T Tauri's companion may be a protoplanet

Astronomers believe that many stars other than the sun ought to be accompanied by planets. Evidence for planet-sized companions to stars is extremely difficult to obtain, and the few instances that have been alleged are subject to outspoken doubts and vigorous debate (SN: 6/26/82, p. 424). Now three astronomers at the University of California at Santa Cruz, Douglas N.C. Lin, Robert B. Hanson and Burton F. Jones, propose that a newly discovered companion to the star T Tauri is a planet in the process of formation.

T Tauri gives its name to a class of variable stars of which it is the best known example. The story of the companion begins. Jones told SCIENCE NEWS, with a radio survey of T Tauri stars by Martin Cohen of California Institute of Technology in Pasadena. Cohen was looking for evidence of mass outflow from these stars, but in the course of his work he obtained more precise radio positions for these stars than had ever been known before. In all cases but T Tauri itself, the new radio positions coincided well with positions determined optically. In T Tauri's case there was a half second of arc difference.

Simultaneously, Ted Simon and Mel Dyck of the University of Hawaii and Benjamin F. Zuckerman of the University of California at Los Angeles observed T Tauri with infrared speckle interferometry, a technique that permits astronomers to distinguish images that under ordinary observation appear to run together (SN: 6/26/82, p. 424). They found evidence for two objects emitting infrared. It also became clear that T Tauri is a double radio source, with the weaker component corresponding to the visible position of the star and the stronger one slightly off that location. Thus it appeared that T Tauri is accompanied by a companion that has very low luminosity in visible light, but does show up in radio and infrared.

Putting together all this information, Lin has suggested a theory by which the companion is a "protoplanet," a planet in the process of formation, accreting out of a disk of matter around T Tauri. It would have a mass somewhere between 5 and 20 times that of Jupiter.

The difference between a star and a planet depends mainly on whether the object has enough mass to initiate nuclear burning. If it burns, it's a star. The mass of T Tauri's companion is "very poorly determined," says David C. Black of the NASA Ames Research Center at Moffett Field, Calif. The mass has not been independently measured but depends on Lin's theoretical calculations of what an accretion disk around a young star like T Tauri ought to be. In other words, "it's very model dependent," Black says. He thinks the companion could have enough mass to be or become a star. According to Jones, Simon is of a similar opinion.

Even if the companion does not have enough mass to ignite, Black says, that does not mean we are seeing another planetary system. It might be "some weird kind of binary star system" in which one member didn't get enough mass to ignite. Black's criterion for seeing another planetary system means seeing something like our own: a large central star that completely dominates the motion of several much smaller companions. A double- or triple-star system in which one or two members failed to ignite, but which retained the more egalitarian dynamical relationships of a multiple star system, is not good enough. — *D. E. Thomsen*

IRAS's second comet

The U.S./Dutch/British Infrared Astronomy satellite (IRAS), which recently shared the discovery of a comet with two earth-based observers (SN: 5/14/83, p. 311), has now found one on its own. Comet IRAS was first detected on May 13 and reported as "an unusual moving object, which may be extended." Ground confirmation followed, and IRAS saw it again on May 23. Its closest approach to earth, in late March, would have been about 90 million miles, more than 30 times that of its IRAS predecessor. The faint comet (seen at about 17th magnitude), appeared to be in a retrograde, nearly parabolic orbit. □

New aerosol vaccine against infant measles

Although measles is well controlled in the United States by an injectable vaccine, 1.5 million children die from the disease and its complications in developing countries each year (SN: 3/27/82, p. 215). Now, though, a vaccine delivered by aerosol spray shows promise of being effective against measles in these countries.

This finding is reported in the May 20 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION by Albert B. Sabin, discoverer of the live oral polio vaccine, and coworkers.

One reason an injectable measles vaccine hasn't been very successful in many developing countries is that there are frequently not enough health personnel to launch a mass vaccination campaign. Another reason is that maternal measles antibodies acquired before birth are still in infants' bloodstreams for the first six to 12 months of life, and these antibodies block the effectiveness of the injected vaccine. Yet it is during the latter half of the first year of life that measles generally strikes in such countries.

A measles vaccine delivered by aerosol spray into the lungs could be applied by community volunteers in these countries and thus reach more children, Sabin and his colleagues thought. Also, it would provoke sufficient antibody formation in spite of infants' already having some maternal measles antibodies, they suspected. They decided to test this latter hypothesis, using two kinds of aerosol vaccines. One was made from live, weakened measles virus grown in chick embryo fibroblast cells — the same source used for injectable measles vaccines. It was called chick embryo fibroblast (CEF) vaccine. The other was made from live, weakened measles virus grown in human diploid cells (HDC vaccine). Both were delivered in aerosol form by a simple, inexpensive nebulizer attached to a face mask.

Thirty-eight infants ages four to six months got the CEF vaccine, and 39 the HDC one. In spite of the CEF vaccine containing 10 times more virus than the HDC one, the latter proved much more effective in providing vaccine protection regardless of whether maternal antibodies were present. At six months after vaccination, 100 percent of HDC recipients had sufficient protection regardless of maternal antibody level, whereas of the CEF recipients only 33 percent of those with high maternal antibody levels and only 61 percent of those with low maternal antibody levels did.

Thus the HDC aerosol vaccine is highly effective for six-to-12-month-old infants, in contrast to the CEF aerosol, and in comparison to the injectable vaccine, which is generally ineffective for this age group, the researchers conclude. —*J. A. Treichel*

A clear peek at the fetus

Jason Birnholz, Rush-Presbyterian-St. Luke's Med. Ctr.

Is this fetus saying "cheese"? One can almost make out a smile in the ultrasound image (taken through the mother's abdomen) of the 5-centimeter head of a 19-week fetus. Acuson, a company in Mountain View, Calif., announces a new ultrasound system including a computer that can form moving images on a TV screen. The computer software controls the way the image is formed, and an analog component provides information for subsequent digital processing. Acuson claims the resulting resolution is two to four times that of conventional systems, and the new system enables physicians to better differentiate tissue types for such medical applications as diagnosing heart disease and abdominal cancer.