

SCIENCE & TECHNOLOGY

ing that all of the Sobells' "reformed" drinkers later suffered bouts of drunkenness and that four eventually died of alcohol-related causes. Neither *Science* nor CBS News's *60 Minutes*, which publicized the story, mentioned that the Sobells' 20-person "control" group went the abstinence route and also suffered four deaths.

Other U.S. research suggests that controlled drinking is feasible. A 1980 Rand Corporation study of one alcoholism treatment program shows that after four years, 18 percent of the patients still free of drinking problems had become moderate drinkers. Indeed, the Rand researchers found that some alcoholics—notably, single men under 40—were *more likely* to suffer relapses if they tried to swear off the bottle altogether rather than learn moderate drinking habits.

Abstinence may be the best policy for some, Peel says. "But when we promote the belief that [10–15 million people] cannot taste alcohol without catastrophic results, we may be fulfilling our own prophecy."

The Chemistry of Man's First Flight

"The Invention of the Balloon and the Birth of Modern Chemistry" by Arthur F. Scott, in *Scientific American* (Jan. 1984), P.O. Box 5969, New York, N.Y. 10017.

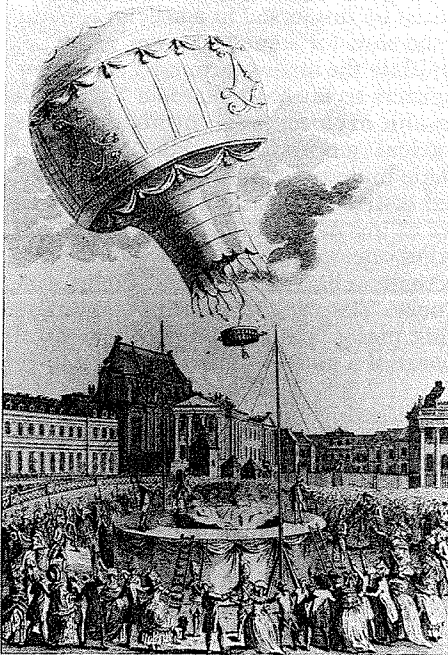
On November 21, 1783, the first men ever to fly without tethers to the ground went aloft in a hot-air balloon over Paris. The feat was the work of two paper manufacturers, Joseph-Michel and Jacques-Étienne Montgolfier, who were encouraged by—and woefully misinformed about—recent breakthroughs in chemistry.

The two revolutionary developments of the day were the overthrow of the phlogiston theory of chemical composition and the discovery of gases. The phlogiston theory, an extension of Aristotle's notion that all matter was composed of four elements (air, earth, fire, and water), explained that when substances burned, fire liberated a fifth element called phlogiston (from the Greek word for "flammable"). Gases, explains Scott, a former Reed College chemist, were regarded as a form of ordinary air.

The first major dent in the theory was made during the 1750s by British chemist Joseph Black (1728–99) who demonstrated that solid magnesia treated with acid released a gas distinct from air. He called it "fixed air," believing it had been trapped inside the magnesia. Black also found that "fixed air" (carbon dioxide) was released by burning charcoal and in fermentation and respiration. In 1766, his countryman Henry Cavendish (1731–1810) announced the discovery of a second gas, lighter than air, which he called "inflammable air" (hydrogen). Air could no longer be considered a basic element.

Aristotle's theory quickly collapsed. Joseph Priestley (1733–1804) soon isolated several gases, including oxygen, which he, still a believer in phlogiston, named "dephlogisticated air." (Priestley also injected "fixed air" into water, and "soda water" quickly became a European sensation.) The final step was taken by Antoine Lavoisier (1743–94),

SCIENCE & TECHNOLOGY



The Montgolfier brothers sent their balloon aloft for King Louis XVI and 13,000 spectators on September 19, 1783. Aboard were a sheep, a rooster, and a duck. The brothers had launched their first trial balloons a year earlier.

who, in 1783, devised an experiment in which he decomposed water into hydrogen and oxygen. That meant that water could not be a basic element. It also left no room for the existence of phlogiston. In a 1789 book, Lavoisier laid down the outlines of modern chemistry, based on chemical elements.

The Montgolfier brothers, both chemistry buffs, heard of some of the new experiments and decided to try out their long-delayed plan to launch a balloon. Apparently, they believed that by burning straw to inflate their balloon, they were creating a light gas. Actually, all they got was hot air. But it was good enough. Anybody could have launched a hot-air balloon years before. It took a revolution in chemistry to give somebody the courage to try.

Another Computer 'Revolution'?

"Reinventing the Computer" by Tom Alexander, in *Fortune* (Mar. 5, 1984), 541 North Fairbanks Ct., Chicago, Ill. 60611.

The computer industry seems to go through more revolutions than a long-playing record. The latest, writes *Fortune's* Alexander, is a coming "fifth generation" of speedy computers that will bring personalized robots and other futuristic gadgets closer to reality.