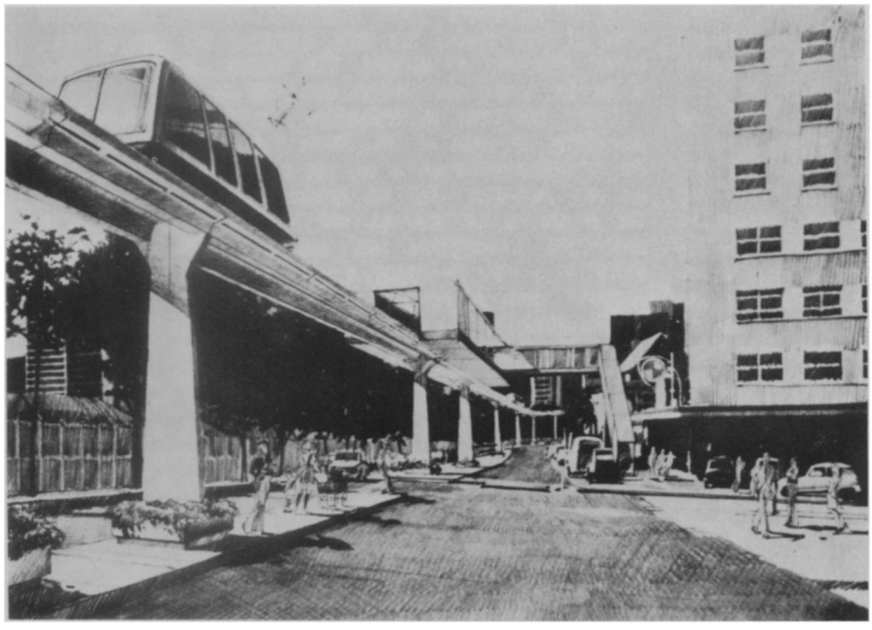
First installation of floating personal transit



Otis Elevator Co.

Artist's conception of automated personal rapid transit system in Nancy, France.

The world's first installation of a fully automated, floating personal rapid transit (PRT) system has been scheduled for Nancy, France. Riding on a cushion of air and driven by a magnetic induction system containing no moving parts, a fleet of 24-passenger cars will whisk along a 14.4-mile network of guideways, responding to individual calls from 20 stations.

Such "horizontal elevator" concepts have been around for several years, but the $80 million Nancy project will be the first large-scale, commercial use of PRT's. Transportation Technology, Inc.—an affiliate of the Otis Elevator Co.—will supply the vehicles; a French consortium will construct the guideways, scheduled for completion in four years.

Air suspension and lack of moving engine parts will minimize friction and thus make the system exceptionally swift and energy-efficient. Similar systems, using magnetic fields to suspend, as well as drive the cars, are also under investigation, but the air cushion system appears simpler and easier to install at present. Electricity for the air suspension blowers and driving magnets is brought into the cars from conductors imbedded in the guideway through a sliding power collector with soft low-friction brushes. Cars are suspended on a cushion of air only a fraction of an inch thick and the in-board magnets set up fields in metallic strips of the guideway to push the cars.

A short demonstration model of the system is in operation on the outskirts of Denver, Colo., which also expects to set up a full-scale PRT system. The air suspension system allows cars to slide out of the guideway laterally into docking areas so that loading and transfer to other modes of urban transportation can take place without impeding traffic on the main guideway. Special-purpose computers route vehicles according to demand in much the same way the latest high-speed automatic elevators are controlled in response to varying patterns of calls. A fleet of 130 cars is scheduled for production for the Nancy installation. □

Cyclic nucleotides affect cell growth and vision

A naturally occurring cyclic nucleotide was discovered in cells during the late 1950's. It was cyclic AMP. Another naturally occurring nucleotide was discovered close on its heels—cyclic GMP. During the 1960's and to the present, researchers throughout the world have been exploring the actions of these sister chemicals in cells. Sometimes the chemicals cooperate, sometimes they act independently, regulating a variety of functions—transcription of genes; the metabolism of proteins, sugars and fats; even the shapes of cells and the speeds of their movements. There is now increasing evidence that the cyclic nucleotides are important regulators in cell growth and vision.

During the past few years various investigators have found that GMP enhances cell growth. Evidence has also been building that cyclic AMP can turn cell growth off. For instance, Abraham W. Hsie and Theodore T. Puck of the University of Colorado Medical Center reported in 1971 that if they added cyclic AMP to transformed fiberblast cells (a particular kind of cell made cancerous by cancer viruses), the cells stopped growing wildly and started to have the properties of normal cells. Hsie and Puck measured the levels of cyclic AMP in cancer cells and invariably found that they contained low levels of cyclic AMP. So it looked as if cancer cells were deficient in cyclic AMP. They then found that cancer cells are defective in a cell membrane enzyme called adenyl cyclase, which is responsible for the synthesis of cyclic AMP in cells.

This work was rapidly confirmed by other investigators, notably by Ira Pastan and his team at the National Cancer Institute. Pastan and his colleagues now report in the latest PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (December 1973, Part II) that normal cell growth in fiberblast cells also appears to be under the control of cyclic AMP. As these cells reach a stationary phase of growth, there is a dramatic cellular rise in the enzyme adenyl cyclase, accompanied by an equally dramatic rise in cellular levels of cyclic AMP.

Some other researchers have noted similar cyclic AMP action in the normal growth of kinds of cells other than fiberblasts. So it looks as if rapid proliferation of normal cells is terminated by a rise in cyclic AMP, and that some cancer cells do not have this regulation.

But Wayne B. Anderson, one of Pastan's colleagues suggests caution. "It is hard at this point to say what is a cause and what is an effect relationship. Cyclic AMP may make cells slow their growth, or cyclic AMP levels may rise as a result of cells slowing their growth." Nonetheless, he and his coworkers believe that cyclic AMP probably helps regulate growth because giving cyclic AMP to cancer cells slows their wild growth and giving cyclic AMP to normal cells also slows their growth.

There has been ample evidence that the levels of cyclic AMP in cells are controlled by hormones outside cells (SN: 12/12/70, p. 450). The NCI investigators and others, however, have evidence that this is not so in the case of cyclic AMP's control over cell growth. In this case the regulators of cyclic AMP are probably within cells rather than without.

Increasing evidence is coming out of the laboratory of Mark W. Bitensky at Yale University School of Medicine that cyclic GMP regulates the sensitivity of photoreceptor cells in eyes to light. These cells, also known as rods and cones, capture light (photons) and turn it into vision.

Several years ago Bitensky and his colleagues found an enzyme in both