embryos for research purposes. "In developing the [final] guidelines, the question is whether the benefits outweigh the controversial aspects of using embryos for research of this sort," says panel chair Janet Rossant of Mount Sinai Hospital's Samuel Lunenfeld Research Institute in Toronto.

In weighing that balance, the 10-member panel opposed the donation or sale of gametes to create embryos for the sole purpose of generating stem cell lines. It also urged a moratorium on creating human embryos by somatic cell nuclear transfer, saying that the underlying science is flimsy and that the practice would inevitably lead down a slippery slope to human cloning. It suggested forming a national advisory body to oversee stem cell research, both public and privately funded, and possible licensing of researchers. Such an oversight body is expected to be part of long-promised federal legislation on reproductive technologies.

Antiabortion groups have already lined up against the guidelines. "We're well aware of the utilitarian argument, that [fetal tissue from elective abortions and embryos from fertility treatments] are going to be discarded anyway," says Tim Bloedow, spokesperson for the Campaign Life Coalition. "But we do not feel it's right to use that tissue for this kind of research."

The guidelines will go before the CIHR governing board this fall. Issues still to be resolved include whether to allow donors to select a particular research lab and whether to require consent from the woman who had an abortion or the individuals whose gametes were used during in vitro fertilization. Those gametes usually come from an anonymous donor, notes committee member and Dalhousie University bioethicist Françoise Baylis.

If the CIHR board approves the guidelines, Bernstein foresees a boom in stem cell research once money becomes available. Bhatia agrees that interest is high, but he also hopes that the final guidelines will satisfy an ethical "comfort level" among the general population. **–WAYNE KONDRO**

Wayne Kondro writes from Ottawa.

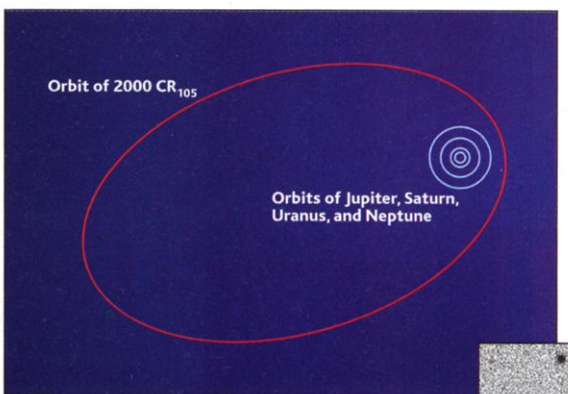
ASTRONOMY

Comet's Course Hints At Mystery Planet

A supercomet following an unexpectedly far-flung path around the sun suggests that an unidentified planet once lurked in the outermost reaches of the solar system, an international team of astronomers reports. What's more, the scientists say, the mysterious object may still be there. "This is the first strong evidence that somewhere out there, there once was something big," says Hal Levison of the Southwest Research Institute in Boulder, Colorado. "It's a very important result."

The giant comet, known as 2000 CR_{105}, measures some 400 kilometers across. It is one of the hundreds of known trans-Neptunian objects (TNOs)—icy leftovers from the early solar system that populate the Kuiper Belt, a flattened region beyond the orbit of Neptune, the outermost giant planet. According to most planetary scientists, distant Pluto is the largest member of this population.

Some TNOs move in vast, elongated orbits. Current wisdom holds that they have been scattered into their eccentric trajectories by the gravitational pull of a giant planet, probably Neptune. If so, basic orbital mechanics dictates that these "scattered disk objects" should swing nearest the sun at perihelion points close to Neptune's orbit, some 4.5 billion kilometers from the sun. But comet 2000 CR_{105}, first discovered in February 2000, doesn't follow this script.



Whodunit? Far-ranging orbit of comet 2000 CR_{105} is hard to explain by gravitational forces of the planets as we know them.

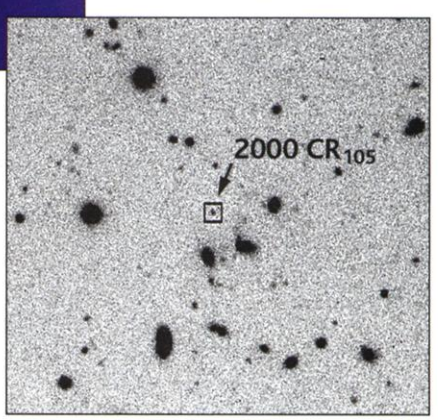
Brett Gladman of the Observatoire de la Côte d'Azur in Nice, France, and his colleagues have discovered that the giant comet's orbit is much larger and more distant than astronomers had assumed. Their observations reveal that 2000 CR_{105} orbits the sun in 3175 years and never comes closer than 6.6 billion kilometers—well beyond Neptune's orbit. The farthest point of the highly eccentric orbit lies 58.2 billion kilometers from the sun—13 times as far as Neptune. "[This is] the first [scattered object] beyond the dynamical influence of the giant planet system," Gladman and his colleagues write in a paper submitted to the journal *Icarus*.

So how did it get there? One possibility is that 2000 CR_{105}'s orbit evolved into its freakish shape gradually, due to small, periodic gravitational nudges from Neptune. Computer simulations imply that such a "diffusive chaos" scenario is unlikely, Levison says, but Gladman says it can't be ruled out. "It's hard to quantify," he says. "There's even disagreement about this among the coauthors of the paper."

The alternative is that the supercomet was hauled into its present orbit by some massive object still farther from the sun. The object might have been Neptune itself: According to some theories, the planet once resided in a much more eccentric orbit and could have created havoc in the distant parts of the solar system. Or maybe there has been a transient population of massive planetary "embryos," formed in the early days of the solar system and expelled later on.

The most exciting possibility is that a planet-sized body still hides in the outer solar system. "A Mars-sized body [at an average distance of some 15 billion kilometers] could scatter a body like 2000 CR_{105} to its present orbit," Gladman and his colleagues write in their *Icarus* paper. Unlike Mars, the planet would consist mainly of ice. Because its high mass would protect it from orbital disruptions, the astronomers say, it could still be around.

"I'd love to find proof that this is true," says Alessandro Morbidelli, a colleague of Gladman in Nice who is not on the team. "Unfortunately, this object [2000 CR_{105}] doesn't constitute a definitive proof yet." On the other hand, Morbidelli stresses, a Mars-sized body 15 billion kilometers away would not measurably affect the orbits of the known planets, so it could well have passed unnoticed. "There's no direct or indirect observational evidence that these objects can't exist," he says.



But Levison doesn't like the idea of an undiscovered Mars out there. "It's not clear how it would have formed," he says. "I would be surprised if anything much larger than Pluto would be found. But of course I could be wrong." Large or small, astronomers agree that whatever nudged 2000 CR_{105} into its large, distant orbit is bound to have done the same to other TNOs. "Finding more would give us a better idea of how they got there," Levison says. **–GOVERT SCHILLING**

Govert Schilling is an astronomy writer in Utrecht, the Netherlands.

CREDITS: (LEFT TO RIGHT) G. SCHILLING AND A. STONEBRAKER; B. GLADMAN, M. HOLMAN, T. GRAV, J. KAVELAARS, P. NICHOLSON, K. AKSNES, AND J.-M. PETIT