



Report from 33d Intl. Geology Congress in Norway (By Charlie Hall)

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Below is an email sent by Professor Charles Hall from SUNY-Syracuse detailing his recent trip to an international Geology conference in Norway. Though written for his friends and colleagues, I thought the details and insights he shared from his trip to Norway would be worth sharing with the TOD readership, particularly the comments on peak oil and climate change. Charlie also tells me he has a new paper published next week on EROI economics which I will format and post here.

Report from 33d International Geology Congress

(or far more than you want to know about geology meetings and Norway)

Charles A. S. Hall

I was invited to attend present at a plenary session of the above meeting in Oslo Norway and since they paid for my flight, a week's hotel in Oslo, the meeting registration and some incidentals I decided to go. My wife Myrna came with me and we have now been in Norway for about two weeks. If you are interested in the details of this huge meeting you can go to www.33igc.org. This report is one person's summary of a number of issues.

1) The meeting was huge (6,500 papers, usually a dozen congruent sessions at any one time). I was initially attracted to the idea of speaking before 6000 geologists from 170 countries) but in fact there were a dozen sessions even during most plenaries so there was in fact maybe 200 at my session, which was not bad by most de facto plenary standards.

2) The sessions were at Lillestrom, about 15 minutes by fast train from downtown Oslo. Given the size of the meeting the organization was superb, except that it was necessary to know in advance, which few people did, how to read the "roadmaps" to find the sessions either conceptually or physically. I found myself each evening reading all titles trying to find those that were interesting to me.

3) Most sessions were about the minutia of a very diverse and well established field.

These were usually less interesting to me than the titles led me to believe, but a few were great. This is as usual with any meeting. I had lots of fun meeting people from all over the world with a common interesting science.

4) Each day had a plenary session of general interest: biodiversity, climate, mineral abundance, energy etc. I stayed all day in the climate and energy sessions (I gave a paper in the latter, and asked many questions, as usual), and much of the minerals.

5) It became clear that most geologists are not particularly interested professionally in oil or minerals except as they may provide funds for their own research. On the other hand a lot of geological research was very well funded compared to what I am used to seeing --- obviously society has a direct interest in funding geology, unlike lots of other sciences, because money can be made from its activity, due to direct or indirect application of the results.

6) I went to excellent (although perhaps predictable, although for this "new" audience that is fine) papers by Colin Campbell and Jean Laherrere, and spent a lot of great time with them at the meetings and dinners. I was pleased to see how relaxed and funny Jean was, something I had not seen before. To my amazement here was Colin Campbell, maybe with one of the world's most important geological ideas, and only 30 people were at his session! Likewise Jean. The general community of geologists do not have a clue about peak oil. They may not have their head stuck in the sand, but they do appear to have their head stuck in the rocks!

7) The two best papers (in my opinion at least) I went to were each in the smaller sessions, not the plenary, which were often rather broad, not especially new to me and often extremely contentious. The ones I particularly liked were by Jim Harris who spoke about making a model of oil formation, or rather the formation of the potential for source rocks (vs the "trap rocks" that collect perhaps one percent of the oil that is formed and that serve as our oil sources. This model was a marvelous "systems" project and included continental drift, paleoclimate driven by the British Hadley climate model, paleo ocean currents and so on all of which would generate better or worse conditions for river runoff (with nutrients and sediments, in turn influencing phytoplankton production) , benthic oxygen levels and so on (I learned that absolute anoxia is not needed to form oil but low oxygen levels is), and temperatures (you need at least 15 C, thus Harris believes that much of the arctic -- where not continentally drifted -- will not produce too much oil). Then he ran a dynamic simulation from say 150 to 90 million years ago (when most oil was formed) with continents tooling around the world, climates warming and cooling, precipitating and not, rivers washing nutrients and sediments around and so on, phytoplankton blooming or not and settling into ocean basins etc. etc. The end result was the formation of the percent carbon in the sediments, and then these were oxidized or not, or washed away by ocean currents or not. All very complex but presented with beautiful dynamic software. He then predicted where the oil would be in e.g. Northern South America, and compared that with where in fact we have found it. Assuming he has not cheated (I am pretty sure he has not) it was a VERY impressive presentation with a wonderful "systems" view and wonderful 3 and 4D graphics. C. Fratelli and others in this session also gave very interesting presentations.

8) The second really impressive presentation for me was by Paul Nadeau. I was sitting next to Colin Campbell and Jean Laherrere and Colin said "Watch this, this will be great" and afterwards Jean said "That was truly wonderful (as did Charlie). His paper was

about the "golden zone", a layer in the earth characterized by temperatures of from 60 to 120 degrees C within which 90+ percent of oil has been found and 80 plus percent of gas. But this layer is found at different depths, deeper (?4000 meters) in the North Sea and shallower at (1000 M) off of, for example, Mumbai, India. Most of the exploration and test drilling near Mumbai (or Bombay) was at the wrong depth, too deep! (Although I don't know why they did not hit oil on the way down). This shows clearly that we have explored most of the "sweet spots" in the earth -- not by understanding the golden zone concept but empirically-- and is I think further evidence that we are unlikely to find too much additional oil by e.g. drilling deeper where we have already found oil. The paper was clear, critically important, extremely interesting and I thought beautifully presented.

9) The plenaries, especially the climate session and somewhat the energy sessions, were designed for a more general scientific audience. They tended to be moderately interesting, optimistic about resources and technology and often extremely contentious. About two thirds of the presenters and question-askers were hostile to, even dismissive of, the IPCC (International panel on climate change) and the idea that the Earth's climate was responding to human influences. This was rather shocking to me who knows of several other such scientists but had no idea there were so many. They talked about Milankovich Cycles of course, but also sunspot cycles and other possible climate forcings. These were linked to some pretty bizarre (to me) ways of influencing the climate: e.g. making cloud condensation nuclei through ionizing radiation from sun spots or slowing or speeding the Earth's rate of spin in response to cosmic rays. These were apparently very serious scientists but presented far more correlation than clear and convincing mechanism, at least I thought. An atmospheric physicist sitting next to me said that there was no correlation between cosmic rays and clouds as he had made all the measurements. The IPCC folks were adamant that their model was built on first principles, could reproduce past changes in climate and was making proper predictions. The plenary had at the end a "debate" but it was really two ships passing in the night--each side presented its arguments --usually using different types of logic, often arrogantly, and said the other side could not possibly be right. The moderators could have done us all a service by guiding the debate to specific issues "what do each of you think about sun spot correlations even when their effect appears trivial" but that did not happen.

10) I could not at first figure out why there was so much hostility between the two climate groups. At first I thought it empiricists vs modelers, although each group was somewhat mixed. Then I concluded that it is the geologists, used to studying constant climate change over very long time periods of Earth's history, who think that basically the climate of the earth is always changing due to various forcings, and what's the big deal now? The IPCCers respond that the Earth has never seen CO2 levels such as we are headed for and that the CO2 changes produce a strong enough signal to change the climate. And on and on. John Holdren has recently prepared a point by point response to the anti IPCCers which I will try to send out. Then we can expect a rebuttal to that and so on.

11) The mineral and energy plenaries were mostly about how although there were some serious supply issues that new technologies were finding marvelous new reserves of copper, oil (except there were no new fields named) and so on. Each presenter tended to argue that all we needed was more money for geological exploration, more or fewer free markets, even higher prices and so on. The only real antidote to this, other than good presentations such as by Jeremy Leggett on climate impacts and the need for solar, was

Charlie's arguments that most of this new technology was extraordinarily energy intensive (arctic minerals for one example) so that it did not matter how much e.g. oil was left in the ground because we were relatively rapidly approaching the point where it took a barrel of oil to find and develop a barrel of oil. Similar arguments are applicable to finding the next ton of copper and so on. While no one countered these arguments and all agreed that the dollar cost of producing energy and other minerals was escalating rapidly it was clear that most were so brainwashed to think in terms of monetary costs few thought much about energy costs and few thought of them as having profound limiting consequences. I thought my own talk was pretty good but rushed as a half hour was not enough time (or I should have had fewer slides). The same talk, given a week later at the University of Bergen to a graduate student and professor audience at their institute of Systems Dynamics (a very cool place) went much better as I had time to develop the concepts better. But a fair number of people at the conference came up to me after words and thanked me for a needed, fresh or different approach different from most of the tenor of the meeting. I will mail out a paper related to this talk very soon as it has just been published.

Bergen, Norway

NORWAY

After the meeting my wife and I took an extremely nice trip from Oslo to Myrdahl to Flam (one of the worlds incredible train journeys for sure to a place far into the fjord called Fjaerland (also known as Mundal and from which Vice President Mondale's ancestors once came). We took the glacier bus tour (my wife models glaciers and yes, Jostedalbreen too, Europe's largest, is melting back in recent years and a whole lot since 1900). I then had a marvelous half day trout fishing with Ivar. Then the next day we climbed to the top (sort of) of a 1000 meter mountain and today I can hardly walk. We also visited the Viking ship and polar exploration museums in Oslo and the glacier museum in Fjaerland and all were amazing to see. Probably the glacier museum was the very best as you went from room to room representing different past epochs of the region.

In all of this travel I was very impressed with what a difference petroleum makes to Norway. In the fjords the grass -> sheep or grass-> cattle link was key to any productivity now or in the past (excluding the phytoplankton -> fish chains). The areas along the steep fjords where grass could be grown were usually very very limited, as were the grazing animals. I watched in Fjaerland as two farmers with two medium sized specialized tractors took previously-cut hay, rolled them up into big round bales, and then with a different tractor wrapped them in plastic with a touch of a button. I compared this with the procedures given in a book my wife was reading ("Out stealing horses") and the pictures in an exhibition of photographs from the turn of the last century by Knud Knudson where entire families were out piling hay on wooden racks to dry. I thought those two farmers in an hour probably put up more hay for the winter than a whole family would in a summer in 1900. We also had gone to the Viking ship exhibition in Oslo and I guess you could see why they became raiders because the land was so unproductive. But a thousand years ago Vikings became Christians, stopped raiding and have been extremely peaceful since. I, who usually think that religion leads to wars, had to see this as an important counter example to my usual thoughts. Finally we went to Bergen which may be the most beautiful city we have seen. In contrast to

Oslo which has ugly new buildings on the waterfront Bergen keeps its city core mostly the old Hanseatic buildings or 18th century lovely housing. The people at the Systems dynamics program of the University were very welcoming and seemed to respond well to the same lecture I gave at the geologists meeting. Both Myrna and I found Norway an extremely lovely, civilized and interesting place to visit, the only problem being that everything is two to three times the price of the equivalent in the U.S. BUT, although beers in a restaurant were eleven dollars the students in the Systems Dynamics program, whether from Norway, the developing world or even my own former students Billy and Bobby, pay NO tuition. Maybe that makes a lot of sense.

Charlie



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