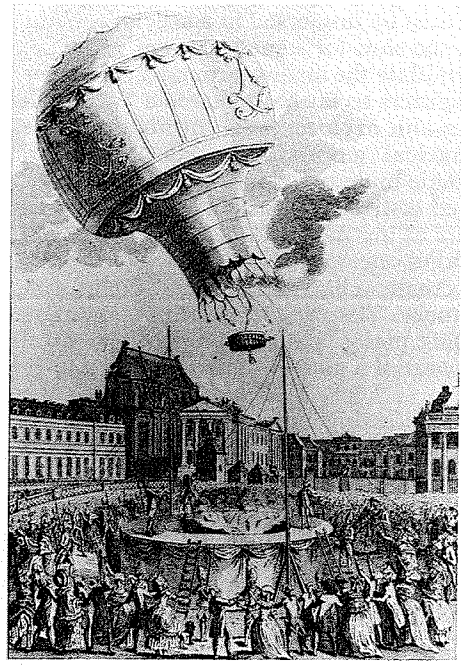

The Montgolfier brothers sent their balloon aloft for King Louis XVI and 13,000 spectators on September 19, 1783. Aboard were a sheep, a rooster, and a duck. The brothers had launched their first trial balloons a year earlier.

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.

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Some of today's best $5 million supercomputers operate so near capacity that their circuit boards must be immersed in a special coolant to avoid overheating, but all are too slow for some tasks. For example, it can take weeks or months to simulate the airflow around a passenger jet in flight. The reason: All computers so far have shared a basic limited design—called "von Neumann architecture" in honor of the Hungarian-American mathematical genius John von Neumann (1903–57) who designed it. "A single main processing unit," Alexander explains, "calls forth programmed instructions and data from memory in sequence, manipulates the data as instructed, and either returns the results to memory or performs other operations."

Relying on only one processor creates a bottleneck in the single channel between processor and memory. The fifth-generation computers will avoid the traffic jam by using many "parallel" processors. Each will work independently on one part of a given problem and exchange its findings with other processors.

Simple as it seems, parallel processing poses daunting technical challenges. Scientists must figure out how to break complex problems into manageable bites that can be worked on "in parallel" rather than sequentially, as in today's computers. And they must develop computer programs that will allow the processors to "talk" to and interact with one another while they are working.

Ultimately, a complex network of processors in a computer might work something like a human brain—"thinking" and programming itself as it went along. Not only would such a machine be able to complete in short order a simulation of an airplane in flight, it would also work fast enough to take on some more "human" tasks—such as understanding spoken language and producing a typed letter from it.

Science fiction? Japan, the European Common Market, and the United States have all launched rival research programs aiming to be first with fifth-generation computers. The research is scheduled to take just five years.

Two Cheers for Irradiation

"Renewed Interest in Food Irradiation" by Marjorie Sun, in *Science* (Feb. 17, 1984), 1515 Massachusetts Ave. N.W., Washington, D.C. 20005.

Now that the U.S. Environmental Protection Agency has severely restricted the use of the suspected carcinogen EDB (ethylene dibromide) as a fumigant for fruits, vegetables, and grains, a lot more of America's food may be irradiated.

Despite its menacing name, irradiation does not involve radioactivity, notes Sun, a *Science* correspondent. It uses controlled doses of gamma rays or high-energy electrons to kill insects, parasites, bacteria, and even viruses. Irradiation can kill trichinae in pork, inhibit sprouting in potatoes, or eliminate fruit fly eggs on oranges.

"By any other name, irradiation of food would probably have been