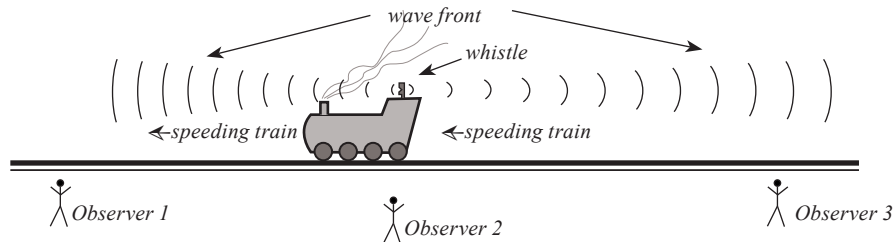


## A Directed Workshop on *Insight*, Chapter 1: Elements

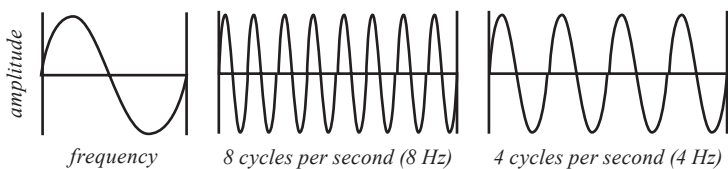
Tenth Session—November 21<sup>st</sup>, 2018—Lonergan Center, TS Department, Concordia: *Empirical Residue: Invariance*

*This is the last section in the chapter on elements. It follows inverse insights, where Lonergan notes that the empirical residue is a more powerful version that denies intelligibility yet affirms a higher perspective that is far more powerful in its explanatory capacity. The connecting link is the notion of invariance, carried over from the previous section where it is used to illustrate inverse insights, now given greater depth in denying intelligibility to particular times and places while laying the foundations for powerful generalizations that span time and space as universal truths.*

**DOPPLER EFFECT.** If anyone has stood beside the tracks as a passing train blows its whistle, they will notice a particular phenomena: as the train approaches the sound of the whistle is high, and after it passes there is a noticeable drop in pitch. This is known as the Doppler effect. Now each of the three observers noted above has their own horizon, and within their respective standing points they will hear a different pitch. Observer 1 will hear a high pitch, observer 2 will hear the pitch at the point of origin, while observer 3 will hear a lower pitch. Each observer is accurately in their observations, but when compared with the other observers there's a paradox: same whistle, different pitch. This is where a shift to a higher perspective (second degree horizon) and the notion of invariance under transformation comes into play.



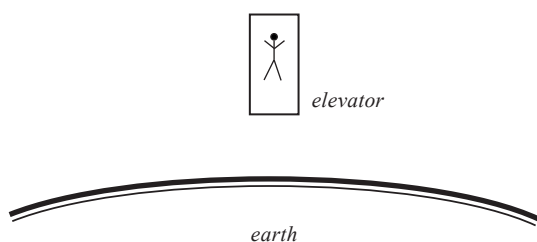
The Doppler effect is a wave phenomena associated with a moving object. The illustration above consists of a moving train, a whistle being blown on the train, and three observers located along the track. Waves are described in terms of frequency, measured in Hertz (Hz) and amplitude (decibels). Frequency is perceived as pitch, while amplitude is perceived as loudness. Although sound waves can be very complex, with a multitude of overtone that gives a sound its particular quality, the sound is built around a fundamental tone. For our purposes we will consider a simple pure tone, i.e., a single sine wave.



When we talk about wave fronts, we are talking about pressure waves. The area above the center line represents a high pressure area while the area below a low pressure one. Every doubling in frequency is perceived as an octave, so 8 Hz is an octave higher than 4 Hz. The lowest sound a human ear can perceive is around 60 Hz.

The point in all this is that the variance among observers can be explained by a higher second degree horizon that allows all to be put into a higher perspective. This allows for various transformations to be enacted on each observer's observations that accounts for the difference in pitch even though the source of the sound wave is the same. As the train approaches observer 1, the wave front is compress, thus raising the pitch; as the train recedes from observer 3 the pitch is low for the receding train stretches the wave front. In a sense, the pitch is invariant under transformation: its the same signal, no matter the actual pitch being observed. Note also that the original data set (the various observed pitches) has little intelligibility in itself; it is only when the shift to a higher perspective, a more inclusive theoretical horizon that the whole situation becomes intelligible. This is a feature of the empirical residue.

**RELATIVITY.** Einstein has a thought experiment to explain how what is perceived varies according to one's reference point. This is particularly important in his theory of relativity where the speed of light remains a constant across different reference points. This means that anyone in spaceship approaching the speed of light will still live in the familiar physical world of time and space, even though compared to those left behind time has radically slowed. (When they return, they may have aged only a few years while centuries may have passed on earth.) His thought experiment has three components: the earth, an elevator, and a man within the elevator.



The elevator is in space poised over a fixed point on the earth. There are no other forces operating on it other than the gravitational attraction between the mass of the earth and the mass of the elevator. From an external perspective, the elevator is falling toward the earth. Now within the closed elevator, the man also is falling toward the earth. Yet he has no sensation of falling, since the elevator that defines his observational horizon is also falling. To him, then, he is floating. Is the man falling or floating? The answer depends on the chosen reference point. (As an interesting aside, the reason satellites stay in orbit is that they are continually falling to earth but because of their orbital speed they continually miss hitting the surface.)

**KEEP IN MIND.** These actually examples are not in themselves important; many others could be chosen with equal success. What is important is the way in which they illustrate human reasoning and understanding, i.e., the realization that there are concrete phenomena that are denied intelligibility (the observed pitches in Doppler shifts, the ambiguity in floating/falling in the elevator) yet understanding is found in higher level theoretical generalizations (the theoretical "observer" that steps outside time and space to provide universal laws to any situation at hand). Such is our first step toward understanding Lonergan's empirical residue and why he considers this an important part of the chapter 1 before proceeding into an ever expanding sequence of shifts to higher viewpoints throughout *Insight*.

- 1. Empirical Residue.** First, positive data exists; second, this data has no intelligibility; third, there is a higher level of intelligibility (generalization).
- 2. There are a series of horizons.** The first and lowest is the personal horizon of the individual, consisting of his or her time and space specific situation, intentions, objects/things, and operations. The second combines all these first level horizons into a broader perspective, e.g., when all the individual participants in a university shift to a common idea of a university as a set of recurring schemes of operations given form through the actions of individual members. There is a third level horizon that can be considered invariant upon changes at lower levels. Lonergan's recurring schemes of cognitive operations or his invariant structure of the human good are excellent examples. If one is of a religious bent, then there is still a higher level of perspective, namely the universal perspective of the Divine Mystery.
- 3. Difficulty.** Part of the problem is that common sense individuals perceive first degree horizons are existing outside themselves, i.e., that they real out there to be seen independent of the seer. Countering naive realism requires an act of intellectual conversion to Lonergan's critical realism. Otherwise individuals are left to resolve their foundational differences through the threat of or use of force.
- 4. The importance of foundations within Lonergan's functional specialties.** Lonergan notes that there's a difference between the development of the empirical sciences and such disciplines as philosophy and theology: the former start with a diversity of theories before converging on a unified theory that explains all within its domain, while the latter starts with a unity such as Plato's philosophy before splitting into a variety of schools of thought that have little to do with each other. The reason this happens is that each school is constructed around a foundational stance that reflects different levels of conversion and differentiation of mind. The only way to resolve these foundational differences in not through an appeal to a normative culture or even scientific method, but a methodology that like the empirical sciences but one geared to human realities leads that when applied leads to cumulative progress in coming to know. Lonergan's functional specialties provides such a scheme of recurring operations that propose to clarify fundamental conflicts, provide a means of enhancing discernment between conflicting positions, and eventually work toward a unified understanding of what it means to be human in a world of emergent probability where the Divine Mystery is an active force in human history.