Objections to Darwinian theory – then and now

- So no substance to the ‘non-scientific’ charge
- But ‘scientific’ doesn’t entail ‘scientific and well-supported (evidentially and conceptually)’
- Maybe *bad* science

Objections to Darwinian theory – then and now

- 1. General objections about mutations and the idea of 'randomness'
- 2. Objection based on the second law of thermodynamics
- 3. Age of the earth objection (Kelvin) - too little time
- 4. Difficulty (impossibility?) of accounting for complex structures
- 5. Fossil record refutes rather than supports

The Randomness objection

- Underlying "problem" - how could chance have produced order?
- .. "chance" is only a word invented by humans to conceal our ignorance. It explains nothing. If we perfectly understood all the laws of motion, we could infallibly predict whether a coin will come down heads or tails. A Christian believes that God *does* perfectly understand His own laws and knows which side up the coin will land, but Epicureans and neo-Darwinians believe that *nobody* knows!

The Randomness objection

- All things bright and beautiful,
- All creatures great and small,
- All things wise and wonderful -
- The Lord *Chance* made them all!
- Do we want this taught to our children?
- (Watson *The Great Brain Robbery*)

The Randomness objection

- 1. Chance and ignorance
- 2. Roulette wheel vs quantum theory
- 3. Probabilistic *laws*

The Randomness objection

- **What do evolutionists mean by "random"?**

The Randomness objection

- What do evolutionists mean by "random"?
- Main point simply contrast with Lamarckism:

The Randomness objection

- **"To sharpen the contrast with Lamarckian ideas of the environmental induction of evolutionary changes, evolutionists stress the randomness of mutations. Since this term has often been misunderstood, it must be emphasised that it merely means (a) that the locus of the next mutation cannot be predicted [presumably as a matter of fact rather than a matter of principle] and (b) that there is no known correlation between a particular set of environmental conditions and the particular allele among many possible ones to which a gene will mutate."** (Ernst Mayr)

The Randomness objection

- In any event the main ordering principle is *selection*
- *Selection* through innumerable small ‘chance’ changes

2nd Law of Thermodynamics

- What the law says
- Entropy increases *in a closed system*
- Does the law really clash with Darwinian theory?
- Morris, e.g., sees the 2nd law as entailing that "There is an inexorable downhill trend toward ultimate complete randomness, utter meaninglessness, and absolute stillness." (*The Troubled Waters of Evolution*, 1974)

2nd Law of Thermodynamics

- Whereas Darwinian theory apparently presupposes an "upward trend" toward increasing complexity and organization
- BUT - 2nd law applies only to *closed systems - END OF STORY*

AGE OF THE UNIVERSE

- 1. Kelvin (1861) did a calculation based on physics and certain facts about the earth and the sun of the time that the earth has been habitable (clearly rough, but nonetheless 'sensible').
- 2. Some biological evidence gives us a rough calculation of how long it would take for evolution to have taken us from the primeval soup to now (e.g. domestic animals have not evolved significantly since the pharoahs)

AGE OF THE UNIVERSE

- 3. These calculations clash significantly - Darwin took himself - on the basis of Lyell's 'uniformitarian' geology -to have at least 300 million years ; Kelvin's calculation implied that the earth could not have been habitable for more than 10 or 15 million years.

AGE OF THE UNIVERSE

- *In retrospect*: Kelvin made a 'mistake'
- (assumed that earth had no internal means of generating heat and this 'ignores' radioactive decay
- Some assumptions about sun similarly faulty)

AGE OF THE UNIVERSE

- *At the time*: Huxley, e.g., said physicists have their calculation, biologists theirs; both based on assumptions that may eventually be challenged; both have interesting support; eventually they will need to be consistent; but as of now - suspend judgment.

Complex Structures

- Mivart (1871): How can we account for the development of complex structures - like the wings of birds and bats - on Darwinian principles?
- No doubt *once formed* these complex structures are useful, but what about during early stages ...??

Complex Structures

- Mivart echoed by contemporary Creationists:
- even if variation, or recombination, really could produce something truly novel, for natural selection to act on, this novelty would almost certainly be quickly eliminated. A new structural or organic feature which would confer a real advantage in the struggle for existence - say a wing, for a previously earth-bound animal, or an eye, for a hitherto sightless animal - would be useless or even harmful until fully developed. There would be no reason at all for natural selection to favor an incipient wing or incipient eye or any other incipient feature. (Morris)

Complex structures

- At least three possible explanations:
- 1. " a pleiotropic by-product of a change of genotype" – i.e. genotype selected for something quite different happens to produce it
- 2. contrary to the assumption, any increase in the particular ability is advantageous
- 3. Change of function – i.e. incipient structure yielded a *different* advantage

Complex structures

- 1.Nectar example
- 2. Presumably applies to eye
- There is fossil evidence that 2 does apply in case of modification of feet of deer and antelopes in response to selection for running speed

Complex structures

- As case of 3, feathers seem to have started to evolve as a thermoregulation mechanism, feathered incipient wings helped their bearers to fun fast initially and only later became big enough to help them fly.
- "The first birds were fast runners that flapped their feathered forelimbs to help them along, as do many modern birds ...Gradually the wings enlarged through processes of mutation and selection, so that in the end they became organs of flight rather than accessories to running."

Fossil Record

- True that there are ‘gaps’
- But rather than explaining these away as ad hoc exceptions, there are very good – independently testable and independently confirmed - reasons why the fossil record should be both biassed and incomplete.

Darwinism's scientific virtues

- Chief criteria for good scientific theory
- 1. Predictive success (independent testabilty)
- 2. Unity
- 3. Fertility

Darwinism's scientific virtues

- Darwinism exhibits all three
- 1. E.g. Kettlewell, but hundreds of examples
- 2. Standard problem solving technique – telling Darwinian histories – applies across the board
- 3. Apparent difficulties turned into successes

Darwinism's scientific virtues

- As an example of 3 take the Tenrecs
- Insectivorous comparatively primitive small mammals in Madagascar.
- All have poor vision, rudimentary excretory systems, testes in males within body
- But many differences between them

Darwinism's scientific virtues

- Some have hedgehog's method of defence
- Some have mole-like forelimbs
- Some can climb like shrews etc

Darwinism's scientific virtues

- Theoretical history: in late Mesozoic or early Cenozoic, small primitive insectivorous creatures rafted across the Mozambique channel and colonised Madagascar
- Later the channel widened and Madagascar became inaccessible to the more advanced mammals evolving on the mainland
- No competition and no pressure from predators
- Hence kept their fundamental body plan, but exploited unoccupied niches elsewhere filled by more advanced mammals.
- TESTABLE?

Darwinism's scientific virtues

- 1. Supposes that Madagascar has drifted away from Africa
- (can be checked independently by findings in geology)
- 2. Supposes that tenrecs could have been able to raft across the initially narrow channel (tides, abilities of tenrecs)
- 3. Theory supposes that the very different looking animals are all tenrecs, i.e. are closely related
- (can be checked by anatomical, and cellular studies – in particular should turn out to be much more closely related to each other than to hedgehogs, moles, shrews..)

Summary

- 1. Not as clear cut as in physics; and
- 2. Certainly – as always – the reasonable attitude was ‘acceptance with reservations’:
- a. No plausible account of hereditary transmission of adaptive mutations
- b. age of earth, etc
- 3. Nonetheless, it has all the virtues, even if in slightly rough-hewn form of a successful scientific theory
- a. key is ‘research programme’ feature – don’t expect core to be testable
- b. with further assumptions it is independently testable and confirmed.

Summary

- 4.Contrast this with competitors
- A. Lamarckism: direct evidence against the possibility (eventually degenerating research programme)
- B Creationism: degenerating from the start and in principle: remember the ‘Gosse dodge’
- (how else could they possibly do it?)