Science Societies

A tale of two Jennys: Pickin' up good vibrations

By Edward R. Landa

May 25, 2022

(Figure 1) Left: Candy Schibli at the cymatic rig. Right: Close-up of the vibrating metal plate with the ground coffee–sand mixture. The results of this work were presented at a Coffee Science Foundation poster session in Boston at the Specialty Coffee Expo in April 2022. For more information, see www.southeasternroastery.com/research.

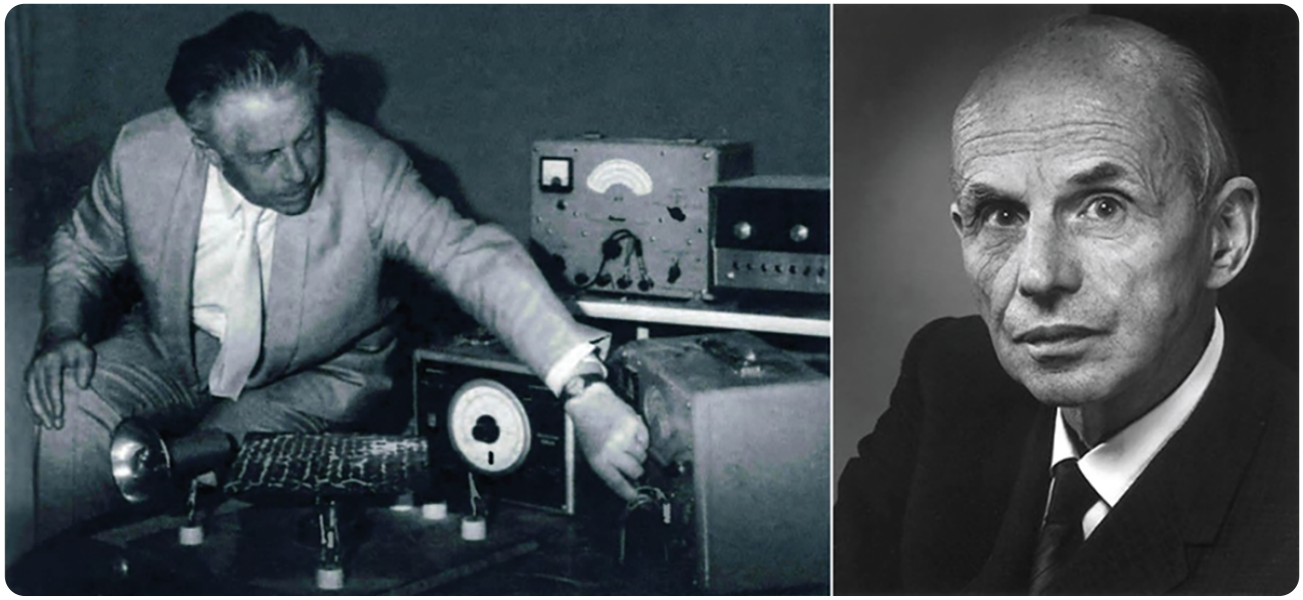
In February 2022, I attended a lecture/demonstration, “To Sense a Solid and Liquid—Exploring Sensory Interaction with Coffee,” at a performance and art space in the Takoma neighborhood of Washington, DC. With the agronomy-friendly name RhizomeDC, this venue both nurtures artists creating experimental work and provides a platform for sharing ideas with the community. The artists here were Candy Schibli (a chemical engineer, natural resource specialist, and craft coffee roaster) and Michelle Lorentzen (artist/photographer) who have been exploring how sound waves interact with ground coffee. Ground coffee for drip immersion (typically “medium grind”—about the particle size of sand) was mixed with red sand and placed on a horizontal, 24-gauge, aluminum plate that was connected in the vertical plane by threaded rods at the center and corners to a subwoofer speaker/amplifier/preamplifier system. Sounds of different frequencies were produced by a tone generator (see, for example, **https://bit.ly/3K5pTIX**). The particles vibrated in the x-, y-, and z-direction, shifting position on the plate, and forming fascinating, dynamic, Rorschach-like images that the investigators are attempting to correlate with flavor characteristics of the coffee (Figure 1).

As a soil scientist, what immediately came to mind was the sonic sifter, a particle-sizing device that originated in the mid-1960s. The brain child of Charles Ward, a sound and vibration technician with the industrial electronics powerhouse Allen-Bradley Company (now Rockwell Automation) in Milwaukee, WI, it resulted from chance observations he made while working on the sound system in the company’s new cafeteria (**https://bit.ly/38btYOE**). Able to separate particles as small as 5 μm, the sonic sifter has gone on to widespread use in the particle-size characterization of materials as diverse as lunar soil and dust mites. As just one example of its innovative use in soils research, Oregon State University investigators Priscilla Woolverton and

Maria Dragila used the device to examine the mechanisms for hydrophobicity in soils from agricultural fields in eastern Oregon. Hydrophobic behavior has a strong influence on water infiltration rates, thus impacting plant growth and runoff volumes. The fine particle fractions of these soils were shown to exhibit the most hydrophobicity. This water-repellent property is thought to be associated with organic-matter coatings on soil particles, and sonic sifting, with its minimally abrading action, was thus a method of choice (Woolverton & Dragila **2014**).

Cymatic Exploration

Schibli and Claire classify their work as a "cymatic exploration". Cymatic, a new term for me, comes from physics and is defined as "the study of wave phenomena, especially sound, and their visual representations." Digging just slightly deeper, I learned that the field was started by Hans Jenny. Our Hans Jenny? Well, no. It seems there were two Hans Jennys of note, both born in Basel, Switzerland at the turn of the 20th century. Wikipedia has attempted to separate the two: Hans Jenny—Cymatics (see **https://bit.ly/3jYiT5Q**) and Hans Jenny—Pedologist (see **https://bit.ly/3MllVgD**) (Figure 2). As the cymatics founder experimented with vibration patterns of sand (**https://youtu.be/GtiSCBXbHAg**) and spores of club moss (Jenny 1967, **1974**), I would like to believe that he was channeling his inner soil scientist.



It seems there were two Hans Jennys of note, both born in Basel, Switzerland at the turn of the 20th century: Hans Jenny, a physician and natural scientist (left), and Hans Jenny, a pedologist (right; photo courtesy of Ronald Amundson, Department of Environmental Science, Policy and Management, University of California, Berkeley).

The roasting process increases the porosity of the coffee beans (see for example, **https://bit.ly/3vxCNdf**). The percolation process involves the movement of hot water through a bed of these porous beans that then releases dissolved organic matter—and then we drink the filtrate. The analogy to the porous soil matrix and the soil solution is obvious. The nature and properties of the pore structure in the coffee beans likely influences how the particles of ground, roasted coffee respond to sound waves.

The cymatics Jenny was a physician, and a Google search of "Hans Jenny" will likely show a headshot of the pedologist with the label "physician." Rather than bemoan this chronic mix-up of players, we should embrace it as an avenue of dialog with a new audience for soil science. We live in a world where there is so much more that unites us as curious human beings than divides us by labels such as artist, scientist, etc. Whether a chance encounter of the third kind happens at a specialty coffee bistro, during an aberrant web search, or wherever … there is undoubtedly an opportunity to learn from this new community, and at the same time, engage in soils outreach.

Acknowledgments

A sincere thank you to Candy Schibli and Ron Amundson for help here.

Dig deeper

Jenny, H. (1967, 1974). Cymatics; A study of wave phenomena and vibration. {A 2001 compilation of the original two volumes by Hans Jenny. Volume 1, 1967: The structure and dynamics of waves and vibrations. Volume 2, 1974: Wave phenomena, vibrational effects and harmonic oscillations with their structure, kinetics and dynamics.} **https://bit.ly/3jYg0C4**

Woolverton, P., & Dragila, M.I. (2014). Characterization of hydrophobic soils: a novel approach using mid-infrared photoacoustic spectroscopy. *Applied Spectroscopy* **68**, 1407–1410. **https://doi.org/10.1366/14-07450**.

More news & perspectives

Back to issue

Back to home