



WHAT'S WRONG WITH OUR

Men's reproductive cells seem to be in serious decline worldwide. One possible

By MICHAEL D. LEMONICK

THE PROCESS OF HUMAN CONCEPTION is almost absurdly inefficient. During copulation, a man expels tens of millions of sperm, with considerable force, into his partner's vaginal canal. Despite the head start, most of the tiny, tadpole-shaped, self-propelled cells never come within shouting distance of the woman's egg, floating deep inside the Fallopian tube. And if one does finally complete the journey, it may or may not have the energy left for fertilization.

With these abysmal odds, a man clearly needs every last sperm cell he's got. Any fewer than 20 million or so per ml of semen—40 million to 120 million in a typical ejaculation—and his chances of fathering a child begin to plummet. That's why doctors are so concerned about a trend they have noticed over the past few years. In study after study, sperm counts in men the world over seem to be dropping precipitously.

The latest appeared last month in the *British Medical Journal*. Researchers in Edinburgh, Scotland, reported that men born after 1970 had a sperm count 25% lower than those born before 1959—an average decline of 2.1% a year. A 1995 study of Parisians also found a 2.1% annual decline over the past 20 years. And in the most comprehensive analysis of all, covering nearly 15,000 men from 21 countries, Danish scientists discovered an alarming plunge of nearly 50% in average sperm counts over the past half-century.

None of these studies are without their critics, and a handful of others show either no decline or some localized increase. There are further indications, however, that something disturbing is going on. Not only do sperm counts seem to be dropping, but the quality of sperm—the percentage of healthy, vigorous cells versus malformed, sluggish ones—appears to be in serious decline as well. Doctors have also noted an increase in

the incidence of testicular cancer and undescended testicles.

Together, these factors add up to a significant drop in male fertility. In the 1960s, says Dr. Masood Khatamee of New York City's Fertility Research Foundation, only about 8% of the men who came for consultation had a fertility problem. Today that number is up to 40%. "This concerns us a great deal," he says, "and that's why we're so adamant about finding the causes."

Just what these causes might be is still largely a mystery. Stress, smoking and drug use are all known to be involved. So is the fact that men are having children later in life, when sperm counts naturally fall off, as well as the increase in sexually transmitted diseases. Even the shift in underwear fashion from boxers to briefs has been offered as an explanation.

But according to a new, heavily promoted book, there is powerful evidence to support another hypothesis. *Our Stolen Future* (Dutton; \$24.95) says a wide range

ENDANGERED SPECIES: A sperm count lower than 20 million can often spell infertility

consequences years or decades later. Male infertility is just one part of the problem, say the authors; these pollutants may also be responsible for a rise in breast and other cancers in humans, along with aberrant mating behavior and genital malformations in animals (minuscule penises among pesticide-contaminated Florida alligators, for example).

Chemical manufacturers dismiss these speculations, arguing that nobody has come close to showing a cause-and-effect relationship. In fact, the evidence for a chemical-infertility link does remain largely circumstantial. "There is no smoking gun," admits J.P. Myers, who is director of the environmentalist W. Alton Jones Foundation and one of the book's co-authors. (The others are science reporter Dianne Dumanoski and World Wildlife Fund zoologist Theo Colborn.)

What scientists do know is that water, air and soil all over the world are tainted with small amounts of many of these chemicals. They know that once the pollutants get inside the body, they can bind with receptors that normally recognize estrogen and other natural hormones. They know that these hormones are crucial to the development of a normal reproductive system. And they know that—in lab tests on animals, at least—vanishingly small amounts of industrial chemicals, delivered at just the crucial stage of fetal development, can "feminize" a male embryo, producing smaller testicles, low sperm output and a miniaturized or missing penis.

But until 1992 scientists didn't know of any convincing evidence that men were experiencing reproductive problems on a large scale. Then came the groundbreaking report by a Danish endocrinologist, Dr. Niels Skakkebaek of the National University Hospital in Copenhagen. Skakkebaek and his colleagues did what is called a meta-analysis: they combined the results of 61 separate studies of sperm count and

quality over the past 50 years in men around the world, and found that the average sperm count had fallen from about 113 million per ml in 1938 to 66 million in 1990.

After Skakkebaek's paper appeared, says Myers, "it immediately became apparent that nature is sending a very strong signal that something is amiss." Just as theoretical chemistry in the 1970s presaged the discovery of the ozone hole a decade later, he argues, "laboratory work on environmental toxins presaged the discovery of the decline in sperm count."

Initially, many medical researchers were highly skeptical. Among them was Pierre Jouannet, a reproductive biologist at the Center for the Study and Conservation of Eggs and Sperm at the Cochin Hospital, in Paris, who began his own study a year later. Says Jouannet: "When we started our work in 1993, we thought that the previous analyses were biased." His data, however, undermined those doubts: Parisian sperm was clearly on a downslide.

Not everyone accepts the link between environmental estrogens and reproductive ills. The relationship, argues Stephen Safe, a professor of toxicology at Texas A&M University, remains "debatable and unproved." Even the idea that sperm counts are dropping worldwide is open to question. Some researchers have questioned Skakkebaek's methodology; they generally agree with his finding that there is a decline in Denmark but consider any broader interpretation more speculative. Several other researchers have shown that sperm counts in Finland, at least, have remained normal; a study of men in Toulouse, France, shows the same result. So, according to published reports, will three more studies of U.S. men scheduled to appear in the May issue of the journal *Fertility and Sterility*.

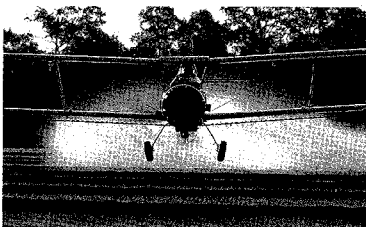
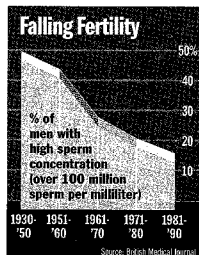
"We're not saying something's not going on in, say, Denmark," observes Dr. Larry Lipschultz, a urologist with the Baylor College of Medicine. "But to deduce worldwide implications from a localized problem is something you just can't do."

What scientists can do, say those on both sides of the debate, is step up the pace of research. If sperm counts are dropping, even in only part of the world, it would be prudent to figure out why. And if they turn out to be declining everywhere, better to know sooner than later. Extrapolating from Skakkebaek's admittedly controversial data, it's conceivable that the average man will be infertile within a century. Even if things are only half that dire, it would be bad news indeed for the human race. —Reported by Bruce Crumley/Paris, Lawrence Monda/New York, Ulla Ploni/Copenhagen and Lisa H. Towle/Raleigh

SPERM?

cause: chemical pollution

of reproduction-related ills may be caused by chemical pollutants in the environment, including DDT, some forms of dioxins and PCBs, and a number of other synthetic substances. The idea is that exposure to even traces of these chemicals in the womb can interfere with proper development of the reproductive system, leading to serious



SPREADING INFERTILITY? Pesticides sprayed by crop dusters like this one are among suspects being investigated