

Syllabus: Environmental Economics

VERSION: 03May11a.

The New School University, New York City

Eugene Lang College, Historical and Social Studies / Environmental Program

M/W 2:00 - 3:40 - Johnson/Kaplan 66 West 12th Street, 615 - Jan 24, 2011--May 16, 2011 - Type: Seminar

Instructor: Prof. Thomas O'Donnell – <http://TomOD.com> .

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Office hrs: Monday following class, Room 620, 66 W. 12th

[Jump to Daily Assignments](#)

STUDENT RESEARCH-BLOG GROUPS [Goto your blogspace: http://www.blogger.com/home](http://www.blogger.com/home)

1. [Alternate Transport http://alttransport.blogspot.com/](http://alttransport.blogspot.com/)
2. [Alternative Fuels in Transport http://alternativefuelsintransport.blogspot.com/](http://alternativefuelsintransport.blogspot.com/)
3. [Lago de Maracaibo Pollution http://maracaibopollution.blogspot.com/](http://maracaibopollution.blogspot.com/)
4. [Political Economy of Oil http://globaloileconomy.blogspot.com/](http://globaloileconomy.blogspot.com/)
5. [Alternative Electricity http://alteelectricity.blogspot.com/](http://alteelectricity.blogspot.com/)

Research Blogs: We hope to establish a system of student blogs (private or public, as you wish) where links to your directed research project sources are archived along with your notes on reading these materials and developing your analysis.) The instructor has done this previously with courses at U Michigan and New School.

Step-by-step information on how to establish your blog can be found in this document: *Blogging 101* (courtesy of the Ann Arbor Public Library) <http://www.aadl.org/files/Blogging%20101.pdf>

Links:

- Class homepage: <http://www.umich.edu/~twod/environ>
- New School Academic [Calendar](#) (Last add 4 Feb, Last drop 11 Feb)
- Articles posted at
 - <http://www.umich.edu/~twod/articles> unless otherwise stated.
- Class e-mail archive: <http://www.umich.edu/~twod/environ/email>
- Homework solutions: <http://www.umich.edu/~twod/environ/solutions>

Required Books:

- Environmental and Natural Resource Economics: A Contemporary Approach, Jonathan M. Harris, 2nd Edition, Houghlin Mifflin, 2006.
 - Textbook publisher's website: TBA

Class General Pattern –

NOTE: this class is listed as a “seminar” and is limited to 18 students (a hallmark of New School classes). This implies an especially participatory atmosphere. Students' active participation in discussion will be expected, and lectures will be particularly Socratic. Also, almost every class will include collective discussions of directed-research group semester projects.

Each Class (unless guest lecturer or field trip) is roughly divided:

- (05 minutes) Attendance and handing in homework, announcements, news item(s), etc.
- (15 minutes) Brief review of previous lecture including:
 - (03-05/student) reports on any directed research assignments from previous class
 - And/or work selected homework problems on board
- (45 minutes) Lecture on assigned reading from textbook or other assigned readings
 - (Optionally: 15 minutes of the 45) To enhance preparation and participation:
 - Either: Three or Four students might be assigned ahead of time to give brief presentations on the day's readings
 - Or: A brief multiple choice quiz will be given and graded immediately to determine who can be called upon in discussion during Socratic lecture sessions
 - Assignments may be made in the course of lecture to specific students for brief research on any questions that arise in this discussion and to be reported back to the next class.
- (10 minute) Break and students informally working problems from lecture and/or explaining to one another solutions to homework that was due today
- (30 minutes) Directed research session with two-to-three of the five groups, and a period of comments received from the whole as time permits.
- (05 minutes – margin of error)

- TOTAL: 110 Minutes

Projects: Each student will participate in a semester-long *directed*-research team project. You should become a budding expert in one of several categories in environmental or energy economics. This will entail not only an economic analysis of the topic, but one must attain a certain technical understanding of the area in order to ground your economic analysis (e.g., one who has no idea of the constraints on material and labor inputs in the assembly of an electric car, and its infrastructure requirements, such as battery charging facilities, has no hope of analyzing the economics of a partial transition to electric cars).

Research teams will consist of a minimum of three and maximum of four students.

Research Topics must be chosen from among the following, subject to the three-to-four-students-per-project constraint:

- 1) **Alternative Modes of Transportation:** Feasibility of replacing personal-automobile-centric society with fast trains, and mass transit. What would the new infrastructure and vehicles consist of, how is it to be fueled, and how would this impact social-economic organization of society? Especially, what are the comparative economics as well as the environmental, energy conservation, social justice and impacts on national economic competitiveness? One can include study of long-established systems in other countries such as Japan and the Western EU, to provide concrete, historical data.
- 2) **Alternative Energy in Transport:** What is the feasibility of alternative non-renewable fuels (now-cheap natural gas as GTL, or coal as CTL, etc.) and alternative renewable bio fuels (ethanol and bio-diesel, etc.). This might include assessment of the “Peak Oil” controversy. There are many historical examples of attempts to convert to bio fuels, such as in Brazil, or CTL as in South Africa and Nazi Germany, or to natural gas as with bus and truck fleets and in Brazil.
- 3) **Alternative Energy in Electrical Production:** What is the feasibility, economic, social and otherwise of converting today’s coal-and-gas centered power production to non-carbon-based and/or renewable sources? How much can be done in how long? Understanding the EU process since about 1999 is of importance here. How much wind, solar and bio-based fuels are feasible and what are the problems in integrating these into the grid? How much nuclear should be used, for how long and open- or closed-cycle? What is the feasibility of geothermal and wave power.
- 4) **The Political Economy of the Global Oil System:** Consider the transition from the former, neo-colonial global petroleum system to the present market-centered system. One must understand the causes and effects of the transformation in property relations from foreign concessions to nationalization during the 1970’s “OPEC Revolution”, the period of conflict between the global north and south and the role of the International Energy Agency of the OECD as vs OPEC for control of the market through esp. 1986. The real or imagined role of monopoly and cartels in the present system, of the International Oil Companies (IOC) as vs the National Oil Companies (NOC), the central role of the spot and futures markets, and the history of the price of oil and the issues that determine its price. This can be combined with team member(s) looking at the “resource curse,” “Dutch Disease” and “rentismo” in oil producing countries (and/or states of the US).
- 5) **Green House Gas Remediation:** It is very difficult to estimate the economic and social impacts of allowing GHG pollution to continue, exacerbating global warming. While the best-available estimates should be studied, one can perhaps better estimate the economic and social costs of implementing GHG remediation schemes such as, but not limited to: (a) carbon credits and markets, (b) carbon sequestration (i.e., can the super-abundant coal, lignite, gas and other fossil fuels be used together with carbon sequestration schemes?). (c) Carbon extraction from the atmosphere and (d) reduction in the production of carbon in transport, housing, industry and electrical production using non-carbon forms of power such as wind and solar, but especially the feasibility of nuclear power from this GHG-remediation perspective. Clear explanations of each scheme/method for reducing GHG and their economic consequences (not only cost, but cost-for-whom, effect on productivity and jobs, effects on national competitiveness, social justice issues, etc.) need to be understood.

Invited Speaker Dates - TBA

Quiz Dates & Midterm Dates – See Syllabus

Grading Schema

- Attendance and class participation 25%
- Homework 10%
- Quizzes 10%
- Midterms 30%
- Collective directed-research project 25%

HOMEWORK: Assignments on Syllabus are due the following class session and must be handed in at beginning of class. If you do not have homework, hand in blank page with your name to show your attendance

| Date | # | TOPICS, HOLIDAYS & EXAMS | Harris Text and Other Readings, Homework assignments, etc. |
|------------|----|--|---|
| - Week 1 | - | | <i>1st Half: ENVIRONMENTAL ECONOMICS</i> |
| Mon 24 Jan | 01 | PART 1: The Economy and the Environment | Chapter 1 Changing perspectives on the Environment - Homework: TBA - Resources: -- UN Environment Program (UNEP) Our Planet Magazine: |

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| | | | http://www.unep.org/Publications/contents/Our_Planet.asp |
| Wed 26 Jan7 | 02 | Since most students do not yet have the textbook, I have assigned a reading to substitute/accompany Chapters 1 & 2. | Chapter 2 Resources, Environment, and Economic Development - Read for class discussion today: -- “Environmental Economics at the World Bank”, Susmita Dasgupta, Kirk Hamilton, Stefano Pagiola and David Wheeler at: http://reep.oxfordjournals.org/content/2/1/4.full#content-block Read: Abstract; Introduction; Evolution of Environmental Economics at the World Bank; Resource and Environmental Accounting; Economic Valuation (stop after Figure 3). Browse remainder, Read Conclusion. -- NOTE: study Tables 1-2 and Figures 1-3 carefully. Try to explain what the charts convey. - Homework link: assignment due before 31Jan class |
| - Week 2 | - | --- | --- |
| Mon 31 Jan0 | 03 | PART 2: Economic Analysis of Environmental Issues | - Lecture: continue discussing Chap 2 and World Bank article, begin: - Read: Chapter 3 The Theory of Environmental Externalities - In class: decide research group members |
| Wed 02 Feb | 04 | | - Read Chapter 3 for today - Lecture: on Chapter 3 and remainder of World Bank article. - In class: -- Finish assignments of research groups; kick off -- Plan Water (Dis)Course attendance |
| Fri 04 Feb | | Class will attend event in lieu of Mon 07 Feb Class NOTE: Those not at NS can watch streaming video. | - ATTEND: Water (Dis)courses Kick-Off - Event Link at New School When: February 4, from 2:30 to 4:30 p.m. Where: Tishman Auditorium, 66 West 12th Street - ASSIGNMENT: Write one-page (< 200 words) reflection on the event. E-mail no later than SUNDAY evening. Use plain text in body of the e-mail (i.e., no attachments please). Use e-mail subject header: EnvEco 4.0 name+initial water |
| - Week 3 | - | --- | --- |
| Mon 07 Feb | 05 | CLASS CANCELLED – go to Friday event above | |
| Wed 09 Feb | 06 | | - Lecture: on Chapter 4, but will complete any Chapt 3 left from class 04. - Read: Chapter 4 Common-Property Resources and Public Goods - In class: -- Brief reports due by three students, assigned on 31 Jan -- Describe upcoming Quiz 1 |
| - Week 4 | - | --- | --- |
| Mon 14 Feb | 07 | ** Quiz 1 ** PART 3: ECOLOGICAL ECONOMICS & ENVIRONMENTAL ACCOUNTING | - Read: Chapter 5 Resource Allocation Over Time |
| Wed 16 Feb | 08 | | Chapter 6 Valuing the Environment |
| - Week 5 | - | --- | --- |
| Mon 21 Feb | - | Holiday - President’s Day | HOLIDAY |
| Wed 23 Feb | 09 | PART 4: POPULATION, AGRICULTURE & ENVIRONMENT | Chapter 7 Ecological Economics: basic concepts |
| - Week 6 | - | --- | --- |
| Mon 28 Feb | 10 | | Chapter 7 Ecological Economics: basic concepts |
| Wed 02 Mar | 11 | PART 6: POLLUTION IMPACTS & POLICY RESPONSES | Chapter 7 Ecological Economics: basic concepts |
| - Week 7 | - | --- | --- |
| Mon 07 Mar | 12 | | Scientific understanding of Green House Warming (Earth ‘breathing’ CO2: http://www.grinzo.com/energy/index.php/2010/12/24/watching-the-earth-breathe/) |
| Wed 09 Mar | 13 | MIDTERM | |
| - WEEK 8 | - | --- | --- |

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| Mon 14 Mar | - | SPRING BREAK | HOLIDAY |
| Mon 16 Mar | - | SPRING BREAK | HOLIDAY |
| - WEEK 9 | - | --- | 2nd HALF: ENERGY ECONOMICS |
| Mon 21 Mar | 14 | | <ul style="list-style-type: none"> - Exams returned, Further discuss Chapter 7 - Plan for remainder of semester. Emphasis on Research Blog groups. - Chapter 12: pp 257-265. Nonrenewable Resources: Scarcity and Abundance- - Lecture: The World's Available Energy Resources: Location, Present and Future Demand, Alternatives. Continued: PowerPoint |
| Wed 23 Mar | 15 | PART 5: ENERGY & RESOURCES | <ul style="list-style-type: none"> - Chapter 12: 2 pp 257-265. Nonrenewable Resources: Scarcity and Abundance - Lecture: The World's Available Energy Resources: Location, Present and Future Demand, Alternatives. Continued: PowerPoint |
| - WEEK 10 | | --- | --- |
| Mon 28 Mar | 16 | | <ul style="list-style-type: none"> - Chapter 12: 2 pp 257-265. Nonrenewable Resources: Scarcity and Abundance - Lecture: The World's Available Energy Resources: Location, Present and Future Demand, Alternatives. Continued: PowerPoint - Discuss research blogs 1,2, 3 |
| Wed 30 Mar | 17 | | <ul style="list-style-type: none"> - Review math: Straight lines, finding intersections and area between lines, graphs; for supply, demand, market equilibrium and NMB (Coordinate Geometry) Study resource: http://www.mathopenref.com/coordintersection.html Time permitting, begin: <ul style="list-style-type: none"> - Chapter 13 Energy: pp. 279-298 The Great Transition - Is the World Running Out of Oil? The US Geological Survey v. the "Peak Oil" School (for readings, see next class, below): - Discuss research blogs 4,5 |
| - WEEK 11 | | --- | . |
| Mon 04 Apr | 18 | Supply and Demand math skills: QUIZ 2 | <ul style="list-style-type: none"> - Chapter 13 Energy: pp. 279-298 The Great Transition - Is the World Running Out of Oil? The US Geological Survey v. the "Peak Oil" School (see next class, below): A: READ: Would peak oil really mean "an end of industrial society"? O'Donnell, T.W., "Theories of a Global-Oil Crisis" [Draft] January, 2006. http://www.umich.edu/~twod/oil-ns/articles/malthusian-7pp_25jan06b.doc (<i>This is an incomplete article; but gives some flavor of the (neo)-Malthusian social implications drawn by "Peak Oil" school adherents</i>) B: LECTURE: USGS (US Geological Survey) assessment of world oil resources: "Long Term World Oil Supply: A Resource Base / Production Path Analysis" Energy Information Administration (EIA), DOE, 2000. http://www.umich.edu/~twod/oil-ns/articles/longterm_usgs_oil_peak_estim_eia2006.pdf - Discuss research blogs 1,2, 3 |
| Wed 06 Apr | 19 | | <ul style="list-style-type: none"> - Finish previous module from Monday, due to time taken by Quiz - Chapter 13 Energy: pp. 279-298 The Great Transition - Lecture, Bio-Fuel Alternatives: Ethanol and Bio-diesel: Lecture: http://www.umich.edu/~twod/environ/failure_bio-fuel_alternatives_25mar11a.pptx A. READ: Sanderson, Katharine, "A Field in Ferment: To move US bio-fuels beyond subsidized corn will be a challenge", Nature, Vol. 444, 7 December 2006, pp. 673 – 676. http://www.umich.edu/~twod/oil-ns/articles/nature_corn-bio-fuel444673a07dec06.pdf B. READ: Farrell A.E. et al, "Ethanol Can Contribute to Energy and Environmental Goals," Science, Vol. 311, p. 506 – 508, January 2005, on energy balance and economic feasibility of corn based ethanol. http://www.umich.edu/~twod/oil- |

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| | | | ns/articles/science_ethanol_ferrell_feb06.pdf - Discuss research blogs 4,5 |
| - WEEK 12 | | | --- |
| Mon 11 Apr | 20 | POLITICAL ECONOMY of NUCLEAR POWER and the 2011 JAPANESE CRISIS | NUCLEAR power and the Japanese crisis of 2011 A. Physics-engineering principles of nuclear power (enrichment, reactors and fuel cycles, waste characteristics, radiation nomenclature and biological effects, etc.) This is an overview ‘primer’ of the basics needed to understand environmental and resource economics of nuclear power (and our discussion of Japan next class): http://hyperphysics.phy-astr.gsu.edu/hbase/nuccon.html#c1 (The following was pushed to Wed.): B. Political economy: “The Future of Nuclear Power” An Interdisciplinary MIT Study http://web.mit.edu/nuclearpower/ <ul style="list-style-type: none"> Update to 2004 Report (2009). Students assigned to report in class on each of nine parts: http://web.mit.edu/nuclearpower/pdf/nuclearpower-update2009.pdf Appendices: http://web.mit.edu/nuclearpower/pdf/nuclearpower-appdx.pdf Each student assigned a section, especially the five economics sections. - Discuss research blogs 1,2, 3 |
| Wed 13 Apr | 21 | | NUCLEAR power and the Japanese crisis of 2011, cont’d B. Continue discussion of B. above. Students have assigned presentations to make to initiate discussion on portions of the two readings from MIT. C. Specifics of the Japanese crisis following March 2011 earthquake and tsunami. Watch the U. Michigan nuclear engineering panel below on UTube.. Then, time permitting, read through the MIT experts’ blogs which explain the Japanese nuclear crisis blow by blow, correcting and explaining media accounts: NOTE: Be prepared to discuss several points you learn from this. <ul style="list-style-type: none"> MIT site http://mitnse.com/ [Optional] U Michigan sites: http://www-ners.engin.umich.edu/ (UTube video) U Michigan Nuclear Engineering Faculty Discuss the Japan Nuclear Reactor Situation – 18 March 2011 http://www.youtube.com/watch?v=4qP8TCtgkhc OGELFORUM and other blog post discussions [insert link] - Discuss research blogs 4,5 |
| - WEEK 13 | | | --- |
| Mon 18 Apr | 22 | Finish: JAPAN NUCLEAR & ENERGY CRISIS Begin: POLITICAL ECONOMY OF THE GLOBAL OIL SYSTEM Part I: World oil market | - Lecture/ Discussion: “Nuclear & energy crisis of Japan’s quake and tsunami” http://www.umich.edu/~twod/environ/nuke_japan_quake_ns_14apr11b.pptx - Political Economy of Global Oil Market: A: Read: pp. 1-25 (in PDF; 1-27 in printout): O’Donnell, T.W., "The Political Economy of Oil in the U.S.-Iran Crisis: U.S. globalized oil interests vs. Iranian regional interests," O’Donnell, Thomas, 39 pp. plus figures, at GPIA Faculty Working Papers: http://www.gpia.info/files/u16/O_Donnell_2009-05.pdf (rest on Wed.) - Discuss research blogs 1,2, 3 |
| Wed 20 Apr | 23 | | A: Read: pp. 25-39: |

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| | | | <p>O'Donnell, T.W., "The Political Economy of Oil in the U.S.-Iran Crisis: U.S. globalized oil interests vs. Iranian regional interests," O'Donnell, Thomas, 39 pp. plus figures, at GIA Faculty Working Papers: http://www.gpia.info/files/u16/O_Donnell_2009-05.pdf</p> <p>-- Students are assigned in class to review particular sections and present summaries and comments to initiate discussion.</p> <p>B:Background resource "Political-Economy of Global Oil Order: Demand, Resources, Technology and U.S. Policy." http://www.umich.edu/~twod/oil-ns/lectures/ns_oil_17nov06bsent.ppt</p> <p>Video: - Discuss research blogs 4,5</p> |
| - WEEK 14 | | --- | --- |
| Mon 25 Apr | 24 | <p>Part II: What explains the high prices of 2003-2008:</p> <p>A. Fundamentals of supply and demand?</p> | <p><i>We continue discussion of final section of:</i></p> <p>Read: O'Donnell, T.W., "The Political Economy of Oil in the U.S.-Iran Crisis: U.S. globalized oil interests vs. Iranian regional interests," O'Donnell, Thomas, 39 pp. plus figures, at GIA Faculty Working Papers: http://www.gpia.info/files/u16/O_Donnell_2009-05.pdf</p> <p>-- Students are assigned in class to review particular sections and present summaries and comments to initiate discussion.</p> <p>-----</p> <p>- Oil prices, volatility and futures market: Fundamentals of supply and demand or speculation?</p> <p>A: High prices of 2003-2008: Arguments from fundamentals of supply and demand:</p> <p>- Reich, Oliver, "Oil Supply and Demand," Newsletter of International Association of Energy Economics, Second Quarter, 2006, pp.15-19 http://www.iaee.org/documents/06spr.pdf#page=15</p> <p>- Discuss research blogs 1,2, 3</p> |
| Wed 27 Apr | 25 | <p>B. "Over financialization" and speculation?</p> | <p>B. High prices of 2003-2008: Arguments from Speculation and Over Financialization:</p> <p>- Watch: 60 Minutes: Speculation Affected Oil Price Swings More Than Supply And Demand (Jan. 11, 2009)</p> <p>- Video Part 1 http://www.youtube.com/watch?v=JOqEkrwBihY</p> <p>- Video Part 2 http://www.youtube.com/watch?v=FRLixfmr-zA</p> <p>- Transcript: http://www.cbsnews.com/stories/2009/01/08/60minutes/main4707770.shtml</p> <p>- PBS Frontline: "The Warning": Long before the meltdown, one woman tried to warn about a threat to the financial system</p> <p>- Watch: PBS Video: http://video.pbs.org/video/1302794657</p> <p>Resources:</p> <p>- Transcript: http://www-tc.pbs.org/cove-media/http/PBS_CP_FRONTLINE/219/453/2802.txt</p> <p>- Timeline: http://www.pbs.org/wgbh/pages/frontline/warning/cron/</p> <p>- Extended interviews http://www.pbs.org/wgbh/pages/frontline/warning/interviews/</p> <p>- Discuss research blogs 4,5</p> |
| - WEEK 15 | | --- | --- |
| Mon 02 May | 26 | | <p>Theories of Rents (Ricardo, Marx), Rentier States, Dutch Disease, Resource Curse</p> <p>- [xxxxx article links]</p> <p>- Rentismo blog: http://rentismo.blogspot.com/</p> <p>- Discuss research blogs 1,2, 3</p> |
| Wed 04 May | 27 | Oil Rents | - Discuss research blogs 4,5 |
| - WEEK 16 | | --- | --- |

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| Mon 09 May | 28 | PROJECTS DUE - GROUP PRESENTATIONS | Discuss research blogs 1,2, 3 |
| Wed 11 May | 29 | REVIEW SESSION – PROJECTS DUE - GROUP PRESENTATIONS | - Discuss research blogs 4,5 |
| - WEEK 17 | | --- | --- |
| Mon 16 May | 30 | FINAL EXAM | |
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Read Chapter 4: "Heat and Work", pp. 97-125

- Read [Goodstein04]: Chapter 4, "Heat Engines & Entropy" (Fits well with textbook this week), and, now read:

- Read: Chapter 11: *Electromagnetism and the Generation of Electricity*, pp. 358-386.

- Read: Chapter 14: *Nuclear Power: Fission*, pp. 451-502

- Continue discussion of HVAC tour, connection to prior topics this semester. Read: *Scientific American*, by Robert Socow, 2005

- Lecture: The physical basis of the Greenhouse Effect: From atomic and molecular physics, thermodynamics, and atmospheric science to global warming. See:

http://www.umich.edu/~twod/energy/resources/lectures/greenhouse_lecture

- Lecture: Automobile Fuel Economy and Safety; Prof. Emeritus Marc Ross, U.M. Physics Department.

See: http://www.umich.edu/~twod/energy/resources/speakers/ross_talk

- Tour of Medical Research HVAC or Power Plant

See e-mail with directions to building in Medical School

Tour conducted by: Mr. Wm. Brushabar, UM Medical School Facilities engineer.

See schematics: http://www.umich.edu/~twod/energy/resources/hvac_model

- Lecture: Air-pollution (cont'd) and Bio Fuels (Andres Clarens)

Link to slides: http://www.umich.edu/~twod/energy/resources/andres_polln-and-bio-fuel.mov

- Lecture: Carbon Sequestration, Andres Clarens

Link to slides: http://www.umich.edu/~twod/energy/resources/andres-co2_seqL_lecture.mov

- Lecture: Large-building HVAC in preparation for tour

See schematics: http://www.umich.edu/~twod/energy/resources/hvac_model

- From lecture: British Petroleum data on petroleum, natural gas and coal: <http://www.umich.edu/~twod/energy/data>

- Data on U.S. and world energy:

http://www-personal.umich.edu/~twod/energy/email/16.0_30oct06.txt

- On Malthus and neo-Malthusians, the Erlich's, the Club of Rome "limits of growth" theories, etc.