Study Questions for Earman & Norton (1998) "Exorcist XIV, Part I"

1. According to E&N, how did Maxwell originally conceive of the Demon?
2. After the turn of the 20th century, what phenomena were widely agreed to constitute a microscopically visible violation of the 2nd Law?
3. What mechanism did Smoluchowski and Szilard appeal to to demonstrate that microscopic violations of the 2nd Law could be amplified into macroscopic violations?
4. How did the Demon "transmogrify" from a helpful spirit into a threat in need of exorcism?
5. What are three morals that Maxwell drew from the Demon?
6. How does Poincaré's recurrence theorem pose a threat to the 2nd Law?
7. What are two senses in which the 2nd Law can be violated, according to E&N?
8. In what sense do phenomena exhibiting Brownian motion violate the 2nd Law?
9. Why did Smoluchowski think his one-way valve device could not be used as a perpetual motion machine? In general, why can't fluctuation phenomena be used to produce a perpetual motion machine?
10. What does Smoluchowski's "time averaged Second Law of thermodynamics" say?
11. According to Smoluchowski, how can an intelligent being exploit fluctuation phenomena to produce a perpetual motion machine?
12. According to Szilard, why must any device that employs fluctuations in an attempt to violate the 2nd Law fail?
13. How does Szilard's one-molecule engine fail to violate the 2nd Law? Why is this a rescue of only a statistical form of the 2nd Law?
14. How do Earman and Norton explain why Szilard's rescue of a statistical form of the 2nd Law was taken by his readers as a rescue of an absolute form of the 2nd Law?
15. According to Earman and Norton, is Maxwell's Demon simply a way of determining the domain of validity of the 2nd Law, or is it a threat against which the 2nd Law must be protected?

Study Questions for Earman & Norton (1999) "Exorcist XIV, Part II"

1. According to Earman and Norton, what is the dilemma faced by all information-theoretic attempts to exorcise Maxwell's Demon?
2. Why do Earman and Norton think information-theoretic explanations of how the 2nd Law survives demonic interventions cannot be universal in their scope?
3. What is Szilard's Principle?
4. What is Landauer's Principle?
5. How does von Neumann's analysis of Szilard's Principle fare with respect to Earman and Norton's dilemma?
6. How does Brillouin's analysis of Szilard's Principle fare with respect to Earman and Norton's dilemma?
7. What are the two technical defects of Brillouin's treatment?
8. What is Bennett's alleged counterexample to Szilard's Principle? According to Earman and Norton, does it succeed?
9. According to Earman and Norton, what is the "official doctrine" about the exorcism of Maxwell's Demon?
10. What are the very definite assumptions about the physical process of memory erasure that Landauer's Principle makes?
11. Why do Earman and Norton think that the value of Landauer's Principle to exorcising the Demon is purely heuristic?
12. What discrepancy do Earman and Norton see in Bennett's treatments of Szilard's Principle and Landauer's Principle?
13. How do Earman and Norton argue for the claim that computerized demons don't need to erase information?