

SLS 12 Midterm 1

Andrew Morley

TOTAL POINTS

52.5 / 75

QUESTION 1

1 Eugenics 5 / 5

✓ - 0 pts Correct

QUESTION 2

2 Geology 5 / 5

✓ - 0 pts Correct

QUESTION 3

3 The Darwins 0 / 5

- 0 pts Correct

- 5 Point adjustment

- ☞ a) a microscope b) Erasmus believed in spontaneous generation whereas Darwin had a mechanism for evolution: natural selection

QUESTION 4

4 Acquired characters 2.5 / 5

- 0 pts Correct

- 2.5 Point adjustment

- ☞ More specifically - It is the passing of traits between generations of characteristics acquired over the lifetime of the individual. E.g. A bodybuilder's beefy arms or a giraffe's long neck

QUESTION 5

Who said 5 pts

5.1 A 0 / 1

- 0 pts Correct - as long as the last name, Huxley, is there
- 0.5 pts a. T.H. Huxley - a correct description of who he was without his name
- ✓ - 1 pts a. T.H. Huxley - the wrong name

5.2 B 0 / 1

- 0 pts b. Oliver Wendall Holmes - Correct - as long as last name "Holmes" is written
- 0.5 pts b. Oliver Wendall Holmes - a description of the person or the context without the name or with the wrong name; identify Buck vs. Bell trial
- ✓ - 1 pts b. Oliver Wendall Holmes - the wrong name

5.3 C 0 / 1

- 0 pts c. Theodosius Dobzhansky - Correct - if last name is present and spelled recognizably (even if not spelled completely correctly)
- 0.5 pts c. Theodosius Dobzhansky - half credit for a correct description of the person even if the name is incorrect, or if name is minimally recognizable from the spelling. Half credit for first name without last name.
- ✓ - 1 pts c. Theodosius Dobzhansky - incorrect if wrong name is given

5.4 D 1 / 1

- ✓ - 0 pts d. Charles Darwin - Correct as long as last name is there
- 0.5 pts d. Charles Darwin - Half credit for correct description of the person or correct context given
- 1 pts d. Charles Darwin - wrong name

5.5 E 1 / 1

- ✓ - 0 pts e. Alfred Russel Wallace - Correct last name
- 0.5 pts e. Alfred Russel Wallace - Half credit for correct description of person or correct context given.
- 1 pts e. Alfred Russel Wallace - wrong name

QUESTION 6

6 Natural Selection 5 / 5

- ✓ - 0 pts Correct - Darwin liked the term because of its analogy to artificial selection and Wallace disliked the term due to the problem of agency implied by

the analogy - artificial selection requires a selector.

- **0.5 pts** missing the term "artificial selection"
- **1 pts** mostly correct explanation, but lacking or incorrect use of key terms.
- **2.5 pts** Half credit if the correct reason is given for either Darwin or Wallace, but not for both.
- **3 pts** Rubric categories 3 and 4 apply
- **4 pts** Partially accurate but not the reasoning we were looking for
- **5 pts** Incorrect if neither reason given is correct.

QUESTION 7

Dating the Earth 5 pts

7.1 A 1 / 2.5

- **0 pts** Correct
- ✓ - **1.5 pts** Added up ages in biblical chronology
 - **1 pts** Calculation: added up ages in biblical chronology
 - **0.5 pts** Added up ages in biblical chronology
 - **1 pts** Be more specific. Added up ages in biblical chronology
 - **2 pts** Added up ages in biblical chronology
 - **2.5 pts** Added up ages in biblical chronology
 - **0.5 pts** Completely independent of Leclerc
 - **2.5 pts** Added up ages in biblical chronology
 - **2 pts** Added up ages in chronology of Old Testament

7.2 B 2.5 / 2.5

- ✓ - **0 pts** Correct
 - **0.5 pts** Iron
 - **1.5 pts** Measured the cooling rate of hot iron balls
 - **1 pts** Measured cooling rate
 - **0.5 pts** Heated, not melted
 - **0.5 pts** Earth was not a liquid
 - **0.5 pts** Measured cooling rate

QUESTION 8

8 Mono v. Polygenism 3 / 5

- **0 pts** Correct
- **1 pts** Polygenism applies specifically to the creation by God of multiple human species.

- **2 pts** Mono and polygenism descriptions are reversed
 - **2 pts** Polygenism is a creationist, not evolutionary, belief. Separate species of humans created by God.
 - **0.5 pts** Human races created as separate species by God (polygenism)
 - **1 pts** Polygenism states that multiple human species were created separately by God.
 - **1 pts** Connect abolitionism/slavery more specifically to these theories.
 - **1 pts** Connect imperialism more specifically to these theories.

✓ - **2 pts** Slavery/colonialism justified using polygenic theories

- **1 pts** Monogenism states that all humans have one common ancestor, not necessarily that the human species descended from Adam and Eve.
- **1 pts** Slavery/colonialism justified using polygenic theories
- **2 pts** Mono and polygenism apply specifically to the creation by God of one or multiple human races.
- **1 pts** Slavery/colonialism justified using polygenic theories
- **1 pts** Polygenism is a creationist, not evolutionary, belief. Separate species of humans created by God.

QUESTION 9

9 Malthus 5 / 5

- ✓ - **0 pts** Correct.
 - **1 pts** need to mention: exponential/ very rapid growth of population if unchecked.
 - **1 pts** need to mention: very limited resource
 - **1 pts** need to mention: competition/ survival of the fittest as a result of 2 and 3.
 - **5 pts** Incorrect

QUESTION 10

Paley 5 pts

10.1 A 1.5 / 2.5

- ✓ - **2.5 pts** No answer given or to get points right
 - + **2.5 pts** Design in nature means designer
- ✓ + **1 pts** Explanation of watch metaphor

✓ + 1 pts Divine creator

- 0.25 pts Flipping logic

+ 1 pts Perfection or complexity of natural world

✓ - 0.5 pts no explanation of complexity/perfection as evidence of design.

💬 This is half of the argument. What about nature revealed or implied divine creation?

10.2 B 0.5 / 2.5

- 0 pts Correct

- 2.5 pts No answer given

- 0.5 pts Get the main point, but just describe evolution

- 0.5 pts Suggest Paley accepting evolution/change!

- 0.25 pts No speciation

- 1.25 pts No Paley, no rapid evolution

✓ - 1 pts No Paley answer or wrong answer

✓ - 1 pts Adaptive radiation incorrect

💬 This answer doesn't address Paley at all and fails to properly describe adaptive radiation.

QUESTION 11

11 Eureka! 2.5 / 5

✓ + 2.5 pts The formulation of Darwin's theory in the Origin of Species was the culmination of careful thought and the meticulous acquisition of evidence over a prolonged period of time, rather than the expression of a single moment of inspiration.

+ 2.5 pts There were many factors that influenced Darwin's thinking both during his voyage on HMS Beagle (his geological interest guided by Lyell's work, his interaction with fossils, etc.) and after his return (collaboration with other scientists, e.g. John Gould, reading of Malthus, etc.), not just the Galapagos finches.

+ 2.5 pts Darwin recognized the importance of his theory and overcame barriers to articulate his ideas in a cultural environment where natural theology was the accepted standard.

+ 0 pts Incorrect

💬

This could be improved by describing important influences such as John Gould, Malthus, geology, etc.

QUESTION 12

12 Vestiges 5 / 5

✓ - 0 pts Correct

- 2 pts Darwin was not pre-empted by Vestiges since the basic idea was somewhat different. Rather, it gave him a picture of how unreceptive the scientific community was to transmutationist ideas, at least those without much scientific support.

- 5 pts Left blank.

- 2 pts Darwin was not inspired by Vestiges, instead the negative scientific reaction to it was part of his hesitation to publish. It caused him to step back and gather more data instead.

- 1 pts Wallace was not just supportive of Vestiges, he was inspired to name himself a transmutationist from the minute of reading it. This work turned his thought to theoretical aspects of the natural world.

- 1 pts Wallace was did not yet have a theory to compare Vestiges to. Instead, it was the very start of his theoretical thought about the natural world, and marks the origin of his transmutationist perspective.

- 1 pts Vestiges not only inspired Wallace to explore, but it also opened him up to the idea of theorizing about the natural world in a transmutationist context.

QUESTION 13

13 Sarawak 5 / 5

✓ - 0 pts Correct

- 1 pts Click here to replace this description.

- 5 pts Click here to replace this description.

- 2.5 pts Wallace is stating that a new species will have arisen from an existing ancestor, and so will exist in a similar space and time as that recent ancestor. It is an argument against spontaneous creation.

- 2 pts Click here to replace this description.

- 2 pts Why do you find closely related species in

the same time and space? Recent descent from a common ancestor

- **1 pts** He had not figured out the mechanism of evolution yet. He is suggesting here that because of common descent from an ancestor, you find closely related species in similar space and time.

- **1 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor

- **5 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor

- **5 pts** No answer provided

- **3 pts** Wallace is referring to a genealogical tree of life where you find closely related species in a similar space and from similar times due to common descent from an ancestor

QUESTION 14

14 Species and varieties 3 / 5

+ **2 pts** Relationship between species and varieties: Darwin argues that the line demarcating species and varieties is fuzzy.

✓ + **2 pts** Citation of experts: Darwin cites disagreement among experts about whether to classify organisms as species or mere varieties.

+ **1 pts** Evidence for descent with modification: Darwin argues that the poor demarcation between species and varieties exists because varieties are incipient species.

+ **0 pts** Click here to replace this description.

+ **1 Point adjustment**

- 1/2 points- Answer points out an instance in which organisms were classified species or varieties. However, the answer doesn't address the blurry line between the classification of species and varieties.
- 2/2 points- Discusses consultation of an expert to identify the finches. (Note: Question is getting at the fact that Darwin

consulted multiple experts who couldn't agree on the classification of organisms as species or varieties.) -1 point- Does not discuss implications for descent with modification. Specifically, the blurry distinction supports the idea that varieties are incipient species.

QUESTION 15

15 Struggle for survival 4 / 5

- **0 pts** Correct

✓ - **1 pts** Click here to replace this description.

- **0.5 pts** Click here to replace this description.

- **2 pts** Click here to replace this description.

- **5 pts** Empty

- Didn't mention divergence of character will MITIGATE THE COMPETITION within species, which is the primary mechanism to generate various varieties occupying different ecological niches.

Harvard ID #: 11170501

TF:

Name: Andrew Morley

SLS 12 2018 Understanding Darwinism
Mid-term 1, 2 Oct 2108

Please be sure to put your Harvard ID, Name, and Section Leader on **every** page. Answer all the questions. Answer **only** in the spaces provided. Each question is worth 5 points. Please make sure that your answers are legible and succinct (you will be penalized for adding to your answer irrelevant material that is not germane to the question). You have 75 minutes for the exam, and there is a total of 75 points available; pace yourself accordingly

1. Distinguish between positive and negative eugenics.

Carter's study of Eugenics encouraged or discouraged the breeding of certain people, as he believed humans had ceased naturally selecting.

- Positive Eugenics: Encourage the "fit" to breed w/ other "fit" people

- Negative Eugenics: Discourage the "unfit" from breeding w/ anybody & passing down vulnerable traits.

2. Compare and contrast catastrophism and uniformitarianism. For each perspective, give the name of the historical figure most closely associated with its development.

- Cuvier spearheaded this idea of "catastrophism", which suggested that dramatic events (floods/comets, etc.) moved in regions & wiped out species living there.

- Lyell's "uniformitarianism" suggested that any changes on earth were the ones happening as we observed them today.

Do not write below line (for grading purposes)

Harvard ID #: 11170501

TF:

Name: Andrew Morley

3. Charles Darwin's grandfather, Erasmus Darwin, wrote the following description of evolution:

Organic life beneath the shoreless waves
Was born and rais'd in Ocean's pearly caves
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet and wing

a. What does he mean by "spheric glass"?

The 'boundary' of the world created by God.

b. Outline one key difference between the evolutionary theories of Erasmus and Charles Darwin.

Erasmus' theory still contained a divine presence.

4. What is meant by "inheritance of acquired characters?" Give the name of the figure in the history of biology most closely associated with this idea.

Lamarck coined this term, called 'besoin'.

(still can't prove it, to be honest)

Do not write below line (for grading purposes)

Harvard ID #: 11170501

TF:

Name: Andrew Morley

5. Who said:

a. How extremely stupid not to have thought of that!

Cyell ?

b. Three generations of imbeciles are enough

Darwin ?

c. Nothing in biology makes sense except in the light of evolution

Wallace ?

d. Seeing this gradation and diversity of structure in one small, intimately related group of birds, one might really fancy that from an original paucity of birds in this archipelago, one species had been taken and modified for different ends

Charles Darwin ?

e. All the human inhabitants of any one country should have equal rights and liberties before the law; women are human beings; therefore they should have votes as well as men

Wallace ?

6. Darwin and Wallace disagreed over the term "natural selection." Give **one** reason why Darwin favoured it, and **one** reason Wallace objected to it.

Implied creator deity,

Should be
to "artificial"

Darwin liked this term to differentiate between 'artificial selection' and Wallace found that this analogy implied the presence of a tangible 'selector' or 'breeder' in natural selection. Since artificial selection requires a being to 'select'. Wallace preferred the term "Survival of the fittest."

Do not write below line (for grading purposes)

7. a. Archbishop Ussher concluded that creation was completed in 4004BC. How did he come up with this figure?

Ussher drew his conclusion using the Bible.

b. Georges Leclerc, Comte de Buffon gauged the age of the planet to be 75,000 years. How did he come up with this figure?

Buffon drew his conclusion by evaluating the rate of cooling of iron.

8. Outline the differences between the monogenic and polygenic theories of human origins. Why was this debate so topical during the 19th century?

There was a lot of racial tension in the 19th century. Monogenic theories suggested that all beings arose from the same, common ancestor. Polygenic theories stated that non-whites came from different ancestors before Adam & Eve, while whites came from the same ancestor.

Do not write below line (for grading purposes)

9. Both Darwin and Wallace report that T. R. Malthus was an important influence on their development of the theory of natural selection. Outline the key idea of Malthus that had such an impact.

Malthus' biggest idea was that the rate of population growth was outpacing that of our food supply. This meant that our population was being limited by our ~~resources~~ resources, and therefore implying competition that made natural selection a plausible idea.

10. Darwin studied Paley at Cambridge.

a. Outline the essence of Paley's natural theology.

Paley likened the presence of various organisms to that of a watch on the ground - Somebody had to put it there, just as Somebody had to put different species on earth (adaptive)

b. What is an adaptive radiation? Using a Paleyan perspective, explain adaptive radiation.

An adaptive radiation is the formation of the same species with very different traits.

11. An historian of Darwin's Galapagos visit, Frank Sulloway, has written that the chief offence of the Darwin-Galapagos Eureka! legend is that it "masks the complex nature of scientific discovery, and, thereby, the real nature of Darwin's genius." Use what you know about the development of Darwin's thinking to illuminate the "real nature of Darwin's genius."

In being asked by Wallace to publish (and avoid losing his precedence), Darwin's "genius" was oversimplified in that everything he included in his "Origin" was not actually every bit of Wallace's process. In fact, he even wanted to include it as an "abstract."

12. The anonymously published *Vestiges of the Natural History of Creation* affected Darwin and Wallace in very different ways. Describe the impacts on each of them.

Chambers' anonymous publication was heavily criticized. The backlash discouraged Darwin from attempting to publish his own evolving theories.

Wallace, however, was encouraged by this evolutionary thinking, and was inspired to further research.

Do not write below line (for grading purposes)

13. In his 1855 "Sarawak Law" paper, A. R. Wallace wrote, "Every species has come into existence coincident both in space and time with a pre-existing closely allied species." What does this mean?

What Wallace is suggesting here is that there is an overlap between closely allied species on earth. New species arise after enough divergence in traits between one another, and Wallace is saying that the new species is found while the "pre-existing" species still occupies the same space.

14. Darwin frequently makes use of experts to support his arguments in the *Origin of Species*. How does he use various experts to support his arguments on defining species and varieties and the relationship between species and varieties?

Darwin's distinction between species & varieties can be highlighted by his "finches" example, which he used in his post-lectures' legions to try and highlight the distinct variations that can exist between the same species, such as adaptive radiation.

Do not write below line (for grading purposes)

15. On the struggle for survival, Darwin states, "The struggle almost invariably will be the most severe between the individuals of the same species, for they frequent the same districts, require the same food, and are exposed to the same dangers." How might this support Darwin's ideas of divergence of character and how species come about?

~~The struggle creates competition, characters have to diverge to get food in different ways. (Hence long/short beaks) to get food & gain an advantage, but only some of these will remain advantageous.~~

This Struggle for food between the same species inherently creates competition. This supports the "divergence of character" idea as members of the same species will then develop novel traits (Hence: long/short beaks) in order to gain a competitive edge in acquiring the same food as the rest of the species.