Dr. David R. Stoddart

Frigate birds fill the air near the proposed airfield site on Aldabra.

BASE OR BIRDS

Secret war for Aldabra island

A largely secret war over the future of the island of Aldabra has been stewing along for more than six months now with no indication yet of who is winning—the scentists who want to preserve the island's unique ecology or the British Defense Ministry which wants to build a military airfield there (SN: 8/12).

All the points seem to stack up in favor of preserving Aldabra, but the final decision must be made by the British Minister of Defense, Denis Healey, who has already ruled out consideration of alternate islands nearby. While speculation piles up as to which way he will lean, no one knows at this point but Healey himself.

Aldabra is actually four islands that surround a large lagoon. It is located 400 miles east of the African mainland and 260 miles northwest of Madagascar in the Indian Ocean. On the respective islands live about 100 fishermen, the Eastern Hemisphere's entire population of giant land tortoises (Testudo gigantea) and a population of frigate birds estimated at from 100,000 to well over a million.

There are, according to the U.S. National Academy of Sciences, 12 endemic species or subspecies of birds, including a flightless rail, and 18 or more unique species of higher plants. About a quarter of Aldabra's invertebrates—insects, for example—are found nowhere else.

But the struggle to preserve this ecological nonesuch has become more of an international political intrigue and less and less a simple confrontation of scientific necessity and military desire. Those involved in the affair now speak of "putting the heat on" British Defense Minister Healey more than of amassing evidence to persuade him to lay off.

One reason for this may be that there is really little new evidence to present. The first party of scientists from Britain and the United States to visit the island under a British Royal Society crash study program has already returned home, without—under orders of the Royal Society—making any public statement on their findings.

A report from that month-long visit by eleven scientists has been prepared. Those privileged to see it say that while it contains no report of any major discovery, it confirms the uniqueness of the abundant Aldabran fauna and flora.

Scientists on the expedition, which was subsidized by the Royal Navy, were sworn to secrecy by the Royal Society. Before embarking, each had to agree, in writing, not to discuss the expedition in public without prior approval of his remarks by the Society.

The 13-man expedition arrived on Aldabra in two parties, on August 13 and 30. On September 18, all but six men left as they arrived—on the H. M. S. Vidal which ferried them to Mombasa for the flight home.

The ruggedness of the island was surprising, expedition leader Dr. David R. Stoddart of the University of Cambridge reports. It is so rough, he says, that "a scientific party could not hope to carry out scientific work while traversing it. . . ."

The first indication of official U.S. attitudes came last week when, in a letter to SCIENCE, Dr. S. Dillon Ripley, Secretary of the Smithsonian Institution, reported, after discussions with U.S. Defense Department officials, his conviction "that the Pentagon is well aware of the scientific values of Aldabra. It is my strong impression that our defense authorities have been willing to consider alternate sites. I am aware that our Government has fully conveyed to the British the concerns of the American scientific community."

From this vantage point, he adds, "we believe that the fate of Aldabra probably lies in the hands of Mr. Denis Healey and the British Ministry of Defense."

"The Smithsonian has been deeply concerned from the beginning over the possibility of military development on what is certainly the most scientifically interesting atoll in the world oceans," Dr. Ripley says.

The 60-square-mile coral atoll should be interesting to Americans for another reason as well: They paid two-thirds of the cost of acquiring it from the fledgling government of the Seychelles Islands, a few hundred miles to the northeast. Aldabra is part of the British Indian Ocean Territory, formed in November 1965, by purchase from the Seychelles and Mauritius, another nearby archipelago.

It was purchased rather than simply appropriated as part of a colony with the intent of preventing any future question as to sovereignty once the Seychelles and Mauritius become full-fledged nations. The questions however, have already been raised in Britain by such publications as THE TIMES and the NEW SCIENTIST magazine.

The U.S. share, so far, is $9.3 million of the $14 million price paid the protostates. If the Aldabra airfield is built, the U.S. is committed to pay half its projected $56 million cost for a grand total of $37.3 million.

Partly because of this, British critics of the Defense Ministry are questioning

the stated reason for establishment of a military base on Aldabra—that England needs a point where Far East-bound planes can take on food and fuel.

There are, they point out, two other routes already open. One of these is via Cyprus, Bahrain and the island of Gan in the Indian Ocean. The other, longer but less involved politically, is across the U.S. and the Pacific Ocean.

Barring war with the United States or military intervention in Southeast Africa, the critics acidly observe, there is no need for a base on Aldabra or anywhere near it—unless, they hint, there is more to America's willingness to pay half the cost than has been publicly stated.

Healey, after negotiations with a Royal Society delegation on May 22, promised that a decision on whether or not to go ahead with the base would be forthcoming within a year.

Whether this will now be shortened to produce a decision this fall as a result of the Royal Society expedition is not yet known. But if the base is ever built it will be over the massed dead bodies of most of the British and American scientific community. ◈

PHARMACOGENETICS

Heredity and drug reactions

Penicillin cures most of the thousands of patients who take it every year but it also kills hundreds of others whose tolerance for the antibiotic is zero.

Aspirin relieves some persons' headaches and makes others sick.

Sleeping pills that give some individuals eight hours sleep wear off in others in four or five hours.

Man's reactions to drugs are as personal and varied as his fingerprints and this same individuality of response also applies to the millions of animals scientists use in initial experiments on new drugs.

For three days last week eminent researchers meeting at the New York Academy of Sciences' first international symposium on pharmacogenetics reported on the complex hereditary and environmental influences that determine drug behavior in man and animals. The staggering thrust of what they said is that genetic make-up plays a definite but as yet undefined role in a person's reaction to a particular drug, that environmental factors including temperature, time of day and other drugs a man may be taking all have their effects and that the old truths about some animal species being categorically better experimental models than others may not be true at all.

In studies of an antituberculosis drug, for instance, Dr. David Price Evans of the University of Liverpool learned that Caucasians generally are slow to react whereas Eskimos and Japanese respond rapidly.

Speaking of disturbing differences in drug response between animals and humans, Dr. Kurt Hirschhorn of Mt. Sinai School of Medicine in New York pointed out that thalidomide, the tranquilizer that deforms unborn children, generally has no ill effects on rat fetuses. Aspirin, on the other hand, is lethal to unborn rats. By that logic, thalidomide would be on the market today and aspirin would not; it was because of this difference in response that thalidomide was not spotted as a teratogenic agent until it deformed hundreds of European children. The answer to such problems, according to Dr. Hirschhorn, is somehow to do studies in man.

Because pharmacologists are becoming more and more sophisticated and their understanding of drug behavior more and more precise, the future of medicine is very bright indeed. Nevertheless, pharmacology is still in its infancy and, for the present, the rapid advances scientists are making merely promise to make drug studies more complicated than they already are.

During the last couple years, a number of scientists across the country, studying the way mice metabolize hexobarbital and other common barbiturates, have reported varying results. At the Academy meeting Dr. Elliot Vesell of the National Institutes of Health, Bethesda, Md., offered a partial explanation for this. "Mice who sleep on maple shavings sleep better than mice who sleep on red cedar bedding," he said. About a year ago Dr. Vesell, who has been investigating hexobarbital metabolism, observed a dramatic shortening in drug-induced sleeping time in his experimental animals; the change occurred when bedding in cages was changed from hardwood shavings to soft—red cedar, white pine or ponderosa pine. Bedding had been changed simply because laboratory odors improve considerably when animals are kept on aromatic softwood beddings.

Following up the dramatically altered drug response, Dr. Vesell discovered that something in the softwood—probably a terpene substance—directly affects enzyme activity in the mouse livers. This substance, he reports, increases the amount of hexobarbital oxidase—an enzyme that breaks down hexobarbital—in the liver. Consequently, animals who have high levels of this enzyme use up the drug and wake up sooner than animals who do not break it down as readily.

"It's not a matter of one kind of bedding being better than another," he says. "But when scientists report results they should include this kind of information because environmental factors have to be taken into account in any valid evaluation."

Dr. John J. Burns of Hoffmann-La Roche, Inc., Nutley, N.J., also reported on environmental factors and species differences affecting drug action. Insecticides such as chlordane and DDT that are often sprayed in animal rooms significantly affect the rate at which animals metabolize drugs. Dogs are particularly susceptible to insecticides, he says. Dr. Burns' studies also cast doubt on the belief that monkeys' response to drugs is most indicative of man's reactions. In some cases, the monkey is really predicative of what will happen in the dog, not in man, he found. He tested the time it takes for man, monkey and dog to metabolize antipyrine, a fever-reducing drug, and discovered that man needs 12 hours to do what monkeys and dogs do in less than two hours. Generalizations about ideal animal models are crumbling, and as they fall, complex and unanswerable questions are being raised about the nature of animal data researchers submit to the Food and Drug Administration for evaluation in new drug applications. "At FDA and in industry levels of understanding are going up," Dr. Burns believes.

The intricacies of evaluating drug behavior in animals are outweighed only by the intricacies of applying new insights to drug response in man. "An allergic reaction to simple chemical drugs involves a sequence of several events," Dr. Bernard B. Levine of New York University School of Medicine told the meeting. And this sequence, involving hundreds of separate events at the molecular level, is probably genetically controlled. The number of effects at work in drug sensitivity is so enormous, scientists can only begin to appreciate the dimensions of the task that lies ahead. "We have no simple formula or hypothesis to apply to genetic effects on drug behavior and man's mind is simply not equipped to handle all the varied, specific information at hand," Dr. Levine said. So far, the best doctors can do is assume that if a rare drug allergy turns up in one patient, it may turn up again in some member of the family.

The hope expressed by participants at the symposium is that pharmacogeneticists will eventually clearly recognize the causes of drug allergies in order to prevent toxic reactions, or at least alleviate their sting. ◈