Astronomy

Molecular astronomy marches on

Four newly discovered radio spectral lines identify a new interstellar molecular species (the 33rd by our count), the ethynyl radical (C_2H). The observations were made at the National Radio Astronomy Observatory in Green Bank, W. Va., by K. D. Tucker of the Goddard Institute for Space Studies in New York, M. L. Kutner of Columbia University and Patrick Thaddeus of the Goddard Institute and Columbia. Their report is in ASTROPHYSICAL JOURNAL LETTERS (Vol. 193, p. L115).

This is the first opportunity to observe free ethynyl radicals since the substance has never been observed in the gas phase in terrestrial laboratories. (The identification was made by comparing the radio data with solid-state electron-spin-resonance data.) The detection allowed the observers to make precise calculations of the constants involved with ethynyl's microwave emissions. Ethynyl is apparently one of the most abundant of interstellar polyatomic molecules, appearing with high densities in a number of sources.

Celestial far-infrared sources

Balloons, rockets and other atmosphere-defying devices have been opening up to astronomy ranges of the electromagnetic spectrum that are unobservable from the ground. One of the latest of these is the infrared, and now specifically the far infrared (wavelengths between 50 and 500 microns). A balloon flight from Palestine, Texas, has recorded a dozen probable celestial sources in that range with apparent fluxes greater than 3×10^{-12} watts per square centimeter, report M. W. Friedlander, J. H. Goebel and R. D. Joseph of Washington University in St. Louis in ASTROPHYSICAL JOURNAL LETTERS (Vol. 194, p. L5).

The new sources are not uniquely identifiable with any well known class of celestial objects although many of them lie close to local stars, and they seem to have a tendency to cluster about the ecliptic plane. They could be a new class of celestial objects. However, the three observers stress that the purpose of their report is not to argue particular models for the sources, but to demonstrate that there are real sources in that spectral range that deserve further study. The situation, they say, "is not unlike that at similar exploratory stages in radio and X-ray astronomy."

A BL Lacertid in a cluster

One of the strangest objects in the sky is designated BL Lacertae. An object with a bright core and a diffuse outer portion, it has given its name to a very small class of similar sources. It has been suggested that BL Lacertids may be nearby quasars, of which we see more (the outer nebulosity) than we do of distant quasars, and spectroscopic evidence from BL Lacertae has been used in an argument that quasars are really events in the center of galaxies and that the BL Lacertids are galaxies with quasars in them.

Now comes an identification of a BL Lacertid in a cluster of galaxies, which is where a galaxy ought to be if it is a galaxy. It is the object called Parkes 0548—322. In ASTROPHYSICAL JOURNAL LETTERS (Vol. 193, p. L103), M. J. Disney of the Mount Stromlo and Siding Spring Observatory in Australia suggests that it is a BL Lacertid and a member of a cluster of galaxies at the center of which it appears projected on survey plates. He also suggests that this cluster has properties characteristic of X-ray emission, and that it may be associated with the X-ray source 3U 0545—32.

Biomedicine

Herbal anesthesia in China

While Americans are dabbling in acupuncture, the Chinese are moving on to still another form of anesthesia that is unorthodox by Western medical standards. It is the use of herbs. Chinese physicians are trying herbs because Chairman Mao has admonished them that "Chinese medicine and pharmacology are a great treasure-house, and efforts should be made to explore them and raise them to a higher level." Some favorable results obtained with herbal anesthesia are reported in the CHINESE MEDICAL JOURNAL (No. 9, 1974).

Two herbs—anisodine and scopolamine—were used for operations on 232 shock patients. The herbs were found to both relieve pain and to have antishock value—they improved breathing, heart action and blood circulation. When combined with some other drugs, they were found to be especially suitable for shock patients. The same two drugs were also tried as anesthetics on 150 patients undergoing various kinds of operations. Here again they worked well as anesthetics. A single dose of herb maintained anesthesia for four or five hours. The main drawback of the herbs was slow induction and recovery.

Mammalian RNA's: Still a mystery

In bacteria, the conversion of DNA into RNA and then into protein is immediate and automatic. This is because the bacterium has no nucleus, and its DNA, RNA and protein manufacturing equipment sit cozily together in the cytoplasm. But the conversion of DNA into RNA and into protein is far more complex in the mammalian cell. It seems that DNA in the nucleus of the mammalian cell makes a large RNA molecule. This large molecule is then lopped off into a smaller messenger RNA. The messenger RNA is then catapulted into the cytoplasm to get on with protein production (SN: 3/23/74, p. 197).

Now G. Stanley McKnight and Robert T. Schinke of Stanford University report in the November PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that mammalian RNA's may not always start out as large molecules. They have found that the messenger RNA coding for chick oviduct ovalbumin is synthesized, transported from the nucleus to the cytoplasm and incorporated into polysomes for protein production without any change in weight.

The experiments, they conclude, strongly suggest that at least one messenger RNA does not start out as a large molecule.

Poly (A) and tumor viruses

Poly(A) is a string of nucleotides that contains adenylic acid only as its base composition. Poly(A) sequences are known to serve as handles on the right ends of messenger RNA molecules in mammalian cells. The handles appear to be necessary for the expulsion of messenger RNA from the cell nucleus into the cell cytoplasm.

Mammalian RNA tumor viruses also have poly(A) handles on the right ends of their RNA molecules. This discovery, by Leo A. Phillips and his team at the National Cancer Institute, is reported in the November PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. What do these poly(A) handles do? The investigators speculate that they might be crucial to the structural integrity of the RNA cores in RNA tumor viruses. Or the handles might serve as binding sites for reverse transcriptase. Reverse transcriptase is the enzyme RNA tumor viruses use to translate RNA into DNA.