

# The Crowded Earth

*The Caltech Population Program is proceeding on the assumption that all the countries of the world have much to gain by slowing their rates of population growth.*

The Caltech Population Program is a long-range plan for studying the world's population problems and making its findings available to population scholars and policy-makers. Headed by Harrison Brown, professor of geochemistry and of science and government, the program is examining how different social and cultural patterns and varying governmental policies affect population. The ultimate objective, of course, is to help man control his own numbers.

Assisting Brown as deputy program director is Alan Sweezy, professor of economics, and an advisory board consisting of Edwin Munger, professor of geography; James Bonner, professor of biology; Thayer Scudder, professor of anthropology; David Elliot, professor of

history; and Kenneth Frederick, assistant professor of economics.

For its first three years the program is being supported by an \$800,000 contract with the Agency for International Development (AID) and will concentrate on underdeveloped countries, where population growth and the resulting socioeconomic pressures are greatest. Later, a separate phase of the program might consider the population question in the United States. This phase would clearly be related to many of the environmental concerns of Caltech's new Environmental Quality Laboratory (*E&S*—January 1971).

Though the program will remain based at Caltech, a large part of the work will be done by the American

Universities Field Staff (AUFS)—an international research organization supported by a consortium of American universities, including Caltech, which has for the last 20 years done field studies on a broad range of topics and countries. Providing the program with a worldwide deployment of population researchers, AUFS has agreed to do a total of 60 studies during the initial three-year period. In each country to be studied, specialists will probe the population policies and programs of individual governments, AID, and other international and private organizations working in the field. Local studies by foreign scholars will also be supported. All this data will become part of a special collection of books, papers, statistical surveys, and other material which Caltech is assembling as a body of source information for scholars and policymakers.

The results of the first year's efforts were presented recently to a group of Caltech scholars, visiting demographers, and AUFS specialists at the first annual conference of the program. Reports on a total of 12 countries were given by as many AUFS population experts: Jon McLin (Belgium), Dennison Rusinow (Yugoslavia), F. Roy Lockheimer (Japan), Loren Fessler (Hong Kong), Willard Hanna (Indonesia), Albert Ravenholt (the Philippines), Louis Dupree (Afghanistan), Thomas Sanders (Brazil), Richard Patch (Bolivia), Victor DuBois (Ivory Coast), James Hooker (Malawi), and Norman Miller (Kenya). The papers illustrated what is unique about the Caltech program because they cut "diagonally" across the problem, dealing with the political, economic, social, cultural, and historical backgrounds of the population policies operating in each country.

One of the most dramatic developments covered by the conference is the discovery of prostaglandins, a group of hormone-like chemicals found throughout the body but mostly in seminal fluid. These substances, described by R. T. Ravenholt, director of AID's Population Office, may prove to be a major breakthrough in birth control technology.

Of the 16 prostaglandins identified so far, two appear to be most promising as birth control agents. They have already been used successfully by a Ugandan doctor in inducing labor in full-term pregnancies, and by a researcher in Sweden, where the chemicals were shown to be effective in emptying the uterus at *any* time after conception. The substances, which are apparently involved in the natural mechanism that triggers labor, operate by causing muscular contractions in the uterus.

If subsequent tests prove successful, prostaglandins may truly be the ideal birth control device: a non-toxic, completely effective substance which, administered on a single occasion at any time after intercourse, terminates pregnancy. If a means of self-administration is developed, prostaglandins could end the "clinical bottleneck"—the shortage of trained medical personnel and available

clinics—which hampers present birth control programs. Of course, the substances may also introduce a new set of problems. For if women can use the chemicals to administer their own abortions, this may conflict with local laws. And if it becomes necessary to regulate the distribution of the chemicals through trained medical personnel, that may re-introduce the clinical bottleneck.

Encouraging as the new research seems, the key is motivation and education, not technology. The "perfect" birth control device, even if we get it, may not have great impact because of other obstacles.

This notion seems to be borne out by the experience of Belgium, where fertility is low—but not because of sophisticated birth control agents such as prostaglandins. Recent research indicates that most Belgians still use *coitus interruptus* and the rhythm method.

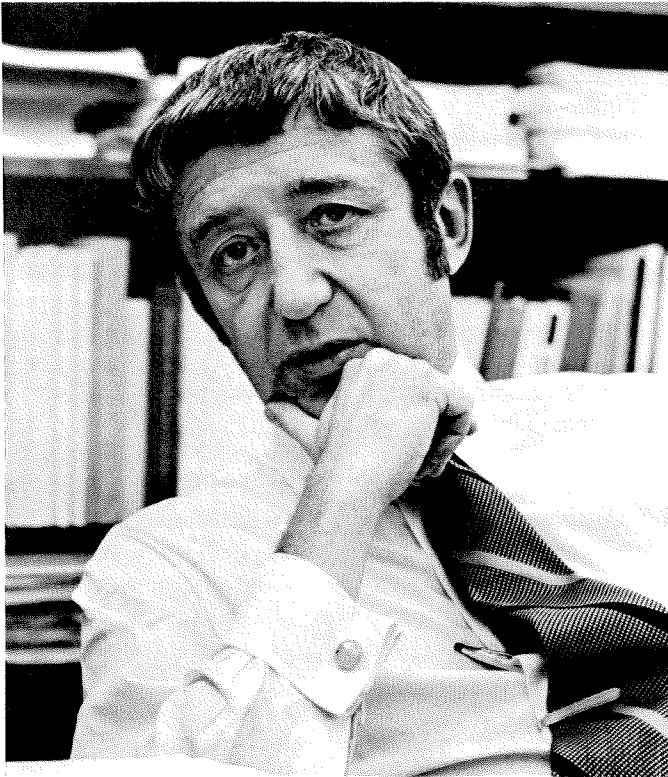
Belgium is fairly typical of Western Europe, where the great decline in fertility which occurred in the 19th and early 20th centuries came about without extensive use of modern contraceptives. The pill and IUD (intrauterine device) were unknown until after the decline had reached its low point. In fact, the real cause of declines in birth rates in these industrialized countries appears instead to have been related to spontaneous forces such as rising affluence and aspirations, or changes in the economic role played by the family.

Large-scale, conscious attempts at family planning are a new phenomenon. The U.S., the U.N., and a growing list of other countries and international organizations are pursuing family planning programs. It is still too early to judge the success of most of these efforts. Taiwan and South Korea, where planned programs of fertility control have been undertaken, exhibit declining birth rates, but there is considerable disagreement as to how much of the decline is due to the program and how much to economic growth, urbanization, and other socioeconomic changes.

Throughout most of history, both birth and death rates have been high and approximately in balance. The success of modern science and technology—progress in medicine and public sanitation—have destroyed the balance. Falling birth rates have eased, though not eliminated, population pressure in the industrialized countries. But when modern public health measures were extended to underdeveloped countries—mostly within the past 20 or 30 years—these countries experienced a sharp decline in death rates without a corresponding decline in birth rates.

Most people in the poorer countries—which are still largely agricultural, where supporting children is cheap, and where children are the only old-age security a subsistence farmer can ever hope to have—kept on having as many children as they could.

Modern public health techniques can be applied on a vast scale without requiring the education of large numbers of people, but birth control techniques obviously



Harrison Brown, principal investigator for the population program.

cannot. This theme—the critical necessity of individual education and motivation, regardless of the technology available—was repeatedly underscored at the conference.

Many reports also made it clear that the required education should not be directed exclusively at the masses; the governing elites also need persuading that their countries face a real population crisis which demands resources and governmental action.

A variety of official attitudes exists among the nations discussed; some actually favor increased population growth. They see it as a means of achieving international stature (more people = more importance in international affairs; more people = bigger armies). They also equate population growth with economic growth—a notion only recently challenged in this country.

Some countries favor decreased population growth, although practically none of these have taken effective action or allocated sufficient resources to family planning programs.

Some countries have no policy at all.

In Malawi (a small country in southeast Africa), few people are very much excited about population problems, though Malawi has an alarmingly high annual growth rate of 3.3 percent and one of Africa's highest densities. Since they are concentrating on agricultural rather than industrial development, Malawians feel that they, unlike Americans, are increasing rather than wasting the earth's resources. So, from their point of view,

American arguments against population growth are merely old-style racism tricked out in new garb.

What happens in tiny Malawi may not do much to impede the worldwide momentum of family planning, but the situation in a country as big as Brazil certainly can. Brazil is one of the countries that officially favors population growth. Currently increasing at 3 percent per year, its population will double in 23 years. The advocates of rapid growth believe it will hasten Brazil's emergence as a great world power. They are also convinced that Brazil's huge uninhabited interior contains vast resources which can be developed to support the rapidly growing population.

Indonesia is a country which is belatedly committed to population control, but so far has been frustrated in achieving it. For Sukarno's Indonesia, escape from colonial domination signaled a single-minded lunge for international prestige, with little thought for the costs of uncontrolled population growth. To Sukarno, population growth was only another monument to the national glory of a country that already ranked fifth in the world in numbers of people. But after the fall of Sukarno in 1966, there came a sobering realization that over-population was closely related to practically every other ill that beset the nation.

Today, Indonesia is experiencing one of the most rapid—and tragic—processes of urbanization in the world. Not only the major cities but also former villages now classified as urban are being packed by migrants attracted by the illusory prospect of employment, housing, and education. In parts of Java, Madura, and Bali, these villages now stretch out almost continuously along the pathways and waterways, so that the residents seem almost to be spilling back into the fields from which they recently migrated.

Statistics in developing countries are often fanciful, but in Indonesia the published numbers bear out what can be seen by any observer: Individual shares of national income, already among the world's lowest per capita figures, are shrinking—even though the national income is rising. The reason is a 2.5 to 3 percent annual rate of population increase.

So far, the country's ponderous, overstaffed, and underpaid bureaucracy has been ineffectual in its attempts to launch a birth control program. In fact, the Indonesian project to date has probably been one of the least efficient and most expensive ever undertaken. The 1969 figures indicated that it cost \$60 to reach each of the 50,000 persons served by the program.

The gloomy inventory goes on: If Kenya's present rate of population growth continues, the potentially productive acres per person will sink from 4.2 in 1965 to 2.6 in 1980 and 1.3 in 2000. Yet, the opposition leaders in Kenya criticize the government's support of family planning on the grounds that neighboring Uganda may get ahead in numbers and power.

Nor should it be assumed that sentiments like these prevail only in relations among nation-states. In the wake of tribal tensions that accompanied the assassination of Tom Mboya in 1969, members of the Kikuyu tribe in Kenya took oaths to avoid any family planning so as to increase their numbers vis-à-vis other tribes in the country.

What is the prospect for increasing the productivity of people, land, and factories to provide for the added population? Rapid population growth acts as a serious drag on economic development, and it means one of two things: (1) Either a part of current production must be used merely to maintain the existing standard of living, or (2) some people must be left out and all the resources concentrated on improving the lot of the in-group.

This gives rise to what social scientists call a "dualistic society": one sector with jobs and a rising standard of living; the other unemployed or underemployed, scraping along on bare subsistence, and looking forward to nothing better.

It is not that there is an ideal population for each country. This surely is a function of technology, social organization, natural resources, and other factors. The problem is capital formation—saving something back from present consumption to invest in greater output of material and social goods in the future.

Critics of Brazil's present policy would undoubtedly grant that this richly endowed land could eventually support 200 million people at a satisfactory standard of living, but they would insist that it makes a great deal of difference how soon that population level is reached.

It is obvious that Indonesia, another vast and potentially rich country, theoretically could support her population at the standard of living enjoyed by Japan, which has a similar population (more than 110 million) but only a fraction of the land and resources. However, in the late 19th century when Japan was beginning to industrialize, her population was only about 30 million. Population grew rapidly *during* the course of economic development—but not before it. Thus, the resources Indonesia needs to *both* sustain her present population *and* invest in the future are enormously greater than those Japan needed to launch her "economic miracle."

Traditionally, most nations have viewed their population problems in economic terms. To some extent this attitude remains prevalent today, with most discussions centering around the question of whether a nation's population can produce enough goods to sustain itself, or how population growth will affect its gross national product. Only recently has the scope of concern broadened to include the effects of population on the overall quality of life, and this awareness has largely been confined to the most industrialized countries. Japan, for example, a country whose economic growth has been spectacular by any standards, today faces problems of industrial pollution and urban congestion at least as severe as those encountered in the U.S. Japan's GNP is



*Alan Sweezy, the program's associate investigator.*

now the third largest in the world, and there is no question of that country's ability to feed its own people. But this very prosperity has brought her up squarely against a whole new set of problems: Her atmosphere, countryside, rivers, and coastal seas are polluted; and her cities are plagued by inadequate housing, increasing congestion, and uncontrolled urban sprawl.

Environmental pollution and urban problems are not confined to industrialized nations. Brazil, for example, which is still a relatively undeveloped country, is already experiencing problems of smog and deficient urban services such as transportation, health, education, and sanitation. Some of these problems, in fact, like inadequate health, sanitation, and housing, are actually worse in the less developed countries, where the resources to cope with them are scarcer than in the industrialized countries. However, people in the undeveloped countries place a higher priority on improving their material standard of living than on preserving their environment or solving their urban problems.

Clearly, rapid population growth not only hampers capital formation—and therefore economic growth; it can degrade the quality of life as well. For this reason the Caltech Population Program is proceeding on the assumption that all the countries of the world—whose individual circumstances and problems it will be examining in detail in the next few years—have much to gain by slowing their rates of population growth.