

vertebrate and invertebrate photoreceptor cells whose activity is markedly altered by light. In fact, it appears to be the only enzyme in these cells that is so affected by light. The enzyme is phosphodiesterase. The Yale researchers suspected that the enzyme might be crucial in the regulation of photoreceptor cells.

Bitensky and co-workers Naomasa Miki, James J. Keirns, Frederick R. Marcus and Jenny Freeman now report

in the latest PNAS that when the phosphodiesterase enzyme in a photoreceptor cell is activated by light, cyclic GMP is dramatically destroyed in the cell. So a decrease in cyclic GMP may well be necessary if these cells are going to adapt to light and dark.

The Yale team has not yet been able to find a hormone that regulates cyclic GMP synthesis in photoreceptor cells. Like cyclic AMP, cyclic GMP is usually under control of hormones. □

## A superconducting accelerator planned

Physicists have long wanted to apply superconductivity to particle accelerators. Use of superconductors in the magnets that bend and focus the paths of the accelerated particles or in the radio-frequency waveguides that accelerate them could yield great savings in electric power and significant savings of space. Experiments in this direction have been going on for some time at a number of centers, but difficulties with the metallurgy of superconducting metals and with techniques for refrigerating large volumes to the temperatures near absolute zero where superconductivity occurs have made the work slow.

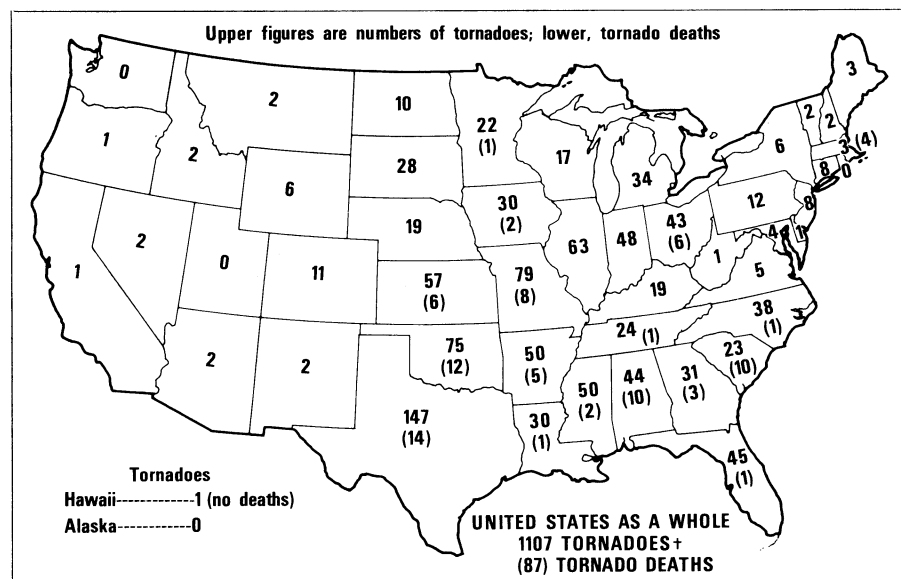
Now the Lawrence Berkeley Laboratory announces plans to build what will be the world's first accelerator with all superconducting magnets—if the laboratory gets the money and builds it in the two or three years contemplated. At the moment the money is promised in the fiscal 1975 Federal budget for the Atomic Energy Commission submitted to Congress this month. It remains to be seen whether Congress will approve.

Called ESCAR (Experimental Superconducting Accelerator Ring), the machine is looked upon as prototype and testing ground for techniques that will be applicable to much larger installations. ESCAR will be a ring 80 feet in diameter. It will have 56 superconducting magnets, each maintained at liquid-helium temperatures (4 degrees K.). It will be able to accelerate protons to energies of five billion electron volts, and will also act as a storage ring for them. In addition it may be used to accelerate heavy ions from the Super-HILAC, LBL's heavy-ion accelerator.

The new ring will be built alongside LBL's existing proton accelerator, the Bevatron, and will take advantage of already existing utilities that serve the Bevatron. The project will be directed by Tom Elioff and Glen Lambertson.

Other national laboratories are expected to collaborate in the venture. Application of superconductivity would greatly cut power costs and enable increases of energy in such contemplated projects as the proton-electron-positron storage ring now being discussed by LBL and the Stanford Linear Accelerator. Substitution of superconducting magnets for conventional ones could also increase energies of existing accelerators. Use of superconducting magnets was contemplated by the builders of the biggest present accelerators but it was decided that the still-experimental status of superconducting magnets made it too risky. □

## A record 1,107 tornadoes twisted across U.S. in '73



Meteorologists suspected even before 1973 was half gone that it would be the Year of the Tornado. By late September they had their record—930 (SN: 11/10/73, p. 294)—and the number kept climbing. The final total: a staggering 1,107 full-scale tornadoes, including record numbers in 11 states.

"The 1973 tornado season," according to the directors of the National Severe Storms Forecast Center, "can only be described by the liberal use of superlatives. It had the most, lasted the longest, involved more states and produced more 'super tornadoes' than any year since tornado records began."

Only four of the 50 states avoided the tumult of twisters completely: Alaska, Rhode Island, Utah and Washington. Others really felt the blitz. North Carolina, for example, which had seen no more than seven tornadoes in any one month for 58 years, had 32 in May. Indiana's twister tally rose more than 200 percent over its long-term average.

The national figures are just as humbling. "While admittedly the reporting networks are superior to those of years past," says the center's director, Allen Pearson, "the total of 94 tornadoes reported from May 26 to 28 equalled the number of tornadoes

reported during the entire year of 1931."

The toppers were a pair of monster storms among the most violent on record. On May 27, a single tornado thrashed its way across 135 miles of central Alabama. Then on Sept. 25, the day that the record was set, another one tore all the way from north-central Kansas into Nebraska, covering almost 160 miles. Property damage for the year is estimated at more than half a billion dollars.

Yet nature is not entirely unforgiving. While the twisters were tearing up the turf, the number of major earthquakes (and deaths therefrom) declined sharply, not just in the United States but around the world.

For years, there had been an average of 18 major earth shocks (those between 7.0 and 7.9 on the Richter scale) and one great shock (over 8.0) every 12 months. 1972 was particularly brutal, with quakes resulting in some 10,000 deaths.

Yet 1973 was almost a year of peace. There was not a single great shock, only 11 major ones, and the death toll dropped by more than 93 percent to 650.

Who knows which way the wind blows? □