

CARROLL LOUIS WILSON
MC 29 BOX 54 F 2056

Correspondence, 1972-1973

OK

June 1, 1973

William Ophuls
Box 2069
Stanford CA 94305

Dear Bill,

Carroll Wilson and the steady-state seminar group wish to thank you for your Prologue, and eagerly await a copy of your dissertation. We will be glad to share the copy with Profs. Forrester and Nazli Choucri.

Our own book is still in the rough stages, but we are hoping for manuscript completion before the end of the summer. You will surely be one of the first to receive a copy when and if it is available.

Best of luck with your work, and we look forward to a visit from you this fall.

Sincerely,

Bill Martin

Bill Martin

E-40,253

MIT

Cambridge, Mass. 02139

rec'd 5/29/73

May 23, 1973

Box 2069
Stanford CA 94305

Prof. Carroll L. Wilson
Room E40-253
Massachusetts Institute of Technology
Cambridge, Mass. 02139


Dear Prof. Wilson:

Thank you for the seminar papers. I have only had the time to skim through them, but their usefulness is apparent (especially the Behrens paper). I look forward to receiving a copy of the book when and if it is published (please note changed address above).

I will be sending you a copy of my dissertation under separate cover very shortly. Since I have only a limited number of copies, I wonder if you would be kind enough to share it with Profs. Jay Forrester and Nazli Choucri, both of whom have expressed an interest in reading it? I am letting them know that you have a copy. A synopsis of the argument is enclosed for your personal use.

It is still very much a work in progress. My readers were, on the whole, very pleased with the case for limits, but much less happy with the chapters dealing with economics and politics. Any comments or criticisms would be gratefully received, as I plan to revise it for publication. Since I would like the copy returned sometime in the fall, I suggest that you note your reactions in the margin.

Sincerely,



William Ophuls

Enc: Synopsis of "Prologue to a Political Theory of the Steady State."

Room E40-253

May 19, 1973

Dean Robert J. Uffen
Faculty of Applied Science
Queen's University
Kingston, Ontario
Canada

Dear Bob:

Many thanks for your letter of March 6th which I received long ago and should have answered long ago.

I have been caught up in a variety of other things which have put my correspondence in bad shape.

We do expect to put the best papers of the seminar on Strategies for Sustainable Growth into form for a book which the Director of the M.I.T. Press has expressed interest in publishing. The papers are all in and I am encouraged to think we might get out a paperback by early fall.

I am glad to have the papers given in your new course and look forward to reading these when the present hectic period of preoccupation with the energy question settles down a little at the end of June.

With best regards,

Sincerely,

Carroll L. Wilson

CLW:F

rec'd 3/13/73



Faculty of Applied Science
Office of the Dean

QUEEN'S UNIVERSITY
KINGSTON, ONTARIO

March 6, 1973

Prof. Carroll Wilson,
Room E 40 - 253,
Massachusetts Institute of Technology,
Cambridge, Mass. 02139

Dear Carroll:

Many thanks for your letter of 20 February 1973 with the enclosures from your seminar.

Last summer we financed two undergraduates to work with Jay Forrester. I have found that there are quite a few interested students and faculty here. We have formed a voluntary ad hoc group (it doesn't fit into the formal structures of the University) which meets every once in a while to discuss similar topics to those of the Club of Rome. It met last Monday and interest is being sustained by our mathematicians and engineers (but not the economists).

Enclosed are some examples of a series of papers given in our new course "Nature, Science and Man". There are thirty sessions including also subjects like "Man and Politics", "Man and his Laws", which conclude with "The Future Prospects for Man" given by Dr. Reginald Clark, Professor of Chemical Engineering and the spark plug of the course.

Enclosed also is a copy of an article I wrote on the Club of Rome for The Commenceman.

I hope I will have the opportunity of visiting you at one of your Wednesday sessions. Thank you for the invitation.

Yours sincerely,

A handwritten signature in cursive script that reads "Bob".

Robert J. Uffen
Dean, Faculty of Applied Science

RJU/LP
Encs.

Room E40-253

May 19, 1973

Mr. Chester L. Cooper
Woodrow Wilson International
Center for Scholars
Smithsonian Institution Building
Washington, D.C. 20560

Dear Chet:

Many thanks for coming to meet with our group. It was extremely helpful for us to hear your report on the activities at the Woodrow Wilson Center and as you see them in the Washington scene.

I am glad to say we have all of the papers in for the possible book and will be putting these in the hands of Howard Webber of the M.I.T. Press within a few days.

I think that Dennis Meadows would be a fine member of the Council on Foreign Relations but as Chairman of the Membership Committee I have avoided being a proposer or seconder of anybody whose name came before the Committee. I am sure you will find others to join you if you take the initiative to propose Dennis.

Sincerely yours,

Carroll L. Wilson

CLW:F

rec'd 5/7/73



WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS

SMITHSONIAN INSTITUTION BUILDING WASHINGTON D.C. 20560 TEL: 202 381-5613 CABLE: WILCEN

FELLOW

May 4, 1973

Prof. Carroll L. Wilson
Room E40-253
Massachusetts Institute of Technology
Cambridge, Mass. 02139

Dear Carroll:

I enjoyed meeting with your seminar last week. I found them a bright and engaging group. Perhaps we can do it again next year.

I have heard that you have been thinking of proposing Dennis Meadows for the Council on Foreign Relations. I will be glad to second your proposal. Please let me know if and when you go forward with it.

Yours very truly,

Chester L. Cooper

Room E40-253

May 7, 1973

Mr. William Ophuls
Box 3378, Yale Station
New Haven, Connecticut 06520

Dear Mr. Ophuls:

Thank you for sending me the enclosure with your recent letter. I am sending you copies of several of the papers which the seminar has prepared. I am also hoping that we'll put the best for the whole year in a book which the M.I.T. Press may publish. Meantime I am sending you three or four of the good papers from the first semester.

We would greatly welcome a copy of your recently submitted dissertation which was one of the first things we read. We have a more optimistic view of the choices you saw but you may be sure that we will send you a copy of our book when and if it is published in the fall.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosures

Dictated by Professor Wilson. Signed in his absence.

rec'd 4/30/73

WILLIAM OPHULS
BOX 3378 YALE STATION
NEW HAVEN, CT. 06520

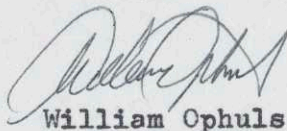
april 26

Dear Professor Wilson:

I know that you have already seen the full-length version of the attached. Nevertheless, at the suggestion of Jack Abbott of California Tomorrow, I am sending you a copy.

If it is at all possible, I would greatly appreciate receiving copies of the seminar papers you are sending to Abbott. In return, I would like to send you a copy of my recently-submitted dissertation, Prologue to a Political Theory of the Steady State once the process of review here is completed.

Sincerely,



William Ophuls

Room E40-253

May 7, 1973

Miss Jean Fortna
California Tomorrow
Monadnock Building
681 Market Street
San Francisco, California 94105

Dear Miss Fortna:

Many thanks for sending me not only the California Tomorrow and Cry California brochures but the information in your letter of March 30th concerning "Environmental Networks: State and Regional Environmental Centers and Councils in the United States." I have passed this on to Scott Paradise.

Sincerely,

Carroll L. Wilson

CLW:F

Dictated by Professor Wilson. Signed in his absence.

rec'd 4/2/73



681 Market Street, Monadnock Building • San Francisco, California 94105 • Telephone: (415) 391-7544

March 30, 1973

Professor Carroll L. Wilson
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Professor Wilson:

With further reference to Mr. Abbott's letter of March 23, he has asked me to write and suggest that you might be interested in sending for the following report:

"Environmental Networks: State and Regional Environmental Centers and Councils in the United States," Preliminary Edition, January 1973, published by the Center for California Public Affairs (An Affiliate of The Claremont Colleges), 226 West Foothill Boulevard, Claremont, California 91711.

Sincerely,

Jean Fortna
Secretary to Mr. Abbott

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Room E40-253

May 7, 1973

Mr. John P. Holdren
Environmental Quality Laboratory
California Institute of Technology
Pasadena, California 91109

Dear Mr. Holdren:

We enjoyed your visit and were sorry that it was so short. I am delighted to have your co-authored book with the Ehrlichs. I haven't had a chance to look at it yet since I am now in a fast marathon but I hope to settle back and do some important reading like this when I get back from various journeys which will end in June.

We are encouraged in the seminar that the M.I.T. Press will publish the best of the papers from the full year under the general title of "Speculations on a Steady State Society." Strangely enough we find that we are on the frontier in this field and only a few people like Herman Daly have really thought about the nature of such a society and some of the systems that would make it work.

I am glad that you found SCEP and SMIC so useful. They were fascinating exercises to be involved in and they do stand as something different. They are models which could bear emulation for other problems I believe.

Sincerely,

Carroll L. Wilson

CLW:F

Dictated by Professor Wilson. Signed in his absence.

rec'd 4/26/73

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91109

ENVIRONMENTAL QUALITY LABORATORY

April 23, 1973

Professor Carroll L. Wilson
Sloan School of Management
M.I.T.
Cambridge, Massachusetts 02139

Dear Professor Wilson:

It was a great pleasure to meet you a week ago, and I very much regretted that prior commitments prevented my joining Herman Daly in staying another day. I hope there will be another opportunity for us to talk before long.

I am enclosing a copy of a newly published book that I coauthored with Paul and Anne Ehrlich. There is a substantial and acknowledged debt to SCEP and SMIC here (see, e.g., footnotes on pp. 4, 15, 117, 149, 194, 195). As I indicated when we spoke in Cambridge, I believe those two documents--and especially the first one because it was a pioneer--to be major landmarks in the environmental field. The scientific community and the public are in your debt for bringing these meetings off and getting the results into print.

With best regards,

John Holdren

John P. Holdren, Ph.D.
Senior Research Fellow
Caltech Population Program and
Environmental Quality Laboratory



Room E40-253

May 6, 1973

Professor Herman E. Daly
Department of Economics
Louisiana State University
Baton Rouge, Louisiana 70803

Dear Herman:

You gave us a great lift by meeting with the group that Sunday afternoon and frankly we have found you the principal, in fact about the only source of ideas about systems in the steady state economy. I am glad to say that Howard Webber, the Editor and Publisher of the M.I.T. Press, believes that we may have a book to be made up from the papers--the best papers of the group for the year--and soon we'll be writing to you about suggestions and criticisms of some features of that book.

I am sorry you couldn't stay the night but I am glad that you found a hotel and got your early morning plane. Enclosed is a check covering your hotel bill.

Many thanks for the additional paper and with hopes of meeting again before long.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosure

rec'd 5/1/73

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE

BATON ROUGE · LOUISIANA · 70803

College of Business Administration

DEPARTMENT OF ECONOMICS

April 27, 1973

Professor Carroll Wilson
A. P. Sloan School of Management
Mass. Inst. of Technology
Cambridge, Mass. 02139

Dear Carroll:

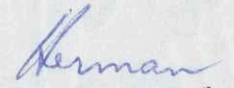
Thanks again for your hospitality, and to you and your students for such a stimulating seminar. I enjoyed and benefited from it.

Enclosed is my hotel bill. If there are any problems involved in reimbursement just forget it, because the extra expense was a result of my misunderstanding with Delta airlines.

Enclosed is a paper that may contain something of interest.

All best wishes.

Sincerely,


Herman E. Daly

HED:mjb

Enclosures

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4/2/73

Note to : CLW

From : Joe Perkowski

Re : Enclosures

I have enough blue booklets to pass out to everyone in 15.965 class, but I only received one copy of the other materials, which I have Xeroxed for your use. I'm not sure that the other materials are worth enough for us to Xerox 15 copies of them.

I suggest that you peruse the booklet when you get a chance. Dennis Meadows and Roger Naill were part of the group that put this together, as you can see from the other materials. These pieces provide an interesting viewpoint re materials policy alternatives and are definitely related to our discussions of "Strategies for Sustainable Growth"

sent to Bill Martin 5/3/73

15.965 Second Term Paper — Bill Behrens

Objective: To take the ideas from "Distribution in Growth and Equilibrium" (paper for first term 15.963) and reorganize them around the question

"Is a relatively even distribution of material wealth a stability criteria for material equilibrium?"

Argument: Maintaining a material equilibrium will require some kind of "leviathan", but a leviathan broadly defined as some kind of widely adhered to social constraint structure. One way to create the necessary Leviathan is politically, i.e. as (the common Leviathan) an autocratic government. Another equally conceivable Leviathan is some generally agreed to social control - i.e. a common social value set that incorporates some form of "sacrifice of personal freedom for social freedom."

I would like to argue that the second Leviathan is better than the first, in that the potential impact of abuse by a small segment

of the population is smaller, and that the acceptance of the Leviathan can be more of a democratic choice rather than an autocratic imposition. Further, and more importantly, I would like to propose that a goal of equal distribution of material wealth could form the cornerstone of this social Leviathan; that equitable material distribution could be a sufficiently powerful restraint to material growth to obviate the need for a political Leviathan.

The arguments as to why I think distribution is so important will be developed by looking at income in the growth society as the nexus of economic, social, and psychological motivations. I will argue that man has an inherent need to "grow", i.e. to expand his boundaries along some dimensions. The message of equilibrium is not that "growth" is dead, but that a couple of the dimensions previously expanded along are obsolete. Currently all measures of growth are assumed to be proportional to the material dimension

If we can change that relationship, by constraining material growth, we can satisfy both the need for "growth" in the total sense and the need for "limits" in the material sense.

I may be inclined to argue that equitable distribution of material wealth is one of a very small set of sufficient conditions for equilibrium but it is not necessary. I.e., there are other equally effective leviathans. This one seems to be inherently more desirable and more possible.

Professor Carroll Wilson's office, E40-253 / 253-1573

April 19, 1973

Mr. Chester L. Cooper
Woodrow Wilson International Center
for Scholars
Smithsonian Institution Building
Washington, D.C. 20560

Dear Mr. Cooper:

I am writing you to confirm your visit to M.I.T. on Wednesday, April 25, 1973. Professor Wilson plans to attend a luncheon meeting on that day, so he will go directly to class at 2:30 and meet you. The seminar, Strategies for Sustainable Growth, meets in the Sloan Building, E52 in Room 369. I have enclosed a map for your convenience.

If there are any appointments or accommodations which I could arrange for you, do not hesitate to let me know.

Sincerely,

Nancy Lovett

Secretary to Professor Wilson

Room E40-253

April 15, 1973

Professor Garrett Hardin
399 Arboleda Road
Santa Barbara, California 93110

Dear Professor Hardin:

I apologize for the long delay in replying to your letter of March 20th. I did leave for Europe on the 21st of March and have just returned. We were most grateful for your participation with the seminar and for the very interesting insights we derived from the long evening with you by the members of the seminar and myself and my colleagues on Wednesday.

Enclosed is a check covering the excess expense over and above your trip to Washington and I am very pleased that you were able to arrange this visit so that it could coincide with a trip east in any event.

I have reproduced the article "Why Plant a Redwood Tree?" for the class and I am giving them a copy of your letter which will call to their attention some of the other important things we discussed.

I am glad to report that on April 15th Herman Daly is meeting with us and I am hopeful that we can bring together a group of papers out of the work of the present participants in the seminar which will be worthy of publication. Bill Martin and I are meeting with the director of the M.I.T. Press next week to explore these possibilities.

It was a pleasure for me personally to make your acquaintance in the course of this visit and I hope very much that we will be finding ourselves engaged in other activities together.

With best regards.

Sincerely,

CLW:F

Carroll L. Wilson

Garrett Hardin
399 Arboleda Road
Santa Barbara, Calif. 93110

20 March 1973

Dr. Carroll L. Wilson
Massachusetts Institute of Technology
Cambridge, Mass. 02139

Dear Professor Wilson:

Thanks very much for a most enjoyable time--and a profitable one: I came home with a number of ideas to develop. That's a very sharp bunch of students you have.

1. Finances. My round-trip ticket, first class, was \$509.00. Had I gone only to Washington it would have been \$414.00. The excess expense incurred was \$95.00 (there were no other expenses). . . . I travel first class for medical reasons.

2. Toward the end of the discussion the matter of the management of international fisheries came up, and I gave it a superficial treatment because there was only 15 minutes to go and I didn't want to get involved in a new topic. However, I have dealt with this in a novel (though not necessarily a wise) way before. I enclose an editorial on "Exploited Seas", which may interest you. Perhaps you could get copies of it to David Gray and Scott Paradise? I would be curious to know their reaction to the proposal.

*I have sent
copies - NCL*

3. The exact quotation from Edmund Burke, which I gave approximately in discussion, is to be found in the unpublished article "Why Plant a Redwood Tree?" (Also enclosed)

Sincerely,

Garrett Hardin

4. William Ophuls paper on "The Tragedy of the Commons" came up for discussion. Since you have an article in the same issue, I'm sure you noticed that a brief version of Ophuls' paper is in the March issue of Science and Public Affairs. It seems to me to be uncommonly keen. He shows so clearly that if we had only remembered Hobbs there would have been no need for Hardin. The decay of information, particularly harsh information, is a serious problem.

rec'd 4/11/73

Campus Correspondence

LOUISIANA STATE UNIVERSITY

from: H Daly

to: Carroll Wilson

Thanks for note of March 20
and kind invitation to stay at your home
Sunday night. I would be delighted, but please
make whatever arrangements are convenient
for you -

Garrett Hardin
399 Arboleda Road
Santa Barbara, Calif. 93110

20 March 1973

Dr. Carroll L. Wilson
Massachusetts Institute of Technology
Cambridge, Mass. 02139

Dear Professor Wilson:

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Garrett Hardin

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*I should send
copies - nel*

(The following "Editorial" is scheduled for publication (1973?)
in a book edited by G. Tyler Miller, Jr., bearing the provisional
title, Earthmanship: An Introduction to Human Ecology.)

WHY PLANT A REDWOOD TREE?

by Garrett Hardin

Why Plant a Redwood Tree?

"Would you plant a redwood tree in your back yard?" the ecologist asks the economist. "I mean, assuming that you had a large back yard, and suitable soil and climate?"

The economist smiles wanly and shakes his head.

"Well, I would," says the ecologist. "In fact, I did."

"Then you're an economic fool," retorts his antagonist.

The economist is right, of course. The supporting economic analysis is easily carried out. A tree can hardly be planted for less than a dollar. To mature to the stage the ecologist has in mind takes some two thousand years, by which time the tree will be about three hundred feet high. How much is the tree worth then? An economist will insist, of course, on evaluating the forest giant as lumber. Measured at a man's height above the ground, the diameter of the tree will be about ten feet and the shape of the shaft from there upward is approximately conical. The volume of this cone is 94,248 board feet. At a "stumpage" price of 15 cents a board foot -- the approximate price a lumberer must pay for a tree unfelled, unmilled, untransported -- the tree would be worth some \$14,000.

That may sound like a large return on an investment of only one dollar, but we must not forget how long the investment took to mature: 2,000 years. Using the exponential formula to calculate the rate of compound interest we find that the capital earned slightly less than one half of one per cent per year . . . Yes, a man would be an economic fool to put his money into a redwood seedling when so many more profitable opportunities lie at hand.

Is that all there is to say about the matter? If it is, then sooner or later mankind will have no great groves of redwood trees for his delight. It is the groves of trees that we are interested in. A single redwood tree, remarkable though it may be for its size, is not that which evokes those religious feelings that seize sensitive people who find themselves enveloped in the hush of a forest of towering trees. But how can we assign a value to religious feelings? Encapsulated in the prejudices of the market place the economist must advise us not to plant a forest of redwoods.

(A "tree farm" is something else. Depending on the price of land and lumber, and on our theory for discounting an uncertain future, economic analysis may justify planting an esthetically sterile, disciplined array of trees that will be harvested in less than a century for the lumber. But that is not our problem.)

Among contemporaries, rationality demands that there be a quid pro quo in every exchange. But what if the exchange is between generations? This logical sticking point was brutally laid bare two centuries ago by the American poet John Trumbull, who wrote scornfully

of those who would have us act --

As though there were a tie
And obligation to posterity.
We get them, bear them, breed, and nurse:
What has posterity done for us?

By asking that question do we prove that all redwood forests must go? Is this the best that rationality has to offer? Or is it true (as Pascal said) that "the heart has reasons that Reason knows not of"? Can we delve deep into the abysses of the heart and expose the reasons that Reason sometimes denies?

I think we can. A clue is given us by the great English voice of conservatism, Edmund Burke: "People will not look forward to posterity who never look backward to their ancestors." His aphorism asserts a sort of symmetry to the psyche. If a man is so brought up that he feels a tie to the past, by symmetry he can perceive and acknowledge a similar tie to the future. By contrast, a hard-headed rationalist, lives only in the present. To him, the remembrance of things past as well as concern for the distant future bespeaks a sort of mental corruption. It is not easy to refute this view which, tragically, is shared by some of the most radical as well as some of the most reactionary people in our time.

Must we be concerned with posterity? It is always tempting to try to get others to do our will by bringing in the word "must". Rationally it is more useful to point out the ecological implications of Burke's insight. If we want a community to care for the future, we must raise its members with a strong sense of place, of ancestry: with a pervasive feeling of connectedness with their origins. The managers of great enterprises, seeking the maximum economic "efficiency," are quite willing to treat people as objects, moving them around like so many men on a chess board. The resulting mobility erodes the sense of place and past-connectedness. When the past disappears the future soon follows. Make a society fully mobile and you can kiss the redwood trees -- and all that they stand for -- goodbye.

Some journalist, a few years ago, coined the phrase "the Now Generation." He intended it to be laudatory. Edmund Burke would surely view it in another light. So also must his spiritual descendants, people now called conservationists, environmentalists, and ecologists. Pure "Nowness" to them indicates a poverty of the spirit that should be strongly deprecated. To them, the world is richer if the psyche has an enduring awareness of both the unalterable past and of a future that can, with effort and intelligence, be molded "nearer to the Heart's desire."

**American Institute
of Biological
Sciences**

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Frank Lo Verde

Membership: Joanna Buckle



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Editorial and business address: American Institute of Biological Sciences, 3900 Wisconsin Ave., NW, Washington, D.C. 20016.

Printed at Garamond/Pridemark Press, Inc., 714 E. Pratt St., Baltimore, Maryland 21202.

National Advertising Representatives: Joseph Bourgholtzer, Inc., the JBI Building, Mahwah, New Jersey 07430. Advertising rates and information mailed on request.

EXPLOITED SEAS— AN OPPORTUNITY FOR PEACE

The Danish physicist Niels Bohr once said: "There is not much hope if we have only one difficulty, but when we have two, we can match them off against each other." It seems to me that the oceans present us with a "Bohr pair" in the political realm.

The future of oceanic fishing looks hopeless. Since no one owns the seas, each nation tries to get all the whales and fish it can "before the pigs get them." It would be futile for one public-spirited nation to fish less: its share would simply go to the others and fishing would ultimately be ruined anyway. Competition favors national greed in the short run and the ruin of all fishing in the long. Conclusion: It is impossible to save the seas.

International peace looks equally hopeless. The fissionable-fusible atom hangs over our heads. Weaponry increases without limit because each major nation wants to be "second to none." Competition favors national paranoia in the short run and universal destruction in the long. So international peace looks impossible, too.

Here we have the raw material for a "complementary" solution in the style of Bohr: two difficulties — or rather, two impossibilities — to be fused into a single solution. "Impossible" is always relevant to a particular frame of reference. In both problems national sovereignty is part of the frame. Can sovereignty be altered? If so, there's hope.

Many people say that both the League of Nations and the United Nations failed. They forget that both institutions were designed as failures by the founding nations, which did not look at sovereignty in a creative way. National sovereignty need not be an all-or-none proposition. Sovereignty can be fractionated. The sovereignty of the oceanic fisheries could be assigned to a supranational agency without national danger. The armament needed for a fish patrol would be no threat to national navies.

The size of the annual catch of each species should be determined by a scientific council; but the division of the catch should be determined by a political body. The system would have to be asymmetrical: rich nations would finance and run it, but only poor nations would benefit from it. Fortunately, rich nations can afford to be generous about the ocean because it is only a minor source of protein for most of them. (Patient diplomacy would be required to deal with Japan, a special case.) Any controlling agency is properly suspected of self-serving. The *bona fides* of this one would be the abandonment of all benefit from the fishing by the rich controllers.

Many will regard this proposal as shamelessly paternalistic. Perhaps it is: but what is the alternative? It is inconceivable that poor countries, envious of one another as they are, could agree to manage themselves. It would take only one non-cooperator to make a cooperative system of equals fail. So which shall it be: paternalism, or more hunger?

Looking at the other side of the system, what's in it for rich countries? It would save something for posterity; but does it offer a more immediate *quid pro quo* for them? I think it does. It holds out the potentiality of the evolution of a truly supranational authority which all nations, the rich especially, need if thermonuclear destruction is to be avoided.

In the strictly limited area of the seas the generation of supranational power is credible. Not easy, but credible. Once this succeeded other extensions might be made, e.g., to Antarctic coal, and the Suez and Panama canals. Whatever the details (and they are unforeseeable), the evolution of a supranational power must be a slow one so as to allow people's minds to adjust. There must be a building from strength to strength, as trust grows.

The prospect of laying a stable base for international peace should be an adequate *quid pro quo* for rich nations, and quite sufficient recompense for relinquishing to the poor all benefits from ocean fisheries, which need to be managed by strong hands if they are not to be exhausted in our lifetime.

GARRETT HARDIN
University of California
Santa Barbara

rec'd 3/30/73

IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL ENGINEERING

Professor D. Gabor

C.B.E., D.Sc., Dr.-Ing., F.Inst.P., F.I.E.E., F.R.S.

CITY AND GUILDS COLLEGE

EXHIBITION ROAD

LONDON SW7 2BT

Telephone: 01-589-5111

Telex: 261503

Miss Nancy Lovett

Secretary to Professor Carroll Wilson, MIT

March 26, 1973

Dear Miss Lovett,

Thank you for your letter of March 2, also for the many most interesting papers which you have sent me. My letter to Prof. Wilson of March 21 found him already on the way to Europe. I was very glad to see him on March 23. I now enclose three letters to Messrs. Gray, Willums and Behrens, with comments on their very interesting essays, with copies to Professor Wilson. I hope that my comments will encourage them in their thinking. - Perhaps it would save time if you would write to Dr. Henry R. Linden, Director, Inst. of Gas Technology, Chicago, Ill and ask him to send to Prof. Wilson copies of his papers which he has distributed in Rome.

Yours sincerely

D. Gabor
D. Gabor

sent
4/3/73

April 3, 1973

Dr. Henry R. Linden
Director
Institute of Gas Technology, 3424 S. State St.
Chicago, Illinois 60616

Dear Dr. Linden:

I am writing you at the suggestion of Dr. Dennis Gabor. He has recommended that Professor Carroll Wilson read several papers which you have distributed in Rome.

In his letter to me, Dr. Gabor did not sufficiently describe the papers he wished me to obtain from you. I presume the papers' subjects relate to the theory of a steady-state society and/or the situation of the energy crisis.

If you know the papers to which Dr. Gabor is referring, would you be so kind as to send copies to Professor Wilson?

Thank you very much.

Sincerely,

Nancy Lovett

Secretary to Professor Wilson

*paid 3/21/73
by CLW*

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HAVE YOU LEFT YOUR KEY?

GUEST'S SIGNATURE: *Samuel Spordan*
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MEMORANDUM

TO: All members of seminar 15.965
FROM: Professor Carroll Wilson
DATE: March 21, 1973
RE: Herman Daly's visit

Herman Daly will meet with seminar 15.965 Sunday afternoon, April 15th, from 2 to 4 pm in E52-461 (the Schell Room).

TO: All members of seminar 15.965
FROM: Professor Carroll Wilson
DATE: March 21, 1973
RE: Herman Daly's visit

Herman Daly will meet with seminar 15.965 Sunday afternoon, April 15th, from 2 to 4 pm in E52-461 (the Schell Room).

March 20, 1973

Professor Herman E. Daly
Department of Economics
College of Business Administration
Louisiana State University
Baton Rouge, LA 70803

Dear Herman:

We are delighted that it is now arranged that our seminar meets with you Sunday afternoon, April 15, from 2:00 pm to 4:00 or 4:30 pm at the Sloan School. Newell Mack has been arranging this and will bring you.

I hope that you may be able to go with me after our meeting to my home in Seekonk, Massachusetts (east of Providence) and be my guest until Monday morning when we can put you on a plane for your next stop.

I leave for three weeks in Europe March 21st. I have just received the invitation from Mr. Palme and look forward to our sessions here.

Sincerely,

Carroll L. Wilson

cc Newell Mack

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

3/19/73

19

Memo to _____ Room _____ Ext. _____

April 13-15 Friday-Sunday
reservations at Parker House
\$17.00/night
arrive before 6 PM.
(227-8600)

April 15 2-4pm
E52-461, Schell Room

from _____ Room _____ Ext. _____

wait for word
from Daley

rec'd 3/12/73

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE

BATON ROUGE · LOUISIANA · 70803

College of Business Administration

DEPARTMENT OF ECONOMICS

March 8, 1973

Professor Carroll Wilson
Room E40-253
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dear Carroll:

Many thanks for your letter of February 20 and the three papers from your seminar, which I benefitted from reading.

Last night Newell Mack called to follow up on your kind invitation to join your seminar, with the result that I hope to see you on the afternoon of Tuesday, April 10. Unfortunately I couldn't make it on the regular Wednesday.

I look forward to seeing you again and to meeting some of your seminar members.

All best wishes.

Sincerely,

Herman

Herman E. Daly

HED:mjb

cc Newell Mack

Room E40-253

March 17, 1973

Mr. John W. Abbott
California Tomorrow
681 Market Street
San Francisco, California 94105

Dear Mr. Abbott:

I was pleased to meet you by telephone and regret very much that my other engagements on the 24th and 25th or 23rd and 24th of April prevent my taking part in your conference in San Francisco.

I think you've done some real pioneering in the work of your organization and I would appreciate very much having another copy of California I and II which one of my students brought into the seminar last fall.

Under separate cover I am sending you four or five of the papers out of this seminar on Strategies for Sustainable Growth. The major focus has been on some features of the steady state or equilibrium society. Among the participants this semester is Scott Paradise whom you know and whom you helped in getting Massachusetts Tomorrow started.

I will be grateful for any information you can send me concerning some of the growing number of communities in the United States where the perspective of long-range planning is taking hold and the community is mobilizing to preserve values which will otherwise be destroyed if present trends continue. I expect you have these conditions in California in a rather special form and hence your activities there and the measures you assess and propose are of great interest to others.

If you are in this region I would welcome meeting you and I should remark that our seminar meets each Wednesday afternoon from 2:30 to 4:30 and we would be delighted to have you with us sometime.

Mr. John W. Abbott
Page 2
March 17, 1973

Professor Garret Hardin was with us last Wednesday and we look forward to meeting with Herman Daly on April 15th.

Sincerely,

Carroll L. Wilson

CLW:F

rec'd 3/20/73

Institute of Animal Genetics

West Mains Road Edinburgh EH9 3JN TELEPHONE 031-667 ~~xxx~~ 1081.

University of Edinburgh Department of Genetics and
MRC. Epigenetics Research Group

Professor C H Waddington CBE ScD.DSc LL D FRS

14th March, 1973.

Dr. Carroll L. Wilson,
Massachusetts Institute of Technology,
Room E40-253,
CAMBRIDGE,
Mass. 02139,
U.S.A.

Dear Carroll,

Many thanks for sending me some of the papers from your seminar. They seem to me of very good standard. I am afraid I am teaching people in their first and second year of undergraduate study, and I have not anything of a comparable kind to send you in reply. Perhaps we shall have something of this kind later on.

Yours sincerely,

Wad

CW

March 8, 1973

Professor Garrett Hardin
399 Arboleda Road
Santa Barbara, CA 93110

Dear Professor Hardin:

I am writing to tell you that we are warmly looking forward to your visit to M.I.T. next Tuesday and Wednesday. I shall be at Logan Airport at 5:14 with Bill Behrens to meet you from TWA flight #66 on Tuesday. We discussed your visit at our seminar this afternoon and the following itinerary was suggested:

Tuesday evening: Dinner (at your hotel) with members of the seminar group, probably 18 - 20 members)

Wednesday ~~morning~~ 10:30 am coffee and informal discussion with Professor Wilson and seminar group

12:00 Lunch with Professor Wilson and one or two other M.I.T. faculty members

2:30 - 4:30 seminar meeting

The class came up with the following list of questions and issues which we would like to discuss with you.

1. Can one develop a revolutionary fervor for a "steady-state" without a catastrophic disaster?
 - a. How quickly can value changes occur? Examples?
 - b. How can a steady-state accomodate aggressiveness (competiveness) in man?
 - c. Can competition in scientific research bring about a steady-state society?
2. How optimistic are you that man will find a solution to the "Tragedy of the Commons"?

Page two
Professor Garret Hardin
March 8, 1973

3. What criteria should be used in setting society's priorities?
4. How do you appraise your critics/your supporters and their opposing views of the world?
5. Do you know of any other seminars like ours or of a news letter describing the activities of groups investigating the implications of a steady-state society?

Yours sincerely,

John Strongman

JS/NCL

March 8, 1973

Professor Garrett Hardin
399 Arboleda Road
Santa Barbara, CA 93110

Dear Professor Hardin:

We are delighted that you will visit us March 13-14.
Enclosed is a letter to you from John Strongman re:
plans. I must be in New York the evening of the 13th
to preside at a session at the Council on Foreign Relations
where Aurelio Peccei will speak.

I look forward to seeing you on the 14th.

Sincerely,

Carroll L. Wilson

March 8, 1973

Professor Garrett Hardin
399 Arboleda Road
Santa Barbara, CA 93110

Dear Professor Hardin:

I am writing to tell you that we are warmly looking forward to your visit to M.I.T. next Tuesday and Wednesday. I shall be at Logan Airport at 5:14 with Bill Behrens to meet you from TWA flight #66 on Tuesday. We discussed your visit at our seminar this afternoon and the following itinerary was suggested:

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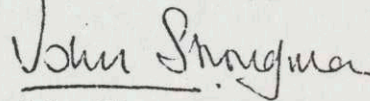
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Page two
Professor Garret Hardin
March 8, 1973

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5. Do you know of any other seminars like ours or of a news letter describing the activities of groups investigating the implications of a steady-state society?

Yours sincerely,


John Strongman
John Strongman

JS/NCL

rec'd 3/13/73

Fellow / Woodrow Wilson International Center for Scholars

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March 7, 1973

Dr. Carroll L. Wilson
Room E40-253
Massachusetts Institute of
Technology
Cambridge, Mass. 02139

Dear Carroll:

Al Meisel passed on to me a note you had written to Ben Read, asking if I would be able to come to a meeting of your seminar group on "Strategies for Sustainable Growth" sometime this spring.

I will be pleased to come down. Either April 18 or 25 looks good on my calendar, so please let me know which is best for you and the group.

Sincerely,

Chester L. Cooper

Chester L. Cooper

Room E40-253

March 4, 1973

Miss Rebecca Cook

Dear Rebecca:

We miss you in the seminar but I understand that you have a conflict.

I have written to Herman Daly and hope very much that he will be able to combine his visit here in Boston with a meeting with the seminar group, if not at the regular time then at some time that meets his convenience. If he does come I hope very much that you can join that session even though I do understand the conflict which prevents your being with us each week.

Sincerely,

Carroll L. Wilson

CLW:F

MEMORANDUM

TO: Professor Elting Morison

FROM: Professor Carroll Wilson

DATE: March 1, 1973

RE: Questions in preparation for the meeting of Seminar 15.965
on March 7, 1973, in E52-369.

1. What are the historic periods of relatively steady-state societies; what are their common features; and what caused them to collapse? What are the roles of groups of people from various social strata in stabilizing and destabilizing society?
2. What are the forces which control the steady-state or how does a steady-state society handle conflict (digressions, disequilibrium)?
3. What are the philosophical reasons which define and lead to growth?
4. What are the differences between "Teddy Roosevelt Conservation" and needs today?
5. Is the "Cultural Revolution" of China needed in the U.S.?
6. Can one develop a revolutionary fervor for a "steady-state" without a catastrophic disaster?
 - a. How quickly can value changes occur? Examples?
 - b. How can a steady-state accomodate aggressiveness (competiveness) in man?
 - c. Can competition in scientific research bring about a steady-state society?
7. What are your perceptions of the future? What variables will prove the most crucial in limiting or expanding growth?

rec'd 2/27/73

Feb 24. 73.
73 Dartm.

Dear Professor Wilson -

I am sorry it didn't work out for me to take your seminar AGAIN this term in light of growth.

You might be interested to know if you already don't that Herman Daly will be in Boston Friday April 13 & 14 for the AEA Annual meeting. It might be that he will be in the area longer & that he would like to come to your seminar.

Again my apologies for a schedule conflict, and am still very interested in the content & outcome of the course!

Best - Rebecca Cobb -

rec'd 2/28/73

RECYCLED : THIS SIDE ONLY

Garrett Hardin
399 Arboleda Road
Santa Barbara, Calif. 93110
(805) 967-1384

24 Feb 1973

Dr. Carroll L. Wilson
Room E40-253
MIT
Cambridge, Mass. 02139

Dear Dr. Wilson:

It would be a pleasure to meet with your seminar. There are two possibilities:

Wednesday, 14 March

Monday, 16 April

If either of these is a possibility, let me know soon so I can make plans.

Since I work at home more than I do on campus, would you please reply to the address given above?

Sincerely,

Garrett Hardin

GENES AND PERSONAL DECISIONS

up to: a rebirth, in modified form, of Calvin's doctrine of predestination, the belief that man's fate is determined for him at the time of conception, a determination that was (in Calvin's mind) irrevocable.

Genetics is a form of Calvinism—but it is Calvinism with a difference. That there is a sort of predestination at the time of conception is true: what genes an individual has is determined by what sperm unites with what egg. The genes of the gametes become the genes of the zygote, and (by repeated equational division) of all the cells of the adult body. In the formation of the next generation of gametes, chance enters in during the reduction division, in the assorting of the various alternative alleles, but the distribution must always be made from the genes available in the individual as a result of the earlier fertilization. Chance, operating within predestined boundaries, determines the possibilities of the succeeding generation.

Biological truth is richer than simple Calvinism. An example will help make the point. Among laboratory mice there are some animals that are very sensitive to noise. Put such a mouse in a metal tub and rattle keys against the side of the tub and you will cause the animal to go into convulsions and probably die. Susceptibility to such "audiogenic seizures," as they are called, is inherited. But one cannot say that a mouse of a susceptible strain is predestined to die of an audiogenic seizure, for it may never be exposed to the risk. Its death is not really predestined (not by genetics, at any rate); what is predetermined is its reaction to an environmental event that may, or may not, transpire.

The mice are worth following further. One can develop a strain that is practically pure for this type of reaction. Suppose we maintain such a strain in acoustically quiet surroundings, generation after generation: what will happen? The animals will, of course, live to a ripe old age without seizures. As generation succeeds generation, will the susceptibility to seizures disappear? *Not at all.* If, say, after twenty generations the colony should once again be subjected to raucous noise, convulsions and death will result just as surely as they would have at the beginning of the experiment.

Room E40-253

February 20, 1973

Professor Herman Daly
Department of Economics
Louisiana State University
Baton Rouge, Louisiana

Dear Herman:

It seems a long time since those sunny, long days in Stockholm last June.

In the autumn semester I have had an interesting group of young people pondering aspects of the steady state society or strategies for sustainable growth. Your papers have been a very important part of the meager literature we've looked at. We have generated a few interesting papers which I am sending to you.

I'm writing to inquire whether if you expect to be in this vicinity this spring we might proceed in having you join the seminar which ordinarily meets from 2:30 to 4:30 on Wednesdays. Rumor has it you will be coming this way and we hope to meet with you in the afternoon or through dinner.

With best regards,

Sincerely,

Carroll L. Wilson

CLW:F

Room E40-253

February 20, 1973

Professor Garret Hardin
University of California at
Santa Barbara
Santa Barbara, California

Dear Professor Hardin:

Last autumn we had a seminar at M.I.T. which continues through the spring on the general subject of "Strategies for Sustainable Growth" or "Features of a Steady State Society." A very interesting dozen or so young people from M.I.T. and Harvard have been working together in this field. The literature is very skimpy but the most interesting things we've had include some which you have written.

Someone told me that you might be in the vicinity of Boston this spring and I'm writing to see whether if you are in this neighborhood you would be willing to meet with this seminar which ordinarily convenes from 2:30 to 4:30 on Wednesday afternoons.

To indicate the kind of thing we have been doing and the interesting ideas generated by some of the class I am sending you under separate cover a few of the best term papers of last semester.

Sincerely yours,

Carroll L. Wilson

CLW:F

Room E40-253

February 20, 1973

Professor C. H. Waddington
University of Edinburgh
Edinburgh, Scotland

Dear Wad:

At the Club of Rome meeting we talked about our experiences in courses and seminars with young people on such subjects as the steady state society, strategies for sustainable growth and other things. I've brought together a few of the best papers of the seminar I've had this past semester and am continuing during the spring semester. They may be of interest to you as you work with a group of young people at Edinburgh tackling similar subjects. We have about fifteen participants including two very interesting Episcopal clergymen, one of whom is jointly at the Harvard Divinity School and the Harvard Business School assessing the issues of political choice in portfolio management.

With best regards,

Sincerely,

Carroll L. Wilson

CLW:F

Room E40-253

February 20, 1973

Professor Robert Uffen
Queen's University
Kingston, Ontario
Canada

Dear Bob:

At the Club of Rome meeting we talked about our experiences in courses and seminars with young people on such subjects as the steady state society, strategies for sustainable growth and other things. I've brought together a few of the best papers of the seminar I've had this past semester and am continuing during the spring semester. They may be of interest to you as you work with a group of young people at Queen's University tackling similar subjects. We have about fifteen participants including two very interesting Episcopal clergymen, one of whom is jointly at the Harvard Divinity School and the Harvard Business School assessing the issues of political choice in portfolio management.

With best regards,

Sincerely,

Carroll L. Wilson

CLW:F

MEMORANDUM

TO: Members of Seminar 15.965

FROM: Professor Carroll Wilson

DATE: February 2, 1973

The first session of Seminar 15.965 will meet Wednesday, February 7 from 2:30 to 4:30 in E52-369. If there are any schedule conflicts, please call Nancy Lovett, 253-1573.

Enclosed is a list of seminar participants to date.

rec'd 2/5/73

William Flynn Martin
29 Concord Avenue — 503
Cambridge, Mass. 02138

February 2, 1973

Dear Professor Wilson,

Upon arriving last night, I was questioned by the custom's man as to the purpose of my trip. I was very tempted to say "enlightenment". Indeed, by listening and talking to such a wide spectrum of interesting people and ideas, my own career and interest horizons were immeasurably expanded. Thank you for the opportunity to behold such an international community of dedicated, sincere people (this ofcourse includes Barbara as well).

Your very happy and thankful student,

Bill

FW

MEMORANDUM

TO: Members of Seminar 15.965

FROM: Professor Carroll Wilson

DATE: February 2, 1973

The first session of Seminar 15.965 will meet
Wednesday, February 7 from 2:30 to 4:30 in E52-369.
If there are any schedule conflicts, please call
Nancy Lovett, ~~253-~~1573.

Enclosed is a list of seminar participants to date.

Room E40-253

January 2, 1973

Bill Behrens
John Strongman
Jan Willums

Dear Bill, John and Jan:

Being obliged to furnish grades before December 20th I had to send in a grade of I--Incomplete for each of you. Apparently the Registrar frowns somewhat upon extending time in this way but I am expecting term papers from each of you soon after your return or about the time of our IAP seminars on January 8th, 9th and 10th.

Sincerely,

Carroll L. Wilson

CLW:F

Room E40-253

January 2, 1973

Rebecca Cook

Dear Rebecca:

I read with considerable interest your paper on a legal systems model for influencing population growth. It is clearly addressed to an important problem but I do not see any connection between this paper and the topics we discussed all semester in our seminar. Since I had to send in grades on December 20th I sent in an incomplete for your grade. I think I must ask you to write a paper which is relevant to the topics we discussed. Clearly population control and the achievement of a zero population growth is one of the things we envisaged in the stable state society. It is possible that you could provide a bridging paper between what you've written which is devoted to the broad question of legal forms and plausible alternative policies and human rights and the like to link it rather specifically to the kinds of things we tried to imagine for the United States in the early part of the next century. I recognize that it lies closely and centrally in the field of your interest and doubtless is directed to other studies you are making at the Kennedy Center but I do think in fairness to the others that I must ask you to write a paper which relates this work you've done to the issues and characteristics of the society we've been trying to sketch.

I hope we can discuss this further at the IAP meetings on January 8th, 9th and 10th.

Sincerely,

Carroll L. Wilson

CLW:F

Room E40-253

January 2, 1973

Anthony C. Picardi

Dear Tony:

I am returning your paper on effluent charges and have found it extremely interesting. Two thoughts occur to me. Professor Edwin Mills at Princeton University, an economist who is the staff director for the CED Environmental Study, is very keen about effluent charges and has written quite a few papers on it which are available in my CED file if you want to look at them. I am wondering if it would be useful and desirable to send a copy of your paper to him with a request for comments.

Another line would be to send it to Alex Cochran at the OECD who heads the air and water pollution activities of the OECD. There are certain places in Europe, notably on the Emscher River in Germany. They have experimented with effluent charges for quite a long time and have the interesting principle that all dischargers, municipal or industrial, into the river must take their intake water from a point below their discharge point. We could get some reactions from Cochran as to whether this system had been applied in studying effluent charges in Europe.

You may have other plans for publishing this paper and if sent out it should be suitably marked but I would be interested in your reactions. I also hope that you will be prepared when the seminar resumes in IAP to develop with the group the system you have used in this case and to probe the degree to which similar concepts can be used for other renewable resources. Inasmuch as most of our controls are likely to come down in the form of point source controls the concept of emission charges is potentially attractive. One can think of extending it to forests or soil conservation or other kinds of resources which we'd want to develop on a basis of perpetual yield. It could be

Anthony C. Picardi
Page 2
January 2, 1973

that the next big push for the successor to the Soil Conservation Service which was aimed primarily at preventing erosion could be the bundle of incentives which will induce land use for perpetual yield. This means much deeper understanding of fertilizers and soil conditioners and cropping practices and periods of fallow land, and so on. It would be interesting to know whether in forests the incentives other than those which apply to the forest land owner are aimed at perpetual yield concepts. I suppose various parts of the air pollution business fall into this category and I wonder if you have looked at the SO₂ effluent charges proposed in the message of the President or a speech he made last spring.

If we assume that one of the specifications for the steady state society is moving all of our renewable resources to a perpetual yield basis I would be interested in your probing into the degree to which effluent charges and/or perhaps other incentives and penalties may be effective in promoting growth in these directions.

Sincerely,

Carroll L. Wilson

CLW:F

Room E40-253

January 2, 1973

Dale Runge

Dear Dale:

I am glad you tackled the subject chosen in your paper of December 14th but it is going to take some more work. Thus I could only give you a B. However, I am hopeful that when you have more time to work at this you will bring it into a significant contribution to the seminar. I am returning the copy with a certain number of my marginal notes which indicate the kind of questions I had as I ran through it.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosure

Room E40-253

January 2, 1973

David Weir

Dear David:

I do not know which course your paper on subsidized family planning services was aimed at but when I finished reading it I could not see any linkage or allusion or connection whatever to the topics we had been discussing during the term in the seminar. Being obliged to send in a grade on December 20th I sent in an incomplete--I.

I must ask you to write a paper which has some relation to the things we've talked about for in fairness to the others I think you should all be obliged to relate what you write about to the topics we spent all semester discussing--the steady state society, the problems of values, etc. Attached is your paper which I am returning.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosure

Room E40-253

December 31, 1972

Professor George Cabot Lodge
Harvard Business School
Soldiers Field Road
Boston, Massachusetts 02163

Dear George:

This will confirm my invitation to you to join the seminar at M.I.T. on Wednesday, January 10th. We will meet in the Sloan Building, Room E52-365, and hope that you can join us around 9:30 for a couple of hours.

The group is meeting under the general purpose of assessing the characteristics of strategies for sustainable growth. This has propelled us into taking a hard look at the plausible characteristics of a steady state economy in the early part of the next century. It would be one in which non-renewable resource useage would be minimized through a variety of incentives and penalties, renewable resources would be organized on a perpetual yield basis, environmental impact of man's activities would be minimized, population would be stabilized, new investment might be limited to the depreciation run-off from existing investment.

As you know, very few people have really confronted what kind of a society such would be, whether in terms of people's life-styles, their activities, the nature of the economy which would sustain them with a satisfactory quality of life, and so on.

We've been making some headway this past semester on these subjects and intend to continue through the spring semester. There are about a dozen students from M.I.T. and Harvard who are taking part.

We would very much welcome your joining us on the morning of the 10th.

Sincerely,

CLW:F

Carroll L. Wilson

sent 12/28/72

MEMORANDUM

TO: Members of Seminar 15.965
FROM: Professor Carroll Wilson
DATE: December 27, 1972
RE: Schedule for Independent Activities Period

Monday, January 8, 1973

9:30 - 12:30	Meet in Room E52-365
12:30 - 1:30	Lunch at the Faculty Club
1:30 - 3:30	Meet in Room E52-365

Tuesday, January 9, 1973

2:30 - 5:30	Meet in Room E52-365
5:30	Dinner at the Faculty Club

Wednesday, January 10, 1973

9:30 - 12:30	Meet in Room E52 - 365 George Cabot Lodge will attend
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A supplement as to the scheduling of other guest participants will be mailed shortly.

MEMORANDUM

TO: Members of Seminar 15.965

FROM: Professor Carroll Wilson

DATE: January 4, 1973

RE: Meetings on Monday, January 8, 9:30 - 3:30; Tuesday, January 9,
2:30 - 8:30; and Wednesday, January 10, 9:30 - 12:30 in Room 365.

You have already received a notice that Professor George Lodge will be with us Wednesday morning and a copy of his paper has been sent to you.

After considering various scenarios for Monday and Tuesday, I decided on the following:

1. Monday - We will examine the energy outlook because energy conservation may become the first real resource pinch. It is useful as an example of how quality of life may be sustained or improved with marked reduction in non-renewable resource use. Many questions arise concerning the factors which might induce such changes in advance of a catastrophe of some kind. Enclosed is a draft of a public statement (an editorial) I've written recently which identifies some of the issues.
2. Tuesday - I propose that we consider options for the second semester and try to develop a general plan. We meet at 2:30 and continue through dinner.
3. Wednesday - George Lodge will be with us from 9:30 to 11:00 or 11:30 and will leave plenty for us to discuss until adjournment about 12:30.

CLW/NCL

Enclosure: Draft Editorial

Draft Statement for Publication by
Carroll L. Wilson, December 30, 1972

SOME IMPLICATIONS OF ENERGY CHOICES

Rarely can the future effects of present national policy choices be seen so clearly as they can today in relation to energy. SCIENCE has become the leading forum for the debate on energy. The main scenarios can now be sketched.

Choice #1 might be called "full speed ahead," relying on oil imports to fill the gap - estimated at 10 million bbl./day or over 50% of domestic oil demand by 1980. Most of this imported oil would have to come from the Middle East in direct competition with Western Europe and Japan who must depend largely on these sources. The payments flow to these countries would rise from the present \$8 billion/year to at least \$32 billion/year (double the amount - double the price) with profound effects on the balance of payments and uncomfortable prospects as to the use some of the exporting countries may make of such untold wealth. Also, do we want to put those countries in a position so that acting together, as they now do, they could bring our economy to a halt by shutting off the flow of oil.

Choice #2 would place great reliance on nuclear energy. We would shift to electricity for much more of our residential and industrial demand and aim to put a severe limit on oil imports. A tiny band of knowledgeable critics is now challenging the gigantic atomic energy complex on the issue of nuclear reactor safety. The real debate is just opening. I expect the evidence is likely to show that a failure of the coolant system in water-cooled types of reactors is plausible, that such a failure would lead to melting of the intensely radioactive fuel core, that this molten mess would burn through the containers and foundations and "start for China" - except for 20% which is gaseous which would probably break into the atmosphere and drift downwind producing casualties by the thousand or million depending upon population densities in its path. One such disaster would generate demands for immediate shut down of similar plants. Several other aspects of Choice #2 are unattractive. Each 1000 MW(e) reactor produces 250 Kg of plutonium per year and 100 such reactors are forecast for 1985. Plutonium is one of the most poisonous substances known and the maximum life-time allowable body dose is set by the AEC at less than 10^{-6} gm. A leading AEC official has said we must expect unaccountable losses of plutonium

to be as high as 1%. Assuming a two-year fuel cycle this "loss" amounts to 125 Kg. of plutonium a year or 500 times the allowable body dose for the entire U.S. population. In addition there is the clandestine weapons problem. Annual plutonium loss would be enough to make about a couple of dozen Nagasaki type weapons if a mixture of Pu²³⁹ and Pu²⁴⁰ is useable for weapons as recently reported. Stealing this much or more out of the transportation system would not be difficult for a determined thief. Still another problem is the perpetual custody and care of radioactive wastes. Is this the kind of world we should bequeath to all future generations if we have safer choices?

The only safe course I see for present and future generations is Choice #3 which might be called energy conservation and development of new technology. A recent Government study defines many possible measures to reduce demand and waste without serious interference with lifestyles. Such conservation measures would reduce energy demand in 1980 by the equivalent of 7.3 million bbl./day. This is about one-fourth of the present energy useage. Such conservation would give us time to develop new technology and to assess whether heat from man's use of energy is likely to change the global climate. Today we

use in the United States about twice as much energy per capita as Great Britain, three times as much as France. In neither of these countries is life austere, nor would many people claim that the quality of life in the United States is 2-3 times better than in Britain or France. In new technology we should do several things. Firstly, we should develop and build environmentally acceptable plants to produce oil and gas from our vast coal reserves. Secondly, we should begin massive R & D on solar, geothermal and fusion energy systems to create an energy base for the 21st century. Thirdly, as an interim measure to reduce risks we should put all nuclear power plants at least 500 feet underground.

Choices #1 and #2 are unacceptable; Choice #3, energy conservation and new technology, is the only safe course. We should adopt a national goal of reducing energy use per capita by one half by 1985 instead of doubling it as we now seem headed towards doing. We probably could achieve this goal if we decided it was necessary, and as a result we would find ourselves and future Americans in a vastly safer and more comfortable position than by following Choices #1 or #2.

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FROM: Professor Carroll Wilson

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CLW/NCL
Enclosure: Draft Editorial

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A supplement as to the scheduling of other guest participants will be mailed shortly.

rec'd 12/21/72

18 December 1972

DAVID BENDEL HERTZ

Canell-

Thanks for your
kind note - look
forward to meeting
over a game design board
(stable economy type) -

All best wishes for
the New Year and
Happy holidays,

Professor Canell L. Wilson

D

Room E40-253

December 11, 1972

Mr. David B. Hertz
McKinsey & Company, Inc.
245 Park Avenue
New York, New York 10017

Dear David:

Thank you very much for your interesting paper delivered in Australia. It would be fun to develop a "stable economy game" and I will put it up to the seminar when we next meet. I am hopeful that we may spend three full days together in January and this might be one of the things we would focus on. The notion of coupons for the right to have babies, for energy, for durable goods, and for other things might distinguish these elements of an economy from others.

It is a fine idea and we'll see what we can do about it. If we make any progress we'll need you and Hazel back to give us guidance and to take part in the design and development.

With best regards,

Sincerely,

Carroll L. Wilson

CLW:F

cc: Hazel Henderson

rec'd 12/5/72

McKinsey & Company, Inc. 245 PARK AVENUE, NEW YORK, NEW YORK 10017

November 30, 1972

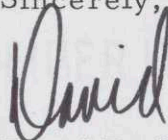
Dear Carroll:

I appreciated the opportunity to sit in on your seminar yesterday. I both enjoyed it and got some useful ideas out of it.

Hazel and I were talking on the plane coming back, and it occurred to me that, if you have not already done so, a very useful exercise would be to develop a stable economy game in which one might set a fixed limit on, e.g., energy, and some constraints, such as, a minimum individual income to a given population, and determine how the production and service elements of the economy might exchange "energy coupons" to yield the necessary goods and services. This is a very rough statement, I recognize, but some of the economic questions are very hairy, and this could be a useful exploration tool. If one does exist, I'd appreciate knowing about it.

I look forward to seeing you again soon.

Sincerely,



David B. Hertz

Professor Carroll Wilson
Urban Systems Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

P.S. You might be interested in a paper I delivered last summer in Australia.

Room E40-253

December 11, 1972

Mr. Sherry F. Huber
Vice President
Maine Audubon Society
57 Baxter Boulevard
Portland, Maine 04101

Dear Mr. Huber:

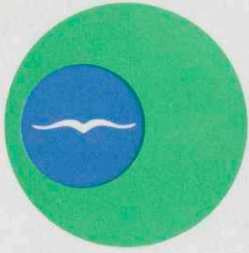
The seminar which Dennis Meadows mentioned to you is one under the general title of "Strategies for Sustainable Growth" but focused principally on features of a steady state society. I expect there will be some interesting papers which result from the work done this semester and if there are I would be glad to send you copies. However, at this time there is really nothing to send to you.

Sincerely yours,

Carroll L. Wilson

CLW:F

rec'd 12/7/72



MAINE AUDUBON SOCIETY

57 Baxter Blvd. • Portland, Maine 04101 • Telephone (207)-774-8281

December 5, 1972

Professor Carroll Wilson
M.I.T.
E 40-214
Cambridge, Massachusetts 02139

Dear Professor Wilson:

Dr. Dennis Meadows has suggested that I write you to ask about the seminar on the limits to growth which you organized.

Dr. Meadows is speaking in Augusta on December 11th, and it is our intention to set up a seminar program under the University of Maine's Center for Research and Advanced Study following his appearance.

I would very much appreciate any information you might be able to send me on your program, including organization, funding, participants, and objectives.

Dr. Meadows has also suggested that you may have some papers which have been ~~distributed~~ ^{presented} at your seminar which would be of value to us.

I greatly appreciate any help you can give us.

Sincerely,

Sherry F. Huber

Sherry F. Huber
Vice President

SFH:1c



Room E40-253

November 30, 1972

Professor Stephen Berry
Department of Geography
University of Chicago
Chicago, Illinois

Dear Professor Berry:

Yesterday Hazel Henderson was in Cambridge and took part in my seminar on "Strategies for Sustainable Growth." This is a group of graduate students from M.I.T. and Harvard who are endeavoring to visualize the characteristics of a society which has such sustainable features. Hazel Henderson mentioned an article by yourself on the thermodynamics of the life cycle of the automobile. Since we are looking around for the analogies of entropy to some of the characteristics of societies I would like very much to obtain a copy of this article and would be grateful if you could either send me a reprint or indicate where this is to be found in publication.

Sincerely yours,

Carroll L. Wilson

CLW:F

Room E40-253

November 30, 1972

Miss Miriam Sherburne
Room E52-470
M.I.T.

Dear Miriam:

Enclosed is the draft notice concerning the second semester seminar. The number I got from Esther as well as the time and place. Please make any changes which seem needed for your purposes.

I do intend to have the present group together for three full days January 8, 9 and 10, perhaps away from Cambridge.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosure

Second Semester - Seminar

C. L. Wilson

Number - 15.965

Topic - HYPOTHESES CONCERNING STEADY-STATE SOCIETIES

The first term 1972-73 in a seminar (15.963) on Strategies for Sustainable Growth we began to develop some models of so-called steady state societies which might exist in the United States early in the 21st century. Because so little serious attention has been given to this subject the opportunities for innovative thinking are large. New concepts have already emerged and we intend to assemble for publication the best products of the year.

Prerequisites - 15.963 - may be waived by permission of instructor.

Instructor - Professor Carroll L. Wilson

Time - Wednesdays 2:30 - 4:30 p.m.

Place - Room E52-369

Room E40-253

November 30, 1972

Miss Hazel Henderson
360 Rosedale Road
Princeton, New Jersey 08540

Dear Hazel:

You brought us a timely and most challenging point of view in the seminar the other day. I apologize for not having your paper reproduced and circulated before the meeting but I am taking steps at once to do so. I must confess that I had scanned it rather quickly and intended to have it reproduced because it was clearly right down the center of our interest in the seminar but then I didn't and left it home.

The discussion after your departure indicated how impressed the group was by a dialogue with someone who was really dealing with the cutting edge of change today. We were all much impressed by your courage and ability to assail the citadel of the economists and to take the very astute steps which you seemed to be taking towards opening up this priesthood and providing some voluntary assistance by economists to public causes. We salute you in this effort and understand after your visit why you may succeed at this and others have failed.

I shall be interested in the brochures you send me concerning the Council on Economic Priorities including the pulp and paper company studies and the other on investor-owned electric power companies.

Today I stayed home to draft an editorial for SCIENCE. Recently Phil Abelson invited me to write an editorial. I don't know whether what I have written will meet his standards but my subject is "Some Implications of Energy Choices." SCIENCE has become perhaps the leading forum for assessments in relation to energy policies. Their series on nuclear safety has been notable.

Miss Hazel Henderson
Page 2
November 30, 1972

We are much indebted to Frank Davidson for bringing you to M.I.T. and the seminar is indebted to Rebecca Cook for suggesting that you join our seminar.

I shall pick out some of the best papers which result from the work this semester and send you copies for I think they might interest you.

We intend to meet full time for several days in January and then run through the second semester probing more deeply the features of the "mature" or "steady state" society.

With many thanks for your exciting and gracious presence in Cambridge.

Sincerely,

Carroll L. Wilson

CLW:F

Carroll Wilson



UNIVERSITY OF COLORADO
Boulder, Colorado 80302

12/11

INSTITUTE OF BEHAVIORAL SCIENCE

November 28, 1972

Professor Jay W. Forrester
Alfred P. Sloan School
of Management
Massachusetts Institute
of Technology
50 Memorial Drive
Cambridge, Mass. 02139

Dear Professor Forrester,

Thank you for your letter and the paper on "Economic Dynamics," which I have read with great interest. If I can be of some assistance in this project, I would be glad to cooperate.

I think you are quite right in detecting an implicit dynamic model in Keynes' General Theory. Like Adam Smith, Keynes was a man whose "reach was greater than his grasp." He had a wide experience in the world and had an almost unconscious feeling of the way the dynamic processes of society actually operated, which I think he was never able to express in a formal way. What goes by the name of Keynesian economics today is an equilibrium theory, but while I am prepared to argue that it has considerable value and significance, it is not adequate to deal with the dynamic processes. The present dilemma of employment versus inflation (what we call the Phillips curve problem, although the Phillips curve itself is probably a myth) is evidence of the fact that we have never developed any adequate dynamic theory of the larger processes of economic life. I think you may be able to make an important contribution here.

I would urge you, however, not to confine yourselves to the General Theory which is a hastily written and unsystematic work in spite of its great importance. Even in the development of Keynes' own thought, The Treatise on Money cannot be neglected. It also contains implicit dynamic models of great importance, particularly in what is called the "widow's cruse" argument, that profits are recreated by distributions out of them in dividends. The deviation-amplifying feedback which produced the Great Depression of 1929-1933 cannot be understood, I think, without appreciating this process, and it is very important to work it into the model.

There are some further dynamic processes of great significance which are not covered in the General Theory which I think are not taken sufficient account of in your outline. All these relate to the price-wage system, which is of crucial importance in the total economic process, and yet which

in some peculiar way Keynes never really appreciated, in spite of his remarkable inside knowledge of the operation of price-making in speculative markets. Sraffa, another great Cambridge economist of that generation, is reported to have said "If only Keynes had taken the twenty minutes that was necessary to master price theory." There are three major dynamic aspects.

1) There are some very difficult and largely unresolved dynamic problems in what might be called the "epidemiology" of money-prices and money-wages. Decisions about prices and wages, in modern society at least, are always made in money terms. Somebody puts a price tag on the steak in the supermarket. An employer and an employee agree on a money-wage, usually plus fringe benefits which can be expressed in monetary terms, either individually or in collective bargaining. Neither real wages nor relative prices are ever the subject for decisions. Nevertheless, price theory has concentrated very heavily on the theory of relative prices. This is important too, but it does not answer the questions of how, in dynamic terms, decisions about money-prices and wages are effected by previous decisions and by information about previous money-prices and wages. I have thought that an epidemiological model would be highly appropriate here, and as it is easy to express these in dynamic terms, you may want to put processes of this kind into your overall system.

2) Even though relative prices and wages do not form an explicit part of the decision-making process, they form an extremely important implicit part, and the dynamics of this process cannot be neglected. Relative price structure is an important element in determining the distribution of income between occupational groups and industries. If the price of wheat is relatively high, for instance, this will shift income towards wheat growers and towards any specialized land, labor and equipment occupied in wheat growing, and away from the rest of society. Money-price and wage bargaining, therefore, is often something of a fraud. If steel workers get an increase in wages, this does not usually come out of the profits of steel corporations, but out of the rest of society in so far as they are users of steel. A rise in the rate of interest or tightening of the money market by the Federal Reserve may mainly affect the people who happen to be in the market for new houses at the moment. If people are dissatisfied with these redistributions, especially those on whom the burden falls, they may take some kind of action. People may, for instance, try to move into those occupations which are more highly favored.

Another very important element in this picture is the role of economic grants. This simply reflects the general proposition that when the system is under strain, what adjusts is the adjustable. In the case of those economic goods which are inelastic in supply, that is, in which the quantities produced or consumed are not adjustable, then the prices will adjust, and this will result in more or less permanent redistributions of income. How people react to redistributions, however, depends very much on their consciousness and how they are organized.

November 28, 1972

3) This brings me to the third dynamic process, which is the impact of various stresses in the system in producing grants, that is, one-way transfers, particularly in the public grants economy, through the tax and subsidy system. In conventional economics, it is generally assumed that if there are strains created by a disequilibrium relative price structure, then these will be relieved by appropriate shifts in relative prices. If, however, the price structure--or part of it--is "sticky" (i.e. non-adjustable), prices will not change but other things--especially grants--may change. These changes, like any other, may or may not be stress-relieving. A very good example of this is the case of U.S. agricultural price supports; these created surplusses, as any economist would predict, but these did not result so much in price adjustments as in changes in the grants, or one-way transfer system, producing, for instance, Public Law 480 to subsidize the export of agricultural commodities abroad. This phenomenon should be contained explicitly in any dynamic model.

The great difficulty in dynamic model-building, it seems to me, is the difficulty of identifying the strain producing changes in the system and, of course, identifying where the system is likely to "give." The system is likely to give at its weakest point, that is, its most adjustable point, but it is often hard to identify this, and particularly if we have a lot of points in the system of about equal strength, which one gives may be rather a random process. Where the adjustments are made, however, determines the whole future of the system, so that we find ourselves with a dynamic system with very large random elements in it, which is most disconcerting to the model-builder.

I am now back in Boulder after a two-month absence, and I hope we can arrange a meeting.

Yours sincerely,

Kenneth Boulding

Kenneth E. Boulding

KB:vw

and/or
Feb 26 / 27
Mar 14 / 15

rec'd 11/14/72

Hazel Henderson
360 Rosedale Road
Princeton, New Jersey 08540

November 10, 1972

Professor Carroll L. Wilson
Seminar on Strategies for Sustainable Growth
Room E-40-214
Massachusetts Institute of Technology
50 Memorial Drive
Cambridge, Mass 02139

Dear Professor Wilson:

I am coming up to give a guest lecture to the Systems Dynamics Group along with Dr. David B. Hertz of McKinsey & Co. on Wednesday, November 29th, at the invitation of Dr. Frank P. Davidson.

Since our lecture is not until 4.30 pm. I wondered if I might stop by and listen to your session at 2.30pm? I first encountered World Dynamics and Jay Forrester at the Institute on Man & Science Seminar on a Steady State Society in the Summer of 1970. I became more involved with steady state problems at the Stockholm U. N. Conference and have been working on the economic implications.

The enclosed article was commissioned by the Financial Analysts Journal, and will appear soon. I would value any comments you might wish to make.

I do hope that we can meet briefly, at least, when I am up in Cambridge on November 29. We are having lunch at 12 noon in the Faculty Club if you would care to join us there. Frank Davidson will know if there is any change of time.

Rebecca Cook, one of your students told me about the Seminar on Strategies for Sustainable Growth. She is a dear friend of mine and is finding the Course most stimulating.

Sincerely,


Hazel Henderson

enc/ Toward New Theories of Value:
How Far Can Economics Go ?

Room E40-253

November 19, 1972

Miss Hazel Henderson
360 Rosedale Road
Princeton, New Jersey 08540

Dear Miss Henderson:

We would be delighted to have you join the seminar on "Strategies for Sustainable Growth" from 2:30 to 4:30 on Wednesday afternoon, November 29th. Rebecca Cook has spoken to me and given me a copy of your paper which I look forward to reading before the 29th.

Sincerely,

Carroll L. Wilson

CLW:F

cc: Frank Davidson

484-8541

P.O. Box 72
Porter Square Post Office
Cambridge, Mass. 02140

September 18, 1972

Prof. Carroll L. Wilson
E 40-214, MIT
Cambridge, Mass. 02139

Dear Professor Wilson:

This is a request to attend your seminar "Strategies for Sustainable Growth". I hope I could contribute to the course because of (1) a limited familiarity with LTG and Systems Dynamics, (2) a long-standing interest in issues brought to public attention by LTG but often neglected in debate on its implications, and (3) experience as a professional editor.

(1) I did a small amount of informal work with Dana Meadows on the population portion of LTG. At her request I gathered and plotted the data for equation #102 (BCE vs. SOPC) and searched the literature for data on a couple of other equations. I sat in on the Systems Dynamics course (which used Principles of Systems and Industrial Dynamics) and occasionally attended the weekly colloquium of the Systems Dynamics group.

(2) One reason I am interested in looking into "what exactly is" an equilibrium/steady-state society is the negative slope of the "resources" curve in LTG's "Stabilized world model I"; I'm curious as to what contributions recycling, substitution and cutting demand can make to the problem of nonrenewable resources. To try to learn how public opinion re a steady-state society depends on values, education, etc. I attended a week-long conference on "Values and Technology" sponsored by those behind the journal Zygon and looked at the work of Kellman and others on what factors influence values; discussed the education problem with my friend Dave Burleson (an anthropologist in Moya Freymann's group who has tested attitudes of students toward birth control before and after taking a course on population); and followed the efforts of the Population Reference Bureau to help the news media cover population growth. The economic and political problems of stabilizing consumption are of particular interest to me. Because of meeting Reimmer, Perry and others at a Sierra Club conference on "Energy and the Environment", I've looked casually into Con Ed's efforts to slow the growth in New York City's use of electricity. (As well as changing its advertising policy, Con Ed has tried to change the rate structure; a real estate lobby has opposed,

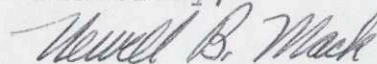
and the Audubon Society supported, Con Ed's application to the Public Service Commission to make a larger per cent increase in the price per KWH charged large customers than in the price charged small users.

The focus of my interest is "How to get from Here to There." My special interests are (a) systems models which include factors influencing the behavior of individuals (values, peer group approval, etc.) and institutions (votes, funds, members, customers, etc.), and (b) practical and realistic ways to forge new links within a system, or break old ones, so as to modify the system's output--for example, to halt growth. One approach I've found interesting is to try to find which new links within the system help trigger debate on social change (the enclosed ABM paper is an example), and a few years later try to find out whether the system's output actually changed (e.g. the enclosed evaluation of birth control programs). I've found the public policy literature, and the approaches of Forrester, Allison, Easton, etc. especially helpful.

(3) I enclose samples of my writing at roughly the level (between popular and technical) of SCEP and SMIC, and a bibliography of other papers. I have done editing professionally, and edited a newsletter.

I am not registered as a student at Harvard or MIT (I am a Harvard alumnus and worked briefly at MIT for John Arnold). I've written at length because, although on Wednesdays I am usually in Cambridge, I expect to be in New York this Wednesday. I shall try to reach you on or before Wednesday September 28 to answer any questions you may have and learn whether I may sit in on the course.

Sincerely,



Newell B. Mack

9/7/72

MEADOWS
DANIELS ROAD
PLAINFIELD, N. H. 03781

Carroll,

The name of the professor at Yale who is conducting the seminar on the limits to growth is:

Prof. F. Herbert Bormann
Professor of Forest Ecology
School of Forestry
Greeley Memorial Laboratory
370 Prospect Street
New Haven, Conn. 06511

I am sure he would be pleased to provide you with copies of the papers which are submitted to the seminar and to give you an updated list of the presentations which are planned under the aegis of the seminar.

Cordially,

Dennis

F. Bormann

Room E40-253

October 24, 1972

Mr. William Ophuls
Box 3378, Yale Station
New Haven, Connecticut 06520

Dear Mr. Ophuls:

Thank you for your note of October 4th. The schedule of the seminar is a little uncertain now but I shall be writing to you in the next few weeks and hope very much that we can arrange for you to join us some Wednesday.

Sincerely,

Carroll L. Wilson

CLW:F

rec'd 10/5/72

October 4, 1972

Box 3378, Yale Station
New Haven CT 06520

Prof. Carroll L. Wilson
Room E40-210
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Mass. 02139

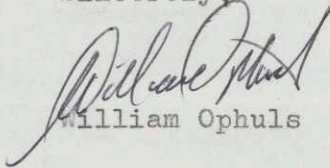
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Dear Prof. Wilson:

My apologies for the delay in answering your letter of August 28. I was away from New Haven until just a few days ago.

I am very interested in the seminar, which deals directly with many of the issues I am exploring in my dissertation, and would be delighted to come up to meet with you and the members of the seminar anytime this fall at your convenience.

Sincerely,


William Ophuls



Massachusetts Institute of Technology
Alfred P. Sloan School of Management
50 Memorial Drive
Cambridge, Massachusetts, 02139

September 26, 1972

MEMORANDUM

TO: Prof. Carroll Wilson
FROM: Bill Behrens
RE: Seminar on Strategies for Sustainable Growth

Very little is known about equilibrium, or sustainable growth; probably fewer than a half dozen people have dared to publish any concrete ideas on the subject. Ultimately, i.e. by next term, the class may want to talk about institutions, implementation strategies, and the like, but it seems to me that right now what we need is good ideas, innovative ideas of how to achieve certain objectives in a steady state. For example, the simple idea of putting effluent pipes upstream of intake pipes on industrial rivers is really the kind of idea that equilibrium currently lacks. Even if we could convince everyone in the world of the necessity of equilibrium, nobody would make the change if we had no descriptors of society in such a state.

I don't think one has to be very precise about choosing a country, location, etc. in order to come up with the rough ideas which are needed at this stage. I think rather that one should choose the objective that needs to be achieved, develop an idea (later to be expanded into a strategy), then see how the basic idea must be bounded in order to fit in some country, area, or region. I don't even think it is necessary for one to be convinced of the inevitability of equilibrium in order to engage in this process. Whether one views it as a realistic necessity or as an intellectual exercise is perhaps less important than focusing on objectives and problem areas. If equilibrium comes out as a desirable social condition, then perhaps society would choose to abandon current practices for the equilibrium alternative not out of some fear of collapse, but as a rational choice of more desirable alternatives.

It could prove useful to assign the few equilibrium readings that do exist--Garrett Hardin, Kenneth Boulding, Herman Daley, Mishan, and the like. Very little reading could cover all the existing ideas on equilibrium. Students could choose a problem area or objective they would like to explore--stimulation of recycling, redistribution of income, and others, and begin the task of developing an "innovation" to attack the problem, be it the structure of an effluent tax, baby licenses, or whatever, using whatever technique they are comfortable with--reading, brainstorming in groups, modeling. A well-written paper on their idea (assuming they come up with one) could be an incredible addition to the current literature, especially if it were written this term as an idea exposition, then redeveloped and written next term as a full strategy. In that way people could have both the free yet directed thinking needed for innovative ideas, and the structure of reality necessary for taking that innovation and pushing it to a real world policy. The sequence, I think, is important.

academic files

6/5/72

31 August 1972

Memorandum to: Those interested in the future of society
From: Prof. Carroll L. Wilson (Room E40-214, X3-1573)
Subject: Seminar on Strategies for Sustainable Growth

I am sending you a description of a seminar (not in the catalogue) that I am giving this year for your own information and so you may pass it on to people who you think will be interested in doing some creative work toward an "equilibrium" society.

Thank you for your cooperation.

A SEMINAR ON
STRATEGIES FOR SUSTAINABLE GROWTH

The publication of Limits of Growth^{*} has stimulated world-wide debate at all levels in national and international institutions. The substantive issues raised by Limits of Growth have received little attention, however, in formal studies of possible future directions for society. Such urgent issues which deserve attention are:

- What exactly is an "equilibrium" or "steady-state" society?
- How can wasteful consumption be reduced in a post-industrial society?
- How is the transition to "dynamic equilibrium" brought about, politically and economically?
- What value structures and motivations does a "steady-state" society imply or require?
- What are the economic issues involved in a stable population, full employment, scarce resource allocation, and the allocation of public goods?
- What are the educational needs to bring about the transition and what are the goals and characteristics of education in an equilibrium society?
- What historical examples of "steady-state" societies exist and how are they relevant to a modern post-industrial society?

It is the purpose of the M.I.T. seminar to deal with the issues of an equilibrium society in an imaginative and creative way, and to make a significant contribution to the literature on the possibilities for a modern equilibrium society.

The M.I.T. seminar to be held weekly will continue through the full academic year. It will be limited to about 15 participants with preference being given to graduate students at M.I.T. and Harvard. A requirement will be demonstrated ability to write. Each term the participants will be expected to write a major paper on some aspect of the subject. This will require original work because the literature is so sparse. It is hoped that the best papers may be published together in a book in mid 1973. It is possible that a 2-3 week summer project in 1973 may be organized to bring together a number of the

* By Meadows, Randers, Behrens, Universe Press, paperback, \$2.95, 1972, available now in 9 languages.

seminar participants and others to make an assessment of the state of knowledge and the programs of research and experimentation which are needed--in the manner in which the SCEP and SMIC studies were made at Williamstown and Stockholm in 1970 and 1971.

Details are as follows:

- Grad. A - 9 units

Subject - 15.963 (Special Studies in Management)

Title - Strategies for Sustainable Growth

Time - Wednesdays 3:00 to 5:00 p.m.

First meeting Wednesday, 13 September. It will be assumed that those attending will have read "LIMITS OF GROWTH."

Place - Sloan Building, 50 Memorial Drive, Room 52-365

Eligibility - Preference given to graduate students from M.I.T. and Harvard. Total number about 15.

Professor - Carroll L. Wilson

- Room E40-214, Telephone 253-1573

(relevant CV attached)

(To go on Poster)

The Response

- A Seminar continuing through the academic year
1972-73 (15. _____ in fall semester)
- Participation limited to about 15 with preference given
to graduate students from M.I.T., Harvard and Wellesley
- Time - 3:00 to 5:00 p.m. Wednesdays
- Place - Room _____, Sloan Building, 50 Memorial Drive
- Professor - Carroll L. Wilson

Information Relevant to Seminar on Sustainable Growth
Concerning Carroll L. Wilson

- Professor, Sloan School of Management
- System Dynamics Steering Committee
- Club of Rome Executive Committee
- Senior Advisor to the Secretary General, U.N. Conference on
the Human Environment
- Director
 - Study of Critical Environmental Problems (SCEP) 1970 - M.I.T.
Press Paperback, October 1970
 - Study of Man's Impact on Climate (SMIC) - M.I.T. Press
Paperback, September 1971
- Chairman, World Peace Foundation
- Chairman, International Centre of Insect Physiology and
Ecology (Nairobi)
- United Nations Advisory Committee on the Application of Science
and Technology 1964-71
- Director - M.I.T. Fellows in Africa and Colombia Programs
1960-67
- Formerly in mining and manufacturing and General Manager,
U.S. Atomic Energy Commission

August 28, 1972

Memo to: Tony Picardi

From: Carroll L. Wilson

Attached is a letter from Ophuls to Forrester which gives some very interesting references which it would be good to add to our list. I also observe his reference to a book that Freeman is bringing out this fall by Herman Daly called "The Economics of the Stationary State."

I suggest you get from Forrester's office the second paper which he sent to him. Forrester sent me only the first one.

I will want to have a good discussion soon with Jorgen Randers about all of these matters but I add these items including a copy of my letter to Ophuls for your information.

CLW:F

Enclosures

August 27, 1972

Memorandum to: Tony Picardi
From: Carroll L. Wilson
Subject: Seminar on Strategies for Sustainable Growth

I will be seeing you about this but I would like to get your help in getting the announcement out and preparing for the first meeting of this seminar on Wednesday, the 13th of September, from 3:00 to 5:00.

Attached is a draft of an announcement which should be put in the right form to be available to various registration officers, student advisors and others. I don't know how many copies are needed but would ask that you get in touch with Esther Merrill in the Sloan School to see how this is done. I'll also want to get it to John Segar at the Harvard Business School and Milton Katz at the Harvard Law School and Richard Smoke at the Kennedy Center and certain others. Enclosed is a draft and I'd like your reactions to it so that we can make any corrections before it is reproduced and distributed. I also need the correct course number and its rating in hours which is blank.

There is also a draft of a poster. I think there is too much on it but I'd like your suggestions of what we cut. I've added one quote from Arnold Toynbee and a substitute response for the lower right-hand corner.

The plan would be to have this made up by the M.I.T. graphic arts people in appropriate color and to have it posted in various parts of M.I.T., Harvard and Wellesley. This might stimulate a lot of people to inquire but I think we need a very selected group of individuals and we need evidence that they can write.

I would appreciate your discussing this since I will be away with Jan Willens, Steve Ehrmann who has a base at the Center for Policy Alternatives in the space building, and with Jorgen Randers who I hope will also take part in this seminar.

I think Willens may be assembling some ideas of bibliographies. I think you're doing the same and I would appreciate your putting these all together. Along with the material I am putting here there is a very interesting article by William Ophuls called "Leviathan or Oblivion." He wrote a letter to SCIENCE which was published at the same time as mine on 23 June. Enclosed is a copy of my letter to him. He sounds like just the sort of person we should try to involve in such a seminar.

People who express interest in taking part include Joe Perkowski who is still away in Washington and John Segar who is in the doctorate program at the Harvard Business School. There may be one or more people in the System Dynamics Group who would like to take part.

In the Ophuls piece there is reference to a controversial but widely acclaimed essay by Garret Hardin. There are also some other references in this which I hope you can round up for they sound relevant.

I am also enclosing here a copy of the blueprint and the announcement of the Woodrow Wilson Center investigation into aspects of sustainable growth. This has some very good material and will be useful to have at hand.

I am not clear at the moment just how we would launch this seminar but I think that an initial discussion for the first couple of meetings on the "Limits to Growth" and on such papers as "Churches at the Transition Between Growth and World Equilibrium" would be highly relevant. There is a volume of collected papers put together by the System Dynamics Group over the past couple of years which will be published, I believe, in October but most important would be accessible and you should look them over.

I am very pleased that you are interested in this topic and at least at the very outset I would hope to get your help in getting it launched. As you know, I must go to Europe on Wednesday, the 30th, for a stop in Munich at the Olympic games, a meeting of the Executive Committee of the Club of Rome in Rome on Saturday, the 2nd, and meetings of the Governing Board and International Committee of ICIPE in London the 4th through the 6th. I now plan to return the afternoon of the 7th--Thursday.

I have a feeling that the material and posters and other things need to be ready and perhaps distributed by that time or a day or so later so that they are clearly available before people start registering the following Monday and making their switches on whatever their programs may be. We have to face the fact that many people will have decided what they do in their program but I believe it's likely that we can get very interesting people to take part. We need about 15 who will, if possible, stay the course throughout the year and do some significant papers from which we can choose those to be published as a part of a book. I'll talk soon with the M.I.T. Press about the possibility of an instant book by September if we do a study project in late June or early July. We might even do it at the end of May and early June as an alternative.

It is probable that we would want to involve people in addition to those in the seminar itself and therefore late June-early July date might be better. As and when this takes shape I'll have to go about raising the necessary funds and organizing the rest of it. I look forward to discussing these things with you on Monday, the 28th, but this memorandum will contain the items of particular importance.

There's one other book I saw by Garrett Hardin called "Voyage of the Space Ship Beagle" by Viking Press which I hope you may order or it may be charged to my Coop card number which is 31944-2.

CLW:F

Room E40-210

August 28, 1972

Mr. William Ophuls
Box 3378, Yale Station
New Haven, Connecticut 06520

Dear Mr. Ophuls:

I read with a great deal of interest your paper entitled "Leviathan or Oblivion?" I am sending you herewith an announcement of a seminar we are organizing here at M.I.T. this year on "Strategies for Sustainable Growth" with other possible titles as indicated.

Your review of the political philosophers over time in relation to the subject of the stable state society is extremely relevant.

I hope very much that we can arrange for you to come up and meet with this seminar after we get underway in the fall.

I welcome you also as a colleague appearing in the same issue of SCIENCE when they finally got around to publishing our letters concerning their rather superficial comments on the Smithsonian session and "Limits to Growth."

Jay Forrester also sent me a copy of your letter to him of July 1 and I am glad to add the other references you have given there to those I am assembling from other directions.

I look forward very much to our early meeting.

Sincerely,

Carroll L. Wilson

CLW:F

Enclosure

1/6
July 1, 1972

Box 3378, Yale Station
New Haven, Conn. 06520

Professor Jay W. Forrester
Massachusetts Institute of Technology
Alfred P. Sloan School of Management
50 Memorial Drive
Cambridge, Mass. 02139

Dear Prof. Forrester:

Many thanks for sending "Churches at the Transition" There are many interesting linkages with my own work. Although I am approaching the environmental crisis from the perspective of political philosophy, ultimately political philosophy and theology merge, and there is no question in my mind that the ultimate solution to the crisis is religious. Selfishness has to give way to virtue, and virtue is a product of the moral order of society. If you have not already seen it, I believe you would find Lynn White's "The Historical Roots of Our Ecologic Crisis" of great interest. It was originally published in Science 155, p. 1203 (1967); it was reprinted in Paul Shepard and Daniel McKinley, The Subversive Science (Houghton Mifflin, 1969).

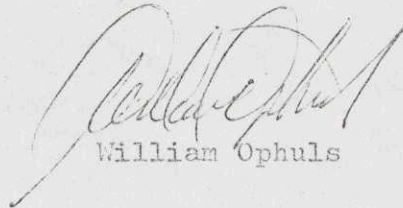
To give you some idea of what I am trying to do, I enclose my essay "Leviathan or Oblivion?" written to expose the incompatibility of our political assumptions and machinery with a long-term solution to the crisis of growth. It is now being considered by the Bulletin of the Atomic Scientists, but regardless of what they decide, it is to appear in Herman E. Daly ed., The Economics of the Stationary-State (tentative title), being brought out by Freeman in the fall. I also enclose a second paper, which adds a couple of points to the argument of the first. The next but last chapter of my dissertation will deal with some of the responses to the environmental crisis, and the religious response ("the turn to the East," etc.) will be a major part of the chapter. Also, as I am sure you know, the stationary-state economists--Boulding, Daly, Mishan--stress the necessity for new kinds of moralities, and I plan to bring out this aspect of their position.

I have no specific criticisms or comments for Mr. Randers, except to suggest that he follow up some of the leads in my longer paper if he is not already familiar with them. I hope he will push on with what I think would be a very important and useful work. I would be happy to respond to questions, supply drafts of chapters from my dissertation (however, the specifically religious section will not be ready until late fall), or assist in any other way possible.

You have perhaps seen my letter to Science by now. Carroll Wilson's more specific defense of the model was excellent, and together the two letters may help to undo some of the damage done by the original reportage.

I would appreciate receiving the paper you mentioned in the first paragraph of your letter (when and if it is written). I can use all the help I can get here at Yale. So far I have survived by having as little as possible to do with the Department of Economics, but the new chairman of Political Science (C. E. Lindblom, one of the greatest defenders of incremental decision-making) holds a joint appointment with Economics, and I may yet get dragged into some kind of battle over my dissertation with Wallich & Co.

Sincerely,

A handwritten signature in cursive script, appearing to read 'William Ophuls', written in dark ink. The signature is fluid and somewhat stylized, with a large initial 'W'.

William Ophuls



Professor Carroll Wilson

Massachusetts Institute of Technology
Alfred P. Sloan School of Management
50 Memorial Drive
Cambridge, Massachusetts, 02139

Room E52-454

August 18, 1972

Mr. Lincoln Gordon, Fellow
Woodrow Wilson International
Center for Scholars
Smithsonian Institution Building
Washington, D.C. 20560

Dear Linc:

Thank you very much for your letter of August 4 telling me of your new connection. Your proposed future program convinces me that a fresh wind is blowing through the social sciences and that we are going to see some exciting new work in the future. I hope very much to keep in touch with you and those who will be working with you.

You ask about my own future work. First of all we have a major program sponsored by The Rockefeller Brothers Fund to develop dynamic models of economic and social change at the national level. Second we have a strengthening program now being sponsored by HUD for extending the earlier work that John Collins and I started in Urban Dynamics.

At the present time the World Dynamics and Limits to Growth program is dormant. The controversy stirred up by the earlier work for the Club of Rome has created substantial difficulty in obtaining funding for further work, particularly through timid individuals in the government bureaucracies. Perhaps it is just as well to pause a moment and think over the next step in that direction.

As an outgrowth of the World Dynamics work we have ventured into the area of ethics and morality and Jørgen Randers and I conducted a two-day program last fall for The National Council of Churches. My paper from that occasion is enclosed. It seems to be creating substantial ripples among the theologians with some strongly interested and some strongly opposed. I anticipate that there will be financial sponsorship for Jørgen Randers' Doctoral thesis, to push system dynamics forward into the areas of ethics and morality.

The Urban Dynamics work which was first published in 1969 has now survived the first onslaught of the critics without serious damage and many practical people on the urban scene are taking it seriously. We have a program sponsored by HUD to now extend the Urban Dynamics work to make it a more specific and practical guide for urban decision-making. To keep the work practical and to

Mr. Lincoln Gordon
August 18, 1972

2

have a laboratory setting to avoid ivory tower isolation, we will be working specifically with Lowell, Massachusetts. The City Manager and many other influential people in Lowell are strong supporters of Urban Dynamics and want this assistance in planning their future directions. Whatever we do there will be readily transferable into other urban settings.

The mainstream of my own research is in the program for the Rockefeller Brothers Fund. This will be to develop dynamic models that will shed light on economic and social change and the policies that are governing the paths followed by nations. The emphasis will be on issues confronting the United States. But, as is true for all of our modeling efforts, one focuses on the general conceptual structure so that the lessons learned will have relevance to almost every country.

In this modelling of national economies I am taking a slightly different approach than in my earlier work. In Urban Dynamics we drew the model structure and the assumptions out of conversations with people who know the urban scene firsthand. This has distressed many of the critics particularly because they are denied access to the same input information and can not trace the transition from description to formal model. On this new program I propose to start with the verbal-dynamic descriptions that are to be found in some of the economic classics. From these descriptions one can develop a system dynamics model that will be completely different from the conventional models in economics and will, I believe, be far more informative and revealing of the actual economic processes. Toward this end I am starting with Keynes' General Theory which is a particularly interesting piece of work. It has been denounced, accepted, rejected, and more recently revived. But almost all of the controversy has revolved around the algebraic and geometric models that Keynes proposed. These represent not more than 5% of his book and Keynes in his own modeling does serious injustice to his own descriptions.

I propose to use this published material which has been available for 35 years as the basis for our own, and I think quite different, approach to economic modeling.

I burden you with perhaps more description than you bargained for because I have a request to make. As you probably have observed, many of the economists are rather strongly and emotionally opposed to what we have been doing particularly in World Dynamics. Yet in this new program we are going to need consultants, advisors, and friendly critics who will react to our work as it develops. So far it appears that the European economists are much more sympathetic to what we are doing than those in the U.S. But that perception may simply result from our not looking in the right places. I am hoping that you can suggest the names of one or more people who have a strong general background in economics and yet would be interested in the approach we are taking. I would appreciate any advice from you or your associates.

Mr. Lincoln Gordon
August 18, 1972

3

So far I have found one such person. He is Professor Helmut Schuster of The Technical University of Berlin. He is a tenure full professor there at the age of 33 and has apparently decided that system dynamics represents the most promising future hope for economics. He has been studying here with me for the last several months, has written a paper applying system dynamics to the classical Keynesian equations, has been of great help to me in shaping my ideas on how to proceed, and may come back next year for a period of two years to work with us. He is planning to write an elementary economics textbook using system dynamics as the methodological framework. I would like to have some people of substantial competence that we can cooperate with in this country. If some of them also have stature and reputation in the profession, so much the better.

Again, thank you for your letter and the information. I hope this reply is not too long. I want to encourage your proposal about acting as an informal clearing house because I feel it is quite important that the people doing some of the new work in the social sciences have some way of becoming acquainted with one another.

Sincerely yours,

Jay W. Forrester
Germeshausen Professor

JWF:ie

Enc. "Churches at the Transition Between Growth and World Equilibrium"
"Counterintuitive Behavior of Social Systems"
"The Carrying Capacity of our Global Environment—A Look at the
Ethical Alternatives"

Fellow / Woodrow Wilson International Center for Scholars

SMITHSONIAN INSTITUTION BUILDING • WASHINGTON, D. C. 20560 • TEL. 202-381-5613

August 4, 1972

Jay W. Forrester
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

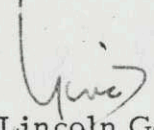
Dear Jay:

A few weeks ago, I shifted my headquarters from the John Hopkins School of Advanced International Studies to this Center, in order to participate on a long-term basis in the proposed work in the very broad field which we are calling "sustainable growth." The connections with your own interest are obvious, although our emphases are more heavily on changing attitudes and actions concerning directions of growth, in response to changing values as well as environmental resource restraints.

The enclosed paper is a very first rough indication of the kinds of terrain we hope to explore in the coming years. It evidently requires a great deal of further work on definition and selection, the latter depending heavily on the specific interest of the additional Fellows to join us. The immediate purpose of this letter is to let you know where we stand and to request an up-to-date indication of your own ongoing research interests. As we emphasized on page 4 of the enclosure, we hope to develop a comprehensive survey of parallel and overlapping projects elsewhere, not merely to assist in our own efforts and to avoid duplication but also to provide a kind of informal clearinghouse service to others elsewhere.

Could you give me some indication of your own plans for the next phase? I would also welcome a visit when you are next in Washington. I expect to be here until August 25, then in New Hampshire for a few weeks, and back in Washington in the second half of September.

Sincerely yours,


Lincoln Gordon

LG:mhp
Enclosure

*

Prof. Jay Forester
DRAFT - NOT FOR PUBLICATION
JULY, 1972

THE WOODROW WILSON INTERNATIONAL CENTER FOR SCHOLARS
Investigations into Aspects of Sustainable Growth

Population and production are pressing on the world's resources and environment to an extent viewed with concern by many and alarm by some. While concern with these pressures is not entirely new, it has assumed fresh urgency in face of the huge population expansion and the acceleration of technological change over the last generation. Moreover, there is an increased sensitivity to environmental problems and a new awareness that social restiveness, institutional overload, and political stress are often by-products of rapid growth. Clearly, there is a need for an integrative approach in attacking these issues in terms of both analysis and policy-making. All of the elements involved -- population growth, economic activity, social goals and the political process both in their domestic and their international aspects -- act and interact on one another and none of them can be realistically dealt with as an isolated phenomenon.

Of late, the debate has revolved around the question of directions and possible limits to growth -- population growth and economic (especially industrial) growth. There is a widening consensus that it is desirable, indeed necessary, to dampen the rate of world population increase and ultimately to stabilize the human census. On the other hand, there is much controversy surrounding the issue of whether the nations of the world should or can proceed on the path of continued, unhibited economic growth. The spate of recent discussion and writing by scholars and public figures demonstrates the depth of emotional and intellectual concern that accompanies any discussion

of "to grow or not to grow."

But to put the question in terms of growth or non-growth is to oversimplify the central dilemma. Few knowledgeable people would argue unequivocally that either indefinite economic growth along present lines or no further growth is a valid, universal solution. Nor is it plausible to suppose that any single solution could be applicable to all parts of the world, given the enormous present disparities in income levels, cultural backgrounds, aspirations, and population-resource ratios.

It is for these reasons that the Center has chosen the concept of Sustainable Growth as a major focus of interest. Some form of continued growth is ingrained in the political, social, economic, and psychological fabric of virtually every society and every institution in both the advanced and the less developed areas of the world. The critical questions are: How much of what kinds of growth any given nation, -- or region and the world as whole -- can sustain to maximize economic and social benefits and minimize disadvantages? How can these rates and kinds of growth be reconciled with a variety of political, ideological, and cultural attitudes and aspirations? What kinds of international tensions will arise and what adaptations and new institutional developments may be required to cope with resource and environmental constraints and differential rates and directions of growth?

These issues encompass a vast and complex family of problems with few immediately apparent, self-evident truths. The Woodrow Wilson Center has no illusions that it or any other single institution will be able to provide clear

answers or detailed blueprints for action over the whole of this vast canvas. Nevertheless, we are convinced that the issues can be substantially illuminated by bringing together at the Center natural and social scientists and political and international generalists to examine various aspects of sustainable growth. The Center has a number of advantages for this purpose: a broad mandate to strengthen the ties between the world of learning and the world of public affairs; location in Washington, and the ability to attract first-rate scholars with a variety of experiences, backgrounds, and national points of view.

* * * * *

In May 1972, the Trustees of the Center decided to make the subject of sustainable growth one of the Center's areas of emphasis during the next several years. The enterprise will concern itself with both national and international aspects of the problem within a time frame encompassing decades. Informed persons of diverse experience and backgrounds will be invited to join the Center to address these issues. A special effort will be made to secure knowledgeable participants from less developed countries. Many scholars working at the Center in related fields will also have valuable contributions to make.

The Center conceives its overall task to be first conceptual, then analytical, and ultimately prescriptive. The work will: (a) focus systematically on interrelationships among population, resources, energy, environment, and economic development; (b) identify the most serious physical, political, and social constraints on patterns of growth; and (c) suggest operational policy alternatives and workable institutional arrangements. The appointment of

Fellows will reflect these considerations. Scholars will be sought from several disciplinary backgrounds -- development and resource economics, demography, ecology, agronomy, political science, and others. The Center will encourage Fellows participating in the program to engage in an active exchange of views, not only with their colleagues, but also with outside experts.

The Center will maintain an active exchange of information with other institutions and individuals investigating these issues in the United States and abroad in order to keep abreast of their work and to avoid duplication of effort.

As first steps, the Center is undertaking two tasks:

(a) Systematic monitoring of analysis and research done elsewhere on interrelationships among population, resources, environment, and development for regions, countries, or smaller areas, as well as the world generally, and for varying time periods, with arrangements as deemed necessary for supplementing such work at the Center or elsewhere. This will include informed and critical evaluations of global and national growth models, to identify the valid and vulnerable assumptions and relationships contained in or overlooked by such models.

(b) Identification of the most likely resource and environmental constraints, with collection and evaluation of plausible ranges of projections for them.

* * * *

In selecting long range research projects, the Center will seek to avoid

duplication of work by others. The Center has already started to explore some of the issues and will be searching for scholars interested in pursuing complementary lines of inquiry. The final shaping of the work at the Center in this area will evolve as a result of our exchange of views with others and the proposals submitted by prospective Fellows.

The following topics are illustrative of early thinking on major problems that need to be addressed:

1. Development of the concepts of alternative patterns and goals of growth, especially those involving "qualitative" elements as distinguished from conventional "quantitative" increases in total or per capita gross national product. This includes efforts to identify "social" as well as "economic" indices of welfare and to quantify "diseconomies" (such as "free" environmental pollution) not now included in the national accounts. Especially in less developed countries, it may include employment levels and income distribution and possible other elements as criteria of "qualitative growth." The concept of "qualitative growth" also requires reexamination of methods for comparing present and future benefits and costs as well as other elements in accepted definitions of economic development.

2. Attitudes and perceptions with respect to economic and population growth, "quality of life," and environmental issues in various societies. Emphasis here would be primarily on philosophical, religious, and cultural attitudes, traditions, and aspirations.

3. Analysis of the shift toward services as a growing proportion of total output and employment, already evident in richer countries, including its effects on resource use and environmental impact, with exploration of possible

incentives for its acceleration.

4. Public policy of key selected countries representing a spectrum of ideologies and social systems (e. g., the United States, the Soviet Union, Japan, Sweden, China, Brazil, and India), with respect to industrial growth, population trends, environmental threats, resource conservation, energy use, etc. This line of inquiry would concern itself with both positive and negative policy postures.

5. Economic, social, and political effects of shifts toward qualitative growth in countries at various stages of pre-industrial, industrial, and post-industrial development. The analysis would include effects on use of various kinds of resources, environmental impacts, employment opportunities, and income distribution, as well as implications for urbanization, welfare, and educational needs.

6. Effects of shifts toward qualitative growth on the organization, attitudes, and functioning of business concerns in the United States and other countries, including multi-national enterprises.

7. The international implications of shifts toward qualitative growth, especially for economic and political relations between more advanced and less developed countries.

8. International tensions and possible confrontations involved in the increasing scarcity of certain raw materials and increasing dependence of high consumption countries on imported supplies. The study should include effects on supply and demand for such resources, markets for manufactured exports, terms of trade between supplying and importing countries, the balance of payments, the international division of labor, capital requirements,

and the role of multi-national enterprises.

9. Arrangements for the assessment of technology and for spreading desirable forms of available and anticipated technological innovation affecting the production or use of non-renewable resources and the protection of the environment, including analysis of the constraints posed by the slowness of national decision making and the absence of effective international decision-making machinery in these fields.

10. Consideration of various models for global or regional decision-making for possible multilateral action on various aspects of sustainable growth, including modification of existing arrangements and creation of new institutions.

11. Means for education and politicization of the key issues so that adaptation to patterns of sustainable growth may be made with a minimum of dislocation and conflict.

* * * * *

In summary, any of these and other possible long-range studies at the Center would be designed to illuminate three cardinal issues for the world community and its several parts:

(a) To what extent, in what manner, and on what time scale may growth be constrained by physical limitations?

(b) What other forms of constraint - political, social, or attitudinal - may affect various patterns of growth?

(c) In the light of both physical and social constraints, what rates and directions of growth are possible and desirable; and how may institutions best be pointed in those directions?

A list of scholars at the Woodrow Wilson Center as of July 1972 who are engaged in research efforts related, directly or indirectly, to this area of sustainable growth is attached.



Massachusetts Institute of Technology
Alfred P. Sloan School of Management
50 Memorial Drive
Cambridge, Massachusetts, 02139

MEMORANDUM

TO: Professor Carroll Wilson
FROM: Jay W. Forrester
DATE: June 28, 1972
SUBJECT: Your Memorandum of April 7 about a Fall Seminar
on the Equilibrium Society

I believe your suggestion is most timely and should be pursued for a seminar this fall on the questions that go beyond Limits to Growth and my paper "Churches at the Transition Between Growth and World Equilibrium." There should be several people at M.I.T. and in the other Boston area universities that would want to take part.

My own time is so heavily committed to the HUD Urban Program and to the Rockefeller Brothers Fund project that I should take no responsibility in planning and organizing.

However, this would seem to fall very close to the subject area of Jørgen Randers' Doctoral thesis and I would think that you and he might be the reasonable ones to get this going. Possibly you can find one or two other co-sponsors from some other department or some other university. My correspondence from other people may suggest names from either Boston University or Harvard. Let me know if you want me to search.

JWF:ie

cc - Professor Gordon S. Brown))
Jørgen Randers) with copy of April 7 Memorandum
Bill Behrens)
Robert P. Greene)

Sam

✓ We are basically facing only one ethical question in the impending global crisis. This is to decide on whether we want to continue to let our actions be guided by the short-term objective function, or whether we should adopt a longer-term perspective. In other words: the ethical question confronting global society today is to decide on the length of the time period used when comparing the costs and benefits of current actions.

It is my feeling that the moral and ethical leaders of our societies should adopt the goal of increasing the time-horizon implicit in mankind's activities--that is, introducing the longer-term objective function which maximizes the benefit of those living today, subject to the constraint that it does not decrease the economic and social options of those who will inherit this globe, our children and grandchildren.

In this equilibrium mode of human civilization, science and technology will be busily developing ways of constructing products which last very long, do not emit pollution, and can be easily recycled. Competition among individual firms may very well continue, the only difference being that the total market for material goods will no longer expand. In work, emphasis will be on repair and maintenance rather than on new production.

Although equilibrium implies non-growth of all physical activities, this will not be the case for cultural activities. Freed from the preoccupation with material goods, people may throw their energy into development of the arts and sciences, into the enjoyment of unspoiled nature, and into meaningful interactions with their fellow man.

From Randers paper on ethical alternatives

TRANSITION TO WORLD EQUILIBRIUM

✓ A vast new set of ethical and moral dilemmas now faces man as humanity begins to encroach on the physical limits of the world. If exponential growth of population and industrialization were to continue at the present rate, the entire globe would be inundated in a few decades. Such growth is becoming progressively harder to sustain. Many of the political and economic stresses we are now experiencing can be traced to the clash of growth colliding with a fixed natural environment.

In all of the social systems that we have examined, from the simplest corporate subsystem to the most complex of world interactions, the great stresses and the great changes in social pressure come at the point where growth begins to slow down and equilibrium begins to be approached. It is during the transition period that turmoil is greatest. Humanity is now approaching the transition from world-wide growth to equilibrium. By equilibrium we mean a condition of constant population, constant use of resources, and constant generation of pollution, all limited so that the equilibrium condition can be sustained indefinitely into the future. Equilibrium does not preclude a shifting composition within the constant level of world industrialization; equilibrium still allows changing cultural and ethical development in all dimensions that do not overload the natural environment.

Multiple pressures arise, as the world reaches the limits of resource usage, agricultural production, pollution dissipation, and living space. As we attempt to alleviate these pressures by intensifying agriculture, seeking resources on the ocean floor, constructing skyscrapers, and building pollution-control equipment, we permit growth to continue. But growth rapidly consumes the gains from our efforts; the task of outrunning growth becomes harder and harder; and eventually the social-economic structure will become nonsustainable. The forces of nature will become as high as necessary to overwhelm our efforts to exceed the capacity of our environment. As long as we succeed in driving forward along the historical growth path, counterpressures will become stronger and will appear in ever-proliferating aspects of existence. By our efforts we are increasing the forces we fight.

The Goal

311. There is every reason to suppose that the stable society would provide us with satisfactions that would more than compensate for those which, with the passing of the industrial state, it will become increasingly necessary to forgo.

312. We have seen that man in our present society has been deprived of a satisfactory social environment. A society made up of decentralised, self-sufficient communities, in which people work near their homes, have the responsibility of governing themselves, of running their schools, hospitals, and welfare services, in fact of constituting real communities, should, we feel, be a much happier place.

313. Its members, in these conditions, would be likely to develop an identity of their own, which many of us have lost in the mass society we live in. They would tend, once more, to find an aim in life, develop a set of values, and take pride in their achievements as well as in those of their community.

314. It is the absence of just these things that is rendering our mass society ever less tolerable to us and in particular to our youth, and to which can be attributed the present rise in drug-addiction, alcoholism and delinquency, all of which are symptomatic of a social disease in which a society fails to furnish its members with their basic psychological requirements.

315. More than a hundred years ago, John Stuart Mill realised that industrial society, by its very nature, could not last for long and that the stable society that must replace it would be a far better place. He wrote¹:

"I cannot . . . regard the stationary state of capital and wealth with the unaffected aversion so generally manifested towards it by political economists of the old school. I am inclined to believe that it would be, on the whole, a very considerable improvement on our present condition. I confess I am not charmed with the ideal of life held out by those who think that the normal state of human beings is that of struggling to get on; that the trampling, crushing, elbowing, and treading on each other's heels which forms the existing type of social life, are the most desirable lot of human kind. . . . The northern and middle states of America are a specimen of this stage of civilisation in very favourable circumstances; and all that these advantages seem to have yet done for them . . . is that the life of the whole of one sex is devoted to dollar hunting, and of the other to breeding dollar-hunters.

"I know not why it should be a matter of congratulation that persons who are already richer than anyone needs to be, should have doubled their means of consumings things which give little or no pleasure except as representative of wealth . . . It is only in the backward countries of the world that increased production is still an important object; in those most advanced, what is economically needed is a better distribution, of which one indispensable means is a stricter restraint on population . . . The density of population necessary to enable mankind to obtain, in the greatest degree, all the advantages both of cooperation and of social intercourse, has, in all the most populous countries, been attained . . . It is not good for a man to be kept perforce at all times in the presence of his species . . . Nor is there much satisfaction in contemplating a world with nothing left to the spon-

aneous activity of nature . . . If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it.

"It is scarcely necessary to remark that a stationary condition of capital and population implies no stationary state of human improvement. There would be as much scope as ever for all kinds of mental culture, and moral and social progress: as much room for improving the Art of Living and much more likelihood of it being improved, when minds cease to be engrossed by the art of getting on."

Our task is to create a society which is sustainable and which will give the fullest possible satisfaction to its members. Such a society by definition would depend not on expansion but on stability. This does not mean to say that it would be stagnant—indeed it could well afford more variety than does the state of uniformity at present being imposed by the pursuit of technological efficiency. We believe that the stable society, ~~the achievement of which we shall discuss in the next chapter,~~ as well as removing the sword of Damocles which hangs over the heads of future generations, is much more likely than the present one to bring the peace and fulfilment which hitherto have been regarded, sadly, as utopian.

345. In a stable society, everything would be done to reduce the discrepancy between economic value and real value, and if we could repair some of the damage we have done to our physical and social environment, and live a more natural life, there would be less need for the consumer products that we spend so much money on. Instead we could spend it on things that truly enrich and embellish our lives.

346. In manufacturing processes, the accent would be on quality rather than quantity, which means that skill and craftsmanship, which we have for so long systematically discouraged, would once more play a part in our lives. For example, the art of cooking would come back into its own, no longer regarded as a form of drudgery, but correctly valued as an art worthy of occupying our time, energy and imagination. Food would become more varied and interesting and its consumption would become more of a ritual and less a utilitarian function.

The arts would flourish: literature, music, painting, sculpture and architecture would play an ever greater part in our lives, while achievements in these fields would earn both money and prestige.

347. A society devoted to achievements of this sort would be an infinitely more agreeable place than is our present one, geared as it is to the mass produc-

tion of shoddy utilitarian consumer goods in ever greater quantities. Surprising as it may seem to one reared on today's economic doctrines, it would also be the one most likely to satisfy our basic biological requirements for food, air and water, and even more surprisingly, provide us with the jobs that in our unstable industrial society are constantly being menaced.

348. Indeed, as we have seen, the principal limitation to the availability of jobs today is the inordinately high capital outlay required to finance each worker. This limitation is withdrawn as soon as we accept that, within the framework of an overall reorganisation of our society, it would be possible for capital outlay to be reduced without reducing our real standard of living.

350. This does not mean that science must in any way be discouraged. On the contrary, within a stable society, there would be considerable scope for the energies and talents of scientist and technologist.

Basic scientific research, plus a good deal of multidisciplinary synthesis, would be required to understand the complex mechanisms of our ecosphere with which we must learn to co-operate.

In the words of H.E. Daly², the

American economist:

For several reasons the important issue of the stationary state will be distribution, not production. The problem of relative shares can no longer be avoided by appeals to growth. The argument that everyone should be happy as long as his absolute share of the wealth increases, regardless of his relative share, will no longer be available...The stationary state would make fewer demands on our environmental resources, but much greater demands on our moral resources.

But these political problems have solutions and we may only hope that we manage to solve them.

Thus it should appear that the idea of stopping the overall physical growth on our planet, is far from being an attempt by the rich countries to deviate the attention from "the" issue--namely economic development--to the protection of "their" environment. Rather equilibrium is a necessity if mankind wants to have an equitable future on his small, fragile planet.

The Golden Age

Only an orderly transfer into an equilibrium will save us from the tumult of an environmental crisis, and again put the human race into harmony with the world's ecosystem.

The presence of equilibrium could permit the development of an unprecedented golden age for humanity. Freedom from ever-increasing numbers of people will make it possible to put substantial effort into the self-realization and development of the individual. Instead of struggling merely to keep people alive, we could employ our energy in developing the human culture--that is, in increasing the quality of life for the individual to a level high above

²Herman E. Daly in The Patient Earth, John Harte and Robert Socolow, eds., Holt, Rinehardt and Winston, 1971.

the present subsistence. The few periods of equilibrium in the past--for example, the 300 years of Japan's classical period--often witnessed such profound flowering of the arts.

The freedom from ever-increasing capital--i.e., from more concrete, cars, dams and skyscrapers--would make it possible even for our great-grandchildren to enjoy solitude and silence. The desirable aspects of the steady state were realized long ago. John Stuart Mill³ wrote in 1857:

It is scarcely necessary to remark that a stationary condition of capital and population implies no stationary state of human improvement. There would be as much scope as ever for all kinds of mental culture, and moral and social progress; as much room for improving the Art of Living and much more likelihood of its being improved, when minds cease to be engrossed by the art of getting on. Even the industrial arts might be as earnestly and as successfully cultivated, with this sole difference, that instead of serving no purpose but the increase of wealth, industrial improvements would produce their legitimate effect, that of abridging labor.

This, then, is the state of equilibrium, which seems to be the logical consequence of the adoption of the long-term objective function.

The changes needed during the transition from growth to equilibrium are tremendous, and the time is very short. But the results seem worth striving for, and the first step--the acceptance of a long-term objective function--is one in which the churches have always been a leader.

³J.S. Mill, Principles of Political Economy, Vol. II, London: John W. Parker and Son, 1857.

From the Article "National Economy: How High Is Up?"
by Herman E. Daly, from Consulting Engineers (March, 1972)

[Why is the stationary-state necessary? In a finite world nothing physical can grow forever. All demographers agree that zero population growth is necessary at some point. The differences among them concern the size of the optimum population and the speed with which we should try to bring our present population (up or down?) to the optimum level. Likewise all economists should agree that zero growth in the stock of physical wealth is necessary at some point, though they may differ on the optimum level and the optimum speed of adjustment to it. The analogy between physical stocks of wealth and people is very close. Both take up space. Both require low

entropy inputs from the environment (depletion) for their maintenance, and both must return high entropy outputs back to the environment (pollution). The larger the stocks, the larger the necessary maintenance flows of depletion (production) and pollution (consumption). As long as these flows are negligible relative to the material and energy exchanges of the total ecosystem then we are protected by our own impotence. But with large and growing stocks of wealth and people, and with ever more powerful technologies for transforming material and energy inputs in ways and in quantities never before experienced in the aeons of biophysical evolution of our planet — we begin to resemble a growing bull in a China shop of fixed dimensions.

Needed Changes

But if there are irreconcilable conflicts between our current social institutions of finance on the one hand, and the first and second laws of thermodynamics and the laws of ecological balances on the other, then it should be clear to all that the burden of adjustment must fall on the social-financial institutions. How can we change our social and economic institutions so as to restore harmony between the economy of man and the ecology of nature? How can we attain a stationary-state economy?

The first thing to realize is that the change is a radical one. It means using technology to minimize the flow of production, subject to maintenance of some chosen stock of wealth and people. It means designing products to last. It means repairing things rather than throwing them away. But none of this strays too far from the old Protestant Ethic. The radical implication is in terms of distribution: if the annual flow of product is kept small, then how can we help those who are still poor? No longer can we piously hope that growth will take care of them. An increase in wealth for the poor will imply a decrease for the well-off. The focus of attention will be on the distribution of the stock of wealth, rather than on the minimized flow of income. Unlike the distribution of income the distribution of wealth has no theoretical explanation, much less justification. It is a historical datum. How can ethical claims to equal participation in using the stock of wealth be countered? Not, as today, by appealing to the necessity of inequality to provide incentives and to facilitate saving, all in the service of growth.

By keeping the stock of physical wealth constant we make fewer demands on our environmental resources, but in sharing the constant stock we place much heavier demands on our moral resources. Although stabilizing population will somewhat ease the problem of sharing, great moral resources are needed to achieve a stable population in the first place. Will our moral resources prove sufficient? No one knows, but even if we are doubtful it is obvious we are reaching the limit of the ability of economic growth to substitute for moral growth. One thing at least seems clear — a physically stationary economy must be a morally growing economy. If this means that economists should begin to study ethics and theology, then so be it. That is where economics began. ▲▲