Molecular Spectra

In an article by John Bally (11 Apr. 1986, p. 185) and in a subsequent letter by Alan H. Barrett *et al.* (9 Nov., p. 143) the history of the discovery of molecular spectra in interstellar space has been briefly discussed. It is surprising to me that in both the article and the letter the early history of this detection is overlooked. It is nevertheless a fact that some 25 years before the radio astronomical detection of OH, NH_3, H_2O, and other molecules, three molecules were unambiguously detected in the visible and near ultraviolet regions of the spectrum. In the 1930s T. Dunham (*1*) and W. S. Adams (*2*) at Mount Wilson Observatory had observed a number of sharp interstellar lines that they could not identify. In 1937 one of the strongest of these lines was assigned by Swings and Rosenfeld (*3*) to the CH molecule. In 1940 this suggestion was fully confirmed by the assignment by A. McKellar (*4*) of several other lines to another electronic transition of CH. McKellar also identified several lines of the CN molecule. A year later the ion CH^+ was identified by A. E. Douglas and myself (*5*). It is significant that the detection of CH in the radio region was accomplished only in 1973 (*6*). It is also interesting that McKellar, from the intensity ratio of the R(1) and R(0) lines of CN, was able to derive an excitation temperature of 3 K for interstellar gas in anticipation of the much later discovery of the 3 K radiation by Penzias and Wilson.

There is no question that the first molecules in interstellar space were discovered in the years from 1937 to 1941, that is, some 25 years before the great advances made by radio astronomy.

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Mars Mission

Norman Horowitz's letter (2 Oct., p. 10) about the Planetary Society's position on human exploration of Mars states that "manned space flight and planetary science are opposed goals." The reason, he states, is budget conflict. This misconception is based on the lack of support planetary science and exploration received during the shuttle development. But the shuttle was a technological development without a mission purpose. In contrast, planetary exploration was substantially supported during Apollo—a manned mission goal.

The goal of human exploration of Mars requires support of planetary science and exploration on intellectual, technological, technical, scientific, and budget grounds. It would provide the right pacesetter for both the human space flight and robotic precursor science missions.

As for the life on Mars question that Horowitz raises, we do not state life on Mars is likely. In fact, it is not. For samples, quarantine international science guidelines should be followed. Despite the Viking lander results, quarantine requirements have not been significantly reduced for Mars. Thus, contamination and quarantine will have to be considered in mission planning.

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Thomas Jukes is correct to note (Letters, 6 Nov., p. 732) that, on the basis of present knowledge, the likelihood that infectious organisms would be brought back from Mars along with returning astronauts and soil samples is low. Without getting into the contentious issue of how much the Viking experiments revealed about the likelihood of microbial life on Mars, however, I would like to note that precautions against "back contamination" of the earth are not simply a matter of discretion, but are required by international law as embodied in the Outer Space Treaty of 1967, to which the United States is a signatory.

The treaty does not require any particular measures, such as quarantine, but does require that spacefaring nations take adequate precautions and engage in consultations with other nations regarding the nature of those precautions. Regardless of Jukes' views, for which there is considerable if not indisputable support in the scientific literature, many nations are likely to be wary of potential contamination. A quarantine represents a comparatively simple (if not especially cheap) way of responding to those concerns and is hence consistent with the treaty and with good politics. And, given the several existing disputes with other nations regarding space issues, such as allocation of geosynchronous orbital slots and establishment of a regime for use of space resources, good politics—and a demonstration that the United States respects existing international space law—are particularly important these days.

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Gametophytes, Not Endosperms

Had the Pacific islanders discussed in the fascinating article by Roger Lewin (Research News, 31 July, p. 483) and the report by Peter S. Spencer *et al.* (31 July, p. 517) received their degenerative diseases from eating endosperm of the cycad *Cycas circinalis*, that would be a botantical novelty indeed. Endosperm is restricted to the angiosperms or flowering plants. Its analogue (not homologue) in the gymnosperms, to which cycads belong, is the female gametophyte (megagametophyte). It appears likely, therefore, that the islanders received toxic amino acids from eating cycad female gametophytes.

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Computer Technology

The article by M. Mitchell Waldrop describing the role of computers in the stock market crash (News & Comment, 30 Oct., page 602) raises two interesting points.

The first stems from the statement that "large distributed [computing] systems . . . may be inherently unpredictable, subject to wide swings in behavior without warning or reason." Since it appears that the proposed Strategic Defense Initiative system will be controlled by large-scale distributed computing, it is sobering to contemplate the consequences of such behavior in this system, and the potential for a nuclear "Black Monday."

Second, does the behavior of these systems, as seen in the financial markets, indicate that computer technology has given us artificial insanity before it has achieved artificial intelligence?

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Erratum: The dates of receipt and acceptance were inadvertently omitted at the end of the report "Unwinding of duplex DNA from the SV40 origin of replication by T antigen" by Mark Dodson *et al.* (13 Nov., p. 964). They should have been, "20 May 1987; accepted 11 August 1987."