

Trevelyan rocker

This project uses a physical oscillatory system, the thermoacoustical Trevelyan rocker, which was discovered in the 1830 but no experimental and theoretical work has been done since 1923. We would like to continue this new and exciting research project after two students made great progress during the 2025/26 academic year (first manuscript to be submitted soon).

The system consists of a heated rocker placed on a cold block, usually lead. The general motion can be seen in Fig. 3. The heated contact points leads to an expansion of the block material, tilting the rocker off balance until the opposite side is in contact with the block. Now, the new contact point expands, while the first point cools and lowers. This rocking motion happens several 100 times per second.

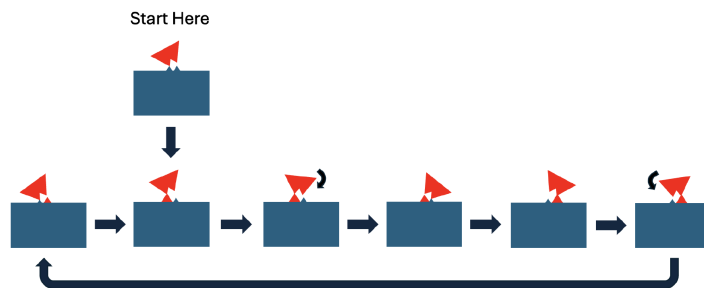


Figure 3: A sketch explaining the process of the gravity theory with a hot rocker and cool base (from Juno Ryan '26 I.S. thesis).

We explored already a variety of materials and discovered that the poisonous lead can be replaced with rock salt. We also created a new type of rocker which enables us to investigate a large variety of rocker types. Now, two rods connected to a rocking block are in contact with the base.

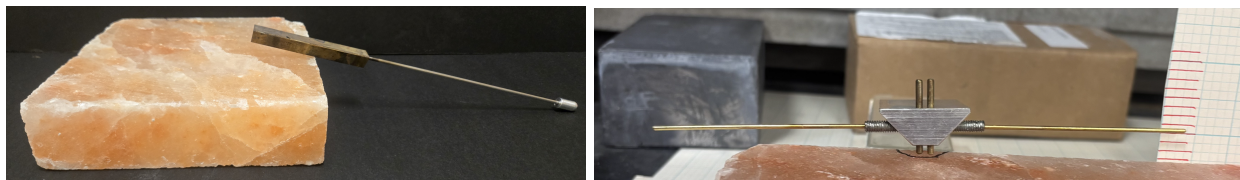


Figure 4: Left: Image of a brass rocker on a rock salt block. Right: New rocking system with easily replaceable rods and horizontal extensions to enhance the visibility of the rocking motion (from Sutton Ursillo '26 I.S. thesis).

We have a wide variety of rods, ranging from gold and silver to graphite. After the 100-year hiatus, many more materials can be explored.

We also found a publication from 1931 which mentioned the use of dry ice instead of a solid block. This effect has not been mentioned or investigated since then. Everything we observe will be new.

We i) took already auditory recordings and analyzed spectrograms and ii) used a high-speed camera to visualize the motion. We also plan to use a thermal camera to see the effect of different rocker temperatures on the vibration frequency. Using a deflecting laser beam to enhance the motion amplitude is another experimental option. Again, technology improvement in the last 100 years offer a wealth of analysis opportunities.