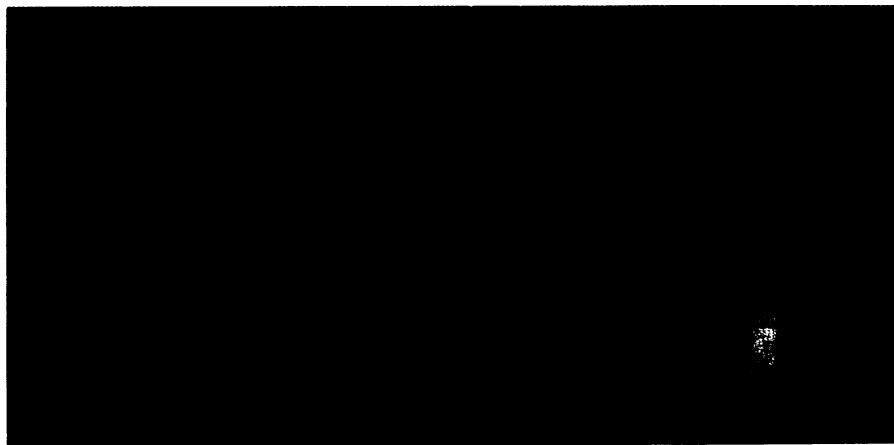


SCIENCE NEWS of the week

IRAS: A Study in Starbirth

Almost as soon as it started looking around from its earth-orbiting vantage point earlier this year, the U.S./Dutch/British Infrared Astronomy Satellite (IRAS) found itself witness to stages in the birth of stars in the Large Magellanic Cloud (SN: 3/5/83, p. 149). Now nearly halfway through what is planned as the first infrared survey of the entire sky, IRAS has found signs of similar genesis in other locales such as the Andromeda galaxy, at 2 million light-years' distance the nearest spiral galaxy similar in size to the Milky Way. This false-color image of Andromeda (at right, shown exaggerated in its vertical dimension) shows orange and yellow hotspots representing regions of intense 60-micron IR emission believed to be sites of star-formation. (Blue and green mark areas of fainter emissions.) An intensity map (below) from the same observations, though at 100-micron wavelengths, shows computer-generated contour lines and shadings of gray, with the blackest areas representing regions populated by either numerous or massive young stars. The satellite's observations, according to IRAS officials, are the first study of Andromeda at long IR wavelengths.

The IRAS survey has also discovered two regions where stars like our sun are apparently being born. As many as five



such "protostars," each no more than one million years old, seem to be coalescing within a dark cloud of dust and gas called Barnard 5, while a similar cloud known as Lynds 1642 may hold one or two more. As regions of the clouds collapse into protostars, they gravitationally attract additional mass from their surroundings, until their temperature and density reach a point at which thermonuclear fusion reactions ignite to create a star. The similarity of the newly found protostars to the early sun also suggests the possibility that planetary systems might be forming around them.

Yet another possible stellar birthplace may be indicated by strong IR emissions that IRAS has detected where a pair of galaxies known as NGC1888 and NGC1889 are passing close together and being torn apart by their mutual gravitational attraction.

At the other end of the stellar life cycle, IRAS has observed a planetary nebula labeled NGC6302, an ancient star that has nearly consumed its hydrogen fuel. The outer layers of the old star have expanded into a shell that looms fully as large as our solar system around the dying core.

—J. Eberhart



Fossils indicate early land animals

Microscopic fossils extracted from rock in upstate New York have provided the earliest known evidence for the evolution of land animals in the Americas, suggesting that aquatic animals may have come ashore much earlier than previously thought. The 380-million-year-old fossils also indicate that the important transition to terrestrial life probably took place in an equatorial environment — on an ancient continent that has since split into northern Europe, eastern North America and Russia.

The fossils — which include the oldest known centipede, several arachnids, a mite and perhaps the earliest known insect — were discovered six years ago at Gilboa in the Catskill Mountains by biologists Patricia M. Bonamo and James D. Grierson of the State University of New York in Binghamton. The fossils have been analyzed by a team of paleontologists, who now conclude that the diverse sample provides the best evidence anywhere for fully adapted land animals during the so-called Devonian era. The scientists reported their findings at the meeting of the American Association for the Advance-

Mapping the coma of IRAS-Araki-Alcock

Besides surveying the stars, IRAS has also been hunting asteroids, including a special search for fast-moving objects that would presumably be asteroids passing close to the earth. The first two fast-movers IRAS has found, however, have been not asteroids at all, but comets. This false-color image is a 20-micron-intensity map of comet IRAS-Araki-Alcock (SN: 5/14/83, p. 311), first detected on April 25. The map is of the comet's huge coma — an enveloping cloud of materials that boil off from the nucleus and are then deflected by solar radiation pressure. The coma covers an area about the size of earth; the comet's nucleus is about 1 kilometer in diameter. (The sharp cutoff along the right side is the edge of the scan path.)

