

Comet Ikeya-Zhang, designated C/2002 C1 (Ikeya-Zhang), is named after Kaoru Ikeya of Shizuoka prefecture, Japan, and Daqing Zhang of Henan province, China, who independently discovered it on the night of 1 February 2002. A preliminary orbit reported the following day indicated that it would come moderately close to both the Earth and the Sun and that it might become visible to the naked eye during late March and April 2002.

By the end of February, observations had shown that the comet was indeed brightening according to expectations, although its sky position, relatively close to the Sun, would make it a difficult object to observe. In addition, it appears to have a fairly high gas-to-dust ratio, reducing the prominence of the developing dust tail.

Continuing observations during February also allowed an improved orbit determination, indicating a probable link with the comet C/1661 C1, observed by the Polish astronomer Johannes Hevelius. With a period of 300–400 years, the orbit stretches to 100 times the distance of the Earth from the Sun. If the suggested link, which was first suggested by the Japanese astronomer Syuichi Nakano and Brian Marsden of the Minor Planet Center, is confirmed, then Comet Ikeya-Zhang would have a record orbital period for a 'periodic' comet (i.e. one recorded as having returned more than once). Calculations indicate that it would then have had a previous perihelion passage in 1273 and another around 877. Figure 1 shows an engraving of the 1661 comet observed by the mathematician Erhardus Weigelius of Jena.

## Orbit

The orbit is unusual in passing exceptionally close to the orbit of Jupiter, enabling close encounters to that planet. At the present time, Jupiter is well away from its near-intersection point with the comet's orbit, but the next time the comet returns (in the twenty-fourth century) it is expected to have a close approach to Jupiter, whose gravity will substantially perturb the comet's orbit. The possibility of strong gravitational perturbations by Jupiter during each revolution means that the dynamical evolution of Ikeya-Zhang is particularly rapid.

Despite its relatively short period (it may be only 341 years since its last return to the inner solar system), Comet Ikeya-Zhang may have experienced just a handful of perihelion passages since it was captured from an initial orbit in the Oort cloud (a nearly spherical swarm of comets that surrounds the solar system stretching halfway to the nearest star) with an initial period of revolution measured in millions of years.

## Star Charts

The star charts show the path of the comet against the stars during March, April and May 2002. The horizon has been drawn to show the view from Northern Ireland at 8.00 p.m. (GMT) on 1 March and 10.00 p.m. (BST) on 1 April respectively, but if you are observing from another site, or at a slightly different time, the view will be broadly similar except that the aspect will be slightly different. For example, the view from London is similar to that shown, except that it occurs about half an hour earlier.

The comet remains close to the Sun in the sky throughout March, and so will be located close to the horizon, low in the west to north-west after dark. During April the comet skims the northern horizon, becoming a morning object (in the north-east before sunrise) later in the month. The proximity to the Sun in the sky means that in order to see the comet at all it will be necessary to have a clear, dark sky with a good view towards the north-west and northern horizons. A dark sky, far from city lights or other forms of light pollution, is an absolute necessity in order to see the full extent of the cometary head and tail.

It is best to have a clear, dark sky to see most astronomical objects, even more so when they are faint, diffuse objects like comets. It is important that there are no clouds right down to the horizon, as the view will be limited if there are any clouds. Check the weather conditions regularly and take the opportunity when there are clear skies.

The best advice, then, is to take whatever chance the weather provides, and to make observing Comet Ikeya-Zhang a top priority whenever clear skies are forecast. It is well worth driving a short distance to avoid city lights and domestic light pollution. Plan ahead, and take the trouble to locate a site with a clear view to the west (March), north-west (April) and north to north-east (late April and May). Allow at least 10–15 minutes for your eyes to become properly dark-adapted, and if you have access to a pair of binoculars — use them. Binoculars greatly improve the view compared with the naked eye, and make it easier to ‘star-hop’ to the comet if it should turn out to be fainter than expected or if there is mist or cloud near the horizon.

For those with cameras, loading it with a fast film, setting it on a firm mount and using an exposure of 20 to 30 seconds on full aperture may be sufficient to record an image of the comet.

## Further Reading

### Books

- Bailey, M.E., Clube, S.V.M. and Napier, W.M. *The Origin of Comets*. Oxford: Pergamon Press, 1990. Comprehensive history of comets describing all theories of cometary origin and the development of mankind's concerns about the cosmos.
- Brandt, J.C. and Chapman, R.D. *Rendezvous in Space: The Science of Comets*. New York: W.H. Freeman & Co., 1992. Popular introduction to comets and the results of the 1986 apparition of Halley's comet.
- Gehrels, T. *Hazards due to Comets and Asteroids*. Tucson: University of Arizona Press, 1994. Comprehensive collection of technical articles covering most aspects of comets and their likely interaction with the Earth.
- Kronk, G.W. *Cometography. A Catalog of Comets. Volume 1: Ancient–1799*. Cambridge University Press, 1999. A comprehensive catalogue of all recorded comets observed throughout history.
- Napier, B. *Nemesis*. Headline, London, 1998. Thrilling fictional account of a plan to use an asteroid as a weapon of war.
- Niven, L. and Pournell, J. *Lucifer's Hammer*. London: Futura Publications, 1978. Classic work describing a cometary collision with the Earth.
- Spencer, J.R. and Mitton, J. *The Great Comet Crash*. Cambridge: Cambridge University Press, 1995. Illustrated articles on the collision of Comet Shoemaker-Levy 9 with Jupiter in July 1994.
- Yeomans, D. *Comets*. New York: Wiley Science, 1991. Chronological history of the science and folklore surrounding comets.

### Web-Links

- *Armagh Observatory*: <http://star.arm.ac.uk/>
- *BAA Comet Section*: <http://www.ast.cam.ac.uk/jds/>
- *Dale Ireland Comet Page*: <http://www.drdale.com/comets/>
- *Gary Kronk's Cometography Page*: <http://cometography.com/lcomets/2002c1.html>
- *IAU Minor Planet Center*: <http://cfa-www.harvard.edu/iau/Ephemerides/Comets/2002C1.html>
- *Joe Rao's article on Ikeya-Zhang*: [http://www.space.com/spacewatch/anew\\_comet\\_020219.html](http://www.space.com/spacewatch/anew_comet_020219.html)
- *JPL Comet Observation Home Page*: <http://encke.jpl.nasa.gov/>
- *Paul Gitto's Arcturus Observatory Home Page*: <http://cometman.com/>
- *Sky and Telescope Magazine News*: <http://SkyandTelescope.com/news/>
- *The Astronomer Magazine Online*: <http://www.theastronomer.org/comets.html>
- *University of Arizona Flandrau Science Center*: <http://www.flandrau.org/astronomy/news.htm>

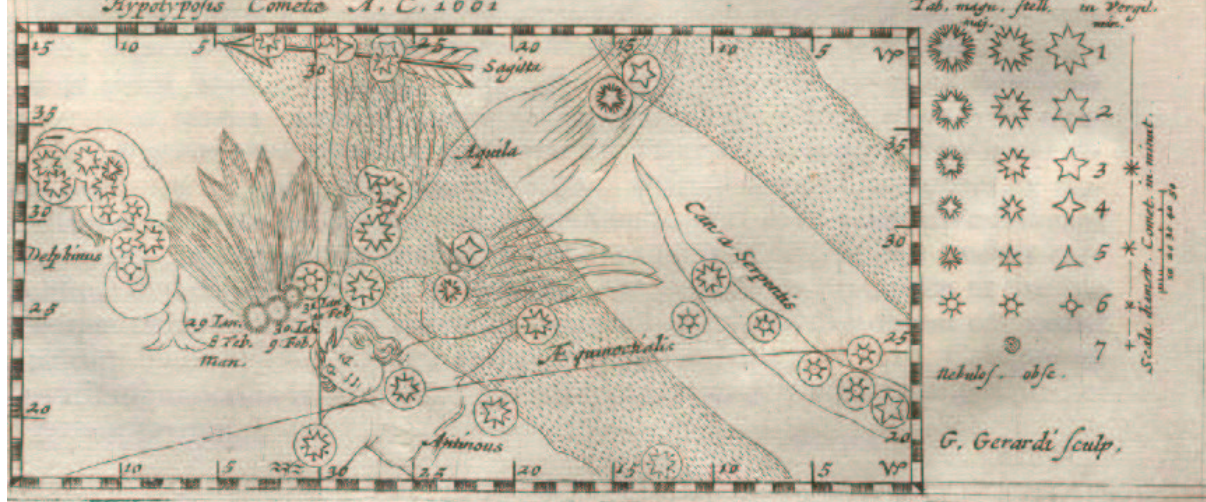


Figure 1: Engraving showing Comet C/1661 C1, from S. Lubienietzki (1667) *Theatrum Cometicum* Vol. II (*Historia Cometarum*, 1666), Amsterdam, The Netherlands. Detail from Diagram No. 77, opposite p.428.

Comet C/2002 C1 (Ikeya-Zhang), discovered 2002-02-01

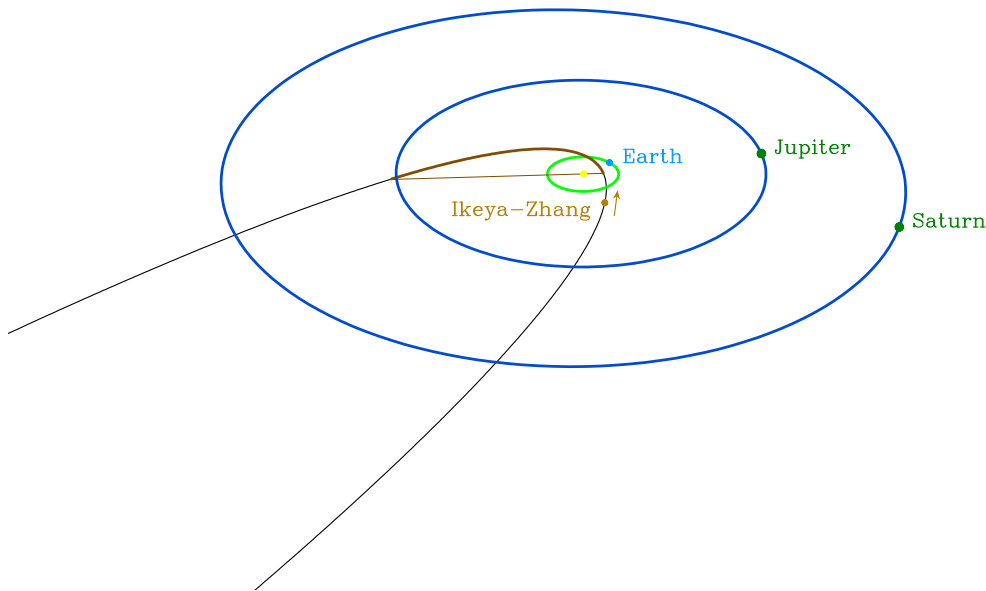


Figure 2: View of the orbit of Comet Ikeya-Zhang at discovery on 1 February 2002. At this time, the comet was approximately 170 million km from the Sun and 230 million km from the Earth. The figure shows the comet moving in a direction from south to north, reaching its perihelion position (the point closest to the Sun) on 18 March 2002, and then rising higher in the northern sky before finally returning south. The comet's closest position to the Sun is approximately 76 million km; and the closest approach to the Earth (perigee) is approximately 60 million km. The latter occurs at the end of April.

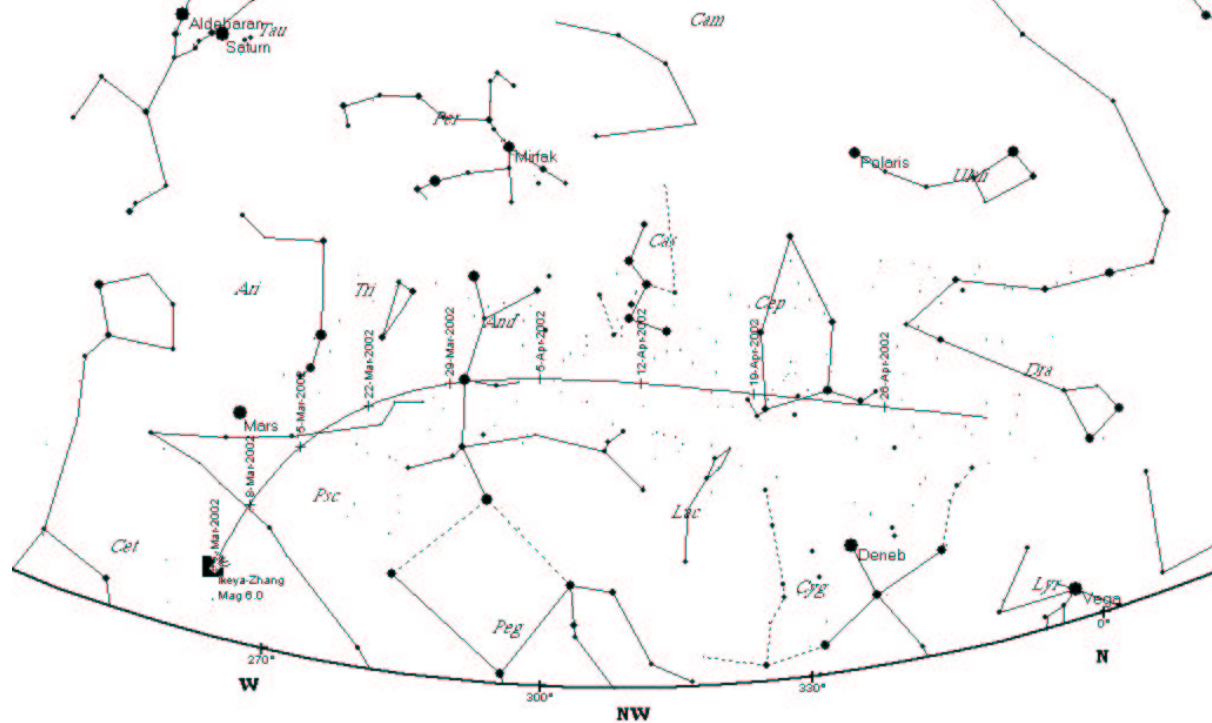


Figure 3: The path of Comet C/2002 C1 (Ikeya-Zhang) against the fixed stars is shown during March and April, when it is expected to become easily visible with binoculars. The constellation positions with respect to the horizon have been plotted at 8.00 p.m. (GMT) on 1 March 2002.

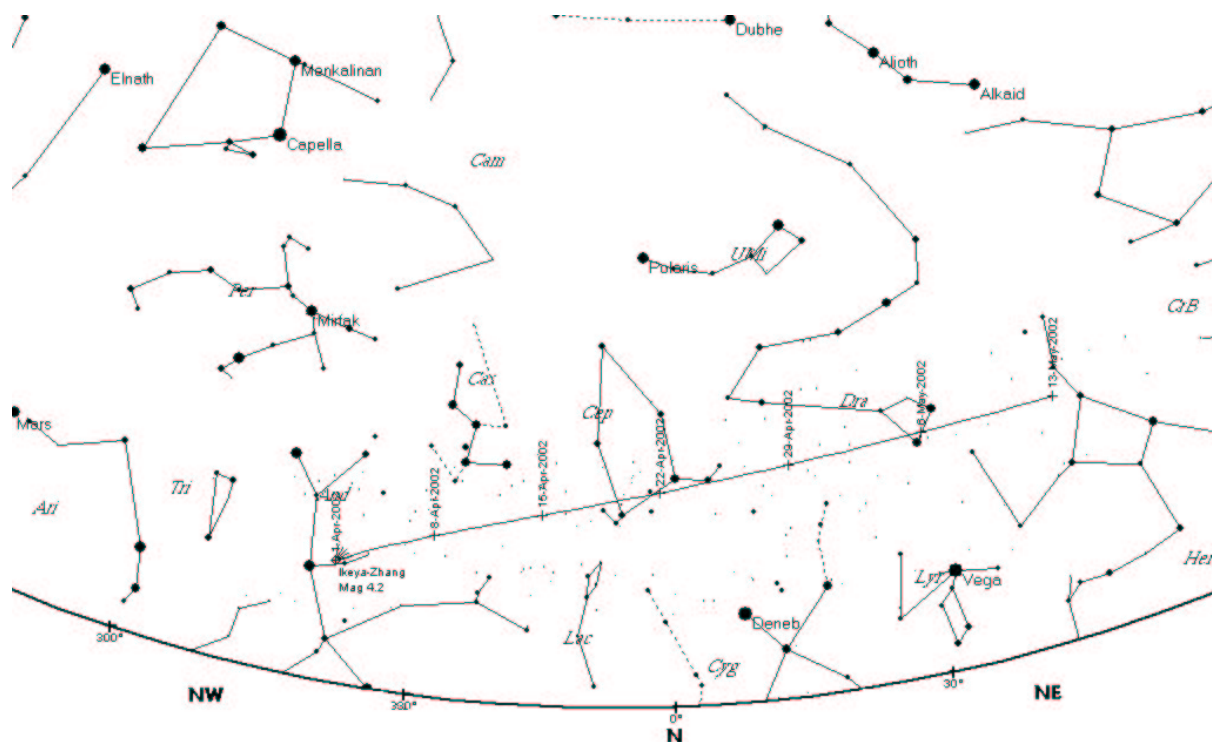


Figure 4: The path of Comet C/2002 C1 (Ikeya-Zhang) against the fixed stars is shown during the period April to early May. The constellation positions with respect to the horizon have been plotted at 10.00 p.m. (BST) on 1 April 2002.