

construction of devices to capture all the energy of a central star, this energy eventually appearing as thermal pollution in the far infrared.

But it was still quite generally agreed that the most likely route to detection of and communication with other civilizations is through electromagnetic radiation particularly at radio frequencies, where some existing systems could detect themselves across half the galaxy. There is still a search for syllogisms which would lead to optimum frequencies and places to search. Surprisingly, what had been a simple situation has become complicated. Where once there was one special radio wavelength on which to listen for other creatures, the 21-cm wavelength of hydrogen, there is now a multitude, including spectral lines of water, the stuff of life, more intense than any hydrogen line. There is no clear choice among them. Once there was a microwave frequency where the cost of transmission was minimal, with the cost increasing at lower frequencies due to cosmic noise, and at higher frequencies due to quantum noise. Now the existence of the universal 3° black body radiation has added a new noise source which spreads the most economical frequency from 1,200 MHz to 60,000 MHz. To make things worse, it no longer even makes much sense to examine the nearest stars first. It has been shown that if there is a range in the luminosities of civilizations in which only a small percentage are much more luminous than the rest, then the ones most visible to us will not be the nearest but the intrinsically brightest. These may lie in any direction, and so there is no guidance as to where to look. Such a situation is not unprecedented; the radio galaxies exhibit just this behaviour.

Despite these new uncertainties, the much discussed conclusion that success would lead to great scientific and social benefits, and the striking potentialities of the existing instruments, produced a remarkably strong consensus that major efforts should be made to search for extraterrestrial intelligent life. It was recommended that existing instruments make the valuable and promising searches they can make. Among other recommendations, it was also suggested that studies should be made of the design of giant instruments for searches: a radio telescope 1 km or larger, a 100 metre millimetre wave telescope, a thirty metre submillimetre wave telescope and a ten metre infrared telescope. The first of these, which has many other uses, could cost billions of dollars, a figure thought, after all, not out of keeping with the importance of the subject, and consistent with the sums spent on space and nuclear research. The Soviet workers at Gorky,

under V. S. Troitsky, have in fact recently initiated a search for signals, so far testing a dozen stars, and watching for pulsed emissions from anywhere in the sky; the work continues.

The conference set up a committee to organize future conferences and meetings to coordinate research, if desirable. So far, such organizational activities and actual research have been confined entirely to the United States and the Soviet Union for no profound or good reason. It was expected that participation in the discussion and research in extraterrestrial intelligent life will spread elsewhere.

HUMAN ECOLOGY

Hopes Balance Fears

OPTIMISTS and pessimists were evenly matched at the annual symposium of the Eugenics Society in London last week. The subject was the now familiar population and pollution and Dr Eliot Slater of the Institute of Psychiatry, University of London, began with a warning that population growth, which meant that "a man does his neighbour more harm than good just by staying alive", was forcing society to adopt new standards of behaviour which were to him distasteful. Population pressure was undermining people's natural benevolence. The maintenance of social order requires more and more state intervention, with the result that human identity will be "increasingly translated into a set of digits on a computer". More crowding means more arousal—then drugs and even greater dangers, rage, despair and organized violence. The nuclear family has already been reduced and the pace of social change is such that "we are like a man racing down a mountainside whose legs cannot keep up with his centre of gravity". Does the encouragement of suicide follow the encouragement of abortion? Is it possible to avoid disaster if we regard man as a measure of all things?

The anthropologists took a longer view. People, even primitive people, have always damaged the environment. They are only worried about it now because they can no longer escape the results. The moors of Yorkshire and Wales, like the deserts of North Africa, are monuments to previous occasions on which people have been able to upset the delicate ecological balance. Pollution is not new, only the perception of it.

The environmentalists tended to the view that pollution is a problem in public administration. The urgent need is for collaboration at the level of local, national and international government. The herrings are disappearing from the

North Sea, but DDT is probably not the explanation. So far as this symposium is concerned, the moral seems to be that the fight against pollution must and should begin at home.

The geneticists were more worried by chemicals than by radiation. Dr Mary Lyon, Girton College, Cambridge, argued that the radiation from nuclear fall-out is likely to be less mutagenic than the medical use of X-rays. Dr M. S. Legator of the United States Food and Drug Administration, on the other hand, took the view that respectable investigations of the mutagenic effects of certain chemicals had only just begun.

The sociologists opened with a new warning that it is affluence and not technology or over-population that spells pollution. In the maddening manner of their discipline, they argued that research tends to be concentrated not on the important problems but on those which can be solved, however trivially. To them, to be practical, zero or even negative population growth would be a worthwhile goal.

The capstone of the symposium was the Galton lecture by Dr C. L. Carter, an optimist. The new eugenics, he implied, is the amalgam of social work and genetics which makes it possible to avoid needless misery while allowing people freedom. Dr Carter argued that once family planning is effective the more intelligent parents will have the larger families, resulting in a higher average IQ. He looked for an even more rapid adaption in the future of "genetic endowment to fit society".

PATENTS

Inventions Incorporated

PLANS for the establishment of a European patent office are finally taking shape and the first European patents will probably be granted in 1973. The intergovernmental conference that has been sitting since 1969 has recently published a draft agreement and it is hoped that final recommendations will be made by June 1973.

The notion of a European patent was first put forward in 1955 by the Council of Europe, which agreed on a system of classification of patents that was eventually accepted in 1968. In 1962, the European Economic Community set up a working party to prepare a draft European patent but the plan was shelved until 1969, when the present conference of nineteen European countries was set up.

The European patent is being welcomed by the British Patent Office and Mr J. D. Fergusson, assistant comptroller, estimated this week that the setting up of a European patent office will decrease the number of annual