b35 Historical geology is not physical geology

< facts of Prehistory, not mechanistic explanations >

> I wish to examine, in the first place, the evidence whereby we establish the fundamental fact that the present surface of any country or continent is not that which it has always borne, and the data by which we may trace backward the origin of the land.
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> — Archibald Geikie, *Geographical Evolution*, 1879.[1]

> ... we have already adopted [a soft] anthropic approach toward explaining some aspects of our existence. The size of the Earth's orbit around the sun, for instance, which plays a crucial role in the existence of life on our planet, does not follow from any physical law: it just is what it is. According to [Martin J.] Rees, then, science must simply decide which cosmic questions can be answered without appealing to an anthropic principle, and which must, by default, be resolved by the anthropic approach. — Donald Goldsmith.[2]

Historical geology discovers the facts of "Prehistory" and so illuminates that "dark backward and abysm of time."[3] It does so by application of the scientific method to readings of the rock record. The historical geologist, guided by principles of geology, reads the rock record in the context of current scientific knowledge. The reading is deemed to be good and useful when it allows syntheses that ultimately aids prospecting. A fact of prehistory becomes known when a reading can be checked by *deducing* its consequences which then can be found or can be shown in their ramifications to fit and extend the body of science. In this way, Agassiz's *Ice Age* theory [4] was a good reading as its enabled many observables (landscape features, distribution of diluvial deposits) to be seen as ice-age indicating and reciprocally as ice-age originating features. His reading allowed for useful synthesis and his Ice Age became a-scientifically-tested-for-truth fact when De Geer demonstrate that a consequence, deducible of a great ice sheet's once existence, would be a left-behind datable record (yearly varves in proglacial lakes) of its retreating margin. Others would test the fact of the Ice Age in additional ways: The existence of the ice would depress the land where it had been and this would now be rebounding. It is. Vegetation evidenced by the pollens in pond sediments would record a boreal climate where today the climate is temperate. It does. And so on, and so on. The reality that there was an Ice Age is no longer a matter of conjecture. It was, and the once existence of the great ice sheet is a fact of recent prehistory. Where does the responsibility of the historical geology stop? The answer is: Stop with the readings of the rock record that are self checking in their application and sometimes with the establishment of the facts of prehistory. A mistake for the historical geologist is to try and explain by mechanisms the facts of prehistory. When this is attempted, the historical record is that the historical geologist fails. The warning here is that an historical geologist should not change hats and become a physical geologist to satisfy an audience that clamors for a mechanism. Let those who wish for a mechanisms provide them or squabble among themselves for the vanity of their finding and for the furtherance of physical geology. Agassiz, working as an historical geologist, read the rock record which indicated that ice had spread far over the land. He then fell into the trap of going beyond his expertise in trying to provide a mechanism for that verity. His grand mechanistic explanation of the Ice Age was shaped more by the biases of his culture (what relativists today claim for all science) than by any scientific observations that he had time to make or could well adjudicate. But the lesson to be learned here is how to avoid the trap of seeking unnecessary completeness (and advance the positivists claim that scientific measurements stand on their own as arbiters of reality). The search for mechanisms is laudable but in the natural sciences, at the time of finding the facts of prehistory and even after they are first proven, efforts will likely be premature for several good reasons. The understanding of complex systems is beyond the power of science in almost all areas relevant to explanation of geological and biological facts of prehistory. Lovely though it be, Paul Dirac's maxim that "physical laws should have mathematical beauty" is a bracket to thought beyond which the historical scientist must imagine.

Timothy Taylor writes: [5]

> Ever since Plato there has been the idea that good explanations should condense into simple formulae. Umberto Eco, in [*Léon*] *Foucault's Pendulum* (Secker & Warburg, 1989), says "The truth must be simple and sayable: $E = mc^2$ ", knowing full well that things are seldom like that in culture. Oscar Wilde was not just witty, but is humane, to observe that "the truth is rarely pure, and never simple." The proper explanation of archaeological phenomena cannot look like $E = mc^2$. Archaeology has to explain its subject in terms of 'how ... possibly [did that event occur in the past]' (h-p explanation) rather than 'why ... necessarily [does that always happen in the lab]' (w-n explanation). This reliance on h-p explanation is shared with other systematic endeavours to explain ontologically unique, unrepeatable phenomena, such as the conditions for the creation of the observable Universe or the extinction of the dinosaurs (whether or not these appeal to certain covering laws).

Technological advances and paradigm changes seemingly unrelated to the immediate question may be needed to have taken place before a question can again be reasonably addressed. Weather forecasting is little more than weather prophecy. Milankovitch cycles can be found in the prehistorical record of the weather. However, no simple explanation is expected for how weak astronomical effects are amplified, as many and possibly changing factors and their combinations are, and are as likely to be involved. The weather is unpredictable on almost every scale and this may always be so. This and other facts of prehistory (epeiric sea ebb and flood, lithospheric plate motion, extinction, speciation, ore veins and so on) may forever resist explanation other than in principle.

Agassiz's attempt to explain the motion of the glaciers was doomed to failure for the classic reason: At the time of a great discovery, the physical sciences are rarely up to the challenge for its mechanistic explanation. Agassiz had studied mountain glaciers. He had proven that the they flowed down slope and could carry their burden of rocks that fell on them or that they plucked from the bedrock over which they passed. The glacial ice with stones embedded was the rasp that striated the bed rock. His knowledge of ice sheets was from what explores had written of Greenland and Iceland. He knew, that sealers had long since found that the Arctic Ocean is frozen. Also, the ice about Antarctica was known as it had been visited to hunt seals. He made no distinction between the Arctic pack ice (3 m thick) along with the Antarctic shelf ice, which float, and the ice sheet of Greenland along with the ice cap of Iceland, which spread from where they are weighted by snow accumulations to where they ablate, melt, or calve icebergs. His speculation was that the ice had grown more widespread during the Ice Age. To explain the motion of his ice sheet he imagined that the Alps had risen to give his passive pancake of ice the slope he believed it needed to do its work. In his model, Earth's age was not great and mountains could pop up over night. This mechanism could not have seemed so reasonable when he had become aware of the vastness of the Canadian shield in which no young fold mountains are present and in which the highest are striated by the apparent passage of glacial ice over their peaks. As a staunch Creationist he could not have been gruntled, to use a P. G. Wodehouse turn of phrase, by William Buckland's (***Figure b35.1***) remark that his Ice Age theory, which had removed from consideration the Noachian Flood as an explanation for diluvium and other features, "had saved geology from Moses" (the interpretation of geological observations in terms of the Old Testament). The theory of evolution for him, which Darwin had published, was also an anathema (quote: a "scientific mistake, untrue to its facts, unscientific in its methods, and mischievous in its tendency"). To explain without recourse to evolution post- and antediluvial life he determined to show that his Ice Age would have had the same effect as the Flood catastrophe was supposed to have had. His passion, as his biographer Edward Lurie finds, was therefore to cover the whole world with ice: "Death enveloped nature in its winding-sheet."[6] As a member of the Thayer Expedition to Brazil, 1865-1866, he saw the exfoliation-weathered rounded granite tors (as Sugarloaf, Pão de Açúcar, and the nearby mountains) of Rio de Janeiro, near the Tropic of Capricorn. These, he (mistakenly) declared, were evidence of sculpturing by an overriding ice sheet.[7] ❑

Figure b35.1 **William Buckland** (1784-1856)[8] delighted in shocking Victorian society by such eccentricities as eating absolutely anything (the more revolting the better) including the meat of animals that had died in the menagerie (or "zoo," which word came to be upon the establishment of the Royal Zoological Society of London in 1826), and reporting "it's not blood; it's just bats' urine" when he put his tongue, his son Francis recalled, to the nightly liquefying bloodstain of a martyred saint on the floor of a chapel in Italy.[9] The bones in St. Rosalia's shrine he forthrightly declared are those of a goat.[10] In 1818, Buckland was appointed Reader in Geology, Oxford, a position created upon his assertion that undergroundology, as he liked to call his exemplary geoscience, could but embellish Mosaic tales.[11] Early recognition came from his diluvialist explanations in *Reliquiæ diluvianæ* (Relics of the Deluge), 1823, of fossil deposits in Kirkdale Cavern, a once den of hyenas (evidenced by coprolites of their dung and bones of carried-in scavengings) in Yorkshire, Goat's Hole in Wales, and other caves.[12] At the time, these top to bottom archeological descriptions did not conflict with his received notion of a young Earth.[13] In 1824, he was inspired to describe the giant fossil bones that he collected and on display in the Oxford Museum after Cuvier, on a visit, had indicated that they could be compared to those of lizards. From incomplete skeletal fragments, he published his description of *Megalosaurus* (the name "giant lizards" borrowed from James Parkinson who had used it in 1822). Buckland's reconstruction of *Megalosaurus* was that of a quadruped.[14] However, comparison of its bones to the North American *Allosaurus* indicates that it was probably a bipedal carnivore of length about seven to eight meters long and weight about a ton. A theme in *Reliquiæ diluvianæ* was that valleys with diluvial fill record the Flood, a singular event. In 1828, Lyell and Murchison, with an agenda to rid geology of Moses, found, while touring France, that the spectacular valleys of volcanic Auvergne exist because of repeated river erosion through successions of damming lava flows beneath which are Diluvial gravels.[15] Word of this caused Buckland, Canon (since 1825) of Christ Church Cathedral, Oxford, to quietly abandoned his planned publication of a revised version of *Reliquiæ diluvianæ*. As a self-proclaimed Professor of Geology and former President (1824-1825) of the Geological Society, London, he publically worked to quell establishment fears that geology was finding against the scriptures (as so of George Julius Duncombe Poulett Scrope (né Thomson)'s (1797-1876) damning observation that a single flood could not sculpt incised-meander valleys).[16] His efforts earned not as Newton had been praised by Alexander Pope: "Nature and nature's laws lay hid in night; God said Let Newton be! and all was light," but the grumble, memorable for being an epigram, by Bishop of Chichester to be, Philip Nicholas Shuttleworth: "Some doubts were once expressed about the Flood: Buckland arose, and all was clear as—mud!"[17] In 1831, Buckland was invited to contribute a work for *The Bridgewater* (later dubbed *"Bilgewater*" by its detractors) *Treatise* entitled *Geology and Mineralogy Considered with Reference to Natural Theology*.[18] During the five years that he spent assembling available geological and paleontological information for this, the notion of an old Earth became convincing to him in view of the stratigraphic record that he detailed and from which he could construct bottom to top a progressivist tale. In 1838, after visiting Agassiz in Switzerland, Buckland embraced glacial theory and proceeded to introduce it into British geology. A colleague wrote him: "You have made all the geologists glacier-mad here, and they are turning Great Britain into an ice-house."[19] Knowledge of the geological strata had persuaded Buckland, to the distress of pastors as James Mellor Brown (1796?-1867), to marginalize the Flood (a possible local event) and to find for a progressive process of creations and destructions occasioning wholesale death of animals witnessed by fossils (before the Fall of man).[20] His conceit was that the Creator gave every creature "a dispensation of kindness to make the end of life to each individual as easy as possible." As to which, "the final irony," writes Deborah Cadbury in Terrible Lizard, 2000, "was his own lingering illness [self-injuring craziness] and death."[21]

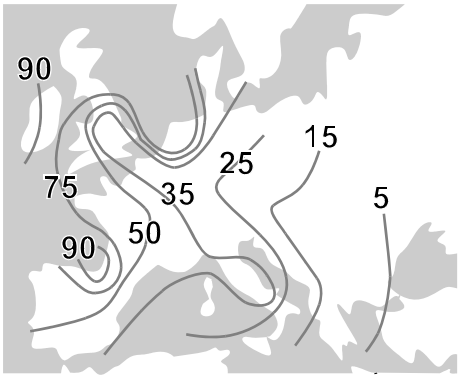

Figure b36.1 Emmeline W. Hill in 2000 identified a haplogroup (cluster of genetic variants) in the Y-chromosome of present humans that has a low frequency in the Near East of 2% in Turkey and increases westward through Europe to least diluted in Spanish Basque country of 89% and in western Ireland at Connaught of 98%. This cline parallels other genetic gradients in Europe and is best explained not by hunter-gatherer indigenes learning from newly skilled neighbors but by the migration in (at 1 km per year on average) of Neolithic farmers from the Near East.[1]