1Q60.16 Celt

**SUMMARY:** A classic device displays unusual rotational behavior of one directional mechanical spin.

**DESCRIPTION:** A celt (aka rattleback) shows normal spin and anomalous, or puzzling, spin. When the celt is rotated in its normal direction, it rotates smoothly until it slows until it stops due to frictional damping.

When the celt is rotated in its normal direction, it continues to rotate smoothly as it slows down due to friction. If it is rotated in the anomalous direction it will not rotate but instead will rock back and forth end-for-end, then slow down and reverse its direction of rotation where it will ultimately rotating smoothly in the normal direction. When it is at rest, tapping one end to make it rock results in rotation in its normal direction. Celts are constructed with an S-shaped keel line which leads to this weird behavior. See additional resources.

**EQUIPMENT:**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
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<tr>
<td>Celt.</td>
<td>Mechanics E</td>
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**SETUP NOTES:** Off the shelf.

**ADDITIONAL RESOURCES:**

- New Scientist - Torque of the Devil


John Satterly, Rocking Experiment with Two Degrees of Freedom, AJP 21, 267-273 (1953).
John Satterly, Three Interesting Instances of Rocking, AJP 23, 14-26 (1955).


Tad McGeer and Leigh Hunt Palmer, Wobbling, toppling, and forces of contact, AJP 57, 1089-1098 (1989).