

ationism has appeared on the
few years. The so-called
generally do not believe in a
in a rigidly literal interpretation
hile still mostly propelled by a
l by mainly Christian sources
ation and the Discovery
lengc posed by neocreationism is
ire detailed consideration.
s of Intelligent Design (ID)
reationism is called, is William
losopher and author of *The*
k he attempts to show that there
er behind natural phenomena
y origin of the universe (see
critique). Dembki's most recent
nce ever since Francis Bacon
ped two of Aristotle's four types
altogether, thereby unnecessarily
y power.

causes in science

Final causes, what something is made
e of the thing or phenomenon;
e activity producing a
Final causes, the purpose of
igating. For example, let's say
uses of the Brooklyn Bridge. Its
mpassed by a description of the
nto its construction. The *formal*
idge across a stretch of water,
mbly of pieces or another kind of
yscraper. The *efficient* causes

designed in order to survive and re
inhabit; yet, as a scientist he worked
naturalistic explanations of such de
answer in his well-known theory of
selection, combined with the basic
design possible in nature without
explanation because selection is de
therefore has 'creative' (albeit non
Creationists usually don't understand
selection can only eliminate the le
insight was that selection is also a
analogous to a ratchet – which can
long as the intermediate steps are

For example, if we were to ask
framework what are the causes of
answer in the following manner. 5
provided by the biological material
the formal cause is the genetic and
that distinguishes a tiger's teeth fro
biological structure; the efficient c
promoting some genetic variants o
others; and the final cause is provi
teeth structured in a certain way n
procure its prey and therefore to s
only 'goals' of every living being.

Therefore, design is very much
at least whenever there is a need to
designed structure such as a living
Aristotelian causes are fully reinsta
scientific investigation, and science
disregard of some of the causes ac
then is left of the argument of De
proponents of ID? They, like Wil
before them, make the miracle of

ms are concerned. He rejected (to modern biologists) but unlike intelligent designer in its place. for a further advance on final cause of living organisms biology to achieve an under-

le complexity

arguments proposed by ID intelligent design in the universe: the 'complexity-speci- le complexity is a term molecular biologist Michael *Black Box* (1996). 'The idea is that natural phenomenon and an intel- rned object is planned in advance, intelligent agent is not evolutionary process, the latter can proceed given that it has no be referred to as incremental complexity then arises whenever all to be present and functional g, indicating that the structure was bly have been gradually built by

ducibly complex object is a any of the minimal elements that ose its function; on the other mble a mousetrap gradually for a e it won't work until the last ght, and therefore intelligent se it is. After all, mousetraps are

involved in the exchange of oxygen blood. As a result of redundancy, individual components of biochemical compromising the overall functions of irreducible complexity. (I never ones to miss a chance, have redundancy is yet another evidence because an engineer would produce minimize catastrophic failures should stop functioning. While very clever ignores the biology: the majority as pseudogenes, literally pieces of eventually lost forever to any biol

To be sure, there are several ca not know enough about the funda cell to be able to hypothesize or evolution. But this is rather an ar positive evidence of irreducible co 1831 advanced exactly the same a impossible to explain the appearance means. Yet today biologists know intermediate forms of the eye, and structure evolved several times in history of life on earth (see Gehri answer to the classical creationist an eye?" is "much better than no

However, Behe does have a po complexity. It is true that some s explained by slow and cumulative selection. From his mousetrap to Brooklyn Bridge, irreducible com hallmark of intelligent design. T that there is no evidence so far of living organisms

ncy in nature. Following one of (Search for Extra Terrestrial) received a very short signal that could be the first three prime numbers, they publish their findings. This is a signal could be construed as due to chance. But, says Dembski, if the signal is so short that its occurrence can be explained by chance, it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits.

It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits.

It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits.

It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits. It needs to be added because it is not just a random sequence of bits.

natural laws and decay. The bridge is built to withstand winds and earthquakes, and its inaptitude for the traffic for which it was not built causes the back pain caused by our recent evolution. The imperfection of living organisms, as Darwin, does do away with the idea of an omnipotent and omnibenevolent God. It cannot be limited by laws of physics to begin with. It starts from scratch.

The four fundamental types of design and how to recognize them

Given the considerations above, I think there is a system that includes both Behe's and Dembski's while at the same time showing why we should not conclude that we have evidence of design in the universe. Essentially, I think there are four types of design in nature which, together with 'regular' and random phenomena, exhaustively cover all self-organizing phenomena, exhaustively recognizes regular, random, and self-organizing phenomena, as well as the first two types of design. The other two types of design are possible, but I do not contend that there is neither empirical evidence nor that they actually occur.

The first kind of design is *non-irreducibly complex*, exemplified by natural selection (which may be possibly elsewhere in the universe), and by design, such as all living organisms. The second is *irreducibly complex*, meaning that the design is incremental, continuous (though it changes over time). These objects are not natural processes for two other reasons: they are not optimal, in an engineering sense, and they are not

ould be due to an evil omnipotent
with suboptimal products. The
ul-sloppy design is not distin-
s (but by no means all) of intel-
r C. Clark's famous third law:
chnologically less advanced
f a very advanced civilization is
rom magic (such as the monolith
I would be very interested if
around Clark's law.

-supernatural-perfect design, which
an omnipotent and omnibenev-
ould be both irreducibly complex
t be constrained by either trade-
ll, the designer created those laws
e kind of god many Christian
ough some do away with the
uite clear from the existence of
ral catastrophes and diseases, that
embiski recognizes this difficulty
(personal communication), admits
uld even be due to a very
ization, and not to a supernatural

conclusions

re that the major arguments of
re neither new nor compelling.
cience does not address all the
r design needs to be explained.
xity is indeed a valid criterion to

standing of both design in nature
Darwinian theory of evolution is a
© MASSIMO PIGLIUCCI 2001
Massimo Pigliucci is Associate Professor
the University of Tennessee. His book
Beyond Nature vs. Nurture, will be
University Press later this year. Some
<http://fp.bio.utk.edu/skeptic>

Acknowledgments. I would like to thank M
and Niall Shanks for insightful comment
article, as well as Michael Behe, William
Palevitz for indulging in correspondence
these matters.

Behe, M.J. (1996) *Darwin's Black Box*. The
Free Press, New York.

Darwin, C. (1859) *The Origin of Species by
preservation of favoured races in the struggl*

Dembski, W.A. (1998) *The Design Inference*

Gehring, W.J. and Ikeo, K. (1999) Pax 6
and eye evolution. *Trends in Genetics* 15:3

Miller, K.R. (1996) The biochemical cha
biomed.brown.edu/faculty/M/Miller.

Paley, W. (1831) *Natural Theology: or, Eviden
of the Deity, collected from the appearances o*

Pigliucci, M. (2000) Chance, necessity, a
science. A review of W.A. Dembski's 'Th
1, January, pp.79-81.

Shanks, N. and Joplin, K.H. (1999) Redu
analysis of intelligent design in biochem