ASTRONOMY

Supernovas as star-formation triggers

The usual theory of the origins of stars says that they form out of interstellar gas clouds. Some occurrence causes part of a cloud to begin to fall together under the influence of its own gravity. The infalling matter heats up as it gets denser until thermonuclear fusions begin in the center of it, and lo, a star is born.

For some time G.E. Assousa and W. Herbst of the Carnegie Institution of Washington have been suggesting that one mechanism for such triggering is the shock wave that passes through interstellar gas after the explosion of a supernova. They illustrated their argument with the association of young stars called Canis Majoris R1. In the Nov. 15 ASTROPHYSICAL JOURNAL LETTERS they, in association with their colleague K.C. Turner, cite a second example, the star association Cepheus OB3.

Their investigation of the distribution of neutral hydrogen in the neighborhood of Cepheus OB3 shows evidence of an expanding shell that could have been started by a supernova explosion about 430,000 years ago. The young stars in Cepheus OB3 seem to be about the same age. The motions of the star association can also be explained by this hypothesis. The three astronomers suggest that the pulsar PSR 2223+65 may be a remnant of the supernova.

If the formation of some stars is induced by supernovas, that could explain a cosmogonical mystery, the presence of rare-earth elements in some stars. Theorists generally do not believe that nuclear fusion in stars can make such heavy elements; the only plausible place for their formation is supernova shocks. So some stars might be "seeded" with heavy elements by the supernovas that triggered their birth.

A starry halo around a galaxy

For a long time astronomers have suspected that there was more to most galaxies than meets the eye. If the clusters of galaxies are bound systems, there has to be more mass in them than is readily seen. Those who would like the universe to be closed also have to postulate a lot of unseen mass.

Two astronomers from the University of Michigan, Dennis J. Hegyi and Garth L. Gerber, report in the Nov. 15 ASTROPHYSICAL JOURNAL LETTERS that there is more to at least one galaxy than is readily visible on the usual astronomical photographs. The galaxy is the giant spiral NGC 4565. Hegyi and Gerber report finding a luminous halo that extends out to 34 kiloparsecs from the plane of the spiral.

The brightness of the halo is only about one thousandth of the background brightness of the night sky. If one galaxy has such a halo, others are likely to. A preliminary analysis of the color of the light from NGC 4565's halo indicates that it comes from stars redder than spectral class K7. If the halo contains a lot of such stars, and is not just a tenuous gas, the halo is likely to be massive enough for its existence to have an effect on theories of galactic dynamics and models of cosmology.

More on the new planetoid

Observers continue to watch the object called 1977 UB (Slow-Moving Object Kowal, SN: 11/12/77, p. 311), which may be a previously undiscovered planetoid between Saturn and Uranus. The latest observations, for Nov. 9 and 10, put it at 2h 1m 38.6s right ascension and +11° 46′ 26.8″ declination and 2h 1m 28.25s right ascension and +11° 45′ 28.5″ declination, respectively. Orbital computations by Brian G. Marsden and K. Aksnes of the Harvard-Smithsonian Center for Astrophysics indicate that a circle is still possible with the new positions, but an ellipse of high eccentricity is not.

BIOMEDICINE

A drug that de-fuses stage fright

How many of us have taken a shot of booze or some other sedative in order to get through the ordeal of facing an audience? Probably most. Yet such drugs, while providing a calming effect, can also impair one's public performance by acting on the central nervous system. The ideal drug to fight stage fright would be one that controls anxiety without also affecting the CNS.

Such a drug may now have been found, according to a report in the Nov. 5 LANCET by I.M. James and his clinical pharmacology team at the Royal Free Hospital in London. Several studies had suggested that a drug called oxprenolol can quell anxiety without affecting the CNS. So James and his co-workers measured the effects of both oxprenolol and a placebo on 24 musicians. The players felt much calmer and happier with their performances after taking oxprenolol than they did after taking a placebo. Their musical performance, judged by two professional assessors, was also found to improve with oxprenolol.

Nipping allergies in the bud

The time-honored treatment for allergy patients is a long and costly series of shots that are often ineffective and may have side effects as damaging as the allergic reactions themselves. Research conducted at the Oregon Regional Primate Research Center and reported in the fall issue of RESEARCH AND INVENTION (a publication of Research Corporation in New York City) promises new compounds that stop allergic reactions before they begin.

Arthur Malley of the center has isolated the fragments of grass pollen that cause grass allergy and has linked them to proteins. Mouse, monkey and limited human experiments show that these modified pollen fragments not only neutralize subjects' existing antibodies against grasses, but block their immune system from making new ones.

How about compounds useful against ragweed and other allergies? Malley feels that his approach can also be used here.

A "geiger counter" for catecholamines

Catecholamines, chemicals produced by the sympathetic nervous system and the adrenal glands and present in the body's tissues, undergo changes in people who have high blood pressure or tumors affecting neural tissues outside the central nervous system. A practical and sensitive method for measuring catecholamine levels in the body, developed by Upjohn Company researchers, should help clinicians better monitor hypertensive treatment regimens and diagnose neural tumors earlier than before.

Past assays for catecholamines required either a lot of blood plasma or a 24-hour urine sample, which eliminated the possibility of getting sensitive readings at the precise moment when catecholamine levels were elevated and, hence, meaningful. These assays also took at least two days to process and could only measure catecholamines at billionth-of-a-gram levels. The method developed at Upjohn, in contrast, requires only two drops of plasma, takes a day or less to process and can detect catecholamines at trillionth-of-a-gram levels.

With the new method, a plasma sample is placed in an incubation mixture with an enzyme and a donor compound that has a radioactive methyl group attached to it. The enzyme catalyzes the transfer of the radioactive methyl groups to the catecholamine molecules. Then, following rapid separation of different kinds of catecholamine derivatives, a technician can determine the amount of various catecholamines in the sample by measuring the amount of radioactivity in each derivative.