

Linnæus' Questions to the Sami Herdsman:

The ID-versus-Science Issue in a Nut-Shell

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According to a United States court ruling, Intelligent Design (ID) theory is religious in nature, not scientific, and must not be taught in schools. In opposition, Fuller argues for a closer rapport between science and religion. Here it is emphasized that any allegedly scientific conclusion from design in Nature to the existence of God is a hypothesis subject to the same quality norms as empirical hypotheses in general. By quotations from his *Iter Lapponicum*, Linnæus is summoned in support of a strictly immanent conception of science, against Fuller's suggestion that Linnæus' personal piety could be reason for considering ID scientific.

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Linnæus; Iter Lapponicum; reindeer clicking

Introduction

Mainstream scientific biology understands the evolution of living organisms in accordance with the neo-Darwinian paradigm, *i.e.* the combination of the theory of

natural selection with modern genetics. It is a central facet of this paradigm that the functionalities and apparent purposes so readily observed in Nature are explained without reference to any intentional creator. What exists in Nature is interpreted as the consequence of an interplay between effectively random changes of hereditary traits with the ecological environment surrounding the genetically determined phenotypes. Although the science of biology does not actively denounce the existence of gods, it is in need of none in order to explain the diversity and evolution of flora and fauna. The theoretical redundancy of divine foresight and action has long provoked uneasiness and opposition in certain theistic quarters and a reciprocal satisfaction among atheists.

Because of its wide acceptance in the scientific community, neo-Darwinism is generally taught in schools. However, although the paradigm is supported by a great many observations in the out-door field as well as in the experimental laboratory, some critics emphasize its theoretical character and demand that alternative theories be also included in school curricula. One such alternative is promoted under the name of 'Intelligent Design', ID (Stewart 2007; Fuller 2008). In line with an ancient teleological argument for the existence of God the Creator, modern ID proponents claim that such complex functions and structures as occur in cells and organisms simply cannot result from mere chance and adaptation but necessarily reflect the operation of some kind of intelligence. For reasons of rhetorical and judicial tactic, ID proponents hesitate to refer to the postulated intelligence as 'God'. However, it goes without saying that ID meets the expectations of certain brands of theistic devotees very well.

In a notable memorandum concerning the legality of including ID in school curricula (the case of *Kitzmiller v. Dover Area School District*), Judge Jones at the

District Court for the Middle District of Pennsylvania, USA, ruled that ID is religious in nature (Jones 2005).¹ The teaching of ID in schools was found to violate the First and Fourteenth Amendments to the United States Constitution which prohibit the establishment of religion by federal or state authority. The judge's conclusion that ID is an expression of religion was based on many arguments, including the roots of ID in past creationist movements. More relevant to an observer outside the United States are certain testimonies in court of the expert witnesses for both plaintiffs and defendants. For example, Judge Jones (2005, 30) quotes Steve Fuller – sociologist, historian and philosopher of science – as having testified that 'it is ID's project to change the ground rules of science to include the supernatural.'

While recognizing clearly the ambition of the ID movement to foster belief in the supernatural, Fuller (2005, 2008) is critical of the verdict not to permit the teaching of ID in schools. A scholar in the field of Science and Technology Studies Fuller has perhaps involved himself with the legal defence in the Kitzmiller case more for the sake of challenging the received conception of science in society than out of a primary wish to support the actual ID movement *per se*. Be that as it may, referring to the history of science Fuller warns against drawing too sharp and rigid a demarcation line between science and religion in general and maintains that 'religion needs to be discussed in science classes. I can't see how one can simply hold science and religion in suspended animation apart from each other.'²

1. In 2009 on several internet sites, *e. g.*

<www.pamd.uscourts.gov/kitzmiller/kitzmiller_342.pdf>

2. From an internet correspondence between Steve Fuller and Andrew Rowell,

<idintheuk.blogspot.com/2005/12/steve-fuller-on-dover-judgement.html>. Fuller

In support of his view, Fuller among other things points to the fact that such great scientists as Newton and Linnæus not only believed in God but were inspired and directed by religious belief in their very research. Portraying Linnæus against the background of the biblical stance of the Church Father, St. Augustine, Fuller (2008, 62) writes:

'The person whose scientific practice perhaps most consistently exemplified Augustine's strong sense of literalism was the 18th-century Swedish physician-turned-naturalist, Carolus Linnaeus, to whom we owe the binomial system of classification by which species continue to be identified – as in *Homo sapiens*, one of his coinages. Linnaeus was a 'special creationist', for whom the concept of species captured the immutable properties that make God's creatures what they are. [---] However, Linnaeus also had larger ambitions, believing that his taxonomy elucidated the method that Adam originally used to name the creatures in the Garden of Eden.'

Although Fuller's view of Linnæus is in all likelihood historically correct, in my mind it does not follow that Linnæus can be recruited as a witness in favour of the scientific character of present-day ID. On the other hand, neither does it seem quite right to argue that a theory about Nature should be regarded as religious just because he who proposes it is driven by religious motives. Judge Jones may have been obliged to do so because of the special restrictions on reasoning in court that are imposed by the framework of legal precedents and constitutional requirements in the United States. In that context it is not only the theoretical content of ID that appears relevant, but also any indirect message that the teaching of ID might convey to the

confirmed the authenticity of the quotation at the conference in 2009 on Religion in an Open Society, Lund University, Helsingborg, Sweden.

American public regarding the state's endorsement or non-endorsement of a certain religion. From a more general philosophical point of view, the status of a theory as scientific or religious, or possibly both, should ideally be judged on its direct and explicit merits only. Moreover, the question whether a theory ought or ought not be taught in schools cannot be answered by merely deciding whether it qualifies as scientific. Certain theories meeting formal criteria for being scientific might simply be too odd or implausible to deserve place in a tight curriculum, regardless of their being in a sense 'scientific'.

In the present communication the question whether ID should be taught in schools is approached in three steps, evading the special legal arguments relevant for the United States. Firstly, it is emphasized that any conclusion from the observation of design in Nature to the existence of God is an empirical hypothesis, not a logical inference. Secondly, the scientific status of ID is examined and the school curriculum issue discussed with reference to the more general question of the context in which to teach the metaphysics of science. Thirdly, by quotations from his famous book, *Iter Laponicum*, Linnæus is called to testify in favour of an anti-ID conception of science, against Fuller's suggestion that Linnæus' personal piety can be taken as an argument in favour of ID's being scientific.

From observation of design to creator hypothesis

As aptly pointed out in Judge Jone's memorandum (Jones 2005, 24–25), drawing conclusions from the observation of design in Nature to the existence of God has a long history, going back at least to medieval times.

For any such conclusion in the present-day discussion to be properly evaluated, it is desirable to be clear about its logical character. That is in turn

dependent on how one uses the term ‘design’ and its corresponding concept. Two subtly different meanings seem to be legitimate in current linguistic usage and should be kept apart:

1) *Design is a form intentionally shaped by a designer for a purpose.* In this sense, *design* does not involve reference to any specific structural property of that which has or is expressive of design. However, the concept is logically dependent on those of *designer* and *purpose*. Hence it would be circular to argue from ‘here is design’ to ‘there must be a designer’, unless there exists a criterion by which to identify design *in this sense* independently of one’s knowledge about and reference to the intentional designer. No such criterion seems to be available or perhaps even possible.

2) *Design is a property of a whole serving a function, this property not being reducible to the sum of the properties of the parts of the whole but expressive of their interplay.* In this sense, *design* is logically prior to that of *designer* but dependent on that of *function*. A designer is one who produces a design, intentionally or unintentionally, or at least has the capacity of doing so. The concept of *function* must here be left undefined, but there can be little doubt that it is readily understood by anyone given suitable and classical demonstrations. Consider, for example, the function of the heart.

The function of the heart is to pump blood. To realize that this is the case, it is not necessary or relevant to believe that there is a creator who has intended the heart to have this function. It is sufficient to know such things as the importance of oxygenation and nutrition for the cellular processes in the body, the importance of blood circulation for oxygenating and nutrifying the cells, the general anatomical architecture of the blood circulatory system, the place of the heart in this architecture, and the effect of heart beats on the flow of blood in the vessel system and hence on the oxygenation of body cells and their processes.

The heart functions as a pump in virtue of its design. To say that the heart has the design of a pump is to say something about the interplay of its parts *now*. It is evidently not a statement about the heart’s origin. Neither is it to imply anything specific about the causes

behind the design. In particular, the intelligibility of design does not logically imply that any of the causes was itself intelligent. If an active intelligence were among the causes giving rise to the heart, that circumstance would not follow logically from our understanding the heart's function any more than the intelligibility of anything in the world constitutes logical proof of (as distinct from, possibly, a clue to) the present or past existence of an intelligent creator.

More generally, one should not confuse the understanding of functional usefulness with explanation of origin. The usefulness ('role', 'function', 'purpose') of the heart in the body is clearly understandable without any reference to evolution whatsoever. The theory of evolution does not define the heart's usefulness, but explains its origin.

The existence of intelligent observers, who perceive an intelligible design, does not logically imply the existence of an intelligent designer. So, assuming an intelligent designer behind the design of Nature is to state an empirical hypothesis, not to draw a logical conclusion. For such a hypothesis to be scientific and not merely metaphysical, it must meet the requirements of empirical scientific hypotheses in general, *i.e.* it should yield testable predictions. As so far ID theorizing seems to have yielded none, this aspect of the ID programme must be considered metaphysical rather than scientific.

Besides positively hypothesizing the existence of an intentional intelligence behind the design in Nature, ID proponents criticize neo-Darwinism for being implausible on statistical grounds. This criticism is not a metaphysical idea in the same sense as the supernatural designer hypothesis, although it may be wrong and does not seem to be well received in the scientific community (Bartholomew 2008). If formally accepted as scientific, the attempt to falsify neo-Darwinism by statistical proof is at best science of contested quality.

Should ID be taught in science class in school?

Although not always clearly perceived or problematized by the average researcher, science is always connected with metaphysical suppositions. If the metaphysics of science is at all discussed in school, there seems to be little reason why ID could not be mentioned along with other ontological ideas. However, it would be clearly inappropriate to picture the untestable and vague Intelligent Designer hypothesis as a theory on a par with and of the same logical kind as the exceedingly more concrete neo-Darwinism. If, as is probably most often the case, the metaphysics of science is not dealt with in the science class, there seems to be no reason for teaching about the Intelligent Designer hypothesis there. Of course, this is not to say that the hypothesis could not be discussed in hours specifically devoted to philosophy or religions.

But what about the claim of ID proponents to have disproven neo-Darwinism by statistical argument? This claim may formally be considered scientific in the sense that it invites rigid scrutiny by logical and mathematical analysis. If it were the case that a substantial number of eminent scientists found the claim convincing, it would no doubt be appropriate to give it a significant slot in the science curriculum. However, to put it in as neutral terms as possible, the alleged statistical disproval of neo-Darwinism seems so far to lack sufficient support in the scientific community to warrant being taught to school pupils.

These arguments against teaching ID in science classes should be valid regardless of any specific national legislation concerning the relation between state and religion. For example, they should hold in Sweden or the United Kingdom with their long historical traditions of a state-affiliated church. In the United States and other nations with a stricter division between state and religion, they are, of course, also valid. However, there they may be redundant in view of legal arguments along other lines, as exemplified by Judge Jones' (2005, 136–138) strongly worded ban on ID in schools.

In marked contrast to the above philosophical and legal reasoning against ID in the science school curriculum, Fuller (2005, 2008) rejects the basic underlying idea that science

is clearly distinguishable from religion. He thinks that ID ought be taught in school science classes, not because ID be science in the presently conventional sense but because he considers the demarcation between science and the supernatural to be unnecessarily strict and even stifling to scientific creativity. Drawing on historical examples from less secular times and societies, he underlines that far from being a mere obstacle to science, religion has stimulated its development. In relation to the scientific character of Biology, the example of Carolus Linnæus is of special interest. Fuller (2008, 62–69; *vide supra*) portrays him as a kind of creationist who viewed himself as mapping taxa and species determined by divine decision and intelligent design.

Linnæus was undoubtedly a pious man and Fuller’s suggestion that his faith influenced the way he looked upon his own work is, as far as I can judge, highly plausible. However, it seems disputable whether these historical facts should have any significant bearing on the issue of how to draw the demarcation line around the field of science as an intellectual endeavour. Interesting as it may be from the point of view of heuristics, the piety of Linneaus is not in my opinion a strong argument against now reserving the term (and concept) of ‘science’ for an activity devoted exclusively to immanent phenomena and explanations. In fact, I think one can summon Linnæus himself to support this reserved view, as may be exemplified by a passage in one of his famous travel journals, *Iter Lapponicum*.

Linnæus’ two questions

In 1732, Carolus Linnæus, 25 years of age and assistant lecturer at the University of Uppsala, undertook a long research journey to the northern provinces of Sweden. The purpose was quite generally to explore Nature in this part of the country, at the time appearing remote and exotic in the eyes of the learned in Stockholm and the university cities, Uppsala and Lund. During the journey he kept a diary, *Iter Lapponicum*, a text which has been recently issued by the Royal Skytte

Society in excellent facsimile quality (Jacobsson and Fries 2005) and with accompanying volumes of scholarly commentary (Fries and Fries 2003) and a modern printed version of the diary (Hellbom *et al.* 2003).

Fuller's view of Linnæus as a pious man is well supported by the title page of *Iter Lapponicum* (Figure 1), where the author has written the subtitle, 'Dei Gratia Institutum' (Undertaken by the Grace of God), and, further down, an invocation with three exclamation marks: 'O ENS ENTIIUM miserere mei.!!!' (BEING OF ALL BEINGS have mercy on me.!!!).³ The same invocation of God is also repeated as the title at the top of the first text page.

Figure 1 about here

Against this background it is interesting to note that this same book, the opening of which expresses such overt devotion to the supernatural, nonetheless clearly illustrates that references to God lacked sufficient explanatory value for Linnæus as a scientist. When staying with a Sami family in the deep forested North, Linnæus happened to notice the clicking sound that so characteristically emanates from the legs of walking reindeer. Given his curiosity it was, of course, necessary for him to ask the Sami herdsman how come there is this clicking sound. Figure 2 shows the passage in the manuscript where the ensuing conversation and Linnæus' reflections are described. Under his little sketch of a reindeer hoof, Linnæus has written (my translation):

3. I thank the Royal Skytte Society for permission to reproduce material from the facsimile edition of *Iter Lapponicum*.

'When the reindeer walks a clicking sound arises from the hoof. I wondered about it and looked for the cause. When I asked, everybody answered: ''because Our Lord so created him''. I asked how Our Lord created him such that there is this clicking sound. But I got no reply. I grabbed the hoof by the joint, pulled, bent, stretched, compressed...'⁴

Figure 2 about here

To Linnæus' first question the herdsman answered like an ID proponent, *i.e.* by referring to the supernatural designer. But that was not an answer in Linnæus' scientific liking, so he rephrased his question and asked *how* God did it, now clearly expecting a reply that would be intelligible in immanent terms. But he got no reply. Dissatisfied with the silence he started to do experimental work, manipulating a hoof to find out what movements could be responsible for the clicking. As a result he was proud to record in his travel journal an empirical hypothesis about the mechanism causing the sound. The fact that this hypothesis was soon to be challenged does not

4. In the original 18th century Swedish: 'När renen går, så knäpper det i foten. Jag undrade därpå, och sökte orsaken, då jag frågade, svarade alla, ty vår herre har så skapat honom, jag frågade huru vår herre honom skapat att det knäpper. Sed ad hoc Forbesius nihil. Jag tog i fot leden, drog, brot, räckte uht, stötte samman [...]' The latin phrase, *Sed ad hoc Forbesius nihil*, here translated as 'But I got no reply', literally means 'But to this Forbesius [had] nothing [to say].' In Linnæus' time this was a standing expression, referring to an anecdote about John Forbes, a Reformed theologian who was made answerless during a disputation with Lutherans in Uppsala 1608 over certain aspects of Christian dogma.

detract from the significance in the present context of Linnæus' behaviour. Rather to the contrary, the falsifiability⁵ of the hypothesis accentuates Linnæus' modern scientific attitude, which seems distinctly different from that of ID proponents. Evidently, Linnæus champions a view of science that does not permit untestable references to God or other supernatural phenomena as causes in scientific explanations.

For a valuation of the intrinsic structure and content of a scientific proposal, it is irrelevant whether the scientist making the proposal is religious or not. Although the legal system of the United States may reason differently, I suggest that ID should not be taught in school science classes for the simple reason that it is poor science, in much the same sense as the Sami herdsman was a poor scientist in failing to suggest an immanent explanation of the perplexing clicking sound. It took the pious Linnæus to propose one, he who did not accept his worshipped God as a relevant cause from a scientific point of view.

5. Linnæus believed that the tips of the two halves of a hoof knocked against one another in each step. Today the clicking sound is usually explained as arising internally in the feet when tendons slip over bone. *E. g.*

<www.uaf.edu/news/featured/05/reindeer/sound.html>

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Legends to figures

Figure 1

Title-page of the *Iter Lapponicum* facsimile

Figure 2

Excerpt from *Iter Lapponicum* with Linnæus' sketch of a reindeer hoof and the passage relating his conversation with the Sami herdsman about the clicking sound from walking reindeer

Caroli Linnaei

Iter Lapponicum

dei Gratia
institutum

1734.

Sumptibus Regia Societatis Litterariae & Scientiarum.

ad
Historiam naturalem Lapponiae dilucidandam institutum
quoad

Lapides terras, aquas, Herbas, Arbores, gramina muscos
quadropedia, Aves, Peces & insecta

in

hominum moribus, Salute, Diatama, moris, vivendi rationem

ab initio d. 12 maji; donec ipse d. 10 octobris
Upsalae

O ENS EXIUM misere mei!!!

1. Handland for sold mig
Swenson for mig gnenom mig
jedruat Adulurot malthe byskipt
Steffens hoyd till en mig fyllingt i sigt.
Storvener of Winter på sundig i stad of p. f. mig mig byskipt.
Prota for mig gnenom mig.
Wahlsted under for mig fyllingt
Storvener fyllingt of mig mig i stad
mig på 2000 till mig 2000 mig

