Rall's farewell to Frontiers

SIR — I shall retire as chairman of the Council of Scientists of the Human Frontiers Science Program (HFSP) in April 1993, and as *Nature* on several occasions has reported some dissension among the participants in this programme, I feel it relevant to record my observations.

The programme was devised and initially totally supported by the Japanese government but initiated only after lively discussion by a worldwide group of scientists who collectively established its goals. The concept developed was to support the most important areas of contemporary biomedical research on an international scale and with particular emphasis on interdisciplinary approaches. Support was to be provided for grants, fellowships and workshops which fell into the categories of "basic research for the elucidation of brain function" and "basic research for the elucidation of biological functions through molecular level approaches".

The programme began officially in the fall of 1989 and Sir James Gowans was inducted as secretary general in January 1990. The first grants and fellowships were awarded in April 1990. The review committees were constructed to have international representation and the grant requests were required to represent interdisciplinary and international efforts. In spite of an extremely tight deadline, Gowans was able to assemble competent committees and present the Council of Scientists with careful and critical reviews only a few months after the initiation of the programme. From the great interest manifested throughout the world it was apparent that this programme could fill a need for modern biomedical science, previously unmet.

So many excellent grant and fellowship applications were received in the first year of the programme that we were forced to reject, for lack of funds, many truly exceptional proposals. At that time, several of the national delegates of the Council of Scientists wondered if a somewhat more focused programme might more appropriately match the limited funds available. No action was taken or recommended. Subsequently the great success of the programme in continuing to attract superb proposals and the gradual increase in funding made the previous discussion appear to be somewhat premature.

Throughout all the discussions over specific grants or fellowships, I was unable to detect the slightest degree of national or chauvinistic tinge to the opinions offered. Obviously opinions differed, but more likely than not they reflected the field concerned; that is, neurobiologists contended that study of

neurobiologists contended that study of brain function was more important than anything else, and cellular molecular biologists vigorously defended their terrain. A view has been expressed that the HFSP should specify the nature of the interdisciplinarity it wishes to sponsor. All these questions are matters for the Council of Scientists and were discussed at its meeting last month. In general the council reaffirmed the original objectives of the broad interdisciplinary programme as it has developed.

Although the budget has increased significantly, non-Japanese contributions still account for less than a quarter of the total. The council and the newly designated secretary general, Dr Michel Cuenod, hope for and strongly support an increase in non-Japanese contributions to make the budget coincide more closely with the opportunities available. The unique characteristics of the HFSP deserve emphasis; it is completely international, both in a rigorous review process and in the grants themselves; it strongly supports a widely interdisciplinary attack on major unresolved problems; and the quality of the grant and fellowship applications is remarkably high. This programme, initiated by the Japanese and developed by an international group of scientists, is an unqualified success.

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Absolute truths

SIR — In the leading article "*Eppur si non muove*" (*Nature* 360,2; 1992) about the Vatican's recent rehabilitation of Galileo, on the one hand you conclude that "the Vatican owed him a less grudging recantation" and on the other hand you wonder whether the Earth goes about the Sun in any but a relative sense, adding that "prescient Galileo was probably too good a scientist to have committed himself to an absolute view".

This seems to miss the central point of the Galileo affair: it was precisely Galileo's insistence on an absolute view of the Earth's motion that got him into trouble. In the 1616 trial he explicitly rejected Cardinal Bellarmine's advice to adopt an instrumentalist view of the matter and to consider the Earth's alleged motion as merely a convenient hypothesis. Following in the footsteps of Mach, Duhem, Einstein and others, you imply that Galileo erred on this matter. If that is indeed the case then perhaps it would be more fitting for the scientific community to apologize to the Vatican for its past ridicule of the Roman Catho-

lic Church's assessment of Galileo's absolutism.

You express concern that "the Galileo business provides a perpetual licence for prejudice in the evaluation of discovery". In particular you cite the damage that can be done among the young by creationists. Yet you yourself note that scientific discoveries are not cut and dried. Indeed, as Popper, Kuhn, Lakatos and others have shown, both the construction and assessment of scientific theories are heavily dependent upon our prior religious and philosophical biases.

What the Roman Catholic Church and creationists have in common is the belief that, regarding the unseen world beyond our observations, divine revelation, in the form of the Bible, is more reliable than mere human speculation. Although such views may nowadays be very much in the minority, in the absence of clear, valid criteria for theory selection they can hardly be summarily dismissed. As history has repeatedly shown, a majority vote is not a reliable indicator for scientific truth. In short, you should be more charitable to those whose religious prejudices differ from yours.

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Music of the stars

SIR — You report the use of pulsars in musical performances (*Nature* 360 96; 1992). The first musical performance involving a radio pulsar as a 'live' performer took place in Western Australia in 1988. The occasion was the Fifth Marcel Grossman Conference on General Relativity and Gravitation. Perth's Tunc Ensemble, which included saxophone, flute and didgeridoo, played to the live sounds of Pulsar 1749-28. The pulsar signal was received by the Molonglo Radio Telescope in New South Wales. The signal was beamed across the continent by microwave link, and beamed directly into the auditorium of the Perth Art Gallery. The wave form was displayed by laser beam.

The particular pulsar was chosen for its drumlike period, its very strong signal and its occasional pulse nulling which gives an interesting syncopated rhythm. The audience included John Wheeler, Murray Gell-Mann and Sir Ninian Stephen (Governor General of Australia). The entire performance was recorded on video and is available from the University of Western Australia.

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