

Sunday, January 31, 2010

Regarding motion and sound:

My recent noticings regarding motion I have difficulty distinguishing from noticings about sound. Perhaps there is a subconscious tendency towards this, knowing that Galileo's discoveries in these realms were related, but when observing motion, specifically speeds of things, I cannot seem to detach them from the sounds they make. Cars speeding up or slowing down I associate with how the noises differ. Things approaching and departing and their sounds. The sound of the golf ball, the bead, the marble on the arcs, on the floor, on the ramp, each of these making different and interesting sounds. The sound I make in my head or just barely aloud as a pendulum swings back and forth, wondering if it is, in fact, keeping time as I feel it might be. Even the wind whistling by as the branches start and stop their motion in its invisible speed. Everything I see moving, I now associate with sound. I feel there will be connections to this in the potential I see for lesson plans of this nature...and in the further readings and explorations from Galileo's life, and his musical background.

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on the slide rule and the compass

The more I evaluate of my writings and compare them with Galileo's process, the more I determine is related to relativity, the more I feel that every discovery is somehow connected by the undertones of mathematics and observation, and somehow combines the two with a relativity that makes the world seem like an overrepeating story of itself. Watching a series of differently sized balls in a bowl, turning circles around each other somehow fits perfectly into a larger scheme of the universe, all motion somehow circular, all calculations somehow reduced to a combination of these circles and similar triangles. My notes in my explorations during these few short weeks, always return to variations on the theme of the same diagram, each time describing some new experiment, but always looking about the same, and always returning to the concept of similar triangles. In this way, I look at the idea of the compass and therefore the slide rule anew: the mathematical relationships between each of these things being defined by the same basic principles of relationships. The connections between the slide rule and the compass clear to me, despite the ambiguities in the actual applications of it, that I feel could become clear only with training or substantial revisitation to the world of mathematics I have long since left behind (my high school math coursework, circa 1997...), but nonetheless clear enough in principle, through this basic idea of similar triangles.

It is interesting to me that such a simple idea, that I assumed I understood so clearly, can continue to gain layers and depth through the very realization that other things rely on it that were previously unknown to me. It therefore seems that infinite answers may lie in the concept I previously considered finite, and simple, and somehow complete in my

knowledge of it.

Vast worlds, I feel, are opened to me through this continual process of exploration and discovery, like a new mirror somehow reached in a hall of mirrors, reflecting in each other over and over again, and somehow holding new knowledge in each repetition of itself, despite the fact that it seems to be the same image over and over again.

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on reflecting rays

The idea of MIT Henge is of particular interest to me as it connects to observation. Stone Henge, presumably, was constructed to meet with the sun's rays in a particular way, determine, I imagine based on a combination of mathematics and observation. In fact, I am beginning to have the feeling that everything that is created, at least to some degree, is crafted from a recipe of mathematics and observation. These are the flour and water of the natural and scientific world (or some other combination of ingredients required to make essentially everything).

Also, I still have the desire to play laser tag with mirrors and sun rays (or moon rays, potentially) in an MIT-henge type of setting. Except for its limited window (so to speak) of time when it could be played, I believe it would actually make an excellent, fun and educational activity for a science classroom.

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inspired by the museum...

I wondered today, between the two (the museum and the library) about mathematics as the origin of all things, as the basis of all things, and in nature at this point, I can begin to see how this might be the case. On art and music, it is clear to me how this could be so; the basis of perspective, of balance, of rhythm, all being in mathematics. I wondered as well, if dance and theatre, which I consider to be the other two of the main arts, can also be reduced to mathematical principles, or if they include some sort of internal mathematics as well - if they, and perhaps all forms of art, must combine math principles with emotional or psychological or otherwise personal principles, or if they all, in truth, can be reduced to mathematics. If this is the case, while I am tempted to be disheartened by its possibility, I wonder if alternately, it means that rather than reducing existence to something dry and devoid of flourish, this would mean that mathematics itself is innately artistic and beautiful and so complex that it encompasses beauty and emotion and life in its very essence, and is not simply numbers and fact, but rather layers of understanding and concept so intricate that they underlay our very existence in a pattern that is so vast that it only seems to us to be chaotic, but in fact, nothing is irrational, and everything would reveal a pattern eventually, if only the universe (or alternately, our minds) were large enough to reveal it.

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on devices in the museum and the library

Many devices caught my attention, though I shall specifically write on two of them, one of which I have drawn and appears in the journal files I will upload separately.

The first of which is actually a series of models: I viewed many models of a copernican view - the sun and the planets circling it, and what caught my attention here is the calculations that must have gone into determining these distances. While Kepler and Galileo both reference the calculations of the size and distance of the moon, the sun, the planets, I still marvel at the complexity of it. I envision the use of the compass to evaluate the relationships between the heavenly bodies, but the construction of these massive models (or sometimes smaller models) complete with the moon and its projected lunar orbit, and for some of them even the time it would take for the bodies to collide with one another in the absence of gravity (discovered at some point before the one model was constructed) baffle me in their complexity.

Secondly, an instrument labeled "apparatus for measuring the angle of incidence" was of great interest to me, and to Therese. Having a strange angle to view it, there were portions of it that were not entirely clear to us, but the circular shape and movable arms, indicated some method of measuring an angle, presumably as a portion of a circle. This makes sense to me, given that a circle serves as a sort of "frame" of measurement, the proportions within it always being the same. It is interesting to me that at some point, someone noticed this, much like the proportions of a compass and then a slide rule would have been accepted as established.

Questions that we encountered included why the device would be a full circle, despite the appearance that the arms of the device could not move past the semicircle on top. Also, we wondered at the plate that rested on the horizontal line dissecting the circle itself - what was placed on this plate? we wondered if a mirror or lens was placed there, and a light shone at it, though a mirror would, in theory, reveal an equal reflected angle, unless it were somehow warped in one direction or the other.

Therese's further investigation revealed that perhaps liquids were placed on this plate to evaluate the angle of reflection from them, and I would wonder at the ease of recreating such a device and these experiments. Would our experiments with lenses have been any simpler given such a device? What types of goals were there at the time that made this instrument necessary? I feel certain that exploration with it would provide more insight into its uses.

AT THE LIBRARY:

I was most affected by two things here as well. First, the simple feeling of being in the presence of artifacts hundreds of years my senior is almost too grand to consider. Touching a page that was touched that long ago is a sort of time machine in itself. These pages and the ideas they hold have transcended time, it seems, and are held suspended in

the small room in the air and in the smell of weathered pages.

Secondly, the appearance again of those diagrams so similar to our own, was astonishing. I copied the diagram from Kepler's book, certain that it bore some resemblance to the one I drew on the board as a combination of DS's and the one TA and I crafted from our experiments. When we left the library, I compared the two and there were, in fact, striking similarities. While we still have not determined exactly what we think the meaning of these diagrams must be (ours not yet useful beyond explaining what we see, and his being accompanied only by words in Latin or Italian), it is still encouraging to see the ideas mirrored in at least this diagrammatic way. And certainly sparks more curiosity and the need for further exploration.

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