Neutron scattering

SIR—The statements that the EMBL outstation in Grenoble "[has an] uncertain future" and that "neutrons have not turned out to be particularly useful for biologists" in Peter Newmark's article on the European Molecular Biology Laboratory (*Nature* **338**, 724; 1989) require some comment.

Neutron scattering is a specialized technique for which the appropriate instrumentation exists in very few places, the foremost centre being in Grenoble at the Institut Laue Langevin (ILL) which is supported by an increasing number of European states. Distinguished biologists from all over the world apply for beam-time at the ILL. Because of the number of applications, experiments have to be chosen very carefully, and to the usual set of questions asked about any proposal before it is supported is added the question: "are neutrons really the only way to obtain this information?" The "usefulness" of neutron scattering, therefore, would not appear to be very high if it were judged by criteria based on number of papers or number of biologists involved. On the other hand, there is no doubt that the state of knowledge in a number of important branches of molecular biology would be much less advanced today had it not been for neutron-scattering experiments (and similar results could not have been obtained in any other way!). Recent examples that immediately come to mind include the quaternary structures of the ribosome[1] and of the Tet-repressor DNA complex[2], and protein dynamics[3].

The locations of all the proteins of the 30S subunit of the *Escherichia coli* ribosome are now known following ten years of hard work (at Yale and Brookhaven) and this provides a sound basis for the interpretation of many other results. Similar work is under way on the 50S subunit (Berlin and Grenoble). In the field of protein dynamics, inelastic neutron scattering provides unique experimental information with which to test the widely used theoretical method of molecular-dynamics simulation. There are many more examples: membrane structures, protein hydration and stabilization, hydrogen bonding, protein and nucleic acid conformations within small complexes, viruses and chromatin[4].

Because of the juxtaposition of national (CNRS, CEA, INSERM, Université Joseph Fourier) and international (ILL, EMBL, MPI, ESRF) laboratories, many of the complementary structural techniques of molecular biology are undergoing strong development in Grenoble, with the most sophisticated instrumentation available. In this context, we believe that the future of the EMBL outstation is anything but "uncertain".

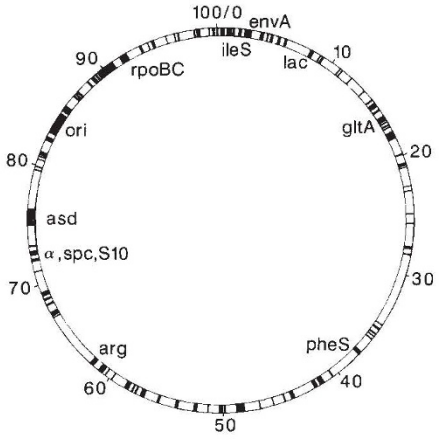
S. CUSACK
B. JACROT
R. LEBERMAN
European Molecular Biology Laboratory, 6900 Heidelberg 1, FRG

R. MAY
P. TIMMINS
G. ZACCAI
Institut Laue Langevin, 156x, 38042 Grenoble, France

1. *Science* **238**, 1403–1406 (1987).
2. *EMBO J.* **8**, 1257–1263 (1989).
3. *Nature* **337**, 754–756 (1989).
4. *Eur. Biophys. J.* **15**, 257–268 (1988).

E. coli genome

SIR—I read with interest Alun Anderson's report from Tokyo (*Nature* **338**, 283; 1989) about the project to sequence in Japan the entire *Escherichia coli* genome.



Unfortunately, this report contains a misleading number, namely that about 450 kilobase pairs have been sequenced by researchers around the world. We have compiled these sequences as carefully as possible from both the GenBank and EMBL databanks and over a period of several years independently from the literature. Deleting the overlaps, we arrive at a total of 956,617 base pairs within 1,132 entries. This corresponds to about 20 per cent of the entire genome already sequenced by individual researchers. If you add a considerable number from unpublished material and some 2 per cent contributed by various insertion sequences, this number will be significantly higher. Our data are published in the sequence supplement of *Nucleic Acids Research* (25 April 1989). The included figure gives a visual impression of where the sequenced areas are located on the circular *E. coli* genome.

MANFRED KRÖGER
Institut für Mikrobiologie und Molekularbiologie, Justus-Liebig-Universität Giessen, Frankfurter Str. 107, D-6300 Giessen, FRG

UK cell biology

SIR—The Southwood report will, according to your summary (*Nature* **338**, 363; 1989) recommend that all biology in UK universities be carried out under the auspices of a single department containing two distinct sub-groups, the one molecular and the other traditional. I note with great concern that the subjects mentioned as falling naturally into one or other category fail to, and indeed cannot, include any aspect of cell biology.

A policy which does not naturally cover this field is short-sighted and misdirected because the cell is the environment of gene expression and the unit of biological function; its role is thus at the very heart of contemporary rather than traditional biology. The study of AIDS, cancer and mitosis, genetic disorders, immunology and developmental biology now involve taking an integrated view of the molecular genotype and phenotype in a cellular context and the work is done as much in biological as in medical departments. These examples also demonstrate that the policy will, if implemented as you report, lead to a fragmentation and hence to a diminution of teaching and research in fields that are becoming more amenable to investigation and hence more important as molecular biology advances.

The Southwood report apparently views biology as being either molecular or non-molecular, but this framework is already out of date. One effect of the molecular revolution has been that almost every branch of biology, be it molecular, cellular or traditional, has a strong molecular component. If therefore we are to plan for the future on the basis of a two-pronged approach to biology, it would probably be sensible to have one focusing on cell and molecular biology and the other on traditional subjects, with the expectation that many groups in both areas will actually be using molecular techniques.

JONATHAN BARD
26 Howard Place, Edinburgh EH3 5JY, UK

Heliocentric Oresme

SIR—It is generally forgotten that the man who anticipated Copernicus[1] was Nicole Oresme who was born at Caen in France *circa* 1320.

In his *Questiones de spera*, c. 1340–50, he treats of a translatory motion of the Earth. Students of the problem may care to consult Balch's paper *The Laws of Oresme, Copernicus and Gresham*[2].

FRANK W. COUSINS
43 Emanuel House, 18 Rochester Row, London SW1, UK

1. *Nature* **338**, 456 (1989).
2. Balch, T. W. *Proc. Am. Phil. Soc.* **47**, 21 (1908) (reprinted).