were apathetic and lethargic even when allowed to eat again, returning to normal only when they regained their former weights. A 1964 experiment showed the effects of *overeating*: The subjects found it hard to gain weight and maintained their new corpulence only by consuming an extra 2,000 calories per day, far more than was theoretically necessary. Evidence suggests that a metabolic speed-up is triggered after two weeks of overeating or by a cumulative 20,000-calorie surplus.

The body also regulates eating. In an experiment run by University of Pennsylvania psychologist Theresa Spiegel, volunteers subsisted on a milkshake-style beverage dispensed from a reservoir they could not see. They soon began drinking just enough to get about 3,000 calories daily—the normal amount. Then, the calorie content was secretly cut in half. After two days, the volunteers adjusted by roughly doubling their intake, keeping their calorie counts steady.

If setpoint theory is correct, neither conscious decisions nor deep psychological forces have much to do with an individual's weight. The only way to slim down is to tamper with the setpoint, and that, the authors say, can only be done by smoking, taking amphetamines or other diet drugs, or increasing physical exercise.

Keeping Secrets

"Secrecy and Openness in Science: Ethical Considerations" by Sissela Bok, in *Science, Technology, & Human Values* (Winter 1982), 70 Memorial Dr., Cambridge, Mass. 02139.

Modern scientists have traditionally viewed anything less than complete openness about research methods and results with suspicion. Now their attitude is changing, writes Bok, a Harvard Medical School lecturer. The burgeoning scientist population, increased specialization, competition for funding, and the rising importance of science in both corporate strategies and national security may actually work against the speedy advancement and diffusion of scientific knowledge.

Most scientists recognize the drawbacks of secrecy: "It fosters needless duplication of efforts, postpones the discovery of errors, and leaves the mediocre without criticism and peer review." On the other hand, the drive to be ahead of other scientists with a discovery can fuel innovation. And researchers are so specialized now that they cannot "shift gears" easily if they discover another scientist on the trail. In the 1960s, biochemist James Watson and biologist Francis Crick selectively released information about their work on the structure of DNA to keep competitors off their scent. By the same token, word that an experiment is going poorly can lead to a researcher's loss of financial support.

Corporations increasingly require secrecy when they contract with university scientists. Without denying all grounds for "trade secrecy," Bok points out the dangers: concealment of promising lines of research that may benefit society and the cover-up of product deficiencies.

But the most fractious issue facing scientists today may be the U.S.

military's attempts to control the dissemination of new mathematical coding systems that are virtually impossible to break. Vice Admiral Bobby Inman, then director of the National Security Agency (NSA), argued in 1980 that sharing such research could hinder U.S. intelligence gathering. In a two-year test, some cryptographers are submitting papers to the NSA for prepublication review. But many others have refused NSA offers of financial aid, fearing censorship or classification of their discoveries.

Keeping new cryptographic knowledge secure may not even be possible, Bok concludes. Voluntary controls will work only if researchers worldwide agree to them. And enough information has already been published to enable interested parties to discover for themselves the essential principles behind "unbreakable" codes.

RESOURCES & ENVIRONMENT

Acid Rain Ignored

"Acid Precipitation in Historical Perspective" by Ellis B. Cowling, in *Environmental Science & Technology* (Feb. 1982), 1155 16th Street N.W., Washington, D.C. 20036.

In 1962, U.S. author-biologist Rachel Carson stirred widespread surprise and public concern when she warned in *Silent Spring* of the "poison rain" that pollutes our lakes and streams, reduces fish populations, and sickens vegetation. Yet, notes Cowling, chairman of the National Atmospheric Deposition Program, scientists, mostly Europeans, studied "acid rain" and its links to industrial emissions for centuries, and they were virtually ignored.

That industrial emissions affect humans and plants was perceived as early as 1661–62, when English country gentleman John Evelyn and statistician John Graunt recommended building taller industrial chimneys to spread "smoke" to "distant parts." The term *acid rain* was coined in 1872 by Robert Angus Smith, a British chemist. He described how coal combustion altered the chemistry of rain and how contaminated precipitation harmed plants, textiles, and metals in industrial regions of England, Scotland, and Germany. Nine years later, geologist Waldemar Brøgger undertook a study of *smudsig snefeld* (dirty snowfall) in his native Norway. He pinpointed its cause: smoke from a manufacturing area in Britain.

Nevertheless, research on pollution proceeded piecemeal as specialists on the world's water systems, agriculture, and air tackled the question independently. In the late 1940s, German chemist Christian Junge and Swedish scientists Carl Gustav Rossby and Erik Eriksson pioneered in the new field of "atmospheric chemistry." And beginning in the 1950s, Eville Gorham, a Canadian ecologist, reported on acid rain's damage to aquatic ecosystems. He noted, too, that bronchitis in