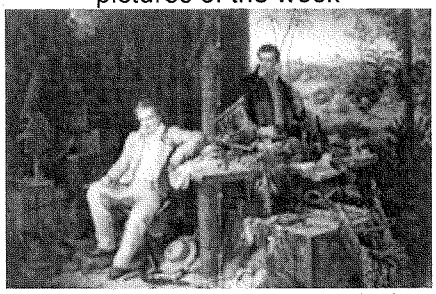
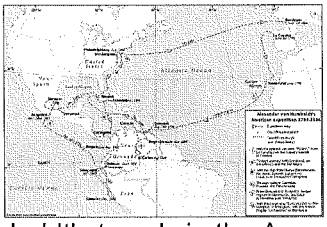
Meeting 8 • 30 January 2014
Week 4: Plants – what they found, where they found it, why it was there, how they used it

Version: **2/2/14**

pictures of the week



Humboldt, Bonpland, and their scientific equipment (source: Botting, *Humboldt and the Cosmos*, p. 98-9 [0026])



Humboldt's travels in the Americas

thought-bite of the week:

"Even when nature does not produce the same species in analogous climates,... we still noticed a striking resemblance of appearance and physiognomy in the vegetation of the most distant countries.... [R]eason cannot stop man forming hypotheses on the origin of things"

(Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, p. 13)

mini-text of the week (start):

"The destruction of the forests... forcefully explains why the present Lake Valencia is decreasing...."

Humboldt, "Personal Narrative", from *Jaguars and Electric Eels*, ed. & trans. Wilson, p. 31 (read more)

Topics for today (key to symbols)

•+(10') Thought-bite of week (and pictures of the week): Life-forms elsewhere/ "elsewhen": how to fit them into current organization or, if they don't fit, how to re-organize the organization.

Now that everybody (?) is on board the Humboldt SINQ Canoe, we'll get to the "sustainable environmentalism" part. Key points: "noticing" (observing, gathering data) and "forming hypotheses" (what does it mean, taken all together? - an early stage of evolutionary theory). The lead-up to Darwin (not than anyone saw it that way): disagreement among (leaving aside religious matters for a while) the **scientists** themselves about interpreting the data. Those huge bones: were they human or something else (turned out to be ejontbvst!)? Could a species become extinct? Was the earth old enough to accommodate slow biological change? Were the creatures (including human-looking ones) encountered outside Europe actually different?

About data: In which area(s) of your life, study and work do you trust the data you encounter? Trust =? accuracy? choice? conclusions drawn from it? WBF examples: research about students' attitudes toward language learning; effectiveness of language activities in upper-level literature courses.

•√(10') Basics about classification of species (KPCOFGS??):

Linnaean classification - its basis in structure rather than function, and its :-) obsession :-) with sex. How scientists give those life-forms their names, and who chooses which scientists get to do that? (Fortey, *Trilobite*, p. ••)

Ungraded quiz: Which of these life-forms do you recognize when you encounter their biological (Latin! - with a little Japanese in one of them) names? - *Ursus horribilis, Cannabis sativa, Pseudotsuga menziessi, Canis lupus (familiaris),* Sphenicus humboldti, Metacarcinus magister (formerly Cancer magister), *Bos primigenius,* Sus domesticus (and farmer talk: "bossy" and "soo-ee"). Can you see and smell the difference between *Quercus rubra* and *Quercus alba* (sounds like a city in New Mexico, doesn't it)? Which of the above are / were (non-)native to Oregon / North America / The "New World"?

Classification of a Humboldt-named species; why shellfish are called "shellFISH" but aren't actually fish (also: crawfish, crayfish, crawdad); illustration of a "type specimen" (C. humboldtiana); get ready to choose "your" Humboldt-named species. Can you see and smell the difference between *quercus alba* and *quercus rufus*

How about a nice plate full of *Dosidicus gigas* (aka diablo rojo)? Should we offer the Humboldt-named schools a lesson plan organized around a banquet of Humboldt-named plants and animals? Maybe with a fund-raiser? Three newspaper / magazine articles about invasive species and the food industry: 0058 squid invasion; 0059 "squidding"; 0085 "Save the Ocean, Eat a Squid". Canoes, invasive species (zebra mussel), and Oregon law

•√(10') SINQing the Humboldt canoe (wrapup, literally [learn how to use this word correctly]):

The actual math: how big was it, and what could it hold?

Followup about the question one of you asked: "So did Humboldt actually calculate that all out when we was loading his canoe?" An example: "Alexander, Wie berechnest du die Größe von deinen Kanus? Alexandre, Le bateau ici - est-ce-que tu sais exactement s'il est assez grand?" And how did they figure out how much wood they needed for those boats and crates? Answer: They planned and calculated carefully; we have the expedition mission orders and packing lists of Cook and Lewis & Clark. By Humboldt's time the field of nautical architecture was very well developed.

Key concepts: displacement and density (Wikipedia: density); key fact: density / weight of (salt, fresh) water (Wikipedia: water weight)

Optional followup: use the map above and your computer/ smartphone map links and applications to trace AvH's route in South America, starting with his travel up the Orinoco and down the Amazon. See Helferich, p. 52 map, but be aware that some place names have been changed over time.

importance of DATA (for Humboldt, for us; about Humboldt); example: how many position measurements did H make in a day? How many other measurements?

What does all this (displacement and such) have to do with: getting up the Orinoco, through the Casiquiare Canal, and down the Amazon (see map above); the Whiskey Rebellion; the Mexican War; and the science and economy of then and ("interpreting the past") now?

•√(15') About educational standards (PSU and elsewhere) and their parts in the course: 1) evaluating own education; 2) appreciating how well-educated (self-educated) Humboldt was, and had to be; c) helping others to learn - how standards are used to develop curriculum (curricula?) and learning activities. Writing assignment 3: Your education and how it compares to standards. Due 6 February (Thursday). A look at some of those standards (as we did last week with Weitsch portrait and Fine Arts standards). About "standardized tests".

•√(05') About Humboldt-named schools and their role in this course; featured schools: PDX (now closed - summer of 2012, but alive in limited form in a school partnership), Arizona, CA (Humboldt BAY HS), Illinois (AvH Chicago), NYC, Saskatchewan, Mexico City, Puebla, Berlin-Tegel, Hamburg, Rüsselsheim, Kazakhstan; reinterpreting the past better for ourselves by (re)interpreting it for others. Upcoming: choosing your Humboldt-named school as source of info about education and possible beneficiary of your project(s).

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(05') The Weitsch portait of AvH - relation to long tradition of portrait painting (and photography, including the pics you take of yourselves to express your identity/ies); the emergence of the scholar/ scientists as claimed co-equal of the ruler, churchman, soldier (good practice for mid-term)
(05') Preview of book review assignment: 1) purpose and chief features; 2) choice of books (with some additions to come, to cover more topics or allow for books from PSU/MultCo libraries or your own resources)
(05') "Leaving Home" assignment: some examples of strong work: "Imagine living in an old elementary school with your grandparents and ten other brothers and sisters. Imagine living in classroom-sized bedrooms and your very own gymnasium. Imagine a cefeteria, a library, separate girls' and boys' bathrooms. This is how I was raised, and this is what I left for a college dorm. A one-room, one-shower, no-kitchen room." "At a certain point in our lives, each (or at least most) of us set out beyond our definition of home. In the course of our journeys some of us return to our origins later to realize that the home we remember is no longer a place of comfort and has ceased along the course to be ours."
(05') if time: some more apps
(0') Use your computer/ smartphone map links and applications to trace AvH's route in South America, starting with his travel up the Orinoco and down the Amazon. See Helferich, p. 52 map, but be aware that some place names have been changed over time.

Source of next 3 pages

TRILOBITE

Eyewitness to Evolution

BY

Richard Fortey

Vintage Books
A DIVISION OF RANDOM HOUSE, INC.
NEW YORK

that rockers bond with other rockers (studded leather jackets), rather than with, say, followers of the Hare Krishna sect (robes and shaven heads). Given well-preserved material we can recognize a fossil species as truly distinctive with almost the same confidence as with a living species. How, then, do we record this realization—turn our recognition of a new species into an official statement?

This is where scientific publication comes into the procedure. You cannot just get out of bed on a wet Monday morning and decide to make some new species. A species does not officially exist until its publication in a scientific journal. The author—often an authority—proposes the species as new and says exactly why, with appropriate illustrations. It is a serious business. You must discriminate the new species from all the others described within the same genus: in the jargon, you are obliged to "diagnose" it. This means that you have to sift through a dozen or more scientific papers, to compare the specimens in hand with all the other related species which have ever been named. This can be a laborious process, not least because the papers in question may well be published in obscure journals originating from Novosibirsk, Norwich or New Delhi. It will be obvious that to have a good library to hand is a tremendous boon to the specialist. The reference libraries attached to the great museums complement the collections as fuel does a motor. If, by mischance or laziness, you do *not* do your literature search thoroughly you could neglect a publication which actually named your species first: then, sadly, your name would be doomed to synonymy (which is a taxonomist's way of saying sunk into oblivion) because the oldest name carries priority. Scientific names are not like the street names in East European cities that change according to the political complexion of the day. They are well-nigh permanent. A rose by any other name will always be *Rosa* to the botanist.

A new species has to have a new second name—the specific name. Long years of tradition (shortly to be brought to an end) have set up rules about the classical form of species

name. It has to be derived from the Greek or Latin root of the appropriate word, so, for example, a beautiful species could be christened *pulcher*, or even *pulcherrima* if it was very beautiful indeed (from the Latin). It could not be *verypretti*, or *jolliattractivi* (from the vernacular). *Rosa pulcherrima* would be quite in order. *Rosa pulcherrimus* would not, because the endings of the genus and species are supposed to agree in gender—it is a matter of euphonious sound, if nothing else. I have always rather liked this adherence to classical roots, if only because it serves to link me with the pioneer taxonomists of the eighteenth century, who wrote in Latin and probably thought in it. This much I share with the great John Ray and the incomparable Carolus Linnaeus (or Karl von Linné, to delatinize him). We are all linked through the great endeavour of classifying the natural world; across more than two hundred years we share the same passion for ordering our knowledge. I actually rather relish trawling through heavy old dictionaries compiled by learned classicists (I have Lewis and Short's *Latin Dictionary* in front of me as I write) to look up the word for, say, "blushing," or "warty," to attach it to a species, and I love to read the quotes from Ovid that justify the usage. This adherence to a past classical culture is a bond, not bondage.

The next stage is that you are obliged to fix your new scientific tag on a particular specimen, the *fons et origo* of the name, which will carry its imprimatur for ever. This is the type specimen (or holotype) of the new species. Here the museum acquires its peculiar importance. The type specimens of species are housed there in perpetuity. The collections are the ultimate reference for the variety of the natural world, past and present. Alongside the type specimens are all the other collections made from everywhere from Antarctica to Ecuador, Tien Shan or Timbuctu, an inventory of everything alive or dead. In the Natural History Museum the fossil collections alone occupy an area larger than a football pitch—and there are four floors of them. Each floor has row upon row of cabinets, and within each cabinet there may be forty drawers

or so. Fifty specimens or more may reside within a single drawer: the mind soon reels if it tries to compute the number of specimens altogether in the collections. If I wish to compare a trilobite with some arthropod that is still alive I have to go to the Zoology Department. In the Spirit Building there are thousands upon thousands of jars containing fish or snake, octopus or lobster, pickled to the life. There are lizards collected by Charles Darwin. There are worms dredged from the bottom of the deep sea. Here is the one I wanted: a large relative of the woodlouse called *Serolis* which lives on the sea-floor under the Antarctic icecap. It looks superficially like a trilobite (although it is not a close relative) and I wanted to check a detail of its thoracic structure. Passing on, I do not have to be overtly anthropocentric to see in the turned-down lips of codfishes a depressed commentary on spending a hundred years in a jar. Colour fades, so that the ghostly quality of spirit preservation seems to match the antiquity of the specimens. As you slide the doors back upon this pallid parade of containers and bottles your voice automatically loses decibels. You reflect: mortality, this is your sad face; you defy decay only as a ghastly pickle.

Thus, after a species has been named, other scholars can always refer to the type specimen itself if they wish to know whether an example they have in hand is the same, or a different species. A number, usually written on a little label and glued to the specimen, is assigned by the curator, official scribe to biodiversity, which uniquely identifies that particular individual for reference (computers have made all this information much more easily available). The holotype has somewhat declined in importance since a less essentialist view of species has prevailed; it has been realized that a population of a type collection is preferable so as to give some account of variation in nature—after all, no two animals or plants are exactly alike. This enhances the importance of the *whole* collection made along with the type (some of these specimens are referred to as "paratypes"—literally, by the

side of the type). In the Spirit Building there are types of species so rare that one of those pale faces looking out at me from their jars might be the only specimen known. Perhaps it is no wonder that it has a gloomy demeanour.

I look forward to the time when images of these type specimens can be summoned up globally on the World Wide Web. Suppose a researcher in Sibumasu wonders whether he has the same butterfly species as one named a hundred years before by one of the early western explorers: all he need do is log into the appropriate website on his field computer, and there will be a gallery of holotypes in living colour for him to compare with the specimen he has in his hand. All that century-long tending with naphtha balls, and the curator's dedication to numbers and records will have been justified in that moment. Only by such definitive reference can we truly know what lives where, and in what numbers. I believe it will remain necessary to summon such living, visual images for a long while yet. DNA "fingerprints" of species are becoming increasingly important, but they do not substitute for the wonderful subtlety of the human eye in judging similarities and differences. It will continue to be more practical and speedy (and cheaper) to "do it by eye." After all, fine discrimination is probably the reason why the eye and brain have become so supremely gifted in our own species.

My part in this endeavour is to be one of the few people privileged to name new species of trilobites. The routine with fossils differs little from the procedure with butterflies, although the holotypes of new species are usually less fragile than lepidopterans—I have collected many of them myself, and with a hammer. Some fossil species are rare because they are difficult to collect, which may not reflect their original rarity in nature. They may be very spiny, for example, or thin-shelled. Over the years I have named more than 150 new trilobite species, and it still gives me a little buzz to know that I have discovered a species "new to science." There have been a few genera, too. Only once have I skirted nomenclatural dis-

aster. I decided to name a pretty new trilobite after an obscure Phrygian nymph, *Oenone*, a name I had trawled from one of my classical sources. It just sounded rather attractive, suitable for the animal. Fortunately, I discovered at the last minute that the same name had already been used for a worm, of all things. This is completely against the rule-book, which is a tome published in English and French called *Rules of Zoological Nomenclature*. I have to say that of all forms of bedtime reading, with the possible exception of Kennedy's *Latin Primer*, the *Rules* take the biscuit for being the dullest conceivable. It is a set of "thou shalts" and "thou shalt nots" for the naming of animals. Like annual accounts and railway timetables the *Rules* are necessary for the smooth running of the (naming) system,* but are also a pedant's paradise. One of the most important rules is not using the same generic name twice. Happily, I was able to quickly alter my name to *Oenonella* before it got published, and this name had never been used before—so *Oenonella* it became, and remains to this day.

When you name animals you are not allowed to be insulting to anyone, but the *Rules* do permit you to be nice and name animals after colleagues. Two Czech palaeontologists named a trilobite *Forteyops*, and there is a *Whittingtonia*, and a *Walcottaspis;* thus may the worker be commemorated in the beast. Taxonomic legend has it that somewhere in the animal kingdom there is a suffix *-chisme* (from the Greek, and pronounced "kiss me") which invites a researcher to add the names of would-be girlfriends before it—as in *Polychisme, Anachisme*, etc. I named a trilobite with a singularly hourglass-shaped glabella *monroeae* (after Marilyn), and a friend of mine named a hunchback-looking fossil *quasimodo*. These little diversions actually help to make names more memorable.

*To remind readers who may not be familiar with taxonomy, the generic name is the first one, and capitalized, and a given genus may contain a number of species, characterized individually by the second, specific name, which is not capitalized. Scientific names are always italicized to distinguish them from the vernacular.

The *Rules* do not allow you to name a species after yourself, but jokes in naming are permitted if they do not cause affront. It is not flattering to name a new species *jonesi* in honour of Jones, if you go on to describe it as "this diminutive and undistinctive species is a typical inhabitant of dungheaps." Usually, species names just tell you, in Latin or Greek, something about the animal in question: *Agnostus pisiformis* (the pea-like agnostid trilobite), *Paradoxides oelandicus* (the Paradoxides from the island of Oland), and so on.

To the name is appended the namer. Thus, an unusually attractive Ordovician trilobite from Spitsbergen (named after my wife, naturally) is correctly known as *Parapilekia jacquelinae* Fortey, 1980. This detail serves the useful purpose of directing subsequent researchers to the reference where the species was originally described and named: a paper published by Fortey in 1980. In the case of species named a century ago, or more, subsequent accounts of the same species (revisions) may also have been prepared. Many palaeontologists that I have never met face to face probably know me as an appendix to a name. I hope that they will be astounded by my youthfulness when we finally get to meet.

The familiar, if slightly garbled, quote from Romeo and Juliet, "A rose by any other name would smell as sweet" implies that the naming of names serves little purpose. This same stricture might be thought to apply to the kind of science which was famously labelled "stamp collecting" by the physicist Ernest Rutherford—and taxonomy may well have been in his mind. That view could not be more misguided. Although the dubbing of scientific names may be fun, these same names can also be deployed for real intellectual purposes. Critical identification is central to some of the important questions I shall examine below. How can you talk about the diversity of life in the past unless the units of measurement (species, genera and the like) are accurately defined by competent taxonomists? How can you speculate on evolution unless you know that the species you are examining are likely to be real entities?

A+ You covered everything, efficiently. Clear structure, details, the works. Your style is lucid, with some notable formulations.

UNST 236-E
William Fischer
1/30/2012

My Schooling & Education

Overall, I feel I got a pretty good general education. At the very least, I could walk away from English, math, science, social science, and foreign language class with the sense that I was more knowledgeable about those subjects than when I first went in. I think the standards set by my school district were good standards—but whether the students actually benefited from those standards seemed to depend on how well the teachers were able to teach them. In sharp contrast to my other teachers, the ones who taught my art courses did not seem to have a clear idea of how to implement the standards without their own personal bias interfering.

I never felt like I truly learned anything in those classes. If my teachers wanted to teach us about a significant impressionist like Monet, for example, they would put on a video for three days straight and then they might make us work on a project where we worked in his art style. While this was technically following the standards, the way they did it didn't really make clear how learning about the artist—or the movement he was apart of—was relevant to help me improve my own art. Although I now know they were trying to implement Standard D: "Exhibit Skill in One Discipline of the Arts", it was frustrating when my teachers would tell me to correct my work in order to conform to what they personally considered "good" art. I was passionate about my drawings and the stylistic choices I made, and that passion, rather than their feedback, was the motivation that urged me to improve. At home, I would practice drawing my favorite video game characters while looking at their official artwork so that my drawings would look as close to them as possible. I engaged in this activity so often that I became very skilled at drawing from observation, whether it be redrawing my own characters with consistency or drawing a still

life in class. It was an ability I developed outside of school, rather than from any of my art teachers.

If I were to rate this standard and one of its criterions, more specifically "D1: Development of a Vision", I would rate my general education as a 2 (working toward the standard), because I could tell that they were at least *trying* to get this message across to us. How to "identify, develop, and present a central idea or image which serves as the basis for artistic choices", is an ability that is important for college students to know if they want to use their artwork to communicate a profound message. But my teachers seemed less concerned with understanding what theme or idea I wanted to apply to my art and helping me with that than they were with simply imposing their own ideas into my art. Therefore it felt like I was being asked to conform to their ideas rather than being helped to express my own.

If I were to give advice to those younger than me about schooling, I would tell them not to lose hope about education, even if their current one is awful, because the one that students receive in college is a drastic improvement. Not only have my instructors been generally more open-minded and understanding, but their feedback—since it relates to design principles rather than personal opinion—has been far more beneficial because their advice has felt more like suggestions that I can try adapting to my current style, rather than replacing my style with a different one. I know with certainty now, thanks to my college experience, that feedback in high school could have been given in a more helpful way. I feel fortunate that I was able to maintain my motivation until I could move up to college, because its learning atmosphere has impacted my artistic choices in a positive way that has truly allowed me to grow as an artist.

Depends - I've seen it the other way around (good, then bad. My own kids got good (or even better) K-12 + then college.

B- The thought is B level: major pieces are there, but more by assertion than proof, and you lack vivid examples to stock the thought home. The writing is C level. You use the same transitional words over & over, and the structure is very loose. Reader gains the impression that you're just rambling on, writing each thought as it comes. Can cut by half here and get a stronger start out of it.

I'm available for coaching. So is Aaron

2/8/12
Word Count: 550

Music of my High School

The subject that I decided to write about was fine arts. I decided this because in my high school I was involved in band, choir, and theatre. Each class was quite enjoyable but sadly I really only feel that band and theatre where the only ones that met the Oregon standards. I really feel that being able to truly pass the standards is really dependent on the teacher and how they are able to connect with their students.

Our language is struggling with the he/she/they problem

In my theatre class my theater teacher was very good about getting us theatre kids in order even though we all had way too much energy after lunch. The things that I really enjoyed about the class were that we got a full understanding of the many different types of theatre. We worked on different types of roles and understood how to analyze and understand theatre. My teacher did a beautiful job of covering all standards by approaching theatre and performing from every aspect and passed all standards.

but you tell only one thing in this sentence

Your teacher performed & passed standards?

How about one, even 2, more examples?

In my choir class it was sadly a very different story and the standards were just not met. I wouldn't say that the teacher intended to not cover all of the standards but they just couldn't quite teach the class in a way that the kids could grasp it. The teacher did try and teach music theory just like the standards hope but sadly since music theory is constantly building upon itself if you don't grasp just one thing you really get lost in all the rest. The other thing that most kids in the class struggled to do was advance as singers and as musicians. Since the teacher really couldn't help advance most kids in music all kids were slowed in there progression and this is the main reason we weren't able to reach the height that we and the state hoped.

their

break the sentence

Many words are out of your stylistic groove

Thankfully my band class was a completely different story from my choir class and the teacher really helped us to amazing successes, new for us and for the school. Unlike my choir teacher my band teacher really helped us understand not only music theory but all aspects of music and that is how we truly met and exceeded the Oregon standards. We learned by listening we learned by writing and more importantly we learned by playing. As we applied the things we were required to learn in many different

// break

// break

| add comma

X word(s) missing

we fully grasped each concept. I think the best thing my band teacher did was made us push one another to work harder // break and that is how we truly got to our success. Our band teacher instilled the drive in all of us to make it to the state band competition and not that just that but we made third place.

Each teacher has a different perspective and a different way of teaching but I think the best thing a teacher can do for their students is get them as involved as possible and push them to learn. My experience in high school is exactly why I want to one day become a band teacher myself. I think that when you can truly teach a student to want to learn and have passion in something then you have really met the standard.

Exceeded ?