systems—"but that's the way it is," says Scarr.

In the end, do the results of the study provide any practical clues to parents on how they should raise their adopted or biological children? "No one has a prescription on how to be a really good parent," Scarr says. "But you [should] provide a humane environment ... and provide what the child wants." □

Ecology: Some historical perspective

Ecology, the study of living organisms in their environment, is a hot scientific discipline these days. Yet what the public, and even most members of the scientific community, fail to realize is that ecology is largely a product of the latter 20th century—a teenager compared to molecular biology; a child next to Mendelian genetics; a great, great grandchild beside the august sciences of mathematics and physics. Both scientists and society might keep this short lifespan in mind as they criticize ecology's limitations or ask its help in formulating environmental impact statements, saving dwindling natural resources, listing endangered species or in solving other complex life-environment problems.

This message was brought home last week at the annual meeting of the American Institute of Biological Sciences in East Lansing, Mich., at a symposium entitled "History of Ecology."

First off, the ancient Greeks tended to believe that living organisms are determined more by their biology than by their environment, as F. N. Egerton of the University of Wisconsin, Parkside, points out. For instance, the Greek philosophers Plato and Aristotle held that animals' reproductive abilities are determined by their anatomy and physiology rather than by their interactions with their physical environments or with each other. However, Hippocrates, a Greek physician and the father of medicine, did note the effects of celestial events on living organisms.

Still further conjecture about the impact of the environment on life emerged in subsequent centuries. A 17th century statistician stated that interactions among species regulate their numbers. The Dutch naturalist van Leeuwenhoek calculated the rate at which various animals could increase their numbers under specific conditions. The 18th century Swedish botanist Linnaeus believed that species are protected from extinction by niche diversity. The 19th century English naturalist Darwin believed that species must compete with each other for survival. Finally, 1891 saw one of the first references to ecology per se, and during the early years of the 20th century, the science of ecology gradually became an established science.

Yet this science was truly in an infant stage, R. P. McIntosh of the University of Notre Dame stresses. Ecology consisted mostly of field observations and descriptions of those observations. Only after 1950 or so did ecologists start testing hypotheses extensively. And only during the 1970s have ecologists become sophisticated enough to frequently formulate theories, or general principles, about living organisms in their environment. (Back in 1941, a young Yale ecologist, Raymond Lindeman, had trouble publishing one of the first ecological theories ever proposed in the journal ECOLOGY—a theory that has since become a classic in its field. Journal referees suggested that he gather more field research to support his theory and resubmit it 10 years later, reports R. E. Cook of Harvard University.)

The current trend among theoretical ecologists is to draw up a picture of the whole, say of a prairie, forest, tundra or other ecosystem, from field observations of its many parts. Ecologists may even use computers and math modeling to achieve such pictures or theoretical representations. Some of the more ambitious efforts along these lines were the International Biological Program biome studies, completed in 1974 (SN: 9/8/73, p. 156). But do such theoretical or mathematical depictions really correspond to how organisms behave in their environments? McIntosh suspects not, largely because such organisms are so dynamic and variable. "Physical entities are relatively homogeneous, but biological entities are more heterogeneous and tend to have a mind of their own," he asserts. Thus he doubts whether ecology will ever be able to draw up a set of rigid theories as mathematics and physics have done.

Other ecologists, however, believe that such modeling corresponds closely to reality, and some are even confident that someday they will be able to devise a general theory of how organisms interact in the world environment, a theory that can be used to predict how various changes might alter these interactions. □

Antibiotics in animal feed: Bans planned

Since the discovery in the 1950s that antibiotics promote the growth of livestock, antibiotics in animal feeds have become a multimillion dollar industry and have undoubtedly helped feed the world's population. At the same time there has been a swell of evidence that antibiotics in animal feeds are helping bacteria in humans build resistance to antibiotics, a trend that might possibly result in vulnerability to deadly and once-conquered infectious diseases (SN: 9/18/76, p. 183).

The U.S. Food and Drug Administration has finally announced this week, on the basis of the above evidence, that it plans to ban the use in animal feeds of certain antibiotics that are also used to treat bacterial infections in humans.

The first ban would be against penicillin, which would mainly affect feed for 35 percent of the nation's swine and for 10 percent of its chickens and turkeys. Bans would then follow for tetracycline and other antibiotics routinely used in feed. The FDA would allow those antibiotics less likely to produce resistance to be substituted in animal feeds. The agency believes that the substitutes would be just as effective as the others in promoting livestock growth.

The FDA is allowing 30 days for comments on the proposed bans from antibiotic manufacturers and from agricultural and commercial interests affected by it. If the proposed FDA ban on penicillin is challenged in the courts, it could take a year to be implemented. □

Pesticide watch

The U.S. Environmental Protection Agency will step up investigation of dibromochloropropane (DBCP) and ethylene dibromide (EDB), two pesticides linked with sterility and suspected of causing cancer. Dow Chemical Co., one of the two chief DBCP manufacturers, reports reduced or absent sperm counts in roughly half of its tested workers that were associated with the chemical's production. Shell Oil Co., the other firm, has yet to submit test data on its employees. Both companies have stopped production of the chemical. EPA is looking for data on farmworker exposures and hopes to measure whether DBCP is passed on to consumers as a plant residue. Meanwhile, the U.S. Food and Drug Administration is looking into whether the chemical is carried on to other parts of the food chain. □

Italian satellite

SERIO, besides being Italian for Sirius, the "dog star," stands for Satellite Italiano Ricerca Industriale Orientata, or industrial-research-oriented Italian Satellite. And, like Sirius, it now has its place in the sky. Launched by NASA for the Italian government on Aug. 25, SERIO is Italy's first experimental communications satellite, designed to study radio propagation at frequencies above those of the increasingly crowded bands in common use.

From a position over the equator at 15°W, the probe will try out transmissions in the SHF (super-high frequency) bands from 12 to 18 gigahertz during the worst weather conditions it can find—rain, snow and fog. It is only one of several attempts (the Canadian satellite CTS-1 is another) to explore the possibilites of widening the available communications bands as satellite-borne telephone, video and data traffic grows by leaps and bounds. □