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cells. From experiments with rats, he found that a diet rich in carbohydrates boosts the amount of serotonin in the blood. What message does serotonin "transmit"? In another experiment, Wurtman fed rats high-carbohydrate "snacks" and gave them a choice at mealtimes between high- and low-carbohydrate foods. Almost invariably, the rats chose the latter, as if they "knew" that they already had consumed plenty of carbohydrates.

Similar effects have been found by research doctors in humans. Serotonin, Wurtman says, "provides the brain with telltale information on the body's nutritional state. This information then helps the brain decide what and when to eat next, and whether to be sleepy or responsive to the environment."

About half of all obese people are "carbohydrate cravers," and Wurtman believes that most of them suffer from a short circuit somewhere in their serotonin-producing systems. Indeed, the drug d-fenfluramine, which stimulates serotonin production, sharply reduces snacking by carbohydrate cravers (whose cravings, oddly, seem to strike in each case at a certain time of day). But because such cravings are satisfied as fully by a 250-calorie bagel as by a 1,000-calorie ice-cream sundae, simply substituting less fattening carbohydrate sources may be the best weight-reduction strategy for these people.

Serotonin may also play a role in other forms of obesity. The neurotransmitter produces a feeling of relaxation and sleepiness, which suggests that some big carbohydrate consumers may in fact be "self-medicating" against the effects of anxiety or depression.

The obese are not the only people who may profit from the new insights into the diet-brain connection. Some research suggests, for example, that Alzheimer's disease, a disorder that afflicts five percent of Americans under age 65 and whose symptoms resemble senility, may be related to a shortage of the amino acid called choline. Choline, available from certain foods, is an essential element in the neurotransmitter acetylcholine.

RESOURCES & ENVIRONMENT

Understanding El Niño

"Floods, Fires, and Famine: Is *El Niño* to Blame?" by Michael H. Glantz, in *Oceanus* (Summer 1984), Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543.

An increase in shark attacks off the coast of Oregon. Drought in Sri Lanka. Windfall profits for Brazilian soybean farmers. What do these three phenomena have in common? All were cited in 1982 and 1983 as indirect effects of *El Niño* ("The Child").

El Niño is a complex meteorological phenomenon that occurs

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when, for reasons that are still unclear, the ocean surface off Peru and elsewhere in the southern Pacific warms up, touching off a series of dramatic wind and weather shifts. The global importance of *El Niño* only recently began to dawn on meteorologists, though its existence has been noted by ship captains and Peruvian fishermen for centuries, reports Glantz, a National Center for Atmospheric Research scientist.

After *El Niño* recurred during 1972–73, scientists began putting together a picture of its worldwide effects. Some were obvious. Global food production dropped in 1972 for the first time since the late 1940s. *El Niño*'s abnormally warm waters altered wind and barometric pressure patterns on a massive scale, producing droughts in Africa, Australia, Central America, and the Soviet Union. Some effects were subtle: Soviet crop failures prompted Moscow's massive grain purchases from the United States during the early 1970s, which temporarily furthered East-West détente.

The 1982–83 *El Niño* was "one of the most extreme on record," notes Glantz. It was also the first that scientists monitored as it was happening, allowing them to study more closely its "teleconnections," or linkages to other meteorological events.

El Niño appears at irregular intervals—notable occurrences were in 1891, 1925, 1934–41, and 1965—with different characteristics and effects each time. The 1982–83 *El Niño*, for example, was accompanied by heavy rains and storms in California, while earlier ones brought drought to the state. On the East Coast of the United States, the 1982–83 episode made for a much warmer winter than usual.

But Glantz adds a word of caution. Nearly every burst of strange weather everywhere on the globe during those two years was laid to *El Niño*. In fact, however, meteorologists are far from knowing for sure when bad weather results from *El Niño* and when mere coincidence brings the two together. And forecasts based on faulty guesses about such linkages, he says, are "worse than no forecast at all."

ARTS & LETTERS

A Rebirth of Jazz?

"Young Jazz Musicians" by Gary Giddins, in *Grand Street* (Summer 1984), 50 Riverside Dr., New York, N.Y. 10024.

Jazz in America is on the verge of a renaissance. Sadly, very few Americans are aware of it, writes Giddins, music critic for New York's weekly *Village Voice*.

Jazz moves in cycles, he notes. "Brief bursts of innovation alternate with longer stretches of consolidation." Inevitably, the public prefers the more accessible music from the more conservative eras. Louis Armstrong's innovative "hot" jazz of the 1920s was followed by commer-