Letters

Gene Transfer Between Eukaryotes

In Roger Lewin's article "Can genes jump between eukaryotic species?" (Research News, 2 July, p. 42), mention is made of several recent examples of movement of genetic elements between eukaryotic species, with special emphasis on a family of histone genes in sea urchins (*1*). Max Birnstiel and his colleagues postulate that a viral vector might be a mechanism for this transfer.

The transfer of genes between eukaryotic species is a well-documented phenomenon among endogenous retroviruses. Retroviral genes can be transferred under natural conditions between distantly related mammals, incorporated into their germ lines, and be subsequently inherited as cellular genes. The first example showed that the baboon type C viruses, which are genetically transmitted in primates, are closely related by nucleic acid sequence homology to a group of genetically transmitted type C viruses of the domestic cat and five closely related feline species from the Mediterranean Basin. *Felis* species from Southeast Asia and the New World, as well as the larger African cats, lack these viral sequences. Since the gene sequences were found in the cell DNA of all Old World monkeys but only in a few cat species, it was concluded that ancestors of the domestic cat had acquired the primate viral genes before the divergence of these closely related cat species (up to 10 million years ago) (*2*). These viruses were incorporated into the germ lines of cats, where they are present in 10 to 50 copies per haploid genome, and are inherited in the same Mendelian fashion as other cellular genes.

Several additional examples of interspecies gene transmission have subsequently been described. The other retrovirus of cats, feline leukemia virus, was also acquired, most likely from ancestors of the Old World rat (*3*). Domestic pigs and their feral relatives the bush pig and warthog have also acquired their genetically transmitted viruses from rodent endogenous viruses. Hybridization data suggest that the virus-related sequences in the pig were acquired from members of the family *Muridae* after the mouse had separated from the rat but before speciation of surviving mice had occurred (*4*). In addition, retroviral genes have also been shown to have been transferred between a New World primate (squirrel monkey) and a New World carnivore (ancestor of the skunk) (*5*). All of these transferred viral genes are now an integral part of the new host species genome and are present as moderately repetitive genes.

The RNA tumor viruses are the only group of viruses that have been shown to transfer genes among the germ lines of different mammalian species under natural conditions. These viruses are uniquely suited for this role because they must integrate into the cellular DNA in order to replicate, but they do not kill the cells that they infect. When integrated, retroviruses form a segment of DNA flanked by 0.6 kilobase direct repeats and thus resemble the structure of the moderately repetitive transposable elements Ty1 and copia described in yeast and *Drosophila*, respectively (*6*). While moving from cell to cell, retroviruses may carry with them other host cell genes and thus serve to maintain a species in contact with its ecologic as well as genetic neighbors. These viruses and other extrachromosomal elements (*7*) may provide some of the genetic plasticity that is being increasingly revealed among eukaryotes.

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Arrests in Afghanistan

As individuals whose professional lives depend upon academic freedom, we wish to register our anger and concern about the recent reports of arrests of many of our academic colleagues at the University of Kabul, Afghanistan.

According to information published here (*1*), this April eight university professors were arrested and their books and research papers confiscated because they had passively resisted the imposition of political and curriculum dictates in their work. Among those imprisoned were Hasan Kakar, a well-known historian who had published widely in Pashto, Dari, and English and who had received his doctorate in England; Fazl-e Rabi Pazhwak, once the rector of Kabul University and a political scientist who was educated in Germany; and Baryalai Tarzi, a prominent member of the Law Faculty who was educated in France. The British Embassy in Kabul, as well as the Afghan Information Service and the U.S. International Communication Agency in Peshawar, have all confirmed that these arrests have taken place and that these men have not yet been released. Unlike the situation in Poland, it has proved very difficult to obtain information from Afghan authorities concerning these reports. The chargé d'affaires at the Afghan Embassy in Washington has stated that these reports are mere propaganda and that no professors at Kabul University have been arrested in the last 2½ years. According to this official, one of those reported arrested, Kakar, was residing in the United States 4 months ago. If this is or was the case, Kakar has not made himself known to his friends and colleagues here.

The brutalities of the prior Taraki-Amin regime (April 1978 to December 1979) (*2*), which eliminated an estimated minimum of 12,000 people, have been well documented by sources with diverse political philosophies (*3*). Although these purges reached into the poorest strata of society, they fell most heavily on the educated and literate, a group which comprised less than 10 percent of a population of 15 million. Among thousands still unaccounted for are such well-known figures as Quasim Saberi, a surgeon who performed the first heart operation in Afghanistan, and Akram Parwanta, an extremely talented engineer. When the present regime took over in December 1979, it was the hope and expectation of many that such violations of human rights would end. It has not been encouraging to learn of these new arrests among an already decimated

group that Afghanistan and we, their colleagues, can ill-afford to spare. We ask all governments and international bodies, such as Amnesty International, to be persistent in protesting these violations of human rights. We urge our colleagues and others who deplore such suppression to demand information about these arrests and to protest as individuals or groups to the officials and diplomats of Afghanistan and the Soviet Union. Join with us to secure the release and safety of these Afghan scholars and their families.

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Ethical Issues in Medicine

In July 1982, a small group of people* familiar with the history and work of the program on Ethical and Value Issues in Science and Technology of the National Science Foundation (NSF), was asked to review the work of that program and provide consultation on possible future directions for it. During the course of the consultation on 12–13 July, it became evident that the available level of federal support for research programs on ethical issues in science and technology and, in particular, for research programs in biomedical research and clinical medicine was clearly below the need. A chief reason is that the major biomedical research and health-care delivery agencies do not support such research. Accordingly, the ad hoc advisory group has prepared the following resolution on the subject representing the views of the individual signers and not those of the NSF or the institutions of which the signers are a part. The resolution states

> that support for research on the ethical problems of biomedical research, clinical medicine, and health care delivery should be accepted as a major responsibility by such agencies as the National Institutes of Health, the Alcohol, Drug Abuse and Mental Health Administration, and other health agencies; and that this be accomplished by means of separate study sections, by the awarding of separate research grants, and by sharing with NSF and NEH [National Endowment for the Humanities] appropriate joint research support.

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Darwin Centenary

Roger Lewin's otherwise excellent review of the Darwin Centenary held recently at Cambridge University (Research News, 20 Aug., p. 717) does not correctly reflect the substance of my remarks at the conference. I did not suggest that traditional evolutionary biologists had nothing new to contribute. I certainly do not believe this. I did say that speakers representing population and evolutionary biology at the meeting, themselves major contributors to their fields, had largely chosen to emphasize philosophical topics rather than the products of current research. In a meeting designed to build bridges between molecular and evolutionary biology, they had failed to communicate to the molecular half of the meeting the progress and excitement so evident in the major journals in our field, such as *Evolution* or the *American Naturalist*. It was apparent that a substantial portion of the audience agreed with my remarks.

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Lewin describes the centennial conference commemorating Darwin's death as having taken place in the "*gentile* surroundings of Darwin and Queen's Colleges" (italics mine). Did he really mean *gentile* (non-Jewish, non-Mormon, heathen); or perhaps *gentle* (noble, honorable, docile, refined); or possibly *genteel* (polite, well-bred)?

In evolution of word meanings, mutation—yes; transmogrification—no.

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He meant "genteel."—EDITOR

Nonquantification in Economics

The concisely stated and documented plaint of Wassily Leontief (Letters, 9 July, p. 104) struck a responsive chord with this reader. Hopefully, I am not alone in joining Leontief's condemnation of the nonquantifiers among my colleagues in economics.

Having trained as both engineer (mechanical) and economist, I am particularly upset by the lack of substance and precision in much current economic literature. I once described this phenomenon to some graduate students as a procedure of piling estimate on top of conjecture, declaring the whole to be an axiom based on the author's reputation, and then using this "base" to launch still further estimates and pseudo-precise conjectures. A harsh appraisal but I fear not an inaccurate one.

I applaud Nobel laureate Leontief's courage in writing as he does. Unfortunately, new thought and new theory are nearly as rare in current economic literature as are new and original data sets. But to be completely fair, there are still heavy "publish or perish" pressures on many economists, and the costs associated with the collection of original data are often found to be out of financial scope in today's economy. It is a true dilemma for many. Personally, I tend to opt for the philosophy that less may be better under these circumstances.

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Erratum: The risk figures for a severe nuclear accident assuming 1000 reactors in operation given in the News and Comment briefing "Using experience to calculate nuclear risk" (23 July, p. 338) did not accurately reflect the probabilities cited in the NRC report. An accurate rendition is as follows: With 74 reactors in operation (the present number) and if the lower risk rate (0.0017 per year) is used, a severe accident could be expected on the average of once every 8 years.