Letters

Scientists and the CIA

On 24 January I was visited by a representative of the Central Intelligence Agency. He asked me for information about the direction being taken by certain foreign scientists in the field of neurophysiology. I felt I should not give him this information, I discussed my reasons with him, and he left.

A request of this type places a member of a university faculty in a very difficult position. Any knowledge or skill one has is freely available; if a colleague had asked me the CIA questions I would have replied without hesitation. But there must be another side to this coin of academic free speech: one should reasonably ask the questioner to share the same ethics and tell you specifically for what purpose he intends to use your information. If one is responsible for the information one hands out, one is also partially responsible for any use to which it is put. A professor's duty is to profess, but he must remain in a position to assess the consequences of his profession. A second consequence of a relationship between scientists and the CIA would be to limit the freedom of discussion between American and foreign colleagues. No one speaks to an official, however sympathetic, as freely as one speaks to a friend. We have all had the experience of talking to foreign scientists who were certainly part-time intelligence agents and part-time scientists, and these conversations are so stultified as to be a travesty of the usually free exchange and argument of a scientific discussion. Any general and indiscriminate questioning by the CIA of scientists, in fields such as the life sciences which are normally free of security restrictions, increases the danger that American scientists will be regarded by their foreign colleagues as government agents, as these colleagues now regard scientists from some other countries.

The regrettable state of the world makes necessary the existence of unfortunate agencies such as the CIA, but one hopes that their activities can be sufficiently restricted so that the entire scientific community does not become involved. As the scope of these agencies enlarges, anything can become grist for their mill; let us hope that academic freedom is not included.

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"Projections" versus "Forecasts" in Human Population Studies

Dorn, in his recent article about human population growth (*1*), has credited our work on the same subject (*2, 3*) as setting "a record, for the entire class of forecasts prepared by the use of mathematical functions, for the short length of time required to demonstrate its unreliability."

According to Dorn, a happy contrast to this method which he describes as "the extrapolation of mathematical curves fitted to the past trend of population increase" is the "analytical approach," which he assures us by no means tries to make a forecast ["to estimate or calculate in advance" (*4*)], but gives "merely indications of the population that would result from the hypothetical assumptions concerning the future trend in fertility, mortality, and migration. However, the projections of fertility, mortality, and migration usually are chosen to include what the authors believe will be the range of likely possibilities. . . ." This he properly points out is called a "projection" ["to send forth in one's mind or imagination" (*4*)]. He states that "the most authoritative projections of the population of the world are those made by the United Nations."

A comparison of the "most authoritative" with the "most unreliable" method is given in Table 1, which lists the United Nations projections (*5*) made during the past decade for, as an example, the year A.D. 2000, together with the values computed from Eq. 11 of our article (*2*).

From Table 1 it appears that the "most unreliable" values are just the asymptotes, at the moment of truth, to the "most authoritative projections"; we might mention in passing that the "most authoritative" projectors changed their minds in the last decade by roughly a factor of 2, while the "most unreliable" values (from Eq. 11) are almost independent of the time of their derivation, as was pointed out in our article (*2*).

The question remains as to what causes the "analytical" method to be so poor in making even short-range projections. The answer is suggested by Dorn, who stresses the point that this method of dealing with a growth process takes into consideration instantaneous first derivatives only—fertility, mortality, and migration. However, it is well known in prediction theory (*6*) that consideration of higher derivatives will diminish the variance in the expectation values. For instance, we could not catch a ball in flight if we were unable to compute at least its trajectory's second derivative, which happens, in this case, to be a constant. On the other hand, computation of higher and higher derivatives requires more and more data regarding the process under consideration, which can, by the blind ones whose vision of the future is blocked, be obtained only by studying

Table 1. Low, medium, and high world-population projections (in billions) for A.D. 2000, made by the U.N. in four different years and derived from Eq. 11 of our article (*2*): $N = 1.78 \times 10^{11}/(2027 - t)^{0.99} \pm 7$ percent.

Projection	*N* (U.N. values)				*N* from Eq. 11
	Year of estimate				
	1950	1957	1958	1959	
Low			4.88		6.44
Medium	3.20	5.00	5.70	6.20	6.91
High			6.90	~7.00	7.40