

TECHNOLOGIES OF THE FUTURE

By

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The human race stands now in the threshold of a new era — the most exciting period of history. Although it is uncertain what may happen in the years ahead, we can clearly see that we have entered a period of fantastic possibilities for good as well as for evil.

The rapid change that we are experiencing means that the future will probably be more different for us than it was for any previous generation of human beings. In preparing for the world of tomorrow, we must look for glimmerings of what may happen in the years ahead.

A New Language

A hundred years ago, many people were ill-prepared for the coming 20th Century because they could neither read nor write. Now comes the prospect of a vastly different society in the 21st Century — one in which computer data bases will replace the written word as the storage for man's accumulated knowledge.

The advent of the computer has begun to revolutionize man's lifestyle. New electronic technology offers so many opportunities for startling and productive innovations that it is safe to forecast that the many innovative experiments taking place now will multiply in the months and years ahead.

The number of areas in our modern society where computers are now employed is truly remarkable.

Computers are presently being utilized in an ever-expanding list of applications, ranging from the drilling of oil wells to determining the sex of chicken eggs in commercial chicken breeding. They are being used in mundane computer applications as the preparation of payroll checks and department store charge account billings, or in such esoteric activities as predictions of the outcome of elections or analysis of the probable authorship of ancient documents.

In science and medicine, computers are being engaged in the control systems of large factories and nuclear reactors, to navigate and guide everything from space vehicles to submarines, help manage hospitals and monitor

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Patients' recovery. At Loyola University Medical Center in Maywood, Illinois, a computer is helping ambulance services improve the pre-hospital emergency care. Patients at Meridian Park Hospital in Oregon are confident that they are receiving their medication in dosages that are just right for their individual systems — by means of a computer.

With the use of a typewriter-like terminal that connects each office to a central computer, representatives of ten government agencies in Washington D.C. can discuss the timing of upcoming meetings, comment on drafts of proposed documents and even vote on issues without leaving their respective offices.

Today's worldwide telephone network means that portable computer terminals can be carried and used anywhere. For instance, a management consultant in Washington, D.C., can use a telephone-plus-computer system to keep in touch with his employers thousands of miles away in Menlo Park, California.

Typewriters are being integrated with small computers to create "word-processing" equipment that is revolutionizing the way in which letters and other documents are written, corrected and reproduced.

Freedom for Builders

Architecture has always been one of man's primary means of satisfying his basic needs and expressing his highest aspirations. New technology has freed the architect from any past limitations. Hence, the architecture that will develop in the next few decades may be excitingly different from the types of structures that are now familiar. To get a glimpse of tomorrow's architecture, we must look at the possibilities opened by the new materials and systems and at people's physical and social needs during the years ahead.

Several recently developed materials foreshadow future construction possibilities. The strength, light weight, molding capability and light-transmitting properties of plastics make possible an almost endless variety in the design in components and entire structures. Today's lighter, stronger steel permits the construction of extremely long spans.

Based on aerospace component technology, the filament wound system which involves the wrapping of continuous strands of resin-coated glass filaments around a collapsible mold to produce on-site housing shells, will allow a builder to "spin" a building at the site.

Ferrocement will make it possible for the architect to sculpt buildings according to almost any design. Concrete can now be manipulated in an unlimited variety of expressive and inspiring ways by using free form steel rod reinforcing systems.

Developed by the Midwest Applied Science Corporation, the MASC extrusion process makes it possible to "spin out" or extrude buildings in one piece by using plastic foams that rise and harden very rapidly.

Originally developed as an insulation material with three times the insulating capacity of fiberglass, urethane foam can be scraped on a variety of molds or forms to create exciting structures and interior spaces.

Usually featuring a combination of inflatable and hydraulic components, kinetic structures can be transported from site to site.

Precast sections of fiberglass can be connected by flexible corridors to permit many design variations.

The rising costs of land, labor and materials have made modular housing a potent factor in the home-building industry.

New Sources of Food and Energy

Energy production constitutes another major area of concern for today's advancing society. Among the alternative sources being discussed today are wind, tidal, geothermal and solar energy.

One problem posed by urban and suburban sprawl is that the land available for agricultural use is gradually being reduced. Buildings can now produce food as well as energy. Greenhouses and hydroponic facilities, in combination with solar energy, could ultimately produce the bulk of the inhabitants' food.

Future Transit

Another major element determining the shape and functioning of cities is transportation.

Public transit of the near future will most likely elaborate on the best of what already exists, such as the Bay Area Rapid Transit (BART) system in San Francisco, Japan's high-speed intercity trains and the elevated mono-rail systems in Disney World and the Montreal Expo site. Personalized rapid transit systems (PRTs) may alleviate the immense future demand for mobility.

Other alternatives now under discussion include the building of elevated highways to free the ground for other activities of man, or constructing ribbon-like apartment complexes with the roofs serving as highways.

Energy from the Sea

Offshore oil exploration began only three decades ago, but vast quantities of oil and natural gas are now being pumped from beneath the Gulf of Mexico and the North Sea. Valuable deposits of manganese and phos-

phates are known to exist on the ocean bottom, but are not yet being exploited. Vast renewable sources of energy exist in both the motion of the water and the temperature gradients of the sea. Great differences in water temperatures can generate electricity by utilizing low-boiling liquids to drive turbines in closed systems. Large floating power-generating plants would be moored in warm seas such as the Gulf of Mexico or the Bay of Bengal. The electricity generated by Ocean Thermal Energy Conversion could be economically transmitted via submarine cable to land that is within 100 miles.

Future Air Travel

Short takeoff and landing (STOL) aircraft will provide feeder service from small towns to major airport terminals. Superwidebody planes carrying 1,000 passengers are another likely development during the next few decades.

The air traffic control (ATC) system will become more sophisticated. Computer control and satellite navigation systems may return more direct control to the pilot.

Space Colonization

We are now at the verge of a new frontier whose richness is a thousand times greater than that of the new western world of 500 years ago. New lands, located only a few days travel time away from the earth can be developed from materials and energy available in space.

Space colonization will enable the establishment of a highly-industrialized, self-maintaining human community in free space, at a location along the orbit of the moon called L5, where free solar energy is available full time. That community shall be constructed on a short time scale, without depending on rocket engines any more advanced than those of the space shuttle at a greatly reduced cost done by obtaining nearly all of the construction materials from the surface of the moon. Lunar surface raw materials shall be processed into metals, ceramics, glass and oxygen for the construction of additional communities and of products such as satellite solar power stations which would be relocated in synchronous orbit about the earth, to supply the earth with electrical energy by low-density microwave beams.

The establishment of an ecological independent human colony on the moon or on artificial space colonies that use the moon as quarry for raw materials has been supported by noted science writer Isaac Asimov in a written statement submitted to the House Subcommittee on Space Science and Applications in August 1975.

This venture will be difficult enough and expensive enough to require a global — rather than a national — effort which will be great enough to

supply mankind with a common goal and a common sense of pride that may transcend local chauvinisms thus encouraging the growth of a global political community that would serve as a substitute for the emotional catharsis of war.

By the year 2150, emigration to better lands, better living conditions, better job opportunities, greater freedom of choice and opportunity in small-scale independent communities could become a viable option possible. By 2150, there could be more people living in space than on earth. The reduction of population pressures on earth left possibly with only a few billion people would allow the planet to recover from the ravages of the industrial revolution.

From the vantage point of several decades in the future, our children will judge the most important benefits of space colonization not as physical or economic, but as the opening of new options, a new degree of freedom, not only for the human body, but for the human spirit and sense of aspiration.