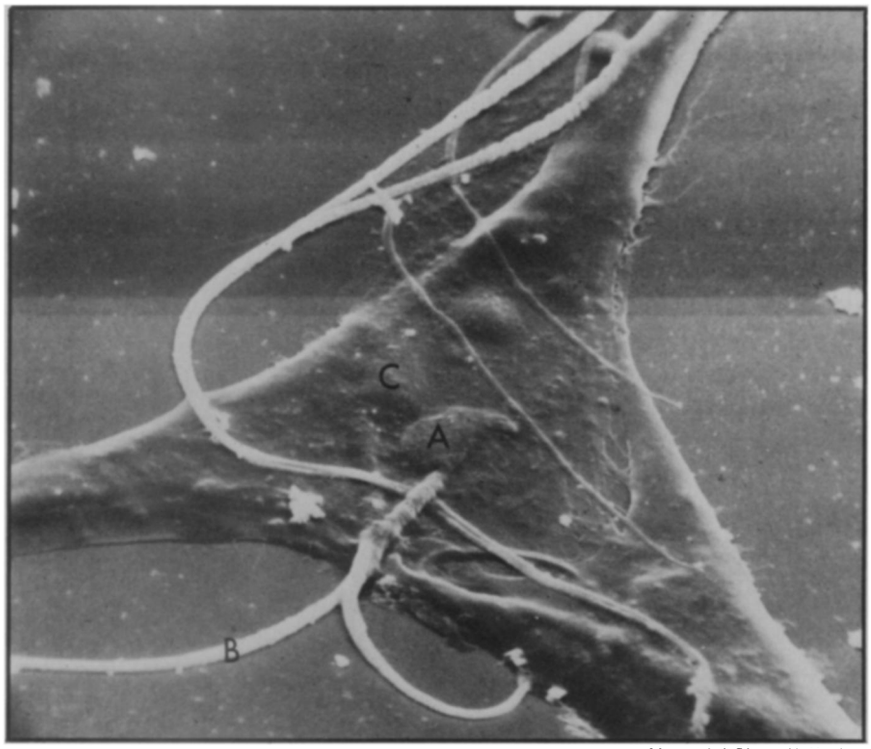

Memorial Sloan-Kettering

Tails of mouse sperm stick out of hamster cells after their heads have entered.

SPERM FERTILIZE NONEGG CELLS

Sperm normally fertilize egg cells, but biochemists at the Memorial Sloan-Kettering Cancer Center in New York City have managed to unite sperm with mature body cells rather than with egg cells and apparently transfer the sperm's genetic information to the cells. The technique, reported in the March 1 SCIENCE, should open new approaches in cancer research and in repairing genetic disease at the cellular level.

In recent years investigators have managed to fuse pretreated rabbit sperm with body cells. But Sloan-Kettering's Aaron Bendich, Ellen Borenfreund and Stephen S. Sternberg managed to get live sperm to propel themselves into somatic cells. The sperm were from the mouse, the cells from the hamster. Using the scanning electron microscope, they could see that the sperm had deeply penetrated the cells, most of their tails, still attached, remained outside the cells. To trace the passage of sperm genes (DNA) into the nuclei of the cells, the New York biochemists had prelabeled the sperm with radioactive tags. Three days after the sperm had been cultured with the cells, radioactivity showed up in two to 10 percent of the cells' nuclei. Although this radioactivity was not widespread, the researchers interpreted it as encouraging since their previous experiments had shown that DNA rarely survives uptake by body cells.

As the cells multiplied, the researchers carefully scrutinized them to see whether there had been a functional transfer of genetic information by the sperm. By using immunofluorescence tests, they found that some of the cells expressed what appeared to be gene products of mouse sperm—antigens (proteins) normally found in the mouse fetus. Proof that mouse sperm actually produced gene products in the hamster body cells, however, will depend on the isolation and identification of the presumed gene products.

Meanwhile the scientists are using the technique to probe the role of fetal antigens in the cancer process. Such antigens pop up in cancer cells, but not in healthy, mature body cells. So the scientists are now studying the hamster cells that appear to express mouse fetal antigens and see whether the cells become cancerous.

Uniting sperm with mature body cells also holds potential for treating genetic diseases, the Sloan-Kettering biochemists believe. "There must be more than 600 well-established genetic diseases, many of them characterized by the absence of normal genes," says Bendich. "I think it should be possible to correct some of these deficiencies—at some future time—by administering sperm to cells taken from diseased individuals, getting the sperm to deliver some of the missing DNA, allowing the cell to build up into a healthy population and reimplanting them in the patient." □

A SHINY GLOBE ROCKS THE WEATHER

It's like a science fiction movie of the world gone wild: record numbers of tornadoes in the United States, unprecedented drought in Africa, scores of new temperature extremes in diverse parts of the globe. The weird weather of 1972 and 1973 cost tens of thousands of lives, hundreds of millions of dollars. This week a husband-and-wife research team suggested a possible explanation: the early and enlarged build-up of snow and pack ice in the northern hemisphere, to the point where it may have significantly changed the average reflectivity of the earth's surface.

The link between reflectivity and weather is the heat balance of the planet. It is an equilibrium between the amount of the sun's incoming energy that is reflected back into space and the amount that is absorbed by the earth. The absorbed energy provides the source of most of the heating of the atmosphere. This, according to George and Helena Kukla of the albedo (reflectivity) task group of the Climate Long-Range Investigation, Mapping and Prediction (CLIMAP) program of the International Decade of Ocean Exploration, is what seems to have changed.

Normally vegetated ground, the investigators report in the Feb. 22 SCIENCE, reflects only about 15 to 20 percent of the solar energy that reaches it, and calm ocean reflects even less, about 5 to 10 percent. Snow-covered grasslands and pack ice, however, reflect about 80 percent. "This reflected light," they say, ". . . represents a deficit in the earth's energy balance."

In 1967, the National Oceanic and Atmospheric Administration began routine mapping of the snow and ice fields in the northern hemisphere. Up until 1971, the area covered by snow and ice hovered between about 33 million and 34 million square kilometers. That year it began to climb, increasing some four million square kilometers by year's end and staying there through most of 1973. It would take only seven such spurts, the Kuklas point out, for the snow and ice cover (with the resulting increased reflectivity and decreased solar-energy absorption) to approach the size of the northern hemisphere cover during the last glacial age. (Such sudden growths are rare, they point out reassuringly, and normal patterns tend to come back in between them, "but the potential for fast changes of climate evidently does exist on the earth and should be kept in mind.")

Also beginning in 1971, the seasonal variations of the cover began to build up earlier and decline later, with a corresponding increase in the year-to-year coverage of snow and ice in a given month. In October of 1972, for ex-

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