the named participants in the Study Institute, soliciting comments from them on these views, but would welcome the opportunity of opening the debate up within a wider section of scientific opinion, through your columns. Can we invite those readers of *Nature* who have views on this matter to communicate directly with us?

Yours faithfully,

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Predicting Population

SIR,—There are two additional factors in the prediction of population besides those which were mentioned in John Maddox's article (*Nature*, **236**, 267; 1972), which seem to me to be worth comment.

The first is that in educated and civilized communities, people's behaviour in reproductive as well as other respects is determined not only by their immediate and past environment as it is with most other creatures, but also with their expectations for the future. In consequence, coming events cast their shadow before on birth rates to an extent which is becoming increasingly important.

Arising out of this is the second factor which I would like to mention. This is rather like an extension of the uncertainty principle in physics. When Ehrlich, or Forrester and his computers, make convincingly unpleasant predictions concerning world population, these predictions will be read and understood by large numbers of people whose behaviour may thereby be affected. Therefore even if the prophets have taken every possible existing factor into account, they cannot take into account the effects of their own predictions.

It is difficult to feed into a computer analysis the effects of knowledge of its own extrapolations on birth rates or pollution. It is, however, abundantly apparent that our responses to pollution and population changes are far more determined by their rates of change, and hence the direct extrapolations of their effect, than they are by the present magnitudes. Forrester explicitly rules this out in his computer calculations, and thereby, it seems to me, very reliably invalidates them.

This is not a criticism of the value of predictions; rather it is an explanation of where their value lies. A prediction which could not be modified by a change in our actions really *would* be useless.

Yours faithfully,

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Obituary

Professor N. P. Buu-Hoï

PROFESSOR BUU-HOÏ, French and Vietnamese expert in medicinal chemistry and cancer research, died of a heart attack in Paris on January 28, 1972.

N. P. Buu-Hoï was born on June 15, 1915, in Hué, and is of the Royal Family of Vietnam. Partly because of the desire of his parents and partly because of his own belief in the human value of science, he did not follow the traditional political career of his family, but instead took up research in biochemistry and medicine. He studied pharmacology at the University of Hanoi, and upon arrival in France in 1935 took degrees in physics and chemistry at the University of Paris. During the Second World War he volunteered as a pharmacist in the medical service of the French Army. From 1941 he held appointments on the research staff of the Centre National de la Recherche Scientifique (CNRS) where in 1960 he became director of research.

After 1941, he worked at the Institute of Chemical Physics under the late Professor Jean Perrin, then studied spectroscopy applied to organic chemistry, under the late Professor Ramart-Lucas at the Sorbonne. From 1945 to 1947 he was assistant professor at the École Polytechnique, and then went to the Radium Institute of the University of Paris as director of the Department of Organic and Medicinal Chemistry, where for more than twenty years he was the closest collaborator of the renowned cancerologist Professor Antoine Lacassagne, who himself died recently (see *Nature*, **235**, 291; 1972). In 1960 he transferred his laboratories to a laboratory group at Gif-sur-Yvette, where he led a team of some 20 researchers while continuing his collaboration with Professor Lacassagne at the Radium Institute. From 1967, he also directed a second team of researchers at the CNRS Laboratories in Orleans.

The main research interests of Buu-Hoï were in the fields of biochemistry and pharmacology, but his exceptional gift as an organic chemist enabled him to apply the whole panorama of possibilities of synthetic chemistry to the search for new compounds of biochemical, biological, and pharmacological activity.

His scientific bibliography comprises over 1,000 papers and chapters in books, and records fundamental knowledge in chemistry, pharmacology and cancer research. From his laboratory stem drugs now in clinical practice as well as in experimental development, such as new thiourea derivatives for tuberculosis and leprosy, thyronamine for cardiac conditions, 6-aminochrysene for splenomegaly and cancer chemotherapy, and anti-rheumatismal agents and analgesics.

The study of chemical carcinogenesis represents the core of his scientific acti-

vities over the last 25 years, in collaboration with Lacassagne and numerous younger associates. This resulted in the discovery of a number of new classes of carcinogenic polynuclear, homocyclic and heterocyclic aromatics, the phenomenon of competition between active and inactive hydrocarbons in the production of skin tumours, and the role of various constituents of tobacco smoke in carcinogenesis and promotion. In the field of hepatic carcinogenesis, he studied the effect of various anti-carcinogenic (*p*-hydroxypropiophenone) and promoting (reserpine) agents on tumour induction by the carcinogenic azo dyes and the nitrosamines.

In biochemical pharmacology Buu-Hoï, with Arcos and Conney in the USA, related the induction of microsomal oxidative enzymes by chemical agents and chemical carcinogens. Very recently, with Dr S. S. Epstein, he demonstrated an association between photodynamic and enzyme-inducing activities in polycyclic compounds.

With Saint-Ruf and Pham-Huu-Chanh he investigated the effect of tetrachlorodibenzodioxin, highly toxic and teratogenic contaminants in the herbicide 2,4,5-T, on several enzyme systems, and also established its fragmentation under electron impact.

In the area of medicinal chemistry, he found as early as 1946 that the development of tuberculosis bacilli is strongly inhibited by certain chemical families, notably the hydrazides. This observation was of importance some years later for Doagk in his discovery of the tuberculostatic drug, isoniazid. His research on *p*-hydroxypropiophenone led to the introduction into therapeutics of moderators of hypophyseal function.

Independently from R. Mayer in the United States, Buu-Hoï discovered the efficacy of the thioureas in the treatment of tuberculosis and leprosy. Treatment of leprosy patients in South Vietnam with 4,4′ - diethoxythiocarbanilide showed this drug to be an active therapeutic agent in both lepromatous and tuberculoid leprosy; and a preliminary trial of 2-mercaptobenzimidazole in a small number of patients gave encouraging results in lepromatous leprosy. With Pham-Huu-Chanh he demonstrated the positive inotropic properties of thyronamine and its derivatives. More recently they described the cardiostimulant and hypotensive properties of one of the N-substituted derivatives of the amphetamines, some of which also possess considerable potency as local anaesthetics. Professor Buu-Hoï received wide international recognition. He was honoured by several awards from the French and the Dutch Academy of Sciences, the French Academy of Medicine, the French Ministry of National Education, and the French League against Cancer. He was Commander of the Legion d'Honneur and of the French Order of Public Health. Among others, he belonged to the Societé Chimique de France, the Chemical Society (London), the Society of Heterocyclic Chemistry, and was a corresponding member of the American Association for Cancer Research and honorary member of the Medical Society of Vietnam and the Society of Medicine and Therapeutics of Argentina. In his native country, he had held a professorship and the post of director-general of the National Office of Atomic Energy. He served on several international scientific organizations, in particular as member of the board of governors of the International Atomic Energy Agency, and of the panel of experts for leprosy of the World Health Organization.

He was also on the editorial board of *Chemotherapia, Medicina Experimentalis,* the *Journal of Heterocyclic Chemistry,* the *Journal of Medicinal and Pharmaceutical Chemistry* among others. As a gifted linguist, he could lecture and write in many of the European and Asian languages.

In addition to his scientific and medical activities, Buu-Hoï was involved in public service for Vietnam and for France. Thus, in 1953, he was entrusted with a special mission to Asia by President Vincent Auriol, in an attempt to negotiate a ceasefire in Indochina; he also carried out several cultural missions to Germany for France. For his native Vietnam, Professor Buu Hoï served as science adviser to the late President Diem and, as director of the Atomic Energy Establishment of Vietnam, was instrumental in the development of an Atomic Energy Research Centre, including a nuclear reactor system in Dalat. He also represented the Republic of South Vietnam as ambassador to several African countries and, in 1963, to the United Nations. He was offered, and rejected, important political appointments because he felt he could serve humanity better as a scientist.

With all of his splendid reputation, his personal background, and the numerous honours accorded him from the world of science, medicine, and politics, Buu-Hoï was a modest gentleman, persuasive because he could document arguments with his wide-ranging factual knowledge; he was generous, charming and lovable. Science and humanity will miss Professor Buu-Hoï, the man and the scientist.

Professor J. J. C. Buckley

JOHN JOSEPH CRONIN BUCKLEY, Julien Courtauld Professor of Helminthology in the London School of Hygiene and Tropical Medicine from 1946 to 1966, died on April 12 at the age of 67.

For more than 40 years Buckley gave his undivided attention to helminthology, and he edited the *Journal of Helminthology* from 1946 until his death. He will be remembered as the most self effacing, the most courageous and undoubtedly one of the greatest of a small group of parasitologists whose main scientific effort was to identify the helminths of medical and veterinary importance, to categorize them and to unravel their complex life cycles. He followed in the tradition of Kuchenmeister, Leukart, Bilharz, Looss, Cobbold, Manson, Fulleborn, Blacklock and Leiper.

When he joined Leiper's department in 1927 the life cycles of most of the common parasites of medical importance had already been worked out but there was one problem that remained unsolved: no one knew the vector of *Mansonella ozzardi,* a filarial parasite affecting several million people in the West Indies and South America. Buckley sailed for St Vincent and within a few months he had demonstrated the full development of the parasite in the midge *Culicoides furens*[1]. This was the first of his numerous contributions to the knowledge of filarial infections in man and animals. From the West Indies he went to Malaya where in 1938 he found that *Culicoides* midges were the vectors of *Onchocerca gibsoni,* a parasite of cattle[2].

During the pre-war period many new foci of human onchocerciasis (river blindness) were found in Africa, and in many areas blindness rates of more than 10% were recorded. One of these was in Kenya in the "Valley of the Blind" and it was here where John Buckley demonstrated the development of the parasite in *Simulium neavei* and where he devised the first successful method of interrupting transmission by clearing the shade trees from the edge of the rivers, thus preventing the vector from breeding[3].

After the war Buckley returned to Malaya and it was here where he produced the evidence for separating the parasites causing elephantiasis in man into two distinct genera, *Wuchereria* and *Brugia*[4]. He was, however, interested in the life cycle and pathogenicity of the parasites as well as with the taxonomic problems and it was in Malaya that he began the series of self-inoculation experiments that may have contributed to his early death. T. J. Danaraj and his colleagues in Kuala Lumpur had suggested that the common and disabling condition of tropical pulmonary eosinophilia might be caused by infection with filarial parasites of animal origin. Buckley was determined to put the hypothesis to the test and during the following two years he