

materials point of view since one could start with the common substance uranium hexafluoride rather than having to refine out pure uranium first, but Snavely is very pessimistic about such a development because of difficulties with uranium chemistry and because the absorption frequencies of uranium hexafluoride overlap so much that laser tuning seems impossible. □

## Portrait of a planet

Ever since the first early weather satellites, earthlings have been used to seeing photos of their cloud-streaked planet from space. But never before have there been views showing the fine detail of cloud structure seen in this week's cover photo. Transmitted by the new SMS-1 meteorological satellite in synchronous orbit 22,300 miles above the equator, the data were processed by a laser recorder and other special equipment at the White Sands Missile Range. The ground station there is currently the only station capable of assembling the data into photos with a resolution of a half mile.

The effect of the earth's rotation on atmospheric motion (the Coriolis effect) is illustrated by the counterclockwise rotation of the cloud systems around a low-pressure area in the northern hemisphere (far North Atlantic) and clockwise rotation in the southern hemisphere (South Atlantic). A stationary band of cumulus clouds typical of those frequently positioned over moist tropical regions extends across the central Atlantic.

Lake Titicaca, high in the Andes on the border of Peru and Bolivia, stands out clearly. The lake influences local climate in such a way that it is frequently left cloud-free. Similarly the dark band along the coasts of Chile and Peru may be the result of a cloud-clearing atmospheric effect due to the upwelling of deep, cold ocean water along the coast.

Note the almost three-dimensional sculptured appearance of the clouds at the extreme bottom of the picture.

Since this photo was taken on June 3, the SMS-1 satellite has been moved farther east into its position directly above the equatorial Atlantic to aid in the 14-week GARP Atlantic Tropical Experiment (SN: 6/1/74, p. 354), which began last weekend.

# The unmaking and remaking of cells

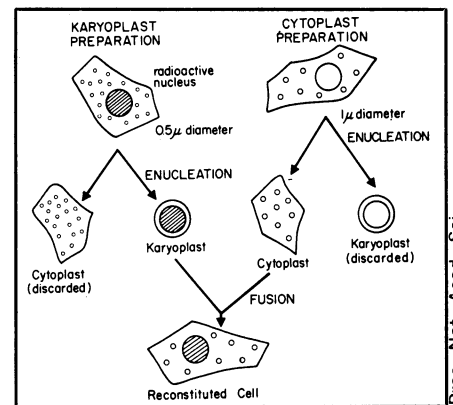
Why do cells develop into different tissues? Why do some of them become cancerous? Why do they grow old and die? It would be easier to answer such questions if cell scientists knew for sure which cellular functions are controlled by the nucleus and which by the cytoplasm. By joining the nucleus of one cell with the cytoplasm of another, for instance, it might be possible to determine which actions the nucleus and cytoplasm are responsible for. Would a cancerous nucleus make a normal cytoplasm cancerous? Could young nuclei rejuvenate old cytoplasts? Researchers have replanted nuclei from one cell to another, but usually in only one cell at a time.

Now a method has been developed for performing this operation on a wholesale basis. It makes feasible the analysis of many interactions between the nucleus and cytoplasm. George Veomett, D. M. Prescott, Jerry Shay and K. R. Porter of the Department of Molecular, Cellular and Developmental Biology at the University of Colorado in Boulder report the process in the May PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

The first step was to take some cells apart. Normal mouse cells were used in the experiment. They were treated with cytochalasin B, a fungus by-product that causes cell nuclei to migrate to one side of the cell where they remain attached to the main body of the cell by only a thin stalk. Centrifuging such cells causes them to separate completely into portions containing only nuclei and portions containing only cytoplasm. The resulting cytoplasts and nuclear structures, karyoplasts, quickly recover from this treatment and are able to function properly for several hours.

Then the cells had to be put back together in new ways. Sendai virus (related to the mumps virus) has been used to make whole cells fuse. In the Colorado experiment inactivated Sendai virus was used to reconstruct whole cells by fusing the previously separated cytoplasts and karyoplasts. Two groups of cells were used. One group, the cytoplast donors, was grown in a solution containing latex spheres of a specific size. Most cytoplasts absorbed five to ten spheres which they carried with them during separation. The spheres served to mark the source of the cytoplasm during the subsequent reconstruction. The other group of cells, the karyoplast donors, were similarly marked with spheres only half the size. In addition, the nuclei of these cells were radioactively tagged.

Both groups of cells were treated with cytochalasin B, centrifuged and



Proc. Nat. Acad. Sci.

separated into solutions of either cytoplasts or karyoplasts. The large-sphere cytoplasts and the radioactive nuclei were then mixed together, centrifuged and treated with the Sendai virus.

Fusion occurred. New cells were formed consisting of a radioactive nucleus and a cytoplasm with only large spheres. Control solutions were not treated with the Sendai and no fusion took place. Not only had cells been successfully reconstructed, they were living. Some had entered mitosis (cell division) after the fusion, indicating that the reconstructed cells are capable of proliferation.

In conclusion, say the scientists, this experiment "establishes the feasibility of constructing mixed cell types by combining karyoplasts and cytoplasts derived from parental cells of different types." □

## Births declining among minorities

Historically blacks, American Indians, Mexican-Americans and the poor have borne substantially more children than urban whites. Two recent but separate studies to be published in the June 24 FAMILY PLANNING PERSPECTIVE, a quarterly of Planned Parenthood's Center for Family Planning Program Development, reveal that this trend has been waning for the past decade.

Using data from the U.S. Census, sociologist James A. Sweet of the University of Wisconsin analyzed the fertility declines of married women from various ethnic groups and compared them with those of urban whites. (Fertility in the United States has been declining for the overall American population since 1957.) Sweet found that fertility has dropped most rapidly for ethnic and low-income families. Whereas childbearing declined 27 percent for white urban women between 1960 and 1970, it declined 45 percent