mate of the amount of volatiles released from the planet—only enough to triple the present atmospheric pressure even with the unlikely assumption that all the carbon dioxide would be in the atmosphere at once, according to Fraser Fanale at JPL. Such a small amount of outgassing would barely raise the pressure enough for liquid water to exist and probably not provide enough of it to cut the large channels.

The measured amount of argon-36 leads Owen of the Viking team to a larger estimate of the volatile inventory on Mars than Fanale suggests, but nevertheless a modest estimate. Using a different published value for the ratio of argon-36 to carbon dioxide outgassed from the earth, Owen concludes that the martian atmosphere was "never much more than ten times as massive as it is now, producing a maximum surface pressure of 100 millibar."

The early newspaper reports of a thick ancient atmosphere were probably based on the amount of argon-40 found in Mars' atmosphere, which does indeed lead to a generous estimate of volatiles outgassed. But most scientists studying the question now caution that because it has a different genesis, the production of argon-40 may be decoupled from the evolution of the rest of the atmosphere. (The moon, for instance, is still giving off argon-40 billions of years after the other volatiles.) Two other noble gases, krypton and xenon, have also been discovered on Mars. The concentrations are parts per million or less, and krypton is more abundant than xenon. In the view of Owen, a member of the molecular analysis team, the noble gases together tend to corroborate the outgassing indicated by argon-36 alone, which is about 1/100 that of the earth.

Speaking of Science

Irrational Drug Prescribing and Birth Defects

One of the weakest links in the chain connecting the drug company and the consumer is the physician. Few physicians receive formal training in the correct use of drugs, but the average practitioner writes 7934 prescriptions each year. Many of these prescriptions are irrational in the sense that the drug has not been shown to be effective for the purpose for which it has been prescribed; many are completely inappropriate because they represent a substantial hazard to the patient without any compensating benefits. The classic example of the first situation is the widespread use of antibiotics in the treatment of viral infections—an inappropriate use that many scientists feel is responsible for the increasing antibiotic resistance of many pathogenic bacteria. A good example of the second situation was the widespread use in the 1950's of diethylstilbestrol to prevent miscarriages—despite evidence (i) that the drug is not effective for this purpose and (ii) that it is carcinogenic in animals.

A current example of the second situation involves combinations of estrogen and progestagens, progesterone-like hormones that are used in birth control pills and that are widely prescribed for prevention of miscarriages, pregnancy testing, and for treatment of other complications of pregnancy. The evidence indicates that physicians have continued to prescribe these hormones for use during pregnancy despite evidence that they may produce birth defects.

The occurrence of an unusual number of birth defects among children of women exposed to the hormone combination during the first trimester of pregnancy has been documented by several investigators, most notably James J. Nora and Audrey H. Nora of the University of Colorado Medical Center and Dwight T. Janerich of the New York State Department of Health. They have found that the incidence of birth defects among such children is from two to five times higher than the incidence among children whose mothers were not exposed to the drugs. The most commonly observed defects are limb reductions (the absence of an arm or leg or of part of the limb, such as one or more fingers or toes) and congenital heart defects. The increased incidence has been observed both in retrospective studies and in preliminary results from prospective studies. Despite the increased incidence, however, the total incidence of birth defects among the exposed population is still less than 1 percent, suggesting that only part of the population is susceptible to the deleterious effects of the hormones.

In light of this preliminary evidence and other evidence that the suspected drugs* are not effective in preventing miscarriages, the Food and Drug Administration (FDA) in December 1973 and February 1974 withdrew approval of the drugs for use during pregnancy. At the start of 1975, furthermore, FDA warned against use of the drugs during pregnancy in a bulletin mailed to physicians and other health professionals.

The change in legal status of the drugs and the warning have apparently been ignored by physicians, however. Evidence obtained by International Marketing Service of Ambler, Pennsylvania, indicates that, in 1975, physicians wrote 533,000 prescriptions for use of the hormones during pregnancy—only about 10 percent less than the number written in 1972, when such uses were approved.

Prodded by Sidney M. Wolfe of the Public Citizen Health Research Group in Washington, D.C., FDA announced last month that it is preparing further regulations about the hormones. The new rules will require manufacturers to print and distribute to users a brochure emphasizing that the drugs should never be used during pregnancy. They will also require manufacturers to revise physician labeling for the hormones to incorporate a warning against use in early pregnancy, to say that no studies show the drugs to be effective in preventing miscarriages, and to say that the drugs should never be used to test for pregnancy. The regulations would thus not only discourage the physician from describing the drugs, but would also warn the patient so that, even if the drugs should be prescribed, she will be alerted to the potential hazard and will thus retain the option to avoid the drugs.

—THOMAS H. MAUGH II

*Provera and Depo-Provera, manufactured by the Upjohn Company; Delalutin, manufactured by E. R. Squibb & Sons; Duphaston, manufactured by Philips Roxane Laboratories; Norlutin and Norlutate, manufactured by Parke, Davis & Company; and Progesterone, manufactured by Eli Lilly and Company.