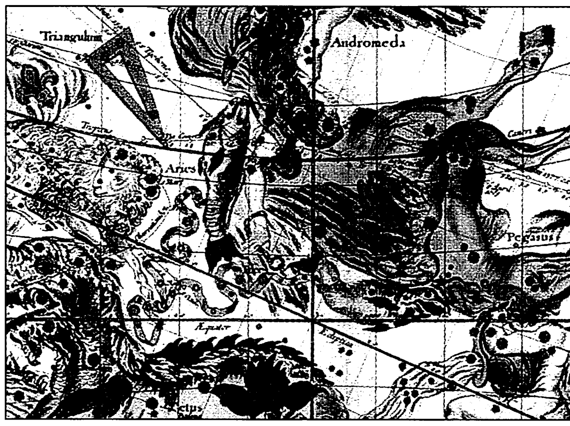
more rapidly than it does today. He notes that several surveys have indicated that many stars rotate faster when they're younger. Gravitational interactions between 51 Pegasi B and its rapidly rotating parent induce a transfer of angular momentum from the star to the planet, spinning up the Jupiter-mass body and effectively giving it a kick outward. (These same forces give the moon a kick backward, away from the rapidly spinning Earth.)

If the amount of angular momentum that the planet gains from the star equals the amount it gives up to the outer part of the disk, then 51 Pegasi B will stay parked in a stable orbit, albeit one quite close to the star. Newly formed planets that moved in ahead of 51 Pegasi B lost a greater amount of angular momentum and continued on the road to ruin.

Even if the young star isn't a rapid rotator, another property might keep the planet from spiraling all the way in, says Lin. The large magnetic field often associated with young stars may serve the same purpose. If the star's magnetic field is strong enough, it will eventually carve a wide ring in the inner part of the disk. Once a planet moves inside this doughnut-shaped region, it can't easily lose angular momentum, so it stops migrating.

In either case, the planet's survival depends on how late it made its debut, Lin adds.



Ignace-Gaston Pardies/Nature

Seventeenth-century drawing of the Pegasus constellation, home of the star 51 Pegasi. The star lies at the base of the left wing.

"I'm in very much agreement with Lin that this is the best explanation for the way [51 Pegasi B] formed and evolved," says planetary scientist Alan P. Boss of the Carnegie Institution of Washington (D.C.).

If an entire generation of planets died before 51 Pegasi B came along, another generation of planets may be moving in from more distant orbits, Lin suggests. Indeed, two independent surveys hint that at least one more planet may orbit the star at a greater distance (SN: 11/25/95, p.358).

Lin adds that the same type of migration may occur in planetary systems around other stars. If so, 51 Pegasi B may not rank as such an oddball after all. He even conjectures that an entire generation of planets might have come and gone in our own solar system before the final nine bodies evolved.

Although the idea of Earth having earlier siblings is intriguing, Lin himself cites one objection: Astronomers believe that the disk around our sun lasted for only a few million years, which may be too short a time to create more than the nine planets that remain today. Boss adds that the progression from the rocky inner planets—Earth, Mars, Mercury, and Venus—to the icy outer ones—Uranus, Pluto and Neptune—suggests that the planets in our solar system didn't stray far from their birth site.

Lin's theory outlines the special conditions that may have allowed 51 Pegasi B to form and prosper. But it offers bad news for astronomers eager to find many other planets beyond the solar system. The raw materials probably exist in abundance, but most of the planetary youngsters would spiral to destruction. □

Biology

Modeling the effects of tiger poaching

It can take just a little increase in poaching to threaten a whole tiger population, scientists have learned from a new computer model.

Tigers, already an endangered species, faced a new threat in the early 1990s, when poachers from Siberia to India started killing the animals in much greater numbers to meet a growing demand for tiger bones, used in Chinese medicine.

At the turn of the century, 40,000 of these royal cats roamed the Indian subcontinent; now only 4,000 to 8,000 exist worldwide. Three of the tiger's eight subspecies have already become extinct.

The model reveals that "a critical zone exists in which a small, incremental increase in poaching greatly increases the probability of extinction," assert John S. Kenney of Maine's Department of Inland Fisheries and Wildlife in Bangor and his colleagues.

To make the model, the scientists used data collected for over 20 years on the survival rates and behavior of tigers in Nepal's Royal Chitwan National Park. In addition, they estimated that every normal-sized tiger group worldwide loses 5 to 10 of its 120 or so members to poachers each year. They then used the model to predict effects of different poaching patterns.

U.S. Fish and Wildlife Service

Bengal tiger.

If poachers killed 10 of the animals in a tiger group every year for 3 years, the group would have less than a 20 percent chance of extinction in the 75 years after poaching stopped, the model predicts. Destroying 15 tigers a year for 3 years, however, bumps that probability to 50 percent, Kenney and his coworkers report in the October CONSERVATION BIOLOGY.

If poachers kill 15 tigers in a group each year for 6 years, or 10 animals for 9 years, they'll destroy that group. Poaching could wipe out many tiger clans in the next 4 years, the model suggests.

Tiger populations can appear stable yet fail to withstand an unexpected disaster, such as bad weather, disease, or reproductive problems, the authors note. Poaching also reduces genetic diversity, which makes the population less robust.

Recently, poaching has begun to diminish in Nepal but not in India, says coauthor James L.D. Smith of the University of Minnesota in St. Paul, where the group created the model.

Test-tube gorilla baby doing well

Rosie, a captive lowland gorilla also known as Mata Hari, gave birth Oct. 9 to a 1.4 kilogram female, the first endangered primate to result from test-tube fertilization, zoo officials announced. Scientists had implanted three gorilla embryos in Rosie in March (SN: 8/26/95 p.139), but only one survived.

Because of her slightly premature birth, the unnamed infant remains quarantined with her mother at the Cincinnati Zoo and Botanical Garden. So don't expect to see any baby pictures until perhaps January, a zoo spokeswoman says.