

Geology at High Mowing School as a Collaborative Teaching Experience

The ninth graders at High Mowing began their high school experience this year with a geology main lesson in which they were guided by three or four teachers at any one time. At the beginning of each day these teachers joined the students in eurythmy. The eurythmist led everyone into the poem *Stone* by Charles Simic, in which he gave a means of sensing the being of a rock from the inside. He writes: *I have seen sparks fly out/When two stones are rubbed/So perhaps it is not dark inside after all.* Reading this is insufficient to really feel the inner being of a stone. Eurythmy, because it opens the middle sphere of the human and creates an immediacy with the world, enabled us to approach the essence of *stoneness*. Five pentagons formed by twenty-five students were then dissolved and reassembled. The dynamic movements of these star forms, once internalized, created receptivity in the students for the perception of the Earth as a living organism. It became clear to us that art has a vital role in providing access to living, dynamic processes. We agreed that such movements can not be grasped with our intellects alone.

The other ingredients of this main lesson were geology, drawing, English, journaling, mathematics and building a stone wall. They were mixed according to the need of the moment, without a predetermined sequence. The mood of the class was read and usually it became clear what the next activity should be. There were days when stone wall building followed eurythmy. To feel the weight of granite, as the farmer's ancient pile of field stones was moved and ordered, was an unforgettable experience. Without gloves, the sandpaper surface of rocks imprinted itself on one's memory forever. On other days wall building took place after a spell of grammar, acting as a counterbalance to the rigorous parsing of sentences. But we realized the two are connected: grammar as the structure of language, rocks as the structure of the Earth. Within English we experienced the contrast between the living, pliable nature of poetry and the unbending, unyielding nature of grammar. It seemed to us that the interplay of the two led to pedagogical richness. The poems of Robert Frost, who spent much of his life in New Hampshire and really knew its stone walls, added poignancy. The extraordinary poems by Helen Keller, taken from her book *The Chant of the Stone Wall* (1), taught us what it means to listen to what the stones have to tell us. To be bathed in the beauty of these words struck a deep chord within each of us. Bearing in mind the following statement by Steiner, taken from lecture four of *The Foundations of Human Experience*, we became aware that the English component, wall building and eurythmy, whenever they involved conscious repetition, were vehicles to cultivate will impulses in the students:

The more the child becomes aware of the need to do deeds out of devotion to repetition, because they should and must be done, the more you elevate these to true will impulses. (2)

This collaborative approach demanded flexibility and openness from each of us in order to create the fluidity necessary to ensure seamless transitions between activities. It also required that each of us was prepared to forgo our own cherished teaching methods and content. Geology provided the anchor, or central theme, around which the different activities moved. We were guided in our choice of geological material by Hans-Ulrich Schmutz's book *Earth Science* (3), in which this is one of a series of interrelated main lessons that lead the students to an understanding of the Earth as a living organism. In this main lesson we asked the students to observe the land forms they encountered. Our intention was to lead the students to a feeling that earthquakes, volcanoes and glaciers are manifestations of movement and life within the earth. It was not our intention to explain how these forms came about: that will be the direction of a main lesson in the tenth grade. We consciously used drawing as a tool to practice observing. The task was always to draw what was there and not what one believed to be there. This required enormous self-discipline, as well as guidance from the art teacher on how to improve one's skills. It was a constant and rapid movement of the eyes between the object being drawn and the drawing. For all of us it was an encounter between the subjective self and the objective world beyond oneself. We had to separate ourselves from the world and hold ourselves back in order to see and hear what is really there. This is particularly important for adolescents who are establishing their relationships with the world and those around them.

Another discovery that we made was the opportunity to incorporate mathematics into the palette of subjects: when monitoring seismic activity around the world it was necessary to use longitude and latitude. This led to instruction in the use of coordinates to find one's place on the Earth. It was interesting to observe the difficulty that a number of students had in grasping this idea. It also suggests that analytical geometry really does belong in the tenth grade. A second application of mathematics was the Richter Scale, which led to an introduction to logarithms. It became clear to us that there is considerable scope for integrating mathematics in such a collaborative endeavor.

The final collaboration was report writing. The team that taught this main lesson sat together and each student's report was the result of their deliberations. Each student's participation and performance was illuminated from different perspectives by different people. It created a much fuller and richer picture of the student than is possible through the eyes of a single teacher.

What did we, the teachers, learn from our collaboration? It was clear to us that the constant stimulation resulting from collegial interest in each other's work was enormously beneficial. The presence of the collaborators throughout the main lesson brought immediate feedback, with corrective action if deemed necessary. The student experience was undoubtedly richer as a result of our collective effort. They perceived us striving together in a fluid fashion. However, there were students who noted in their evaluations of the course that they were not challenged enough. They felt that their needs were not met. We will strive to address this next year.

Where are we going in the future? We have already laid plans for next year. The first four weeks of ninth grade will be given over to an earth science block. While integrating all of the aforementioned subjects, mathematics and foreign languages will be woven into the fabric of the main lesson. The entire day's lessons will be devoted to this pilot study, thereby allowing us to observe the benefits and challenges for the student when the subjects to be studied are experienced as a cohesive whole.

- (1) The Chant of the Stone Wall: Helen Keller. Hodder and Stoughton 1910
- (2) The Foundations of Human Experience: Rudolf Steiner. Anthroposophic Press 1996
- (3) Earth Science: Hans-Ulrich Schmutz .AWSNA Publications 2011

Robert Sim for the collaborative team: Raven Garland – eurythmy, Brad Miller- geology, Rachael Johnson- drawing, Colleen O'Connors – English, Robert Sim – math.

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