Topics for Paper #2. Due Tues Dec. 2.

Instructions:

(a) Choose one of the following topics and respond to it in an essay of no less than 5 pages and no more than 7 pages (not including title page and bibliography). Your paper should be typed, 10- or 12-point, double-spaced and spell-checked.

(b) Your essay should conform to the guidelines handed out in class. *Make Absolutely Certain that you have read and understood these guidelines before you attempt to begin writing your paper.* Please submit both a hard-copy in class on the due date, and an e-copy to SafeAssign. Make sure to retain an extra copy for your own records.

(c) Your essay must include a bibliography that minimally lists the relevant course texts. Your essay must use this bibiliography as a source to cite for all claims and quotes you attribute to authors.

(d) Lecture notes should ***NOT*** be listed and/or referred to in your essay. Lecture notes merely summarize topics in the texts or related material. Online websites that have not been peer-reviewed should ***NOT*** be listed and/or referred to in your essay. This encompasses (but is not limited to) online lecture notes, personal websites, and Wikipedia. If you find an online source that you'd like to use, but are in doubt over whether it is legitimate, please email me for advice.

(e) Please make use of Poly's Writing Center <www.poly.edu/academics/support/polytechnic/writing> if you have trouble with spelling and/or grammar. If your essay contains so many spelling/grammatical errors that a reader cannot comprehend what your claims are, then your grade will suffer.

1. This topic concerns the relation between Faraday and Maxwell. How much was Maxwell's theory of electromagnetism an elaboration and extention of concepts introduced by Faraday? In particular, what role did the "electro-tonic intensity" play in Maxwell's formulation of Faraday's Law, and what did Maxwell mean by polarization, electric charge, and electric current in his 1873 *Treatise*? Finally, how was Maxwell's theory, as he presented it in 1873, different from what we today take to be his theory of electromagnetism?

2. This topic concerns 19th century mechanical models of electromagnetism and the ether. Describe Maxwell's vortex model of electromagnetism: How did it mechanically account for electric and magnetic phenomena? How did Maxwell's vortex model differ from FitzGerald's wheel and rubber-band model? How did these models in turn differ from Lodge's string and beads model? Finally, what distinguished these models from FitzGerald's vortex sponge model?

3. This topic concern the Maxwellian's analysis of the propagation of electric signals in telegraph wires. How did the Maxwellian view of signal propagation differ from previous views based on the analogy of water flowing in a pipe? How did this Maxwellian view inform Heaviside's analysis of distortion in telegraph wires? Finally, why was Heaviside's analysis so controversial with practicing electrical engineers?