CORRESPONDENCE

Tungus Black Hole?

SIR,—The interesting suggestion of Jackson and Ryan that the Tungus event was caused by a black hole (*Nature*, **245**, 88; 1973) has a flaw. If the postulated interstellar population of small black holes inhabits the Galaxy, their mass density is $\gtrsim 10^6\ M_\odot\ \mathrm{pc}^{-3}$ (assuming a flux of 1 per century over the Earth), which is impossible. A cosmological habitat is equally impossible. Implausible alternatives are: (1) Those objects are confined to the solar system (why? gathered somehow during formation?); their total mass is $\gtrsim 10^{-2}\ M_\odot$. (2) These objects are much rarer, and the Earth is most fortunate to have received a visit in the last century. (3) One can somehow make as large a bang with a much smaller black hole.

Yours faithfully,

DOUGLAS M. EARDLEY

W. K. Kellogg Radiation Laboratory,
California Institute of Technology,
Pasadena,
California 91109

Tungus Event

SIR,—In regards to an objection raised by Mr Eardley to the black hole explanation of the Tungus event, I should point out that we do not make a claim for there being a flux of 1 per century over the Earth. In fact the only estimate of substellar mass black hole mass density is that of Hawking and others that it may be on the order of the cosmological mass defect.

A more serious question is why the object would have a velocity characteristic of the solar system. Can this be due to a complex perturbative encounter of the small mass with the Earth–Moon system? Would this explain the strange discrepancy in the longitude of the Moon for the period of 1900 to 1920[1]?

Yours faithfully,

A. A. JACKSON

Department of Physics,
The University of Texas at Austin,
Austin,
Texas 78712

[1] Munk, W. H., and MacDonald, G. J. F., *The Rotation of the Earth* (Cambridge University Press, 1960).

Transcription Unit

SIR,—During the proceedings of the Thirteenth International Congress of Genetics in Berkeley (August 20–29, 1973) it became apparent that there is now a definite need to have operational terms for the units of transcription and translation, particularly in eukaryotic systems. I suggest the terms 'transcon' and 'translon' for the units of transcription and translation respectively. A transcon—as presently understood by the work of people like Richard Firtel of the Massachusetts Institute of Technology, Cambridge, and Brian McCarthy of the University of California, Santa Barbara—includes that segment of the total DNA sequence on a chromosome which is located between two spacer sequences; a spacer sequence consists of about twenty-five thymine–adenine base pairs (poly(A) in mRNA). A transcon has a total length of about 30,000 base pairs in insects and has alternating sets of repetitive and unique sequences of DNA. A transcon thus has several structural genes (unique sequences) and is obviously different from a replicon in eukaryotes or an operon in prokaryotes. A translon may be defined as the unit of translation at mRNA level. It may be as small as a single gene, for example in the case of haemoglobin mRNA, or as large as a hundred or so genes, for example, perhaps, in the case of histone mRNA.

Yours faithfully,

SURESH C. GOEL

Department of Zoology,
University of Poona,
Poona 7

Reprints for USSR

SIR,—I have just today received a request from Professor E. M. Nadgornyi of the Institute for Solid State Physics of the Academy of Sciences of the USSR in Moscow for a reprint of one of my scientific articles as well as for exact details of special search techniques for digital computer simulation.

While requests of this sort are not infrequent, in this instance I hesitated to send the information requested because of the recent increased repression of Soviet advocates of civil rights and of Soviet scientists who have applied for permission to emigrate to Israel.

Because of the immediate dismissal of leading Soviet Jewish scientists and engineers from the professional positions and their virtual scientific ostracism following such visa applications, I decided to adopt a different approach in sending the requested information in this particular instance.

I have written to Professor E. M. Nadgornyi and informed him that while I personally favour cooperation, collaboration, and dissemination of information between scientists of all countries, I cannot condone the official attitudes of the Soviet government in respect of such noted scientists as Professors Lerner, Levich, and Sakharov. I am, therefore, sending all of the information requested by Professor Nadgornyi regarding special computer simulation techniques to Professor Aleksander Lerner, a noted cyberneticist and computer scientist. I am informing Professor Nadgornyi that he can obtain these documents by contacting Professor Lerner, a fellow Muscovite.

I feel that this may be a very important method by which scientists and engineers in the western world can make it clear to their counterparts in the USSR that such repression of Soviet Jewish scientists and, indeed, of many Soviet civil rights activists such as Sakharov and Solzhenitsyn is counter to any East–West *detente*, be it political, cultural, or scientific. I therefore urge others to follow my example in this matter of transmitting reprints and other information to the USSR.

Yours faithfully,

MARC HERBERT RICHMAN

Division of Engineering,
Brown University,
Providence,
Rhode Island 02912

Diving Terns

SIR,—Dr Dunn's observations on the diving success of terns[1] are very interesting, but I think do not take account of what may be the most important fish behaviour contributing to their surviving the unwelcome attentions of such birds of prey. I refer to the "Mauthner Reflex", the startle-response of teleost fish, which is discussed in detail elsewhere[2]. A bird in free fall from a height of 10 m would, after hitting the water,

take some 40 ms to arrive at a fish swimming 0.5 m below the surface (longer than this if the impedance of the water is allowed for). The shock wave set up by the bird, however, would reach the fish in considerably less than 1 ms, and in a good-sized fish the sequence: activation of the VIII nerves ——> activation of Mauthner neurones ——> activation of motor neurones ——> onset of tail flip, would take up not more than 15 ms. Thus the almost inevitable reflex movement of the fish would certainly have begun at the time the bird arrived, and on its completion the fish would be displaced by an amount approximately equal to its own length from the position it occupied when the bird hit the water. ("Purposive" escape-swimming would usually follow the success of such an evasive but automatic reflex response.)

Whether or not the bird catches the fish would be very much influenced by the depth of the fish, the speed of the bird hitting the water, the momentum and direction of its continued dive, and possibly optical stimuli to the fish, etc.; the latter could, in theory, slightly advance the moment of excitation of the two Mauthner cells in the hindbrain, or influence which fired first, and thus which way the fish moved. Yasargil and I have shown[3] that the interval between the firing of these cells is the all-important factor in eliciting the reflex response. When both cells fire simultaneously or within about 150 μs of each other, no tail flip ensues; a mutual crossed inhibitory mechanism operates at every segment of the spinal cord. Any factors which would make the excitability fluctuations (the synaptic noise) in the two Mauthner cells out of phase would increase the probability of the reflex being produced and *vice versa*. Perhaps relatively calm conditions bias the situation in favour of the former probability, and thereafter with increasing windspeed the situation is reversed, the in phase noise component would be increased, the two Mauthner cells would fire within the critical 150 μs period, and the tail flip would not operate. However, the other suggestions made by Dunn are probably valid, and it seems likely that the characteristics of the Mauthner reflex are among a number of factors which affect the survival chances of the fish, albeit the most important.

Yours faithfully,

JACK DIAMOND

Department of Neurosciences, McMaster University, Hamilton, Ontario L8S 4J9

[1] Dunn, E. K., *Nature*, **244**, 520 (1973).
[2] Diamond, J., in *Fish Physiology, The Mauthner Cell* (edit. by Hoar, W. S., and Randall, D. J.), **5** (Academic, New York and London, 1971).
[3] Yasargil, G. M., and Diamond, J., *Nature*, **220**, 241 (1969).

Announcements

University News

Dr A. Ozin, University of Toronto, has been awarded the **Meldola Medal and Prize for 1972** of the **Royal Institute of Chemistry.**

Drs M. J. Owen and R. G. Rose, University of Nottingham, have been awarded the **1972/73 Novadel Prize.**

Appointments

Professor A. D. Baddeley, University of Stirling, has been appointed **Director** of the **Medical Research Council's Applied Psychology Unit.**

Sir Michael Clapham has been reappointed **Chairman of the Council for National Academic Awards.** The following have been appointed **members of the Council: Sir David Barran; Mr S. T. Broad; Dr A. H. Chilver; Dr Patricia H. Clarke; Mr D. Davis; Professor L. A. Gunn; Mr T. McI. Howie; Dr Ian M. Mackintosh; Professor G. D. S. MacLellan; Professor D. G. MacRae; Dr R. G. Murray; Mr T. B. Owen; Professor A. M. Ross; Miss A. C. Shrubsole; Professor J. E. Salmon; Mr S. W. Smethurst; Mr K. S. Toft; Rev G. Tolley; Mr G. R. Tyler; Professor M. Zinkin.**

The following have been appointed **members of the Nuclear Power Advisory Board: Lord Aldington; Mr A. E. Hawkins; Sir John Hill; Sir Peter Menzies; Dr A. W. Merrison; Mr R. V. Moore; Mr J. R. S. Morris; Lord Penney; Mr F. L. Tombs.**

Miscellaneous

The Headquarters Office of the **Public Health Laboratory Service Board** has moved to **Lower Entrance, Colindale Hospital, Colindale Avenue, London NW9 5EQ. (01-205 1295.)**

Ramsay Memorial Fellowships have been awarded to the following: **Mr H. J. L. Clarke, University of Strathclyde; Dr Hajime Kato, Cambridge University; Mr Jose Gonzalez, University of Sheffield.**

Corrigendum

IN the article "New Antibacterial Agent *via* Photofluorination of a Bacterial Cell Wall Constituent" by J. Kollonitsch *et al.* (*Nature*, **243**, 346; 1973) the first sentence in paragraph 5 should read "The assigned structure is in agreement with: (a) PMR spectrum (60 MHz; D_2O/DCl): two multiplets (CH_2) centred at 5.3 p.p.m. (J_{H-F}: 47); two multiplets (CH) centred at 4.65 p.p.m. (5.02 and 4.28 p.p.m.)."

Errata

IN the article "Embryonic and Adult Chymotrypsins of Chicken Pancreas", by A. Cohen and R. G. Kulka (*Nature*, **244**, 97; 1973), line 3 of the legend to Fig. 1 should read "... chymotrypsinogens from *a*, 19-d-old embryo . . ." instead of "... 10-d-old embryo ...".

IN the article "Immunological Relationship of DNA Polymerase from Human Acute Leukaemia Cells and Primate and Mouse Leukaemia Virus Reverse Transcriptase", by G. J. Todaro and R. Gallo (*Nature*, **244**, 206; 1973), the symbols were omitted from the legend to Fig. 3 and should read as follows: "●, Effect of antibody (IgG) prepared against reverse transcriptase of gibbon ape leukaemia virus on acute leukaemic cell polymerase; ▲, effect of control sera (pre-immunized animal) on human leukaemic cell polymerase; ○, effect of antibody (IgG) prepared against reverse transcriptase of FeLV on human leukaemic cell polymerase."

International Meetings

November 1–3, **Magnetospheric Cleft Symposium** (American Geophysical Union, 1707 L Street, N.W., Washington D.C. 20036).

November 1–6, **The Royal Society Meetings** (The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG; 01-839 5561, ext. 278).

November 2–4, **Management for Quality** (The Meetings Secretary, The Institution of Metallurgists, Northway House, High Road, Whetstone, London N20 9LW).

November 3, **Geologic Data Analysis with Computers** (Dr D. F. Merriam, Department of Geology, Syracuse University, Syracuse, New York 13210, USA).

November 4–7, **Transport, Survival and Fertilizing Ability of Spermatozoa** (Professor C. Thibault, Station de Recherches de Physiologie Animale, INRA, 78350 Jouy-en-Josas, France.

November 5–6, **Biochemical Society Meeting** (The Meetings Officer, The Biochemical Society, 7 Warwick Court, High Holborn, London WC1R 5DP).

November 5–6, **Forward Planning in the Service Sectors** (Forward Planning Symposium, Science Policy Foundation, Benjamin Franklin House, 36 Craven Street, London WC2N 5NG).

November 5–7, **Normal and Osteoarthritic Cartilage** (The Secretary, Professorial Clinical Unit, Institute of Orthopaedics, Stanmore, Middlesex HA7 4LP).

November 8, **Analytical Chemistry in the Polytechnics** (Society for Analytical Chemistry, Analytical Division, Chemical Society, 9/10 Savile Row, London W1X 1AF).