sponsored a meeting that may signal new support for investigation of the environmental and ecological aspects of the toxin-producing organisms.

For now, researchers have a handful of possible explanations for the increase in toxic tides.

At least some of the toxin producers seem to be responding to increases in the amount of nitrogen (SN: 2/15/97, p. 100), phosphorus, and other nutrients washing off the land from fertilizers and animal wastes. As Hong Kong experienced a sixfold increase in population between 1976 and 1986, the concentrations of nutrients in its harbor more than doubled, and the annual count of red tides increased from 2 to 18.

Pfiesteria outbreaks, too, seem to be connected to nutrients, which stimulate the growth of the algae that *Pfiesteria* feed on, says Burkholder. In North Carolina, "75 percent of the kills that we've observed have occurred in nutrient-overenriched areas."

At the same time, some of the toxin producers seem to respond to pollution controls. In Japan's Seto Inland Sea 4 years after sewage and effluent controls were implemented, the number of red tides leveled off at about half their peak of 300.

In other places, dams may contribute to changes in nutrients. In the March 27 NATURE, European researchers reported that a dam on the Danube River has altered the Black Sea's chemistry, in turn skewing the major species in the plankton community from diatoms to dinoflagellates.

Some researchers believe that a global change in the complex interaction of climate, ocean, and temperature is affecting marine plankton (SN: 9/30/95, p. 220), as well as other organisms (SN: 4/6/96, p. 218).

Increased traffic on the world's oceans may be another factor in seeding new blooms, according to several scientists. Water used as ballast in ships has transported and introduced animals into new waters; exotic microorganisms are probably being introduced as well, says Fred C. Dobbs of Old Dominion University in Norfolk, Va.

Finally, the increased frequency of the blooms may be partly an effect of heightened interest in these events, expanding fish farming, or improved methods of detecting toxins that had previously gone undiagnosed or unnoticed.

"There are toxic and nontoxic blooms all the time," says Jeffrey L.C. Wright of the National Research Council of Canada in Halifax, Nova Scotia. "If you don't have blooms, you don't have life. They are part of the natural ocean processes."

Today's oil deposits in the North Sea and elsewhere are the remains of bygone blooms that settled and accumulated into massive amounts of carbon on the ocean floor.

The causes of the increase may be the focus of study and debate, but there is one thing on which researchers agree: Other, as-yet-undetected microorganisms or their toxins will eventually make their presence known.

Of the rash of blooms and poisonings in the last 2 decades, several have involved unknown toxins or organisms (see sidebar, p. 203). When farm-raised salmon died recently in Washington State, researchers found microcystin, but they have yet to find the producer.

In the case of *Pfiesteria*, the most infamous of the newly discovered microrogues, researchers are trying to figure out how its toxins act. The secrets of the organism itself haven't been completely cracked either (see sidebar, p. 202). *Pfiesteria* seems to be a complex of at least four species, according to Burkholder, although only *P. piscicida* has been named.

The water world these organisms occupy is huge, much of it unexplored, and they've been concocting toxins for eons. "In terms of biological interactions and biological warfare, they've seen it all," says Paerl.

Through a range of activities, humankind has simply waded into the crossfire. □

Behavior

Meds may give attention a lasting boost

An estimated 1 in 50 school-age children in the United States receive stimulant medication to help quell inattentiveness and hyperactivity. A month or two of this treatment helps many youngsters, although researchers have yet to show that stimulants exert benefits over the long haul.

Now, a study conducted in Sweden indicates that an amphetamine given to kids diagnosed with attention-deficit hyperactivity disorder (ADHD) often reduces their core behavior problems during and after the treatment. About one in seven children taking the medication did not improve or dropped out of the study because of severe side effects, report psychiatrist Christopher Gillberg of the University of Göteborg and his coworkers.

The investigation, published in the September ARCHIVES OF GENERAL PSYCHIATRY, consisted of 52 boys and 10 girls treated at one of four sites. Youngsters ranged in age from 6 to 11. They displayed severe problems with inattention, hyperactivity, and impulsiveness. More than half had a developmental or behavioral disorder in addition to ADHD, a pattern frequently noted in prior studies.

Each child received amphetamine treatment for 3 months so that a proper dosage could be established. The children were then assigned at random to receive either the amphetamine or an inactive substance for 1 year, followed by 3 months of the inactive substance for everyone.

The scientists found at the end of the program that behaviors typical of ADHD had subsided to a much greater extent, both at home and at school, in kids who had taken the medication. Intelligence test scores also improved for the amphetamine group.

Still, the study found no conclusive evidence of stimulants' unique long-term benefits in treating ADHD, remarks Michael Rutter of the Institute of Psychiatry in London in an accompanying comment. The study did not, for example, examine whether the benefits of amphetamines exceed those of a psychological intervention, such as training families and teachers to deal with a child's behavioral problems.

A study now under way in the United States is examining 7- to 9-year-olds diagnosed with ADHD during 14 months of medication alone, a comprehensive counseling and training program alone, a combination of both, or no treatment; it will follow them for the subsequent 10 months as well. —*B.B.*

From poverty to undernutrition

Poor women in many countries have access to free food supplements for their babies and young children. Yet a large minority of these children still suffer from a lack of protein and calories known as undernutrition (which falls short of malnutrition). In psychologically vulnerable women, the stresses of poverty may trigger a breakdown in their ability or willingness to care for a child, thus fostering undernutrition, says psychologist Marta Valenzuela of the University of Quebec in Montreal.

"Intervention efforts need to extend beyond food supplements to support infant-mother relationships as a means to prevent [chronic undernutrition]," Valenzuela writes in the September DEVELOPMENTAL PSYCHOLOGY.

She studied 85 poor mothers who regularly attended health clinics in Santiago, Chile, with their 18-month-old infants. All of the babies had a normal weight at birth, but 42 had been underweight since about age 3 months.

Cases of infant undernourishment clustered among mothers who showed little availability, acceptance, responsiveness, or affection toward their children in interactive laboratory tasks, Valenzuela says. Those mothers may, for whatever reasons, recoil emotionally and physically from infants who are initially unresponsive and whose frustrating traits grow increasingly worse due to undernutrition, she theorizes. —*B.B.*