The report also notes that, if antibiotics were removed from feeds, the present structure of the swine industry might break down. Piglets would have to be suckled longer to get the natural bacteria killers in their mothers' milk. Sows would breed less frequently. "More labor and time would be required to thoroughly clean and disinfect between groups of pigs." And because of increased costs, farmers might have to return to "pasture production." The seasonal nature of natural pig life "would mean large month-to-month variability in marketings reminiscent of historical patterns and would be disruptive for today's packing industry." In this way, the pig industry has become dependent on drugged feed.

The drugs that keep the animals healthy have a negative effect, however. When used steadily in small doses—as is the case today—they create an environment with a strong selective bias. Bacteria genetically endowed with the strength to survive in a sea of antibiotics flourish. Those without it die. Thus, modern feedlots are marvelous breeding farms for resistant strains of bacteria. The potential threat to human health lies in the fact that some of these bacteria infect people as well as animals, and some are able to pass their resistant genetic structure to other types of bacteria, including types that infect humans. (*Salmonella* and *Escherichia coli* are the two most frequently mentioned.) As the microbiologists say, these feedlots act as reservoirs for drug-resistant genes.

No research has linked a human epidemic with the perceived threat in using low levels of antibiotics, but the threat itself was enough to persuade Great Britain to ban the use of human-disease antibiotics as a feed additive in 1971. By all reports, however, farmers in Britain have circumvented the government by obtaining the drugs by prescription from veterinarians, and adding it to the feed privately. They could do the same here.

The FDA in 1978 proposed to ban the use of penicillin and tetracycline as feed additives because these two drugs are the most important for human therapy. According to Virgil Hays, the properties that make them valuable for humans also make them valuable in animal feeds: they are "broad spectrum" bacteriocides without peer. Just as the FDA was preparing to go into regulatory hearings, Congress intervened and stopped the process.

Crawford says, "We are ready to go to hearings right now and regulate." But there is a "catch-22." If new evidence relevant to the issue turns up, the FDA must consider it before taking final action. "It would be a little stupid to go to hearings unless we could see what the light at the end of the tunnel is," according to Crawford. The FDA, he thinks, will probably go to Congress and ask what should be done next.

To judge by the comments of the House Agriculture Committee staff, Congress is not recommending any action at the moment. And it is not difficult to understand why. Limiting antibiotics

Rain Forests Vanishing

Barring a change in human nature, virtually all the world's remaining rain forest will have disappeared within the next generation. Although a committee of the National Research Council does not label this a "crisis," it makes it clear in two new reports that nothing less than an emergency effort is called for to mitigate the effects of this loss.

The reports, on "conversion of tropical moist forests" and on research priorities (the latter to be produced at the end of May) relate that the world's tropical forests are being destroyed at an even faster rate than anyone thought, by commercial timber harvesters, forest farmers, cattle raisers, and fuel wood gatherers. An area the size of Massachusetts is being permanently converted every month, and by the end of the century the only

Monteverde Cloud Forest Preserve in Costa Rica.

Photo by G. Powell

sizable areas remaining will be the remote parts of the Amazon and areas of equatorial Africa. But these, too, will probably disappear in 40 or 50 years. Actually, it may happen sooner as 90 percent of world population growth over the next 20 years is expected to occur in tropical countries.

The committee, headed by Peter H. Raven of the Missouri Botanical Garden, says that very little is known about the complex and fragile tropical ecosystems. Of the 4 to 5 million species of plants and animals in the world, 3 million are found in the tropics, and no more than one-sixth of these have been taxonomized. In addition to research on tropical ecosystems, the committee emphasizes the need to accelerate biological inventories, collect specimens, set up gardens, zoos, and seed banks to preserve the fast-diminishing tropical gene pool, and increase by four or five times the number of tropical experts in the world, who now number about 1500.

Norman Myers, a Nairobi-based wildlife expert who collected information for the committee, says the picture is not as bleak as it might be as the government of Brazil, which owns one-third of the world's rain forests, has come to recognize the ecological and economic losses incurred by rapid and heedless exploitation of the Amazon. But this new sensitivity may only delay the inevitable.

Says the committee: ". . . the destruction of these vast ecosystems without the development of ways for replacing them with others equally productive foredooms a large portion of the human race to misery and portends instability for the entire globe by the year 2000."—CONSTANCE HOLDEN

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