with the vote in prospect, it is desirable to encourage development projects to reduce Micronesian economic dependence; he is regarded as a strong backer of the superport idea.

The environmentalists believe that the government attitudes are also influenced by defense considerations. Since the U.S. pullback from the Asian mainland, the Pentagon is said to have become interested in using Palau for anchorages, storage, and training but has met stiff resistance from the islanders to proposals to use Palau as a base and is apparently backing the superport idea.

Because of Palau's status as a Trust Territory there is some confusion about whether federal legislation such as the Endangered Species Act applies. A crucial question is whether the Environmental Protection Act applies, and an environmental impact statement must be submitted before a superport project could be approved. An Interior Department spokesman notes that an impact statement is required in cases where significant federal action affects the environment, but says Interior officials decline to speculate on whether the act would apply in Palau on the superport issue. Environmentalists say that a U.S. Corps of Engineers' statement indicates that an impact statement would be required. If battle lines are drawn on the superport, environmental groups' initial tactics might well include efforts to prove that U.S. environmental legislation does pertain.

Palau's ecology, described in a long article in the September *Audubon* magazine, is both valuable and vulnerable. The main features of the island group are the big island of Babelthaupe—about 25 miles long with hills and jungle, which are unusual in Oceania—and a long barrier reef system on the western, leeward edge of the group which encloses two major lagoon areas to the north and south. The lagoons and some rare inland "lakes," which combine salt and fresh water in varying proportions, provide important breeding grounds for Palau's exotic biota. Native to Palau, for example, are a breed of dugong, an aquatic herbiverous animal, the Hawkbill turtle, and Palau owl, all of which, say environmentalists, would be endangered by the superport. The superb coral reefs are also said to be at risk from the effects of dredging, construction, oil spills, and industrial wastes. A longer range fear is that further development of refinery and petrochemical industry would involve the bringing in of construction crews and workers who would inevitably upset the life-style and culture of the inhabitants.

Palau is not entirely unspoiled. Particularly in the administrative center of Koror at the south end of Babelthaupe, where a large part of the Palau population is concentrated, there is evidence of the adoption of the sleazier features of American culture that have blighted Guam, American Samoa, and other Pacific islands. The Palauans are certainly more dependent on American money and modes than they were a generation ago, but so far have retained their own culture and village living patterns to a remarkable extent.

Panero and his colleagues agree that the ecology of Palau is fragile and argue that the superport could, so to speak, be sealed off in a northern area of the islands. No specific site, however, has yet been picked. Sound planning and the use of new techniques could minimize damage from dredging, construction, and operation of the port, says Panero, and prevailing winds and ocean currents would carry any oil spills or pollution away from vulnerable areas. And the port would provide jobs which the Palauans need. The environmentalists are inclined to dispute this analysis point by point.

What appears to be emerging is not a contest along conventional lines between developers and preservationists. An accident of geography and the turn in oil politics has made Palau a natural target for economic development by powerful international interests. There is disagreement over whether "self-determination" by the Palauans on the issue can mean very much when the members of an isolated and unsophisticated society are subjected to such pressures and temptations. Add to this the claim that Palau is of such environmental value as to be a rare world resource. Consider also that, for the United States, there may very well be a conflict between acting in the best interests of the Palauans and furthering its own strategic and economic aims. All in all, the issue of Palau and the superport is shaping up as a challenge for the new Administration from an unexpected direction.

—JOHN WALSH

# Birth Control: Report Argues New Leads Are Neglected

One thing this overcrowded world needs most is a perfect contraceptive—safe, effective, long-lasting but reversible in action, easy to administer, and inexpensive. Granted, there are very few individuals who actually believe that such an ideal agent is likely to come along. And no one is so simplistic as to believe that, even if there were a perfect contraceptive, it alone could reverse the world's headlong course toward disaster that is accelerated every time the birth rate rises. But there is reason to believe that a limited variety of new and better contraceptives are well within the realm of possibility and that they would contribute measurably to slowing the rate of population growth.

The trouble is, according to a major Ford Foundation report* that will be released within a couple of weeks, neither governments nor drug companies nor scientific institutions are doing nearly as much as they might to exploit available leads to make improved contraceptives possible. Nor are they devoting adequate resources to studies of safety of existing methods of fertility control.

From the mid-1960's until the early 1970's, population control was a very glamorous subject that attracted a lot of attention as women by the millions began using oral contraceptives or intrauterine devices (IUD's) and people expressed high hopes that these agents of modern technology would work wonders by putting the brakes on the perpetual baby boom in developing countries in particular. It was not long, however, before it became apparent there were many obstacles to zero population growth. Women in developing countries, the members of ancient cultures that prized

*For information about obtaining a copy of *Reproduction and Human Welfare*, contact MIT Press, Cambridge, Massachusetts 02142.

large families for important social reasons, did not always welcome pill or IUD-bearing family planners. And in industrialized nations, the United States in particular, genuine concerns about the safety and efficacy of the new contraceptives harnessed what had begun as unbridled enthusiasm. Support for research in reproductive physiology and contraceptive development peaked in 1973 and has been declining gradually in real dollars since then. Authors of the Ford Foundation report, *Reproduction and Human Welfare*, would like to see their well-documented arguments on behalf of research and development reverse this trend. However, as one foundation official said on a more realistic note, they would be satisfied if it even helped to "renew" interest in a field that has not declined in importance just because the glamor has worn off.

Like most reports intended to garner support, *Reproduction and Human Welfare* has the familiar ring of a special pleading. But the authors have gone easy on hyperbole, concentrating their efforts instead on a substantive analysis of the state of the art of reproductive physiology and a thorough discussion of the realities of funding.

*Reproduction and Human Welfare*, which reflects the work of more than 150 experts from 23 countries and contains 41 scientific essays, began as a modest venture. A couple of years ago, Ford Foundation officials gave Harvard biologist Roy O. Greep a contract to write a paper on the contributions of basic science to contraceptive development. As they say, "It growed like Topsy." Greep then directed what turned into an enormous study that covers the waterfront as far as its assessment of research is concerned and ends up citing 230 "gaps in knowledge" that should be amenable to closing. The report also candidly notes those areas of past promise that have not turned out so well—development of a morning-after pill being one of them.

Research in contraceptive development, unlike research in other areas of biology, has been supported extensively by the "private sector," which in this case means foundations and, to some extent, drug companies. This was the case particularly at first—pre 1965. For instance, as the report points out, until the mid-1960's the U.S. government had a positive abhorrence of the idea of getting into anything related to birth control and the National Institutes of Health (NIH) was therefore a latecomer to the field. Furthermore, if budgets are an indication of priorities, the U.S. government seems to be losing some of the interest that was generated during the heyday of the pill and IUD. Nevertheless, it is true that during the years from 1965 to 1974, governments' share of the funding increased from 44 to 69 percent of the world total.

For a time there was no great concern about where support for contraceptive development would come from. It was assumed that the drug companies, which in the late 1960's were falling over each other trying to develop a pill with a new twist that would make brand X more marketable than brand Y, would pick up the burden by initiating full-scale research efforts. That simply has not happened. Enthusiasm for existing contraceptives has dropped while Food and Drug Administration requirements for premarket testing in animals and small groups of women have stiffened appreciably. The costs in time—estimated at up to 15 years—and dollars—in the neighborhood of $10 million—of producing a new contraceptive are huge. The rewards, if one were to be successful, would be small, because the ideal contraceptive would be inexpensive to produce and cheap to buy. As one observer noted, the prospects are not likely to make a stockholder's heart go pitter-patter. The drug companies are pulling out. The report notes that whereas they once accounted for 34 percent of resources in the field, they now account for about half that. Estimates that the drug industry spends even $20 million a year on birth control research are said to be exaggerated.

The irony, as Greep and others see it, is that support is declining at the very time that advances in the understanding of reproductive physiology in the male as well as the female are coming along at a good pace—advances that offer genuine opportunities for practical exploitation. Of course, the usual caveat is there—no one is making any promises. But the opportunities are there, in drug-containing implants and vaginal rings, in male contraceptives, and in an antipregnancy vaccine based on human chorionic gonadotrophin, one of the hormones necessary for the development of the placenta.

In current U.S. dollars (that is, not taking account of inflation), the worldwide level of support for fertility regulation research increased from $31 million in 1965 to $119 million in 1974. The authors of the Greep report find that an expenditure of half a billion dollars, worldwide, by 1980 would constitute an "adequate" effort in the field. That would be approximately triple the current amount of support. If it were to be achieved—probably only an optimistic hope—U.S. sources would have to contribute $328 million, other industrial nations $162 million, and developing nations $7 million.

The authors also recommend that a significant amount of that money be spent on evaluations of the intermediate and long-term safety of contraceptives, including research to identify useful animal models for study, and prospective and retrospective epidemiological surveys to find out, for example, what happens to women who take the pill for 5 or 10 or more years.

Recognizing the fact that drug companies have a reservoir of talented scientists whose expertise in reproductive endocrinology is no longer being fully exploited for contraceptive development, and acknowledging that the drug companies are not going to make huge investments on their own, the report proposes a new relationship between industry and government. Specifically, it suggests that the government subsidize certain types of research in industry—toxicological studies are an example—and that it consider modifications of patent law to favor companies that do invest in research and development.

The report also encourages a greater division of labor among scientists in (i) the United States, (ii) other industrialized countries including Western Europe, Canada, Japan, Israel, and Australia, and (iii) the developing nations, suggesting that by 1980 the split be 50-40-10 percent of the work. To accomplish this the industrialized nations will have to increase their spending, as will multilateral agencies, such as the World Bank and the United Nations Fund for Population Activities, both of which tend to support research in developing nations.

It is unrealistic to suggest that the recommendations in the Ford Foundation report, which was prepared in collaboration with the Rockefeller Foundation and the International Development Research Centre of Canada, will lead to a massive outpouring of research funds. However, it may give policy-makers a better idea of what is most important in the field, while also reminding them that it is still there. As one scientist who is quoted anonymously in the report put it, "Contraception is not a take-it or leave-it matter. The future of mankind depends not upon the conquest of cancer but on the control of human reproduction."

—BARBARA J. CULLITON