

For present purposes, I do not need to say much more about ecology as a biological science. Life activities are supported by energy originally from the sun. Green plants collectively seem able to capture only about two percent of that reaching the surface of the earth. This is the low average efficiency. Since keeping themselves alive uses up some of the food of green plants, and since the herbivores—that is, the plant eaters or vegetarians—do not harvest completely the annual production of the primary producers, and cannot use what they eat with perfect efficiency, the biomass of the first order consumers may be about 10 percent of that of the plants. Moving up a trophic level, not all rabbits get caught by predators and the predators themselves have a relatively low efficiency in converting rabbit flesh to fox flesh, so they and other associated predators of that level may make up only 10 percent of what is theoretically potential. The idea of ecological pyramid has become clear.

Let us suppose for a moment that we are interested in the welfare of animals that are not so choosy—ones that are omnivorous. Man is a good example. If something is eatable, he will eat it. Not any one man, but man collectively, for we each have psychosomatic hungers and distastes. Some of us will eat snails, whole fish, if they are small enough, dairy products rotted by fungi, which we call cheese, and blood sausage. But we find distasteful the idea of eating grasshoppers, termites, and grubs. Hungry rice eaters have to force themselves to eat wheat and on today's world grain market you could exchange one ton of rice for two tons of wheat without asking the nutritional value of either.

There is a lesson in the ecological pyramid of biomass made up of the different tropic levels. If man is looking for food, assuming that he can digest it, he will find more of it available at lower than at higher tropic levels. This is the moral of the human population/food dilemma. People of populous poor countries must subsist mainly on grains. Meat, poultry, and milk are too scarce and costly for common consumption. And if starving, man turns to grass itself, bark of trees, and as did Moses and the children of Israel during their sojourn in the desert, to manna, which the dictionary says was food miraculously supplied, and which botanists speculate must have been lichens called rocktripe blown by desert winds from rocky summits.

It is an interesting fact that most human foods comes from a relatively small number of kinds of domesticated animals and agricultural crops. Over time the varieties and strains of these few species have been increased, but scarcely a new species has been put to use for human food during historic time.

This problem is being faced by the International Biological Program that has been in its planning phase for the past few years and is just now starting on the research phase. The theme of the IBP is the biological basis of productivity and human welfare. Some 60 nations are embarking on more or less elaborate programs of study of organic production on land, in fresh waters, and in the seas, so that more adequate estimates may be made of the potential yield of new as well as existing natural resources. Another, related part of the IBP is a group of studies of human adaptability to changing conditions, while yet other sections of the program are looking at the scientific basis for the use and management of biological resources and the conservation of natural areas for comparison with managed ecological systems.

The plain facts of the matter are that burgeoning human population, especially during the past two decades, and the rate at which man is deteriorating his environment by thoughtless and ill-advised practices and constructions that reduce the productivity of ecological systems, has caused biological scientists to recognize an urgent need for greatly increased ecological research. *The United States' part of the IBP promises to cost millions of dollars and the sympathetic House Science and Astronautics Committee's Subcommittee on Science, Research and Development, chaired by Congressman Emilio Q. Daddario, of Connecticut, is currently holding a series of hearings on it.*

This massive, worldwide, planned effort will produce a much better understanding of how biological systems work. For the various landscapes, and especially those upon which most people depend for sustenance, there will be better knowledge of natural production at the different tropic levels, of their interrelationships, and of the principal effective species of each level. From such knowledge there will stem guidelines for the selection of new species to be used for human benefits, for the modification of agricultural practices to higher levels of sustainable efficiency, and for the planned allocation of land to its highest uses.