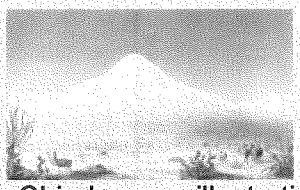
Meeting 14 • 21 February 2013 • Thursday
Week 7: Rocks & soil, weather & water

Version: **2/21/13**

pictures of the week



Mt. Chimborazo, illustration from Humboldt's time

Humboldt's iconic engraving of Mt. Chimborazo

thought-bite of the week:

"...often during astronomic observations I almost dropped my instruments when I realized my face and hands were covered with these hairy bees. Our guides assured us that these bees only attacked when you annoyed them by picking them up by their legs. I did not try."

(Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, p. 17)

mini-text of the week (start):

"...the general phenomena of plant distribution..."

Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, pp. 14-16 (read more)

Topics for today

(15') This week's thought-bite: expensive instruments, extreme conditions, and progressive insights into geography, climate, and species distribution:

1) Which of the planets can be seen by the naked eye? Common binoculars? Which have you yourself seen?
2) Assume your standing on top of some PSU building. At what time of day might you see the full moon over Mt. Hood?
3) What are the largest / most powerful telescope and microscope you have ever looked through? What did you see? How powerful is whatever such instrument you yourself possess or once possessed?

Magnification (and the misconception about "power"); light-gathering; the importance of stable mountings and precise angular measurement; cost (in relation to size; then and now)

Humboldt's portable instruments: a) the portrait of H&B at their research table; b) out in the field near Chimborazo.

The portable telescopes of Humboldt's time: 1) superbrief history of telescope from 1608 into 21st C; 2) telescopes of the 18th C, including 3) the one that Capt. Cook used for advanced astronomical observation on his voyages; 4) telescopes of the 19th C; 5) history of the observatory; 6) stationery telescopes and their astronomers: Wilhelm / William Herschel; 7) the Paris Observatory - Humboldt would have known it well; 8) the Berlin Observatory - Humboldt would have been quite familiar with it too, especially after his travels; 9) the US Naval Observatory, the major center of American astronomy around 1800; 10) two sources of interest to us as we deal with the unavoidable and very complex issue of science and religion: the Vatican Observatory; Wikipedia: "Catholic Church and science"; 11) something to think about the next time

you sing "Auld Lang Syne" at Times Square :-)

Good topic for a group project: archaeoastronomy and ethnoastronomy – explanation; sample lesson plan for "A web-based activity exploring how different cultures have interpreted constellations"

This week's mini-text about plant distribution: It's not just that the distribution of species varies with altitude, as it varies with latitude and climate; the same or similar species appear in similar zones that are separated by barriers like mountains that - once geology was mature enough to recognize this - may have arisen to isolate those species from each other. There was much effort to distinguish closely related species and to determine which were variants of ONE species and which were truly species of their own. Definition of species then was based on reproduction (the reproductive parts of the plants; the possibility of fertile mating); that principle has yielded to cladistics and classification by shared genes (see handout for meeting #11, Fortey, Horseshoe Crabs and Velvet Worms, pp.24-5)). A thorny related problem: How to tell whether a newly-encountered being is a member of species X, say our own species.

Small groups: put forth your own definition of "human". Recent poll: owners + pets

(15') The iconic "Chimborazo" graphic: that was the best they had "back then" about sustainable environmentalism: the data, the thought, the presentation in words and pictures. There was NO "Big Science": no government-sponsored science (until late in 19thC in US - Powell's fights), no corporate-financed R&D. Well, there was a little, especially for military purposes (mapping, weapons). But most science was "amateur" (gentleman, a few gentlewomen Caroline Herschel! - , and a few others), because science then was not regarded as important. Producing that engraving involved huge effort and expense, even after the data was collected.

Some other "iconic" images related to science (whether as concepts or as means to deliver data effectively).

Special points: natural history collections; rarity of travel; topographic mapping (Wikipedia; Geosciences, Idaho State U)

(15') Our discussions of data and last meeting's meditation about reading Darwin were a preview of the topic:

What can we trust? Can we even trust the Helferich book?

Examples of "cognitive traps": availability bias; hindsight bias; confirmation bias; contamination effects (distraction by irrelevant but proximate information); overconfidence in calibration (precision ≠ accuracy; best-case scenario ≠ most probable outcome) (source: R0303, Ferguson, *Ascent of Money*).

So what can we educated citizens read while we wait to see how today's contentious issues will work out and what today's classics will be? What our are reliable sources of information and opinion: electronic / paper / other; periodical press; local, quotidien; long-term knowledge? Related question: how do educated citizens become capable / better writers? Small groups: Where do you get your citizen information, opinions, conclusions, solutions, and how do you check it out? If you are into "think globally, act locally", where do you get your **local** info? What "signs" are there that your sources are reliable?

(10') More about writing assignment #04 and the group project:

Educating the young(ish) learner about sustainable environmentalism, as you will explore with your projects, requires systematic learning (lesson plans!) mapped onto standards. Here are examples: Lyon Arboretum and Hawaii school standards • Hawaii STEM Intercommunity Portal • Enchanted Learning - but one of many sources of

	learning activities, especially for younger learners. Here's their "Explorers" page about Humboldt. Here's their section about "astronomy:Earth", with activities that could be inspiration for learning activities for Humboldt-named schools. Here is "ThirteenEd Online", about lesson plans (example: math). And here's a blog article, from Scientific American, that attacks state science education standards, including Oregon's, as "'mediocre to awful."
	(10') Exploring group projects (continuation of previous meetings): Link to the group project specifications. First, let's encourage "inclusion" by group-thinking some examples of projects that could call on the interests and expertise of: business/econ majors; architecture majors; PE/sports majors / athletes; music. Groups report out: who is doing what, how far are you getting, what have been your triumphs and problems? What help do you need? Now some general specifications (review of several earlier discussions): 2) Projects can be aimed at Humboldt-named schools, but can also target just about anything that is related to sustainable environmentalism: OMSI Planet under Pressure; PSU Earth Day; 3) Examples of projects aimed at Humboldt-named schools: Earth Day with Alex; designing a Humboldt-related learning garden or specimen collection; planning initial contact with Humboldt-named schools; researching Humboldt-named schools; re-branding a Humboldt-named school (colors, totem animal /plant, mascot & costume, rally/same implement, cheer, events); familiarizing stakeholders with Humboldt; planning the model "Humboldt Box"; adaption of lesson plans for Humboldt-related content (organized according to subject area, or according to age level); grant research and draft proposal. 4) Your part in a project does NOT have to be based on your academic subjects. You may have a serious personal interest that can help (pets, dance, sewing), or an area of "non-academic" interest, experience and talent (organizational skills) 5) The projects are Big IDEAS. They do NOT have to be Giant Finished Products. The Humboldt Project has been going on for more than five years, and already includes some student-begun projects that have been handed on to you. Your projects will be handed on to other teams. 6) Start RIGHT AWAY (or even sooner) to document your contribution to your group project so that it can be known (and graded) individually. 7) Groups work separately. Suggestion: Sketch a timeline and think backward from it.
	(5') Announcements, Checkups & Previews: 1) apps Humboldt would have liked; 2) presentation about society back then (and any time before 1800 or so), to help understand how H related to people of other classes / races (teaser: When was it that someone's ears first popped with a change in altitude?); 3) advice about "educated citizen" reading, with a short sample; 4) one focus of "interpreting the past" to the present during the rest of the course: land and water allocation and use in the American West, including Oregon, and how Humboldt play an important role in that. One theme of next several weeks: Humboldt's influence on the development of systems of land and water measurement and management in the US.

Less snow, more blizzards. How?

A warmer climate puts more moisture in the air, so when it snows it really snows

By SETH BORENSTEIN
THE ASSOCIATED PRESS

WASHINGTON — With scant snowfall and barren ski slopes in parts of the Midwest and Northeast the past couple of years, some scientists have pointed to global warming as the culprit.

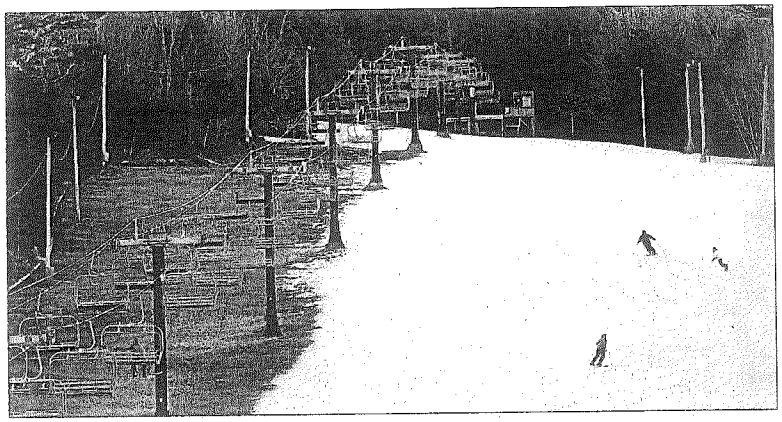
Then when a whopper of a blizzard smacked the Northeast with more than 2 feet of snow in some places this month, some of the same people again blamed global warming.

How can that be? It's been a joke among skeptics, pointing to what seems to be a brazen contradiction.

But the answer lies in atmospheric physics. A warmer atmosphere can hold, and dump, more moisture, snow experts say. And two soon-to-be-published studies demonstrate how there can be more giant blizzards yet less snow overall each year. Projections are that that's likely to continue with man-made global warming.

Consider:

• The United States has been walloped by twice as many of the most extreme snowstorms in the past 50 years than in the previous 60 years, according to an upcoming study on extreme weather by leading federal and university climate scientists. This also fits with a dramatic upward trend in extreme winter precipitation, both rain and snow, in the Northeastern U.S. charted by the National Climatic Data Center.



ROBERT F. BUKATY/THE ASSOCIATED PRESS

The snow at a Bridgton, Maine, ski run in January is man-made. Despite some big blizzards, overall snowfall in much of the country is way down.

• Yet the Global Snow Lab at Rutgers University says that spring snow cover in the Northern Hemisphere has shrunk on average by 1 million square miles in the past 45 years.

• And an upcoming study in the Journal of Climate says computer models predict annual global snowfall to shrink by more than a foot in the next 50 years. The study's author said most people live in parts of the U.S. that are likely to see annual snowfall drop between 30 and 70 percent by the end of the century.

Ten climate scientists say the idea of less snow and more blizzards makes sense: A warmer world is likely to decrease the overall amount of snow falling each year and shrink the snow season. But when it is cold enough for a snowstorm to hit, the slightly warmer air is often carrying more moisture, producing potentially historic blizzards.

Scientists say they are just now getting a better picture of the complex intersection of man-made climate change and extreme snowfall. But when they look at the past few years of less snow overall, punctuated by big storms, they say this is what they expect in the future. "It fits the pattern that we expect to unfold," Oppenheimer said.

The world is warming, so precipitation that would normally fall as snow in the future will probably fall as rain once it gets above the freezing point, said Princeton researcher Sarah Kapnick.

Her study used new computer models to simulate the climate in 60 to 100 years as carbon dioxide levels soar. She found large reductions in snowfall throughout much of the world, especially parts of Canada and the Andes Mountains. In the United States, her models predict about a 50 percent or more drop in annual snowfall amounts along a giant swath of the nation from Maine to Texas and the Pacific Northwest and California's Sierra Nevada.

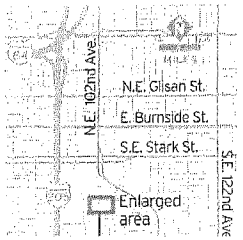
This is especially important out West where large snowcaps are natural reservoirs for a region's water supply, Kapnick said. And already in the Cascades of the Pacific Northwest and in much of California, the amount of snow still around on April 1 is down about 20 percent compared with 80 years ago, said Philip Mote, who heads a climate change institute at Oregon State University.

Shooting

Continued from Page One

scene overnight and received a briefing from Police Chief Mike Reese on Monday morning.

Hales declined to comment through a spokesman.



when they peeked out their windows, they saw flashing lights and officers with guns pointed at the employee lot and nearby parking garage.

"We knew by then that it was something more serious than fireworks," she said.

Two mobile police command units arrived soon after, followed by a helicopter.

volved shooting occurred on Sept. 29. A Multnomah County grand jury found no criminal wrongdoing by two Portland police officers who shot and wounded Joshua Stephen Baker, 27, after responding to a domestic violence call in Southeast Portland.

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This 'failure of invariance' is only one of many heuristic biases (skewed modes of thinking or learning) that distinguish real human beings from the *homo oeconomicus* of neoclassical economic theory, who is supposed to make his decisions rationally, on the basis of all the available information and his expected utility. Other experiments show that we also succumb too readily to such cognitive traps as: Ferguson, Ascent of Money RB 305

1. *Availability bias*, which causes us to base decisions on information that is more readily available in our memories, rather than the data we really need;
2. *Hindsight bias*, which causes us to attach higher probabilities to events after they have happened (*ex post*) than we did before they happened (*ex ante*);
3. *The problem of induction*, which leads us to formulate general rules on the basis of insufficient information;
4. *The fallacy of conjunction* (or disjunction), which means we tend to overestimate the probability that seven events of 90 per cent probability will *all* occur, while underestimating the probability that *at least one* of seven events of 10 per cent probability will occur;
5. *Confirmation bias*, which inclines us to look for confirming evidence of an initial hypothesis, rather than falsifying evidence that would disprove it;
6. *Contamination effects*, whereby we allow irrelevant but proximate information to influence a decision;
7. *The affect heuristic*, whereby preconceived value-judgements interfere with our assessment of costs and benefits;
8. *Scope neglect*, which prevents us from proportionately adjusting what we should be willing to sacrifice to avoid harms of different orders of magnitude;
9. *Overconfidence in calibration*, which leads us to underestimate the confidence intervals within which our estimates will be robust (e.g. to conflate the 'best case' scenario with the 'most probable'); and
10. *Bystander apathy*, which inclines us to abdicate individual responsibility when in a crowd.[1]