

The subterranean, designed with a hot nose to melt rock, may be the tunneler of the future.

ATOM



Burrowing like a bullet through a brain or like a hot knife through butter, the subterranean can melt its way through solid rock. When fully developed the device, now in prototype, will penetrate the side of a mountain—leaving a glass-lined tunnel 35 feet wide.

The design is basic. Most rock melts at 1,200 degrees C. Therefore, with the proper amount of pressure and heat a subterranean should be able to sink a shaft or dig a tunnel with much less loss of life, time and money than is required by conventional methods.

This hot-hole digger is being developed by engineers at the Los Alamos Scientific Laboratory in Los Alamos, N.M. To date their electrically heated subterranean has been able to melt a 2-inch hole 35 feet deep. Plans are on the drawing board for a 4-inch hole 1,000 feet deep by mid-1972. Project director John Rowley says that technology could be developed within 15 years to produce a 35-foot-wide tunnel.

The basic subterranean is described in the December ATOM—the laboratory's house organ. The subterranean consists of

a penetrator, coolant or radiator section and stem. The cone-shaped penetrator (made of a refractory metal) makes contact with the rock. Against its inside walls an electrical insulator is wrapped around the heating element. Another insulator separates the penetrator from the radiator section whose walls are cooled either by circulating water or by a gas such as argon or nitrogen (these gases will not corrode the subterrene's metal parts). Coolant and electrical feed lines are routed through the stem.

As the machine advances, molten rock is forced into voids in the walls of the hole and frozen in place by the cool surface of the radiator. This eliminates debris removal, one of the major problems in tunneling and deep-hole digging. The molten rock then forms an obsidian-like glass lining on the wall. This lining has a compressive strength at least 10 times that of concrete, say the engineers, and will provide support against cave-in.

The present 2-inch borer melts holes at a rate of 30 inches an hour, with a 3-kilowatt power supply—enough to

light 30 100-watt bulbs. Rowley estimates that 10 to 50 megawatts will be needed to dig a 35-foot tunnel at the rate of 300 feet per day.

When this electric power supply is not available or when it is impractical Rowley suggests that atomic power will be used. A subterrene, with its own atomic reactor and with a wall grabber to propel it along the tunnel may eventually crawl through mountains or deep into the earth. The shape of the penetrator can be changed, to make a tunnel with a flat floor. The Department of Transportation has expressed interest. Or a circular penetrator might be used to take core samples from as deep as the earth's mantle.

The Los Alamos researchers predict that the subterrene will be used for the excavation of highway and railroad tunnels; subways; pipelines and channels for collection and transportation of wastes; conduits for fresh water, drainage and irrigation; wells for petroleum, natural gas and water; mine entries and ventilation ducts; underground silos for missiles and control systems; and for prospecting and exploring. □

Correcting infertility without multiple births

Artificially inducing ovulation in women whose eggs generally do not mature has been possible for several years now. Treatment often consists of a preliminary injection of FSH (follicle stimulating hormone, which gets the ovaries ready for release of an egg), followed by an injection of LH (luteinizing hormone, which causes an egg to release). Sometimes a synthetic chemical, clomiphene, is used instead of FSH and LH to induce ovulation. But with all these injections, there is considerable risk of triggering the release of up to five, eight, even ten eggs at a time. Often the eggs are fertilized and the result has frequently been multiple births. The multiple pregnancy risk probably results from direct hormonal stimulation of the ovaries.

Now Arthur Zarate of the Mexico Institute of Social Security in Mexico City and Abba Kastin and Andrew Schally of the Endocrine and Polypeptide Labs at the Veterans Administration Hospital in New Orleans have tried inducing ovulation in infertile women in a less direct way. They have used injections of luteinizing hormone-releasing factor (LH/RH).

LH/RH was recently sequenced and synthesized by Schally's and Kastin's endocrine team at the VA Hospital (SN: 7/17/71, p. 37). It is a hypothalamus chemical, and a sort of master releasing factor for luteinizing hormone (the latter is made in the pituitary). For this reason the investigators were confident that they could induce ovulation with LH/RH. Because LH/RH acts indirectly on the ovaries, through LH, and not directly on them, they thought LH/RH might also possibly assure the release of only one egg at a time.

On this assumption they induced egg production in one woman with an injection of FSH, followed by an injection of natural LH/RH. The woman ovulated, and conceived one healthy baby. They then induced single ovulation in two other women by giving each two injections of synthetic LH/RH, 10 days apart. In this case no FSH was used beforehand.

LH/RH might be superior to present methods of infertility correction for several reasons, the investigators believe. It might cut down on the risk of large multiple egg release. It might be cheaper because it is synthetically available. FSH and LH are not. LH/RH is also natural to the body—not true of the drug clomiphene. But as Kastin says, "What makes LH/RH exciting for me is that it opens doors for investigating a whole new area of control of fertility and infertility." □

Rippled landscape on Mars—believe it or not



NASA

Wrinkled Martian terrain may be a lava flow segmented by a network of faults.

The dust storm that has obscured much of the surface of Mars since late September has been gradually clearing. On Dec. 17, on its 67th orbit around the planet, Mariner 9 was able to photograph a bizarre landscape that, three weeks previously, had been hidden.

The photo, unlike any yet obtained, was released last week. It shows an area just south of the Martian equator that is criss-crossed by faults a mile and a half wide. Relatively few craters mar the surface, indicating that it is relatively young and may be covered by volcanic deposits that subsequently became faulted. The area photo-

graphed, known as Phoenicis Lacus, lies on a plateau about three-and-a-half miles above Mars' mean elevation; many lower areas are still hidden by dust.

The persistence of the dust storm and unforeseen effects of Martian gravity have necessitated a change in Mariner's orbit. On Dec. 30 the low point in the orbit was raised from 862 miles to 1,028 miles. The change will increase the area covered in photographs, allowing mapping to be completed in two 20-day cycles that began Jan. 2 and will free the 210-foot antenna at Goldstone, Calif., for use on the upcoming Apollo 16 mission. □