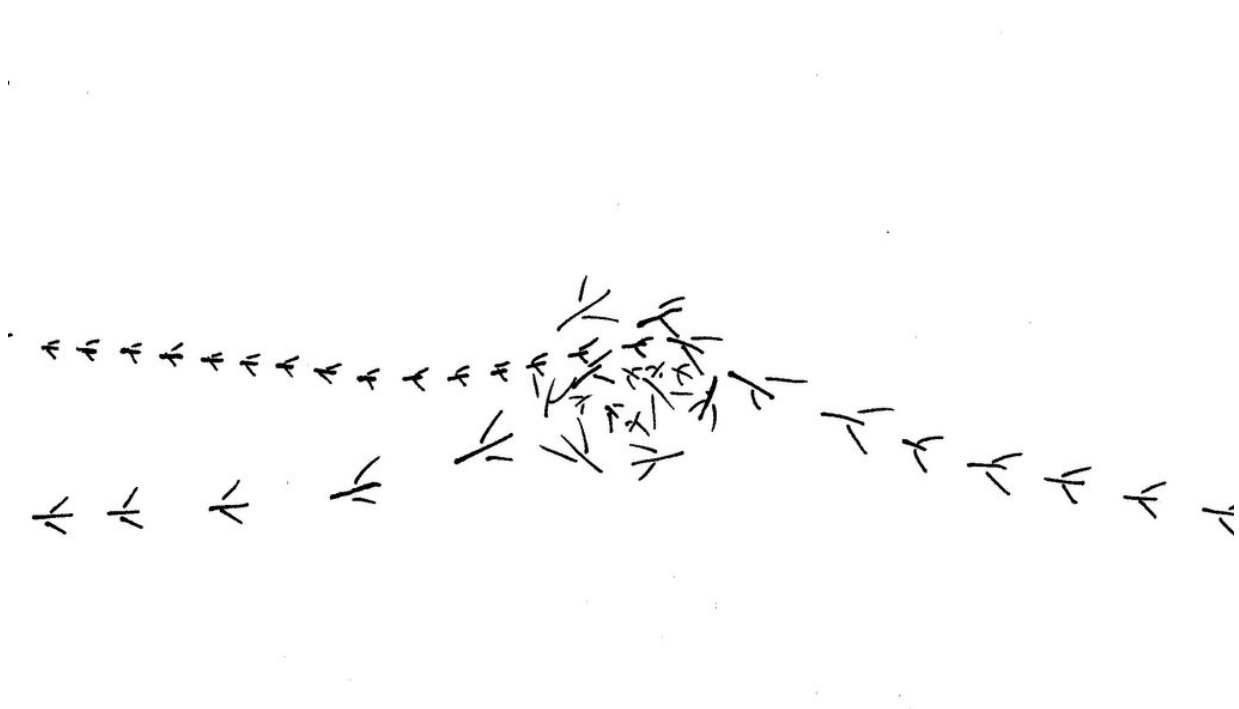


Lessons from Salzburg (1)

Last week I travelled to Salzburg to attend a week's training on teaching science in primary schools, run by Pri-Sci-Net. It was a wonderful experience. I enjoyed seeing the city and met some lovely people. I also learned a lot about science teaching, and I thought I'd share of the ideas here on my blog.

I'll start with a session 'Teaching the Nature of Science' by Christian Bertsch from the University of Education in Vienna. The session was on method rather than content, and Christian talked about how to help students approach their science learning. He focused in particular on the distinction between observation and inference and on the nature of scientific theorizing. He illustrated these with some practical examples. I'll mention two of these.

First, Christian gave us sheet like the one below and asked us what we saw.



Most of us said we saw two sets of differently-sized bird footprints, moving from left to right, converging, and meeting, and then one set (the bigger) moving off again. Christian then asked us to interpret what we saw: What had happened? Most of us said that the footprints were of a bigger bird and a smaller bird. The bigger bird attacked the smaller and ate it, and that was why there was only one set of footprints walking off. Christian suggested we could use such examples in class to illustrate the distinction between observation and inference: we observe certain marks, and then we make an inference or interpretation to explain them.

I liked this example and will use it in class. But I would want to take it a bit further. With younger children I would probably do two things. First I would ask them to try to think of other

interpretations of the scene. Maybe the smaller bird flew off; maybe it was tired and the bigger bird gave it a ride; maybe the marks weren't made by birds at all, and so on. Second, I would introduce the importance of context and background knowledge. For example, an Austrian child looking at the white paper might assume she is looking at snow, but a child from a desert country might think of sand. Again, I would try to get students to think of more examples.

For older children I would focus on the observation/inference distinction. Can there really be observation that is completely devoid of interpretation and independent of background knowledge? After all, the observation statements we offered in the session were not completely neutral. People said they observed bird footprints, not geometrical shapes, and in doing so they were drawing on background knowledge of avian anatomy. Could there be a completely neutral description of the scene? Would a description in geometrical terms do? What about real-life cases? I might ask students to describe other scenes (say, photos from a magazine) in as neutral terms as possible.

The second of Christian's examples involved a model — an opaque box with two ribbons passing through it parallel to each another. Christian encouraged us to play with the box, without looking inside. The interesting thing, of course, was that the ribbons did not always work as expected. For example, sometimes pulling the top ribbon to the right would cause all the other ribbons to retract; sometimes it would only make the top one retract. Christian asked us to formulate theories about how the box worked, make predictions, and then test them by pulling the ribbons in different orders.

Again, I thought this was a great way of introducing children to the idea of scientific investigation and the cycle of observation—theory-formation—experiment—new observation. Christian also suggested that the model could be used to illustrate the difference between scientific theories and scientific laws — the former, unlike the latter, being provisional.

As I understood it, the moral of the example for us as teachers was that we shouldn't simply state scientific theories as established facts to be taken on trust, but rather present them as the product of a process of theory formation, just like that we go through in theorizing about how the box works.

More on the conference later.