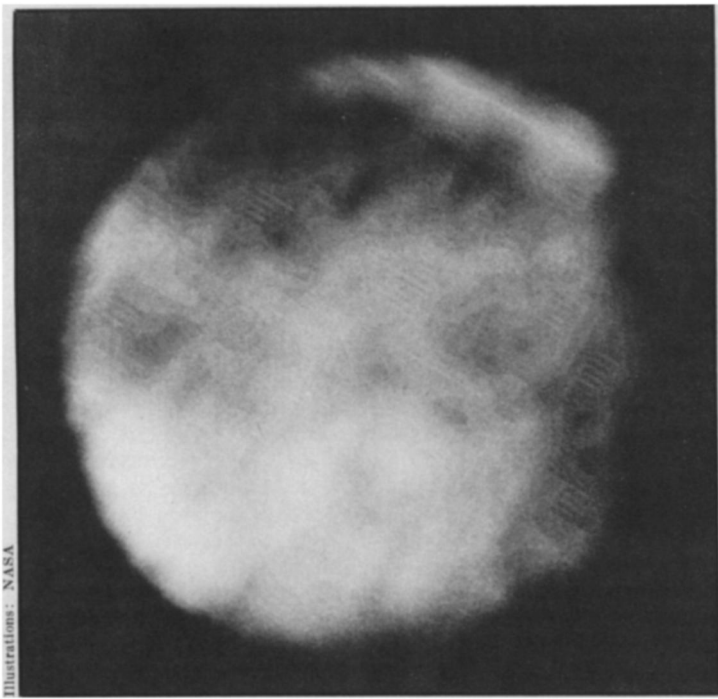


# Features on the world of Ganymede



*Ganymede, although larger than all but one of the 32 other moons in the solar system, remained little more than another point of light until Pioneer 10 took its picture. Dark, luna-like maria, possible craters and a bright southern region that could be ice add a new personality to the planetary family.*

Ganymede, largest of Jupiter's 13 moons, was little more than a featureless point of light until Pioneers 10 and 11 took a close look. Now, aided by data from earth and space, scientists are beginning to assemble a picture of the huge satellite, which is fully a tenth bigger than Mercury.

The best photo ever taken of the 3,270-mile-diameter worldlet was made in December 1973, as Pioneer 10 flew by some 467,000 miles away. Though the image is not sharp enough to show features smaller than about 240 miles across, months of careful

enhancement by computer and eyeball have revealed what seems to be a north polar mare (similar to those on earth's moon) about 480 miles across and another, perhaps 800 miles across, near the planetoid's central region. In addition, says Tom Gehrels of the University of Arizona, mentor of the Pioneers' imaging devices, there appear to be large meteorite craters and a bright region to the south.

One possible source of such brightness could be a polar cap. Pioneer 11 detected no ultraviolet hydrogen "glow" or other direct indications of an atmosphere during its pass by Jupiter last month. But earth-based spectroscopic studies have suggested that Ganymede is largely covered with a layer of water frost (with possible traces of methane and ammonia) held in its icy state, Pioneer data indicates, by a temperature, even on the sunlit side, of 145 degrees below zero F.

The lack of a gaseous atmosphere is not so surprising, thanks to the Pioneers, as it might have been in the past. Prior earth-based studies had suggested a density almost a fourth higher than the spacecraft reported, with a correspondingly high escape velocity that might have been enough to hold a rarefied atmosphere in place. Analysis of Ganymede's effect on Pioneer 11's orbit, however, shows a density some 63 percent less than earth's and 40 percent less than even earth's moon.

Despite its lightly compressed mass, Ganymede manages to make its presence felt. Pioneer 11 reported slight changes in Jupiter's magnetic field in

Ganymede's vicinity, as well as a tendency—weaker than that of some other Jovian satellites, but definitely there—to "sweep away" charged particles trapped by the Jovian field.

Together with Saturn's Titan, Ganymede is one of the two largest natural satellites in the solar system—and well nigh a planet. □

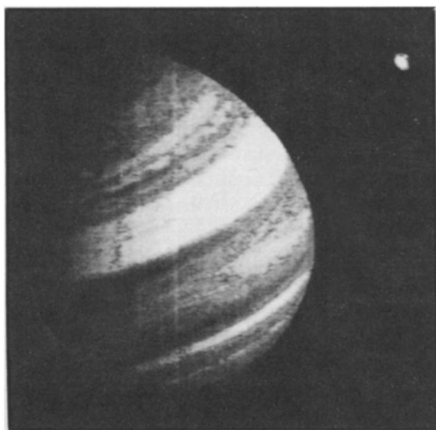
## Do women have sex pheromones?

In an age of instantaneous electronic communication, why would humans need or want to release odors into the air to convey information? Lewis Thomas muses about this in his *Lives of a Cell* essay "A Fear of Pheromones." Pheromones are small molecules, such as the sex attractants of insects and mammals, that convey information. Until now, the presence of pheromones in humans has been only a subject for essays and philosophical speculation. But a team of medical researchers has changed all that by isolating aromatic chemicals from the vaginal secretions of young women.

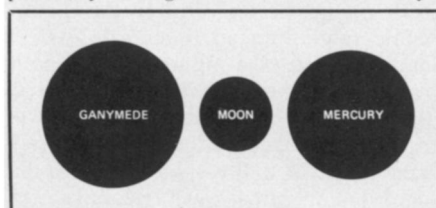
Richard P. Michael, R. W. Bonsall and Patricia Warner of the Emory University School of Medicine in Atlanta report the isolation in the Dec. 27 *SCIENCE*. They identified several volatile aliphatic (open chain) acids such as acetic acid, propanoic acid and butanoic acid in the secretions they collected. Michael and other colleagues earlier found these same substances in several monkey species and showed that in the rhesus monkey, they act as sex attractants. Whether or not they attract human males is not yet known.

Taking oral contraceptives apparently can disrupt the normal production of these acids, the team found. Thirty-two women tested were not taking the pill and fifteen were. The concentrations of the acids were cyclical in pill nonusers occurring in highest levels near the middle of the menstrual cycle (the most fertile time) and in lowest levels near the beginning (the least fertile time). In pill users, the secretion concentrations were approximately the same throughout the menstrual cycle and were lower than in nonusers. Vaginal bacteria produce the aliphatic acids, Michael says, and create a natural acidic environment that suppresses the growth of infectious yeasts. Oral contraceptives can change the acidity of the vagina (and reduce "pheromone" levels), perhaps by inhibiting bacterial growth.

Determining the effects of the chemical signals in humans will be difficult, Michael says, "and I'm not sure I want to go off in that direction. It's



*Dwarfed by Jupiter in this Pioneer 11 photo, yet larger even than Mercury.*



January 4, 1975

5