

## A Conversation About Restraint

He looked at the stars and felt so young  
The stars, unaware, shined though the air  
She felt like crying and thought, “how come?”

Planets, not unlike Earth, and stars, like the sun<sup>1</sup>  
wobble<sup>2</sup>, like a human hair two miles from here<sup>3</sup>  
He looked at the stars and felt so young

A temporary star and its transient plunge<sup>4</sup>  
cannot be detected by Kepler's leer<sup>5</sup>  
She felt like crying and thought, “how come?”

The light below red uses the young<sup>6</sup>  
to discover, like a firefly in a spotlight<sup>7</sup>, the sphere  
He looked at the stars and felt so young

These apples jaunt back and forth moving as one<sup>8</sup>  
Their change is observed<sup>9</sup>. Oh, how they're revered  
She felt like crying and thought, “how come?”

These terrenes beseech the precision of a nun<sup>10 11</sup>  
Patience is exacted by Jupiters—perpetually severe<sup>12 13</sup>  
She looked at the stars and felt so young  
He was crying and knew how come.

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<sup>1</sup> Robert Naeye, “At Last, an Exoplanet by Astrometry,” *Sky and Telescope* (May 29, 2009): <http://www.skyandtelescope.com/community/skyblog/newsblog/46462532.html>

<sup>2</sup> Robert Naeye, “At Last, an Exoplanet by Astrometry,” *Sky and Telescope* (May 29, 2009): <http://www.skyandtelescope.com/community/skyblog/newsblog/46462532.html>

<sup>3</sup> Robert Naeye, “At Last, an Exoplanet by Astrometry,” *Sky and Telescope* (May 29, 2009): <http://www.skyandtelescope.com/community/skyblog/newsblog/46462532.html>

<sup>4</sup> Kelly Beatty, “Kepler Shows Its Promise,” *Sky and Telescope* (August 7, 2009): <http://www.skyandtelescope.com/news/52657352.html>

<sup>5</sup> Kelly Beatty, “Kepler Shows Its Promise,” *Sky and Telescope* (August 7, 2009): <http://www.skyandtelescope.com/news/52657352.html>

<sup>6</sup> John Matson, “Out of this World Pictures: First Direct Photos of Exoplanets,” *Scientific American* (November 13, 2008): <http://www.scientificamerican.com/article.cfm?id=exoplanets-direct-imaging&page=2>

<sup>7</sup> Katie Walter, “Extending the Search for Extrasolar Planets,” *Science & Technology Review* Mr/ap (2008): 4-10.

<sup>8</sup> ScienceDaily LLC, “Towards Other Earths: 32 New Exoplanets Found,” *ScienceDaily* (October 19, 2009): <http://www.sciencedaily.com/releases/2009/10/091019105304.htm>

<sup>9</sup> ScienceDaily LLC, “Towards Other Earths: 32 New Exoplanets Found,” *ScienceDaily* (October 19, 2009): <http://www.sciencedaily.com/releases/2009/10/091019105304.htm>

<sup>10</sup> ScienceDaily LLC, “Towards Other Earths: 32 New Exoplanets Found,” *ScienceDaily* (October 19, 2009): <http://www.sciencedaily.com/releases/2009/10/091019105304.htm>

<sup>11</sup> Robert Naeye, “At Last, an Exoplanet by Astrometry,” *Sky and Telescope* (May 29, 2009): <http://www.skyandtelescope.com/community/skyblog/newsblog/46462532.html>

<sup>12</sup> Liz Kruesi, “Planet-hunting method snags its first,” *Astronomy* 37.9 (2009): 22.

<sup>13</sup> Kelly Beatty, “Kepler Shows Its Promise,” *Sky and Telescope* (August 7, 2009): <http://www.skyandtelescope.com/news/52657352.html>

Endnote's corresponding quotes

1. "Veteran exoplanet hunter Geoff Marcy (University of California, Berkeley) says, 'The only known method for detecting Earth-like planets around nearby Sun-like stars is with astrometry.'"
2. "The astrometry method shares one important attribute with the method that astronomers have used to find most of the nearly 350 known exoplanets: they look for stellar wobbles."
3. "Pravado and his team observed VB 10 for 12 years before making its announcement, and they measured motions of just a few milliarcseconds, akin to measuring the width of a human hair from 2 miles away."
4. "For 25 years, he's championed a spacecraft that uses the *transit method*—carefully watching for temporary dips in a star's light—to detect planets around other stars."
5. "Kepler doesn't see the planet directly; instead, it monitors dips in the starlight as HAT-P-7b crosses directly in front of and behind its host star."
6. "Marois and his team used ground-based infrared detection to seek out exoplanets around nearby, young, massive stars—those whose planets would have wide orbits and emit significant amounts of radiation as they cool from their relatively recent births millions of years ago."
7. "'Trying to observe exoplanets is like trying to find a firefly next to a searchlight', says Macintosh."
8. "Michel Mayor, from the Geneva Observatory, led a consortium to build HARPS, which was installed in 2003 and was soon able to measure the back-and-forward motions of stars by detecting small changes in a star's radial velocity—as small as 3.5 km/hour, a steady walking pace."
9. "Michel Mayor, from the Geneva Observatory, led a consortium to build HARPS, which was installed in 2003 and was soon able to measure the back-and-forward motions of stars by detecting small changes in a star's radial velocity—as small as 3.5 km/hour, a steady walking pace."
10. "Such precision is crucial for the discovery of exoplanets and the radial velocity method, which detects small changes in the radial velocity of a star as it wobbles slightly under the gentle gravitational pull from an (unseen) exoplanet, has been most prolific method in the search for exoplanets."
11. "Finding planets via astrometry requires patience, because it takes many years of painstaking, ultraprecise observations to notice these tiny wobbles as the planet orbits its star."
12. "Even at this close distance, VB 10b is considered a 'cold Jupiter' because its star, VB 10, is only one-twelfth the Sun's mass."
13. "It's a 'hot Jupiter' that whirls just 3½ million miles (5.7 million km) away in a 2.2-day-long orbit"

## Bibliography

- Beatty, Kelly. "Kepler Shows Its Promise." *Sky and Telescope* (August 7, 2009):  
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