Meetings

Interdisciplinary Communications: Population

One might call it a midterm reappraisal. It is 20 years since the population problem demanded action programs and the prospect of 7 billion people by A.D. 2000 remains inescapably with us. To evaluate what has been achieved and what the prospects may be, the Interdisciplinary Communications Program of the New York Academy of Sciences and the Smithsonian Institution brought together representatives of demography, anthropology, economics, biomedicine, the law, business management, international relations, ecology, sociology, and programmers. The time-scale was the next 20 to 25 years.

T. W. Schultz (University of Chicago) professed his belief that in the next 20 to 25 years the world could feed the multiplying population. If the governments of the developing countries would modernize, which means abandoning a cheap food policy, they could maintain a dynamic economy and be able to take advantage of the modern advances in high-yielding crops. He admitted that it would not eliminate hunger nor produce the balanced diets which the nutritionists would want. It would mean a shift in the areas of food production. For example, in India the advantages of high yields would mean a shift to the Ganges Plains and the major rice bowls of the southern parts, at the expense of the large triangle of central India. Scores of millions of people who are dependent on agriculture reside in this large area of the Deccan, but the new superior varieties of rice, wheat, corn, millet, and others that are responsive to fertilizer are decisively less productive in this triangle because of lack of rainfall and water for irrigation. It would mean migration from this area to provide labor supply for the others. It was inescapably true that the modernization of agriculture could not be administered in such a way as to encourage the production of the optimum requirements of nutritious food. But it did reduce the requirements of land so that acreages would not be the limiting factor. High yields meant not only the intensive use of fertilizer but of pesticides. A danger lay in the vulnerability of the new strains to blight.

J. L. Fisher (Resources for the Future) similarly claimed that minerals, water, and fuel would not be a limiting factor in the next 20 to 25 years. Petroleum would continue to be the major source of power. Even if wells should show signs of depletion, there were vast reserves in the oil shales. New fields were being proved like that in Northern Alaska which, with pipelines, could supply up to 20 percent of the present consumption in the United States. The world outlook was hopeful. He did not see anything which could prevent a fivefold increase in energy supply. Nor were there any predictable shortages or cost increases in iron supplies. Copper, lead, and zinc were more problematical—but there were "outs" there by tricks of substitution. Water could be much more efficiently used. Only 5 percent was required for domestic use. The big losses were in mismanaged irrigation. In industry there would be much more recycling. The compelling reasons for population control were not the running out of resources. He was concerned about the social and biological effects of crowding and environmental damage.

K. Davis (University of California) reported preliminary findings in a world survey of urbanization. Already 38 percent of the world's population were living in urban places, of whom 22½ percent were in cities of 100,000 or over. By coincidence, this was the proportion in the United States in 1900.

The rate of change was remarkable. Ten percent of the world's population were already living in million-plus cities. In 1950, 161 million were so living and today the figure is 375 million. On present trends the whole population of the world would be living in cities of a million and over within 76 years—15,000,000,000—and there would be cities of 1.3 billion population. He stressed the absurdity of the figures.

One of his most telling points about the trends in urbanization in developing countries was the difference between the historic process in the United States and what was happening elsewhere today. The growth of American cities was produced by migration from rural areas. The growth in the cities in developing countries was mainly due to urban fertility and not to intake. The cities themselves were providing the new industrial labor. At the same time, the rural population was growing rapidly without being able to find work by migration to the cities. This meant that, unlike the pattern in the United States where the movement of rural population to become the industrial workers of the cities had compelled technological advance on the farms, the modernization of agriculture in the developing countries would be impeded. He foresaw great political dangers in the growth of the cities. Hunger and misery was obscured in the countryside. In the cities, they provided a common front. In the United States, urban unrest was traceable to the rapid growth of the cities where the planners were trying to solve the problems created by the solving of problems 6 years before.

R. Freedman (University of Michigan) reported on the evaluation of family planning programs in Asia. Not enough time had yet elapsed to judge success or failure. Although many governments had accepted the need for family planning 10 or 15 years ago, effectively the programs had been operating for much shorter times—in India, for only 3 years. He cited "good programs" in Taiwan, Korea, Hong Kong, Singapore, and Malaysia. There the birthrates were falling. In Taiwan, the birthrate was down from 40 in 1962 to below 25. In Singapore where, uniquely the program is based on The Pill and where 85 percent of the babies are born in one maternity hospital, the birthrate had dropped to 24. In Korea the birthrate was falling. It could be ascribed to uterine devices, vasectomy, and illegal abortion.

S. J. Segal (Biomedical Division of the Population Council) reported on birth control methods at present in use or on clinical test. He estimated that between 12 to 15 million women in the world were using the pill and about 5 to 7 million were using intrauterine devices. There were still clinical reserva-

tions about oral contraceptives. There was concern about prediabetic symptoms in over one-third of the women. The effect of the steroids on the liver function could be serious when the nutritional level was low and where there was parasitic infestation. It was difficult to promote oral contraception mass campaigns in developing countries when the pill was still subject to medical prescription in the advanced countries.

M. C. Shelesnyak (Interdisciplinary Communications Program) called for more enterprise both in research and application. In no other field of pharmacology were the safety demands so exacting and indeed unreasonable—complete reliability of the method and no side-effects being expected. The population problem was so serious that some degree of calculated risk must be taken.

The discussions ranged over the effects of the rate of population increase not only on amenities but on the environmental necessities for survival, over the possible role of legislation in imposing either incentives or sanctions, and on communications. Here it was stressed that the levels of communication and persuasion from the educated elite to the person-to-person conversion did not conform to any global blueprint. Far more had to be known about the grass-root responses or nonresponses, because in this especially intimate question people were not going to be persuaded by either international or national imperatives.

S. Zuckerman (Chief Scientific Adviser to the U.K. Government), a specialist in reproduction physiology, pointed out that all the hormonal contraceptives, in use or in clinical evaluation, were based on physiological principles known in 1935. He urged that basic researches into human reproduction should be better supported, not just likely winners. He also urged that far more should be found out about the historical patterns of population change—like investigating parish registers in Europe. In the demographic field we needed far better information about birthrates and age distribution, not only for whole countries but for localities.

While Sir Solly accepted the fact that acreages would not be the limitation of food production and that in absolute terms there would be no desperate shortages of "hard resources" in the short term of 20 to 25 years, he foresaw grave complications in the social patterns which were considerably being determined by decisions now being taken. He cited the problems of the disposal of nuclear waste from installations being projected now. He pointed out the risks involved in the modernization of agriculture. This had to be highly capitalized and mechanized, but by intensification and localization crops became more vulnerable and liable to catastrophe. He stressed the point about reproduction in the cities now producing a labor force which would stifle migration from the countryside, while the high-yield areas would mean the virtual abandonment of the low-yield areas.

He contended that we could not decide what another generation would regard or accept as a way of life. The tendency seemed to be toward huddling together, by choice, in cities. Our responsibility was to avoid squandering resources and fouling up the amenities that the next generation might want to use. He accepted the likelihood of a rise before A.D. 2000 in mean temperature through human activities, with consequent climatic effects, and he recognized the dangers of pollution. The whole story of mankind was the adaptation of the environment. Were we producing a nonadaptable environment?

Speaking as a scientist who was concerned with practical politics, he said that there were no shortcuts to the solution of the population problem. It began with individuals. The individual had to be convinced that there was a problem. Then it had to be made societal, then political, then governmental, and then executive. Government action could only reinforce or facilitate initiatives which had already been taken.

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Influenza Virus: Genetics and Control

The recent advent of the new Hong Kong strain of influenza virus, an A_2 (Asian) variant of sufficient antigenic distinctness to infect previously immune human populations, presages another influenza outbreak of pandemic proportions in the very near future. The periodic appearance of such influenza strains within cycles of approximately 10 years is a well-known phenomenon as is the tendency for these viruses to continuously undergo "antigenic drift." Public health authorities are aware of the general ineffectiveness of our present methods for coping with new strains either by vaccination or chemotherapy, vaccination against known strains being, at most, moderately effective. Also adding to the gloom of current attemps to prevent influenza outbreaks is the inability of virologists to predict the direction which the antigenic fickleness of these myxoviruses will follow. It was against this setting and mood that an informal roundtable conference on possible new approaches to the study and control of influenza viruses was held in Princeton, New Jersey, 11–12 November 1968. This meeting, sponsored by the National Institute of Allergy and Infectious Diseases (NIAID), emphasized discussions on the genetic aspects of influenza virus with the hope that new information might be gained for the effective control of the influenza virion as a disease-producing entity and for future direction of influenza research. Participation in the conference was by invitation and included the following scientists: Convener, W. Braun (Rutgers University), S. Baron (NIAID), R. Chanock (NIAID), P. W. Choppin (Rockefeller University), F. M. Davenport (University of Michigan), F. Fenner (John Curtin School, Canberra), G. K. Hirst (Public Health Research Institute, New York), E. D. Kilbourne (Cornell University), H. G. Pereira (National Institute for Medical Research, London), M. Pons (Public Health Research Institute, New York), R. W. Schlesinger (Rutgers University), E. Simon (Purdue University), R. W. Simpson (Rutgers University), R. R. Wagner (University of Virginia), P. Wright (NIAID), and N. D. Zinder (Rockefeller University). Observers from the National Institutes of Health also attended this conference.

The first and perhaps most interesting session was on the genetics of myxoviruses and paramyxoviruses. Pons led off the discussion with a review of his earlier work demonstrating that high-molecular-weight (38*S*) single-stranded RNA could be extracted from purified influenza virus (A_0/WSN). This RNA was later shown by Pons and Hirst to consist of five distinct components as