SRS 200-11: Sophomore Research Seminar
Biological Thinking, Ancient and Modern

Prof. Tarik Wareh, wareht@union.edu, Lamont House 203, 518-388-6743

Course description

What ways of thinking did the Ancient Greek physicians and philosophers of nature develop in their attempt to understand the principles and nature of living organisms? How do these ancient discussions combine attention to still-important philosophical and biological issues with assumptions that derive from ancient cultural conditions and values? We will study the writings of the Hippocratic medical writers, Aristotle, and the Pre-Socratic theorists of nature (guided by David Sedley’s book, Creationism and its Critics in Antiquity). We will also read Kim Sterelny’s account of the conflict between two contemporary views of evolutionary biology (Dawkins vs. Gould: Survival of the Fittest) and seek connections between ancient and modern theoretical dilemmas in biology.

Students will build on these shared readings in order to research, discover, read, and analyze additional theories and problems (in the primary texts of ancient and modern biological thinkers). The goal will be a research paper that grapples with facts, theories, and historical conditions that go beyond the class’s shared reading list. Attention to the cultural context of biological thinking will be encouraged, and students may choose projects that focus on eccentric or apparently dead-end lines of biological thinking.
YOUR SOURCES

“Known Knowns...Known Unknowns...Unknown Unknowns”

Required books
- David Sedley, *Creationism and its Critics in Antiquity*, Univ. of Calif. Press, ISBN 9780520260061

We will also read extensively from
- Aristotle’s theory of nature
- the Hippocratic physicians

You will also discover (and assign in part to the class) other ancient and modern primary texts that respond to your interests and feature in your projects!

For all the surviving fragments of the Presocratic philosophers, according to their Diels-Kranz numbers (“B” in Sedley), see: [http://www.sacred-texts.com/cla/app/](http://www.sacred-texts.com/cla/app/)

To help you brainstorm about possible modern sources that would be fruitful to engage with the ideas and methods we will develop in this course, here are a few suggestions. Remember when skimming or studying these texts that we are particularly looking for passages and examples that expose the thinkers’ theoretical assumptions, motivations, and innovations. What models for understanding biological and physical reality did they construct? From what sources in addition to empirical evidence?
- Gassendi (1592-1655) [article on his atomic theory on Nexus]
- 18th c. science poems: “Man a Machine”; “The Art of Preserving Health”
- Owen, *On the Nature of Limbs* (1849) [Nature “In Retrospect” discussion on Nexus]
- Thompson, *On Growth and Form* (1917) [Nature “In Retrospect” discussion on Nexus]
- Oparin, *The Origin of Life* (1936) [Nature “In Retrospect” discussion on Nexus]

Another starting point for more ideas is Grene and Depew’s *The Philosophy of Biology: An Episodic History* (2004) [selections on Nexus].
SCHEDULE OF READINGS AND ASSIGNMENTS

Tu 4/2  Introduction

Tu 4/9  Sedley, pp. 31-62
Th 4/11 Sedley, pp. 75-92 [shorter assignment: plan ahead]

Tu 4/16 Sedley, pp. 93-132 [longer assignment: plan ahead]
Th 4/18 Library walk; Interpretive analysis and synthesis due

Tu 4/23 Sterelny, pp. 3-65
Th 4/25 Sedley, pp. 133-166

Tu 4/30 Sterelny, pp. 67-141
Th 5/2 Sterelny, pp. 143-178; Aristotle [Nexus], pp. 206-217 (Parts of Animals)
   [note: make use of the glossary on Nexus when reading Aristotle]
   Introductory selections from the Hippocratic Corpus

Tu 5/7  Gotthelf [Nexus], “Darwin on Aristotle” and “Aristotle as Scientist”
   [I strongly advise reading these chapters before writing the proposal.]
   Research proposal due
Th 5/9  Aristotle [Nexus], pp. 83-95 (Physics I)

Tu 5/14 Aristotle [Nexus], pp. 95-112 (Physics II)
Th 5/16 Sedley, pp. 167-204; Updates to research proposals

Tu 5/21 Aristotle [Nexus], pp. 112-126 (Physics II-III)
Th 5/23 Sedley, pp. 239-244; Further selections from the Hippocratic Corpus

Tu 5/28 Research presentations (ancient medical thought emphasis)
   [Presentations include supplementary reading assigned by presenters.]
Th 5/30 Research presentations; Rough draft due

Tu 6/4  Research presentations
Th 6/6  Research presentations; Peer responses due
Grading components

10% prepared participation and/or reading quizzes
15% discussion leader assignment
10% interpretive analysis and synthesis (5 pages, 1375 words)
5% research proposal
5% rough draft
10% peer response to rough drafts
10% final presentation
35% final paper (12-18 pages, 3300-5000 words)

-1% each day absent
-½% each day without a printed copy of the day’s reading
-¼% each day tardy

Late policy. All assignments must be turned in on time. Presentation assignments are essential to our class plan and cannot be accepted late. Late work, if accepted, will be subject to a grade penalty. No work will be accepted more than seven days after the original due date. Do not expect special arrangements to be made except in extraordinary circumstances and in advance.

Gentle reminders. Come to class on time with the reading (including printouts of anything distributed online), and do not leave except during the break. (Feel free to suggest that it is time for the break, rather than leaving.) All electronic devices should be switched off and stowed away in your bags. Explanations of absences or other irregularities are worth infinitely more when they are given in advance, and leeway is only to be expected for compelling reasons.

Honor code. You are expected to be fully familiar with and committed to the college’s Honor Code (http://muse.union.edu/honorcode/) and to have a good understanding of what plagiarism is (“Statement on Plagiarism” linked from that page). For this course, every intellectual debt to any consulted source must be fully and specifically spelled out in every assignment, written or oral. This means anything you’ve read that’s left a trace in your ideas: not just wording, but the ideas behind them; not just what you have to say, but which collections of sources and passages you chose for discussion; including online and assigned reading; etc. The reader must be able to determine exactly what in your writing is owed to exactly what in the consulted source. Always err on the side of too much information, and please consult me if you believe there is any grey area.
General principles of interpretive argument
(criteria for all work in this course)

Claims; arguments supporting an interpretation (not a description)
In this course, the goal is never simply to describe or report the ideas we discover in biological and cosmological thinkers. It is always to analyze and interpret them—that is, to make specific claims about their meaning and significance based on a close reading of the details of their wording and ideas, the echoes of other kinds of thinking that may have informed them, the hidden possibilities and dangers they offer, etc. These claims should be backed up by an argument—a series of uncertain but supported suggestions about how to read the sources that add up to an overall case for your interpretation and analysis. Your first paragraph should answer the question, “What is the complicated and original overall claim of this piece of writing?” And each subsequent paragraph’s topic sentence should answer the question, “What interpretive or analytical insight will this paragraph argue?”

Taking our “ridiculous” sources seriously (skipping the obvious criticisms)
Please start from the assumption that the theories we are studying are historically and intellectually important, complicated, and worthy of being considered seriously. Of course I do not expect you to accept obsolete scientific doctrines, but we will be working on a very shallow level if we harp on what is factually wrong. What seems conceptually questionable is more interesting to us, but even there we will only really learn if we always offer ourselves (and our readers) the chance to see what is conceptually valuable in these obsolete theories as well. Scientific breakthroughs have always depended on creativity and “wrong” but compelling ideas: find out what ways of thinking are actually worth understanding in your sources.

Embracing complexity and uncertainty
In this kind of work, it is not important that your argument be bulletproof. Quite the contrary: you must leave aside the more obvious claims and look for more ambitious ones that require the support of an original and careful argument. A good rule of thumb is that an interpretation differing significantly from yours should be possible. This means that you are forced to construct a persuasive argument. Spell out the stakes—tell your reader why you find rival lines of analysis less compelling or less useful guides towards deeper thinking. (You are not a lawyer who needs to ignore or conceal “opposing evidence.” The more complexity and contradiction in the material you help your reader sort through, the better.)
**Daily assignment: Passages and questions**

Reread the previous page of the syllabus—the more you practice close-reading interpretation with each day’s reading, the more prepared you will be to complete an excellent research paper at the end of the course!

For each meeting, bring notes on at least two passages, explaining why you would like to bring them to the class’s attention, and what interesting ideas or claims we might arrive at by studying and interpreting them. Also bring at least two questions you would like to pose to the class. The regularity and quality of your contributions make up a significant part of the “prepared participation” grade component.

**Discussion leader assignment**

Reread the previous page of the syllabus—the discussion leader assignment is an excellent opportunity to develop and try out arguments that will be useful inspiration or material for your research project.

You will sign up for this in advance based on your schedule and interests and treat it as a serious commitment. The discussion leader will begin the class by offering an introduction to the reading, and then will follow up that introduction by guiding the class through passages and questions as well as drawing out other students about the passages and questions they have chosen and brought to class. As your ideas for your research paper develop, you may wish to offer some connections to a work that is not on the syllabus (or from a future reading). In this case, you may want to email a key passage from that work to the class in advance. **Plan to be “in charge” for 30 minutes of our time.**

There is a **written component** to this assignment that you can fulfill in several ways:

1. Prepare a handout outlining key ideas, evidence, and arguments (email to me in an easily printable format 24h in advance or bring 14 copies to class)
2. Use a Powerpoint presentation (check the classroom’s technological requirements, your laptop/connectors, etc., in advance)
3. Use the chalkboard/whiteboard to offer a clearly organized analysis of your discussion plans, and hand in an outline of your plans to me at the end of class.

No matter which of the options you choose, always include a **diagram** of some kind that visually organizes some of the day’s ideas.
Interpretive analysis and synthesis

Reread p. 5 of the syllabus, and practice building a complete and compelling evidence-based interpretive argument! Study the surviving fragments of a Presocratic philosopher (Heraclitus, Parmenides, Empedocles, Democritus), or Plato’s *Timaeus*, or another text you have cleared with me well in advance. Be sure to choose material covered by Sedley only insofar as you are prepared to stand on his shoulders to offer what are truly your own original arguments and selection and interpretation of the evidence. Be sure that you are reading each passage or quotation in the light of others—how do this thinker’s ideas become more complex and interesting when the fragments are synthesized with each other? What non-obvious connections and implications do the fragments contain that are (if we are persuaded by your argument) more than the “sum of their parts”? Remember to avoid any unnecessary restatement, summary, etc.: your job is to produce interpretation, not to report what the fragments say. Announce to the reader at the very beginning exactly what larger complicated claim you will be making, and how it will depend on the more specific interpretive ideas you will defend at the paragraph level (each one clearly announced in its topic sentence).