Uncertainties greet latest planet finds

Tucked away in the constellation Ursa Major, the dim star Lalande 21185 stands out from the crowd. At a mere 8.1 light-years from Earth, it's one of the stars closest to our solar system. It's also one of the fastest.

Now, an astronomer argues that Lalande 21185 may have an even greater distinction: It may harbor two planets. Instead of moving at a constant velocity in a straight line across the sky, the star follows a curving path, as if two unseen companions were tugging on it.

The finding remains uncertain, in part because one of the two proposed planets takes some 30 years to orbit and the researcher has accurately tracked its motion for only 8 years. If other studies confirm the report, Lalande 21185 would rank as the nearest star to the sun known to have planets.

Moreover, the orientation and locations of the two proposed planets—both appear to orbit Lalande 21185 in the same plane and to lie relatively far from their parent star—resemble the architecture of our own solar system. Indeed, "this is the place to look for an Earthlike planet," comments theorist Alan P. Boss of the Carnegie Institution of Washington (D.C.).

George D. Gatewood, director of the University of Pittsburgh's Allegheny Observatory, announced the tentative results this week at a meeting of the American Astronomical Society in Madison, Wis. Gatewood divided the study into two parts. He reanalyzed the movement of Lalande 21185 recorded on photographic plates taken at the observatory between 1930 and 1984, and he tracked the star's motion from 1988 to the present using a photoelectric detector called MAP (Multichannel Astrometric Photometer). Both parts of the study show the star increasing its velocity and moving in the same direction.

From the old photographs, Gatewood deduced the presence of a planet that orbits Lalande 21185 at 10 times Earth's distance from the sun. He says the planet's orbit is about 30 years, indicating that the body is about 1.5 times as massive as Jupiter.

Combined with the photographs, the newer, more sensitive MAP observations hint that the star's motion requires two massive planets. One would have the location indicated by the photographic study and about the same period. The other, MAP data suggest, would be nearly as massive as Jupiter and circle Lalande 21185 every 6 years. This planet would lie at a distance equal to 2.5 times Earth's distance from the sun.

"The short time span of the MAP data does little to establish the longer period," admits Gatewood. He adds that even the tug of two planets can't entirely account for the star's complex motion.

The observational method that Gatewood used, known as astrometry, relies on the fact that a planet and its parent star orbit a common center of mass (SN: 11/18/95, p. 332). Because a star is much more massive than any of its planets, it lies close to the center of mass and so has only a small orbit. When a star is orbited by a planet lying far from it, the center of mass lies farther out, enlarging the star's orbit and making it easier to observe. Thus, astrometry typically finds planets that take a long time to orbit their parent star.

In contrast, astronomers have found most planets that lie outside our solar system by using the radial velocity method, which tracks the back-and-forth motion of a star along the line of sight to Earth. A planet nearer its star produces a faster wobble, so this technique usually discovers planets that take only a short time to orbit their parent star.

R. Paul Butler of San Francisco State University and the University of California, Berkeley, a codiscoverer of several planets with the radial velocity technique, says that barring an unusual geometry, either method could detect Gatewood's planets. He and his collaborator have examined Lalande 21185 for 8 years but have found no evidence of wobble, Butler says. Their finding is inconclusive, he adds, because detecting a planet with a 30-year orbit would require many more years of data.

Other researchers suggest that Gatewood's interpretation of his findings may be too speculative. "I think the acceleration indicates something is there—whether it's one object or two and whether they are planets remains to be seen," says David C. Black, director of the Lunar and Planetary Science Institute in Houston.

Ironically, Gatewood has disproved several reports of other extrasolar planets. "I spent 3 months deciding if I should say anything about this," he notes.

"He's a cautious fellow," adds Boss. "My bet is he's really got something there." —*R. Cowen*

The taste of fat may pose a heart risk

Simply tasting fat—not even swallowing it—can alter the way the body processes fats already in the stomach, according to a new study in humans. That sensory stimulation boosted both the concentration of triglycerides, a class of fatty substances in the blood, and the period during which it remained elevated. Large amounts of triglycerides in the blood are thought to increase a person's risk of coronary heart disease.

These findings confirm effects in rodents reported a decade ago by others. They also suggest the possibility of a previously unrecognized health benefit in fake fats, observes Richard D. Mattes of Purdue University in West Lafayette, Ind., who conducted the new study.

On 4 separate days, he took blood samples before and 2, 4, and 6 hours after each of his volunteers—six men and nine women—swallowed capsules containing 50 grams of safflower oil. On 3 of the days, after they ingested this untasted fat they tasted saltines, saltines with regular cream cheese, or saltines with fatfree cream cheese. Each participant tasted each food, one per day, in a randomly assigned order. After chewing for 1 minute, each volunteer spat out the food.

Mattes tested for changes in concentrations of both cholesterol and triglycerides in the blood as the safflower oil was digested, but only the triglycerides varied from test to test, he reports in the June American Journal of Clinical Nutrition. After volunteers tasted the crackers with full-fat cream cheese, their triglyceride concnentrations rose an average of 60 to 100 percent, compared to readings on the other 3 days.

This response cannot be attributed to the tasters' identification of fat, Mattes points out. In separate taste tests with 10 of the volunteers, he found that only one individual could reliably distinguish between the commercially available regular and fatfree cheeses that he used.

Such data pose a conundrum, he admits, because there has been a dogma in nutrition science that fat is perceived by the way it feels in the mouth rather than by any chemical sensor. Yet the fact that his volunteers could not tell the cheeses apart suggests, Mattes says, that something in the mouth is responding to features other than recognized texture.

"This isn't as crazy a possibility as it sounds," says biopsychologist Israel Ramirez of the Monell Chemical Senses Center in Philadelphia, who had conducted the earlier rat studies. "There are sensory capacities that we're not [consciously] aware of" that can alter food digestion. They probably developed, he says, as a way to warn the gut of the impending arrival of food that must be broken down.

That's certainly the implication of a study to be published next month by physiologist Karen L. Teff, also of Monell. She reports that tasting, but not swallowing, peanut butter triggers the production of a small amount of extra insulin. It facilitated the breakdown of sugar that she had deposited untasted (using gastric tubes) into the stomachs of her human volunteers. —*J. Raloff*