PHIL 501
Philosophical Foundations of Ecology
– University of Montana –
Spring 2012

Soazig Le Bihan

Chapter 1

Syllabus

1.1 Course Information

- Course Number: PHIL 501
- Credits: 3
- Class meets: Tuesdays, 3:40-5pm, LA 146
- Instructor: Soazig Le Bihan
  - Office Number: LA 153
  - Office Hours: Thursdays, 3:40-5pm
  - Mailbox: LA 101
  - Email: soazig.lebihan@umontana.edu
- Websites: Articles to download and information about your grades are on the Moodle course supplement.

1.2 Course Description

In this seminar we will look at some of the key papers in philosophy of ecology (and perhaps, more broadly, environmental philosophy). Some of the topics covered will be: whether nature can be thought to be in balance, the complexity-stability debate, the role and nature of models in ecology, whether there are laws of ecology, what biodiversity is and why we should care about it.

Learning goals:

1. to learn about the major views of contemporary philosophers of ecology concerning the questions above;

2. to develop critical thinking skills (including analyzing philosophical texts, evaluate philosophical arguments, exploring the relationships between different views);

3. to articulate, convey, and argue for your own views concerning the foundations of ecology.

To attain these goals, we will carefully read and discuss original texts by some of the most important philosophers of ecology of the 20th and the 21st centuries.

The final grade will be based on:

- Attendance and Participation: 20%

- 4 Syntheses: 5% each – total 20%

- 2 Presentations: 10 % each – total 20%

- 1 Research Paper: 40 %, including 3 presentations (5% each, total 15%), and the paper (25%)

See Section 1.4 for further details.

1.3   Course Schedule

Textbooks

We will read the following book in its entirety:

- Cooper, G.J. (2003) The Science of the Struggle for Existence: On the Foundations of Ecology, Cambridge University Press. – required for the class

Other readings will be posted on Moodle.

Background Reading

Gotelli, N.J. (2001) A Primer of Ecology. third edition. Sinauer Press.

Colyvan, M. (2008) Population Ecology. In S. Sarkar and A. Plutynski (eds.), A Companion to the Philosophy of Biology, Blackwell, 301-20.

Colyvan, M., Linquist, S., Grey, W., Griffiths, P.E., Odenbaugh, J., and Possingham, H.P. (2009) Philosophical Issues in Ecology: Recent Trends and Future Directions, Ecology and Society. Vol.14, No. 2 (December 2009), article 22. Available at: `http://homepage.mac.com/mcolyvan/papers/fieldguide.pdf`

Kingsland, S.E. (1985) Modelling Nature: Episodes in the History of Population Ecology. University of Chicago Press.

Odenbaugh, J. (2005) Ecology. in S. Sarkar, and J.. Pfeiffer (eds.), The Philosophy of Science: An Encyclopedia, Routledge, 215-24.

Sarkar, S., (2007) Ecology. The Stanford Encyclopedia of Philosophy, (Fall 2007 Edition), E.N. Zalta (ed.), `http://plato.stanford.edu/archives/fall2007/entries/ecology/`.

Sterelny, K. and Griffiths, P.E. (1999) Sex and Death: An Introduction to the Philosophy of Biology. University of Chicago Press.

Stotz, K. and Griffiths, P.E. (2008) Biohumanities: Rethinking the Relationship Between Bioscience, Philosophy and History of Science, and Society. Quarterly Review of Biology, 83(1): 37-45.

van der Valk, A. (2011) Origins and Development of Ecology. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 25-49.

Proposed Schedule

You should expect to read about 40 to 60 pages a week (more if the content is not strictly philosophical). Remember that in order to understand a philosophy text, you will most often need to read it at least twice.

We will try to cover the following reading list. Depending on how fast we go, I may remove one or several articles from the list.

Part I: Balance of Nature – Diversity/Stability Hypothesis

Main Readings :

> Cooper chap. 1-3.
>
> Mikkelson, G.M. (1999) Methods and Metaphors in Community Ecology: The Problem of Defining Stability. Perspectives on Science, 5: 481-98.
>
> Justus, J. (2008) Ecological and Lyapunov Stability. Philosophy of Science, 75(4): 421-36.
>
> Justus, J. (2008) Complexity, Diversity, and Stability. In S. Sarkar and A. Plutynski (eds.), A Companion to the Philosophy of Biology, Blackwell, 321-50

Further Readings :

> Chesson, P., Pavala, S. and Neuhauser, C. (2001) Environmental Niches and Ecosystem Functioning. In A. Kinsig, S. Pacala and D. Tilman (eds.), The Functional Consequences of Biodiversity, Princeton University Press, Princeton, NJ: 213-45.
>
> deLaplante, K. and Picasso, V. (2011) The Biodiversity-Ecosystem Function Debate in Ecology. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the

Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 169-200.

Egerton, Franck (1973) Changing Concepts of the Balance of Nature. Quaterly Review of Biology, 48: 322-50.

Grimm V. and Wissel, C. (1997) Babel, or the Ecological Stability Discussions: an Inventory and Analysis of Terminology and a Guide for Avoiding Confusion. Oecologia 109: 323-34. Pimm, S. (1991) The Balance of Nature: Ecological Issues in the Conservation of Species and Communities. University of Chicago Press.

Justus, James. (2011) A Case Study in Concept Determination: Ecological Diversity. In Brown, B., K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Ecology. Elsevier Press: 147-67.

King, A. and Pimm, S. (1983) Complexity and Stability: A Reconciliation of Theoretical and Experimental Results. American Naturalist, 122: 229-39.

Lehman, C. L. and Tilman, D. (2000) Biodiversity, Stability, and Productivity in Competitive Communities. American Naturalist 156: 534-552.

McNaughton, J. (1977) Diversity and Stability of Ecological Communities: A Comment on the Role of Empicism in Ecology. American Naturalist, 111: 515-25.

Naeem, S. (2002) Biodiversity Equals Instability?. Nature, 416: 23-24.

Odenbaugh, J. (2001) Ecology, Stability, Model Building and Environmental Policy: A Reply to Some of the Pessimism. Philosophy of Science, 68: S493-505.

Pfisterer, A. and Schmid, B. (2002) Diversity-Dependent Production Can Decrease Stability of Ecosystem Functioning. Nature, 416: 84-86.

Reice, S.R. (1994) Nonequilibrium Determinants of Biological Community Structure. American Scientist, 82: 424-35.

Tilman, D. (1996) Biodiversity: Population Versus Ecosystem Stability. Ecology, 77: 350-63.

Tilman, D. (1999) The Ecological Consequences of Changes in Biodiversity: a Search for General Principles. Ecology, 80: 1455-74.

Part II: Models, Laws, Explanations in Ecology

Main Readings :

Cooper 4-8

Levins, R. (1966) The Strategy of Model Building in Population Biology. American Scientist, 54: 421-31.

Colyvan, M. and Ginzburg, L.R. (2010) Analogical Thinking in Ecology: Looking Beyond Disciplinary Boundaries. The Quarterly Review of Biology, Vol. 85, No. 2 (June 2010): 171-82.

Odenbaugh, J. (2005) Idealized, Inaccurate but Successful: A Pragmatic Approach to Evaluating Models in Theoretical Ecology. Biology and Philosophy, 20: 231-55.

Colyvan, M. and Ginzburg, L.R. (2003) Laws of Nature and Laws of Ecology. Oikos, 101(3): 649-53.

Further Readings :

Literature on Models: ask me!

Brown, B. (2011) Ecology as a Historical Science. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 251-82.

Caswell (1988) Theory and Models in Ecology: A Different Perspective. Ecological Modelling, 43: 33-44.

Colyvan, M. (2001) The Indispensability of Mathematics. Oxford University Press, New-York, NJ, chap. 3.

Forster, M.R. and Sober, E. (1994) How to Tell When Simpler, More Unified or Less Ad Hoc Theories Will Provide More Accurate Predictions. British Journal for the Philosophy of Science, 45: 1-35.

Ginzburg, L. R. and Jensen, C. X. J. (2004) Rules of Thumb for Judging Ecological Theories. Trends in Ecology and Evolution, 19(3): 121-126.

Ginzburg, L. and Colyvan, M. (2004) Ecological Orbits: How Planets Move and Populations Grow. Oxford: Oxford University Press.

Haila, Y. (1997) Trivialization of Critique in Ecology. Biology and Philosophy 12: 109-118.

Justus, J. (2005) Qualitative Scientific Modeling and Loop Analysis. Philosophy of Science, 72: 1272- 86.

McIntosh, R. (1987) Pluralism in Ecology. Annual Review of Ecology and Systematics, 32: 481-517.

Mikkelson, G. M. (2001) Complexity and Verisimilitude: Realism for Ecology. Biology and Philosophy, 16(4): 533-46.

Mikkelson, G. M. (2003) Ecological kinds and ecological laws. Philosophy of Science, 70:1390-400.

Odenbaugh, J. (2001) Ecology, Stability, Model Building and Environmental Policy: A Reply to Some of the Pessimism. Philosophy of Science, 68: S493-505.

Odenbaugh, J. (2003) Complex Systems, Trade-Offs and Mathematical Modeling: A Response to Sober and Orzack. Philosophy of Science 70: 1496-1507.

Odenbaugh, J. (2006) The Strategy of "the Strategy of Model Building in Population Biology". Biology and Philosophy 21 (5): 607-21.

Odenbaugh, J. (2011) True Lies: Realism, Robustness, and Models. Philosophy of Science 78 (5): 1177-88.

Odenbaugh, J. (2011) Philosophical Themes in the Work of Robert MacArthur. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 109-128.

Orzack, S. H. and Sober, E. (1993) A Critical Assessment of Levins's "The Strategy of Model Building in Population Biology" (1966). Quarterly Review of Biology, 68: 533-546.

Peters, R. (1991) A Critique for Ecology. Cambridge University Press: Cambridge, MA.

Reagan, H. M., Colyvan, M. and Burgman, M.A. (2002) A Taxonomy and Treatment of Uncertainty for Ecology and Conservation Biology. Ecological Applications, 12(2, April): 618-28.

Sterelny K. (2001) Darwin's Tangled Bank. In The Evolution of Agency and Other Essays, Cambridge University Press, Cambridge.

Wimsatt, W. (1987) False Models as Means to Truer Theories. In Nitecki, M. and Hoffman, A. (eds). Neutral Models in Biology. Oxford University Press: London, UK.

Part III: Biodiversity

Main Readings :

Excerpts from:

Maclaurin, J. and Sterelny, K. (2008) What is Biodiversity?. University of Chicago Press.

Sarkar, S. (2005) Biodiversity and Environmental Philosophy. Cambridge University Press.

Further Readings :

Faith, Daniel P. (2008) Biodiversity. The Stanford Encyclopedia of Philosophy, Edward N. Zalta (ed.), `http://plato.stanford.edu/archives/fall2008/entries/biodiversity/`.

Justus, J. (2010) The Diversities of Biodiversity [review of James Maclaurin and Kim Sterelny, What is Biodiversity?] Metascience 19: 247-250.

Odenbaugh, J. (2009). Sahotra Sarkar, Biodiversity and Environmental Philosophy: An Introduction. Biology and Philosophy 24 (4): 541-50.

Part IV: Existence and robustness of ecological communities

Main Readings :

Sterelny, K. (2006) Local ecological communities. Philosophy of Science, 73: 215-31.

Odenbaugh, J. (2007) Seeing the Forest and the Trees. Philosophy of Science, 74(5): 628-41.

Eliot, C. (2011) The Legend of Order and Chaos: Communities and Early Community Ecology. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 49-108.

Further Readings :

Clements F. (1916) Plant Succession. Carnegie Institution of Washington, Publication No. 242, Washington, DC.

Collier J. and Cumming G.S. (2011) A Dynamical Approach to Ecosystem Identity. In B. Brown, K. de Laplante, and K. Peacock (eds.), Handbook of the Philosophy of Science Volume 11: Philosophy of Ecology. North Holland/Elsevier: 201-18.

Gleason H. (1917) The Individualistic Concept of Plant Association. Bulletin of the Torrey Botanical Club, 53: 7-26.

Davis, M.B. (1981) Quaternary History and the Stability of Forest Communities. In D.G. West, H.H. Shugart, and D.B. Botkin, (eds.), Forest Successsion: Concepts and Application. Springer-Verlag, New-Yourk, NY.

Levins, R. and Lewontin, R. (1980) Dialectics and Reductionism in Ecology. Synthese 43: 47-78.

May, R. M. (1973) Stability and Complexity in Model Ecosystems. Princeton University Press, Princeton, NJ.

Swenson, W., Sloan Wilson, D. and Elias, R. (2000) Artificial Ecolsystem Selection. Proceedings of the National Academy of Science, 97(16): 9110-14.

Other possible topics of interest

- Notion of "niche"

- The theory of Island biogeography and its relevance for designing biological reserves (SLOSS debate)

- Ecosystem ecology (reductionism)

- Individual-based model in population ecology (reductionism in ecology + use of computer simulations)

- Geographical Information System based models (influence of modes of representation on science)

1.3.1   Course Requirements

The final grade will be based on:

- Attendance and Participation: 20%

- 4 Syntheses: 5% each – total 20%

- 2 Presentations: 10 % each – total 20%

- 1 Research Paper: 40 %, including 3 presentations (5% each, total 15%), and the paper (25%)

Attendance Attendance is required, and necessary to succeed in the course. There will be a lot of material covered, and the material covered will be hard.

You are allowed to miss two classes without penalty. Following that, you will lose 2% up to a maximum of 10% (that is, a letter grade) every time you miss a class without a proper excuse.

You are expected to arrive on time and stay for the duration of the class. *Three late arrivals count as one absence.* If you have to leave early, please tell me at the beginning of class and sit close to the exit to minimize the disturbance to the class.

You are expected to give your full attention to the class. Cell phones or other means of communication should be silenced for the duration of class. You will be asked to leave if you are doing anything not relevant for class, e.g. reading the newspaper, sleeping, doing work for other classes, etc. *Three offenses of this type will count as one absence.*

That said, absences may be excused in cases of illness or other extreme circumstances. Relevant documentation is required in such cases. You also will be expected to work through the material covered during the classes you may have missed.

Participation I encourage you to participate in class. Trying to answer my questions or asking questions qualify as participation. You will not be penalized for answering incorrectly. I want to emphasize that your questions are welcome and that you should aim to leave the classroom with a good understanding of the material covered.

Syntheses There are about 4 themes in our program of study. To each theme corresponds a group of articles. When we finish with one of the groups, you will be required to write down a synthesis of the material we covered.

In a synthesis, you are expected to summarize what the main problem is, which kinds of solutions are available, and what the advantages and drawbacks are for each of these

solutions are. Your synthesis can take the form of a schema, an outline with bullet points, or it can be a few paragraphs. In any case, it should fit on two pages maximum.

On the days a synthesis is due, I will ask one of you to present your synthesis. I will not tell you in advance who will be asked to present.

You will be penalized by 5% every time you don't turn in your synthesis up to 20% maximum.

Presentations You will be required to present on two articles in class from the primary literature. For your presentation you will have to have an excellent command of the article you are presenting on as you will be leading discussion. The presentations should have two parts: 1. A summary of the main question(s) the author(s) deal(s) with and their proposed solutions (taking no more than 30 min.) and 2. a set of problems for discussion. You should provide a handout (with your name written on it) to me and the class with a list of the problems for discussion.

To be clear, a problem is a reason for thinking the author's argument is defective in some way, i.e. defective premises or weak argument structure. In addition, some of your questions might relate the article being discussed to previous work we have discussed.

I will expect to receive a copy of your handout on the Thursday before the class on which your presentation is scheduled BEFORE 5 AM so I can give you feedback. I will not be able to give you any feedback on your presentation if I don't receive your draft on time.

I am happy to meet with you to help you understand what is going on in the article you will present on. My office hours are on Thursdays 3:40-5pm.

I recommend that one of your presentations be on an article related to your research paper.

Research Paper You will be required to write a paper on the order of 12 pages (no less than 10) on a topic of your choosing. Original thinking is necessary for a research paper. That said, original thinking does not amount to asserting your personal opinions without taking into account any appropriate literature on your topic. For a research paper, the challenge is to find a topic which is not too broad and to treat it incisively. In order to help you do this, I will require that you take on at least one primary source (from a reputable collection of papers or philosophy journals) as a starting point. Such a source should not have been used in class. Reference works, encyclopedia articles, etc. do not meet this requirement. I will be glad to assist in the selection and formulation of the topic. For most of research papers, one article is not enough: you are expected to at least partially survey the relevant literature on the topic of your choice – I can help you with this.

- You will be required to present your project during on the week before Spring Break. Your presentation should contain your thesis statement, a short outline of your argument, and a significant bibliography.

- After Spring Break, you will be required to present the progress you have made on your project in class every other week until the final version is due.

- The final version of your paper is due on May 8th, at 2 pm in my mailbox.

The presentations as well as the final version of your paper count for your final grade (15% and 20% respectively). I will give you comments on your presentations. The final version of your paper will be partially graded on the basis of how well you responded to my comments on your presentations.

Note that the presentation before Spring Break counts for 5% of your grade, that is, half a letter grade. You are expected to give a serious presentation, which means that you should start working on your research paper early in the semester. A research paper is a project for the entire semester. Don't expect to be able to get it done the week before it is due.

All papers must be typewritten, double-spaced, paginated, stapled, the notes at the bottom of the pages; no outline or bullet points.

Late Assignment Rules Without prior arrangements, the grade of any late assignment will be lowered by one letter grade a day.

> **IMPORTANT NOTE**: If you encounter difficulties concerning an assignment, **it is almost always possible to make arrangements before the assignment is due**. No accommodation is possible once the deadline has passed. **Come and talk to me before it is too late**.

Writing Center Students from all levels can take advantage of the writing center (LA 144 : drop in or by appointment)

> "The Writing Center exists to help all UM students improve their writing skills as they pursue their academic and professional goals. We provide free writing instruction through one-on-one tutoring, in-class workshops, and the Writing Assistant program." (quoted from the writing center website)

> The tutors won't write your paper for you, but they will teach you how to write better. For more information, go the website: `http://www.umt.edu/writingcenter/welcom_about.htm`

Academic Misconduct You are strictly held to the University of Montana Student Conduct Code (`http://life.umt.edu/vpsa/documents/StudentConductCode1.pdf`).

> Unless collaborative work is specifically called for, work on assignments and exams is expected to be your own. If you plagiarize, your assignment will receive a zero. You may fail the class altogether depending on the circumstances. Also, I will report the case to the Dean.

> I will be glad to answer questions you may have about how to document sources properly. Anytime you take a phrase or sentence from someone, you have to quote it. Anytime you take an idea from someone, you have to cite your sources.

Students with Disabilities If you are a student with a disability and wish to discuss reasonable accommodations for this course, contact me privately to discuss the specific modifications you wish to request. Please be advised I may request that you provide a letter from Disability Services for Students verifying your right to reasonable modifications. If you have not yet contacted Disability Services, located in Lommasson Center 154, please do so in order to verify your disability and to coordinate your reasonable modifications. For more information, visit the Disability Services website at `www.umt.edu/dss/`.

1.4 Grading Policies

The following are generic grading policies that I make available to my students.

1.4.1 Participation evaluation

- A range: The student is fully engaged and highly motivated. This student is well prepared, having read the assigned texts, and has thought carefully about the texts' relation to issues raised in lecture and section. This student's ideas and questions are substantive (either constructive or critical); they stimulate class discussions. This student listens and responds to the contributions of other students.

- B range: The student participates consistently in discussion. This student comes to section well prepared and contributes quite regularly by sharing thoughts and questions that show insight and a familiarity with the material. This student refers to the materials discussed in lecture and shows interest in other students' contributions.

- C range: The student meets the basic requirements of section participation. This student is usually prepared and participates once in a while but not regularly. This student's contributions relate to the texts and the lectures and offer a few insightful ideas, but do not facilitate a discussion.

- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

1.4.2 Homework evaluation

I am in general very generous in grading homework. The point of the homework assignments is to help you to focus on the important points during your reading.

- A range: Readings are very well understood. Only minor problems (up to four for a five questions assignment) remain. The assignment is written in whole sentences, good English and clear style.

- B range: There is either too many minor problems, or a few minor problems plus one major problem on one of the questions, or more than two major problems in the

understanding of the readings. The assignment is not fulfilling one or more of these requirement of the A-range: whole sentences, good English and clear style.

- C range: There is a major problem for all questions. The assigned material was read, but not understood.

- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

1.4.3 Text analysis and presentation evaluation

- A range: You present an accurate reconstruction of the problem that the author is dealing with, an accurate and charitable reconstruction of the arguments pertaining to that problem, and a careful criticism of the author's arguments via your discussion questions. You take an active role leading discussion of the paper by responding to student's comments. In particular, you will have anticipated responses to your discussion questions, especially how you think the author(s) might respond, and use those to draw out more elaborate comments about student's responses or to generate further discussion.

- B range: You present a reasonable reconstruction of the problem that the author is dealing with, a charitable reconstruction of the arguments pertaining to that problem, and some criticism of the author's arguments via your discussion questions. You will lead discussion of the paper and respond to student's comments.

- C range: You state the topic of the paper without articulating the problem that the author intends to address. You provide a summary of the paper (mere chronology without isolating the main arguments). You provide discussion questions that are related to the text, but aren't primarily geared to addressing possible weaknesses in the author's argument. You ask questions, but don't develop discussion.

- Failure to fulfill satisfactorily any of these criteria will result in a grade of "D" or below.

1.4.4 Paper / Essay evaluation

Six criteria for evaluating a paper:

- Substance,

- Thesis and argument structure, including introduction and conclusion,

- Use of supporting material and evidence,

- Quality of analysis, including the crucial distinction between unsupported assumptions, value judgments vs. analysis and argumentation,

- Use of quality sources,

- Quality of writing including grammatical correction, clarity, concision and persuasiveness.

Objectives for a good paper: rigorous inquiry, critical thinking, effective written argumentation.

- A range: This paper is outstanding in form and content.

  - The materials covered in class is understood in depth: the student shows that he or she has a command on the materials, including a critical understanding.

  - The thesis is clear and insightful; it is original, or it expands in a new way on ideas presented in the course.

  - The argument is unified and coherent.

  - The evidence presented in support of the argument is carefully chosen and deftly handled.

  - The analysis is complex and nuanced.

  - The sources are original texts or quality scholars' literature.

  - No grammatical mistakes, clear, precise and concise style.

- B range: The argument, while coherent, does not have the complexity, the insight, or the integrated structure of an A range paper.

  - The material covered in class is well understood: the student does not make any mistake on the materials but does not show great depth in critical understanding.

  - The paper's thesis is clear.

  - The argument is coherent.

  - The paper presents evidence in support of its points.

  - The paper is reasonably well written and proofread.

- C range: This paper has some but not all of the basic components of an argumentative essay (i.e., thesis, evidence, coherent structure).

  For example:

  - a clear misunderstanding of some of the material covered in class, or

  - no clear or incoherent thesis, or

  - incoherent structure of argument, for example simply repeats points made in class without an overall argument, or

  - presents no evidence in support the thesis

  - no use of original texts, but only secondary or popular literature (encyclopedia...)

  - poorly written and proofread.

- A paper will fall below a "C" if it lacks more than one of the basic components of an argumentative essay.

Sources

- Tips for grading in the humanities, Stanford Center for Teaching and Learning website

- Introduction to the Humanities Program, STANFORD UNIVERSITY, Information for Faculty, 2005-06

`http://www.stanford.edu/dept/undergrad/ihum/instructors/`

Chapter 2

Introduction

What we are talking about : "Ecology" ?

population (sets of populations made of interacting individuals of the same or different species) / community (set of interacting species) / ecosystem (community + habitat factors)

Difference between:

(1) Foundations of the science of ecology

(2) Conservation and environmental issues

We will focus on (1): philosophical foundations of ecology: (2) is obviously of primary importance, but the philosophical investigation of (1) is a crucial prerequisite before one can address (2).

issues we are interested in :

"Biohumanities" (Stotz and Griffiths):

- neither concerned with the ethical issues related to the application of biological sciences,

- nor simply translation project (popular science).

Rather: better understanding of the science itself:

- Concepts

- Methods

Balance of Nature :

Intuitive notion of the balance of nature: equilibrium + stability, i.e. persistance / restauration under disturbances – e.g. restoration of climax forest community after fire.

- Questions:

  1. Can we make this notion more precise?:

  - Notion of equilibrium / Notion of disturbances – problem of definition

  2. Are communities in equilibrium most of time? Non-equilibrium ecology?

  3. Is it desirable and why?

- Diversity-Complexity/Stability hypothesis:

  "As the diversity or complexity of a community increases, so does the stability of the community"

  Is it true? It all depends on how we define the notions of diversity / complexity and stability. Both notions admit of multiple definitions.

- Another controversy about the status of the hypothesis: empirical studies vs. theoretical models (May 1973):

  Conflict? Not necessarily. Still controversial.

Models, Laws and Explanations :

- Problems with ecological modeling:

  MacArthur: ahistorical program: looking for general pattern beyond possible noise (e.g. plant succession)

  Exemplar of successful model: Lotka-Volterra model and population cycles: generality, predictive accuracy and straightforward biological interpretation.

  - General patterns in ecology? Contingency, history, complexity.

  - Testability and predictive success? Model uncertainty and difficulties linked to testing.

  Success assessment: is predictive success all there is to modeling?

- Laws and Explanations:

  - Laws? Poor predictive success in real life experiment – compare with physics!

  - Explanations? Requirements:

  Explanans = true law. Probably not. Then what else?

  Explanans = underlying (biological?) mechanism. Regress. Then what else?

Biodiveristy : What is it? Should we value it? And if so, why?

Biodiversity as an index vs Biodiversity as a value in itself : descriptive vs normative

- Biodiversity as an index for some other property (stability, medicinal value etc.): question of reliability.

- Biodiversity as value: question of the sources of such value.

Existence and robustness of communities :

(1) Clements: communities as super-organism

(2) Gleason: communities as aggregate of species at particular places and times

Problem: (2) does not exist objectively.

Can we make sense of (1)? How?

Problem: boundaries

One possible answer: causal interactions?