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**On the Truly Noncooperative Game of
Island Life: Introducing a Unified Theory
of Value Evolutionarily Stable Island
Economic Development Strategy**

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The Linnean Society of London

4 July 2009

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On the Truly Noncooperative Game of Island Life:

Introducing a Unified Theory of Value

&

Evolutionary Stable Economic Development Strategy

4 July 2009

*Independence Day**

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Author:

Matt Funk,^{‡§} Fellow

The Linnean Society of London**

Naturae Discere Mores

* I liked America from the first, perhaps because I had been somewhat prejudiced against it. There was in 1950 a feeling of freedom, of personal independence, which did not exist in Europe and which, I thought, was even stronger than in New Zealand, the freest country I knew. These were the early days of McCarthyism... but judging by the general atmosphere I thought that this movement, which was thriving on fear, would in the end defeat itself. On my return to England I had an argument about this with Bertrand Russell....

The greatest and most lasting impact of our visit was made by Einstein. I had been invited to Princeton, and read in a seminar a paper on [quantum and classical physics]... In the discussion Einstein said a few words of agreement, and Bohr spoke at length....

I learned to my surprise that Einstein thought my suggestions concerning simplicity... had been universally accepted, so that everybody now knew that the simpler theory was preferable because of its greater power of excluding possible states of affairs; that is, its better testability....

It is difficult to convey the impression made by Einstein's personality. Perhaps it may be described by saying that one felt immediately at home with him, his good sense, his wisdom, and his almost childlike simplicity. *It says something for our world, and for America, that so unworldly a man not only survived, but was appreciated and so greatly honoured.*

—Sir Karl Popper, *Unended Quest*, 1992

‡ I only know that he who forms a tie is lost. The germ of corruption has entered into his soul.

—Joseph Conrad, *Victory: An Island Tale*, 1915

⇒ The Author declares no conflict of interest.

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DEDICATION

For Benjamin Joseph Funk Jr.

Born in London, England, on this very day, the 4th of July, 2009.

A remarkable feat of long-distance dispersal to an island:

from the former Union of Soviet Socialist Republics (φ_1)

and the United States of America (σ_1)

to the United Kingdom ($\varphi_1 + \sigma_1 + \sigma_2$).

TOUCHSTONE

Joshua Slocum was the first man to sail around the world in a small boat with none but himself as captain, mate and crew. Other men may repeat the feat. No other man can be the first.... He wrote of his ship and his voyage, and it never occurred to him that in doing so he was forging a bond between the English whose blood was in his veins and the Americans under whose flag he was proud to circumnavigate the world....

Captain Joshua Slocum was born in Nova Scotia in 1844. His father was a farmer, but for many generations his had been a seafaring family and, like most small boys along that coast, he spent every minute of his holidays in and out of small boats, though like many other sailors he never learned to swim. He was eight years old when his family moved to Briar's Island and he left school and was put to work on the farm. At the age of twelve he was caught making a ship model in the cellar where he should have been grading potatoes, was given a beating, saw his model smashed and ran away from home. For the next few years he earned a living for himself, as cook, ship's boy and what not, among the fishermen on the Bay of Fundy. At the age of sixteen he and a friend sailed before the mast in a full-rigged ship from St. John's [*sic*], New Brunswick, to Dublin. We next hear of him as an ordinary seaman in a British ship, sailing from England to China. He went down with fever and was left in a hospital at Batavia. There he made a very good friend in Captain Airy of the S.S. *Soushay*. He left Batavia in the *Soushay*, and in that vessel voyaged at many far-eastern ports. He can have lost no opportunity of educating himself, for at eighteen he was promoted to second mate. He twice rounded the Horn in British ships.

—Arthur Ransome, July 1947

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PRÉCIS

This discourse offers a solution to *The Problem of Sustainable Economic Development* on islands. This hypothesis offers a foundational, sub-game solution to *The Island Survival Game*, a counter-intuitive, dominant economic development strategy for ‘islands’ (and relatively insular states). This discourse also tables conceptual building blocks, prerequisite analytical tools, and a guiding principle for *The Earth Island Survival Game*, a bounded delay supergame which models *The Problem of Sustainable Economic Development* at the global level. We begin our exploration with an introduction to *The Principle of Relative Insularity*, a postulate which informs ESS for ‘island’ and ‘continental’ players alike. Next, we model ‘island’ economic development with two bio-geo-politico-economic models and respective strategies: *The Mustique Co. Development Plan*, and *The Prince Edward Island Federal-Provincial Program for Social and Economic Advancement*. These diametrically opposed strategies offer an extraordinary comparative study. One island serves as a highly descriptive model for *The Problem of Sustainable Economic Development*; the other model informs ESS. *The Earth Island Survival Game* serves as a remarkable learning tool, offering lessons which promote islander survival, resource holding power, cooperative behaviour, and independence by illuminating the illusive path toward sustainable economic development.

Key Terms:

Non-cooperative games, evolutionary game theory, relative insularity, islands, tragedy of the commons, sustainable economic development, theory of value, resource holding power, evolutionary stable strategy, natural selection, long-distance dispersal

Nothing is easier than to admit in words the truth of the universal *Struggle for Life*, or more difficult—at least I have found it so—than constantly to bear this conclusion in mind. Yet unless it be thoroughly engrained in the mind, I am convinced that the whole economy of nature, with every fact on distribution, rarity, abundance, extinction, and variation, will be dimly seen or quite misunderstood. We behold the face of nature bright with gladness, we often see superabundance of food; we do not see, or we forget, that the birds which are idly singing round us mostly live on insects or seeds, and are thus constantly destroying life; or we forget how largely these songsters, or their eggs, or their nestlings, are destroyed by birds and beasts of prey; we do not always bear in mind, that though food may be now superabundant, it is not so at all seasons of each recurring year.

—Charles Darwin, Esq., FLS, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*, 1859

The Linnean Society of London
Burlington House
Piccadilly
London
W1J 0BF
United Kingdom

12 February 2009*

RE: *On the Problem of Sustainable Economic Development, Human Survival,[†] & Fellowship*

Dear Fellows:

I find myself caught in an unenviable dilemma—caught between the obligation to disclose the vastness of my ignorance,[‡] and my responsibility to bring a great discovery to your attention.[§]

Therefore, perhaps I should state clearly from the outset that...

* Two hundred years ago [today], two of the most influential men of all time were born... , one in a three-story country mansion in Shrewsbury, in Shropshire, England, and the other in a one-room, dirt-floor frontier cabin in Kentucky.

Many believe English biologist Charles Darwin and American statesman Abraham Lincoln did more to change the world than any other figures in 19th Century history. Historians credit the pair with guiding the world into modernity.

Darwin did it by piecing together the theory of evolution, which... so thoroughly blew apart conventional scientific, religious and social thought and theory that 150 years later the dust still hasn't settled.

When Lincoln became president in 1861, much of the world still regarded the American ideal of democracy as a shaky, unstable experiment on the verge of failing.

Lincoln lived and validated the American dream... He saved the American experiment in its severest test, and validated the nation's founding documents by ridding us of slavery (1:1).

† The modern hero, the modern individual who dares to heed the call and seek the mansion of that presence with whom it is our whole destiny to be atoned, cannot, indeed must not, wait for his community to cast off its slough of pride, fear, rationalized avarice, and sanctioned misunderstanding. 'Live,' Nietzsche says, 'as though the day were here.' It is not society that is to guide and save the creative hero, but precisely the reverse (2:391, cf. APPENDIX I: GLOSSARY – *Human Survival*).

‡ All the great natural scientists were intellectually modest; and Newton speaks for them all when he says: 'I do not know what I may appear to the world, but to myself I seem to have been only a boy playing on the seashore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.'

Moreover, all the great scientists realized that every solution to a scientific problem raises many new and unsolved problems. Our knowledge of our ignorance becomes increasingly conscious, detailed and precise, the more we learn about the world. Scientific research is the best method we have for obtaining information about ourselves and about our ignorance. It leads us to the important insight that there may be great differences between us with regard to minor details of what we may perhaps know, yet we are all equal in our infinite ignorance (3:40).

§ The true responsibility of a scientist, as we all know, is to the integrity and vigor of his science. And because most scientists, like all men of learning, tend in part also to be teachers, they have a responsibility for the communication of the truths they have found (4:91).

I have never fancied my mind to be in any respect more perfect than those of the generality; on the contrary, I have often wished that I were equal to some others in promptitude of thought, or in clearness and distinctness of imagination, or in fullness and readiness of memory....

I will not hesitate, however, to avow my belief that it has been my singular good fortune to have very early in life fallen in with certain tracks which have conducted me to considerations and maxims, of which I have formed a Method that gives me the means, as I think, of gradually augmenting my knowledge, and of raising it by little and little to the highest point which the mediocrity of my talents and the brief duration of my life will permit me to reach. For I have already reaped from it such fruits, that, although I have been accustomed to think lowly enough of myself, and although when I look with the eye of a philosopher at the varied courses and pursuits of mankind at large, I find scarcely one which does not appear vain and useless, I nevertheless derive the highest satisfaction from the progress I conceive myself to have already made in the search after truth, and cannot help entertaining such expectations of the future as to believe that if, among the occupations of men as men, there is any one really excellent and important, it is that which I have chosen.

After all, it is possible I may be mistaken; and it is but a little copper and glass, perhaps, that I take for gold and diamonds. I know how very liable we are to delusion in what relates to ourselves....

This Tract is put forth merely as a history, or, if you will, as a tale, in which, amid some examples worthy of imitation, there will be found, perhaps, as many more which it were advisable not to follow, I hope it will prove useful to some without being hurtful to any, and that my openness will find some favor with all (5:preface).

On Sleepless Nights

With this disclosure in mind, I will relate that I have been a gifted sleeper all of my life, but for the past three years, something has been keeping me awake at night (*cf.* 6); it has also made many otherwise trivial pursuits far more wearisome.

Consider the following communiqués I mailed last week...

----- Original Message -----

Subject: RE: The Principle of Relative Insularity

From: Matt Funk < matt@funkisland.org >

Date: Fri, 06 Feb 2009 12:23:29 -0400

To: priya@linnean.org, leonie@linnean.org, biolj@soton.ac.uk, library@linnean.org

Greetings from Prince Edward Island!

As I echoed in the copied email I sent just a moment ago, I am writing to report a discovery.

As I noted, I'm about to board a flight, and whenever I do so, the thought of the loss of this solution becomes a bit unnerving!

I hope this rough abstract [*cf.* 6] outlines my discovery in sufficient light.

Fortune* willing, I'll send along a refinement and more details when time permits.

Bidding you Godspeed,

Matt Funk

* She was to be found on the back of many Roman coins, holding a cornucopia in one hand and a rudder in the other. She was beautiful and usually wore a light tunic and a coy smile. Her name was Fortune. She had originated as a fertility goddess, the firstborn of Jupiter, and was honoured with a festival on the 25th of May and with temples throughout Italy, visited by the barren and farmers in search of rain. But gradually her remit had widened, she had become associated with money, advancement, love and health. The cornucopia was a symbol of her power to bestow favours, the rudder's course, maintaining an imperturbable smile as she watched us choke to death on a fishbone or disappear in a landslide.

Because we are injured most by what we do not expect, and because we must expect everything ('There is nothing which Fortune does not dare'), we must, proposed Seneca, hold the possibility of disaster in mind at all times (7:87).

----- Original Message -----

Subject: Re: The Principle of Relative Insularity

Date: Fri, 06 Feb 2009 11:53:55 -0400

From: Matt Funk < matt@funkisland.org >

To: manastasio@lanl.gov

Sir:

First and foremost, I am writing to report a discovery which informs ESS for ‘individuals’ and ‘individual nations’ alike. This counter-intuitive, game-theoretical framework models the complex inter-dependencies which relate to your most central mission,* and, to this point, offers tenable solutions which foster national security, international cooperation, and global threat mitigation.

Secondly, please note that I most sincerely want to join your team at Los Alamos—but this matter is quite secondary to the urgency of my first point.

I am sorry that I did not have time to review or edit the first draft of the paper enclosed herewith [6], but I am boarding a plane for Chicago in an hour, and I wanted to send you this work-in-progress before tempting fate.

If you would like to meet with me, my near-term schedule is:

Tonight through Sunday: *The Union League Club of Chicago* (312.427.7800)†

16-17 February: Los Angeles: *The Los Angeles Athletic Club* (213.625.2211)

17 February - 5 March: *Waimea, Hawai’i* (808.885.1275)

On 6 March 2009 I will return to Prince Edward Island to finalize my *Researches into the Natural History of Hawai’i*, then my schedule remains quite open.

Yours very truly...Matt Funk

Upon my safe arrival in Chicago, however, I was horrified to discover the following reply:

----- Original Message -----

Subject: Mail System Error - Returned Mail

Date: Fri, 6 Feb 2009 11:34:22 -0500

From: Mail Administrator

To: matt@funkisland.org

Your message is larger than the destination computer is willing to accept, so it was returned. The error message below indicates the size of your message and the maximum size allowed by the receiving E-mail system. The following recipients did not receive this message:

<priya@linnean.org> <leonie@linnean.org> <library@linnean.org> <biolj@soton.ac.uk>

Of course I should have known better: after delivering a paper in the Åland Islands last summer—under this

* For more than six decades, the United States has trusted Los Alamos National Laboratory with its most formidable national security challenges. Perhaps the greatest threats facing the nation today are climate change and the related challenge of securing a sustainable... future. The nation’s investment in the Laboratory’s defense mission has fostered a host of unique scientific and technical capabilities that are also used to... mitigate the impacts of climate change, clean up conventional energy sources, and develop renewable sources and the energy storage technologies...

...For two decades, the Laboratory has also modeled energy, water, economics, and other elements of our national infrastructure with a focus on their complex interdependencies (8:1).

† Union College, the Union League Club. These and thousands of other familiar US landmarks, along with more than six hundred towns and cities bearing the name, testify to a once vital theme in American popular discourse. Few of those who today pass through, disembark at, or otherwise inhabit these places are likely to recognize the Union appellation as meaningful, much less as stating a profound aspiration to political unity. But from the late colonial period to the early Gilded Age, American leaders and ordinary citizens constantly expressed—in everyday talk and grand administrative planning, as well as in place names and architecture—their dreams of a ‘more perfect’ national union.

Beginning in the mid-1880’s Americans’ references to union declined sharply. So did the public testaments they left behind: of the eight states admitted since 1890, and the four lands that remain US territories today, just two included a (single) Union town or county, each established well before statehood. In succeeding years the practice was in fact reversed, as former Union cities, streets, and so forth were renamed or dismantled (9:ix).

menacing duress which I have been unable to escape—I had attempted to transmit a likewise ill-fated communiqué:*

----- Original Message -----

Subject: Re: Greetings from Stockholm!

From: Matt Funk <matt@funkisland.org>

Date: Tue, 17 Jun 2008 01:11:16 +0000

To: "Godfrey Baldacchino" gbaldacchino@upei.ca

Here's a copy of a very rough draft of a very big book - if Fortune should twist her hand and dash my efforts to reach the shores of North America again, please do your best to clarify it all, write an introduction, find a publisher, send a third of the proceeds to my son, a third to my wife, and keep a third for yourself.

Cheers! Matt

On the Difficult Art of Explaining[†]

In any case, I suspect that—at the very least—you may see that something heavy has been weighing on my mind, and, perhaps even recognize that, essentially, I am an illiterate American burdened by a very big idea. Although I had set out in search of a tenable economic theory of value – a solution to the most fundamental, open-problem in economics[§] – after much *sturm und drang*, I recognized only a unified theory of economic *and* evolutionary value would suffice. Thus, in the end, my journey has taken me into perilous seas of thought I was ill-equipped to sail: Although I am a fairly competent mathematician, able-minded theorist, learned logician, bold speculator, and a patient, detail-orientated, relentless problem-solver^{**}—I stumble in literary darkness, groping clumsily for words and narrative order which, more often than not, elude me. A great editor once told me that all great writing is a slow form of seduction, and, indeed, two of your brightest stars^{††‡} had the uncanny ability to seduce the human race, to spool out just the right amount of Ariadne's thread to lead the

* The original message was received at Mon, 16 Jun 2008 21:11:23 -0400 from ns-omr.2.mgt.netsol.com [10.49.6.65]

The following addresses had permanent fatal errors : <gbaldacchino@upei.ca> (reason: 552 Error: message too large).

† Explaining is a difficult art. You can explain something so that your reader understands the words; and you can explain something so that the reader feels it in the marrow of his bones. To do the latter, it sometimes isn't enough to lay the evidence before the reader in a dispassionate way. You have to become an advocate and use the tricks of the advocate's trade (10:xiv).

§ In economics the most fundamental of these central problems is the theory of value. The theory of value must explain how the comparative values of different goods and services are established. Until that problem is solved, it is not possible to analyse for scientific purposes what will be produced and in what quantities, how the resources will be employed in producing the menu of outputs, and how the resources will be valued. Without a theory of value the economist can have no theory of international trade nor possibly a theory of money (11:61).

** THE desire of knowledge is first stimulated in us when remarkable phenomenon attract our attention. In order that this attention be continued, it is necessary that we should feel some interest in exercising it, and thus by degrees we become better acquainted with the object of our curiosity. During this process of observation we remark at first only a vast variety which presses indiscriminately on our view; we are forced to separate, to distinguish, and again to combine; by which means at last a certain order arises which admits of being surveyed with more or less satisfaction.

To accomplish this, only in a certain degree, in any department, requires an unremitting and close application; and we find, for this reason, that men prefer substituting a general theoretical view, or some system of explanation, for the facts themselves, instead of taking the trouble to make themselves first acquainted with cases in detail and then constructing a whole (12:xxvii).

†† Charles Darwin was elected a Fellow of the Linnean Society of London on 7th March 1854.... He remained an active Fellow throughout his life, using the Library as a resource and reviewing papers submitted to the Society. We also received from him copies of his publications which now are a treasured part of the Library. He died on 19th April 1882 and is buried in Westminster Abbey (13).

†† Alfred Russel Wallace was elected to Fellowship of the Society somewhat later, on 18th January 1871 and remained a Fellow until his death on 7th November 1913.... By that time he was well established figure in natural history. The Society is lucky to hold a number of his manuscripts, as

unbearably shy, somnambulant human psyche through a long and tricky maze; they possessed an extraordinary range of talents—they were keen observers, deep, analytical, and consilient thinkers, *and* they also happened to be gifted with the rare ability to wax rhapsodic of beauty and grandeur, standing shoulder-to-shoulder with the greatest of your romantic prose stylists.* Alas, poetry flows not from my pen. Though I have toiled long into the night and struggled to convey the ‘unity of nature’ which I see so clearly in my mind’s-eye, my talents are more akin to Shiro (15) than Darwin or Wallace. Although I was once even foolish enough to believe that the logical content of this letter might suffice to move a province, island nation, or more—I have reluctantly surrendered and accepted the fact that I must continue to search for the appropriate words for each and every audience, and patiently relate my elegant *theory* (cf. *GLOSSARY*) with—so it seems more likely than not—a fairly large number of simple, straight-forward words (16). I have also had that extraordinary luxury of leisure,† do not own a television, possess a fiercely independent mind, and in light of the fact that a certain amount of bold speculation and stumbling about in the dark often proves productive,‡ perhaps there is some hope.

On the Problem of Long-Distance Dispersal

Our fossil record clearly demonstrates that 99.99% of all species that have ever inhabited the earth have fallen to extinction and, as a naturalist, I grasp the menacing shadow this record casts over the prospects for human survival,§ and although I understand why the logical implications** of this grave truth have been so dimly seen,†† I have had a tough time mustering

well as much of his biological library, often with interesting marginal annotations (13).

* It is somewhat remarkable that a man who died in 1882 should still be influencing discussion among biologists. It is perhaps equally strange that so many biologists failed for so many decades to accept ideas that Darwin expressed in clear and beautiful English (14).

† One of Darwin’s advantages was that he did not have to write grant proposals or publish 15 articles a year. He thought deeply about every detail of his theory for more than 20 years before publishing *On the Origin of Species* in 1859 [17], and for 12 years more before its sequel, *The Descent of Man* [18], which explored how his theory applied to people (13).

‡ The fascination of scientific work does not lie in the craftsmanlike utilization of the tools of a science. It is admirable for the gymnast to put his splendidly disciplined body through intricate manoeuvres, and it is no doubt equally admirable for the scientist to put his disciplined mind through a sequence of complex analytical or experimental manoeuvres. The great fascination of scientific endeavour, however, is precisely in the speculative pursuit of new ideas that will widen the horizon of our understanding of the world. This endeavour is not that of a graceful intellectual gymnast: on the contrary, the scientist is stumbling about in a jungle of ideas or facts that seem to defy... logic (11:70).

§ If we are the only intelligent beings in the galaxy we should make sure we survive and continue. But we are entering an increasingly dangerous period of our history. Our population and our use of the finite resources of planet earth are growing exponentially along with our technical ability to change the environment for good or ill... It will be difficult enough to avoid disaster in the next hundred years, let alone the next thousand or million. Our only chance of long-term survival is not to remain inward looking on planet Earth but to spread out into space... If we want to continue beyond the next hundred years, our future is in space (19:*finale*).

** Man's mind is his basic tool of survival. Life is given to him, survival is not. His body is given to him, its sustenance is not. His mind is given to him, its content is not. To remain alive, he must act, and before he can act he must know the nature and purpose of his action. He cannot obtain his food without a knowledge of food and of the way to obtain it. He cannot dig a ditch—or build a cyclotron—without a knowledge of his aim and of the means to achieve it. To remain alive, he must think (20:1012).

†† The hero adventures out of the land we know into darkness; there accomplishes his adventure, or again is simply lost to us....

There must always remain, however, from the standpoint of normal waking consciousness, a certain baffling inconsistency between the wisdom brought forth from the deep, and the prudence usually found to be effective in the light world. Hence the common divorce of opportunism from virtue and the resultant degeneration of human existence (2:188).

the eloquence to utter these truths effectively and unapologetically[†]—to relate why—like our mythical conception of *Struthio camelus*—we choose to bury our heads in the sand[‡] and, more often than not, refuse to explore self-evident evolutionary truths as they relate to *Homo sapiens*. For example, Carlquist’s revolutionary and daring advocacy of long-distance dispersal[§] (cf. APPENDIX II) has had a profound influence upon my theoretical development. During a recent seminar in the biology department at—we’ll say for anonymity’s sake—The University of Lonesome Isle, Professor ‘Biogeography’ postulated a positive correlation between large body-size and ease of long-distance dispersal across *Mammalia*. I politely countered that *Homo sapiens* effectively falsified this theory. Several attendees laughed, assuming that I was revealing a previously undetected sense of humour. Afterall, Professor Biogeography was by no means an amateur (e.g., cf. 22-25), and, furthermore, planes, trains, and automobiles, do indeed, at first glance, make this conjecture appear laughable. But it was not a joke. I was not kidding. I am not a funny man. If long-distance dispersal were as simple for relatively large-bodied humans as boarding a flight, half of the inhabitants of Sub-Saharan Africa would be living in limestone townhouses on the Upper East Side, bungalows at the Beverly Hills Hotel, and fortified country manors from Cornwall to Cumberland. As I clarified in Dr Biogeography’s seminar, ≈1MM Canadian geese (*Ranta canadensis*) migrate each spring from the United States into Canada – but not one is forced to land and present a passport at the border. This anecdote may help illustrate just how illusive the ‘unity of nature’ may be; furthermore, *Dr Biogeography’s Error* may be related to the fact that he had failed to recognize – or was taught not to understand – that subjects do not exist.^{††}

† Darwin... had the intellectual toughness to stick with the deeply discomfiting consequences of his theory (14).

‡ Darwin is still far from being fully accepted in sciences outside biology. ‘People say natural selection is O.K. for human bodies but not for brain or behavior,’ Dr. Cronin says. ‘But making an exception for one species is to deny Darwin’s tenet of understanding all living things. This includes almost the whole of social studies — that’s quite an influential body that’s still rejecting Darwinism’ (14).

§ As a result of his studies of plants inhabiting oceanic islands, Sherwin Carlquist became an advocate of long-distance dispersal. Vicariance biogeography rose to dominance in the late 20th Century, overshadowing the significance of long-distance dispersal as a legitimate biological process worthy of scientific study.... From Carlquist’s observations [in Hawaii]..., he formulated his theory of loss of dispersibility, which stated that island endemics, themselves descendants... that arrived via long-distance dispersal, have less dispersal capacity (21:abstract).

†† As a rule, I begin my lectures on Scientific Method by telling my students that scientific method does not exist. I add that I ought to know, having been, for a time at least, the one and only professor of this non-existent subject within the British Commonwealth. It is in several senses that my subject does not exist, and I shall mention a few of them.

First, my subject does not exist because subject matters in general do not exist. There are no subject matters; no branches of learning—or, rather, of inquiry: there are only problems, and the urge to solve them. A science such as botany or chemistry (or say, physical chemistry, or electrochemistry) [or biogeography] is, I contend, merely an administrative unit. University administrators have a difficult job anyway, and it is a great convenience to them to work on the assumption that there are some named subjects, with chairs attached to them to be filled by the experts in these subjects. I do not agree: even serious students are misled by the myth of the subject. And I should be reluctant to call anything that misleads a person a convenience to that person.

So much about the non-existence of subjects in general. But Scientific Method holds a somewhat peculiar position in being even less existent than some other non-existent subjects.

What I mean is this. The founders of the subject, Plato, Aristotle, Bacon and Descartes, as well as most of their successors, for example John Stuart Mill, believed that there existed a method of finding scientific truth. In a later and slightly more sceptical period there were methodologists

On the Non-existence of Subject Matters

As word of Humboldt's death filtered around the world, there was an outpouring of... reverence befitting a beloved international celebrity.... *The Herald* lauded him as 'one of the greatest men of his age or of any other age.... He had a gigantic intellect, from which nothing in nature or in science appeared to be hid. He could grasp all subjects, and he appeared to know everything.... *Cosmos* is his imperishable monument, which will endure as long as the earth which it describes.' *The Tribune* averred, 'His fame belonged not only to Europe, but to the world; and in this country especially, probably no man who was known to us only through the medium of his scientific writings was held in equal reverence and admiration.... But what will ever distinguish Humboldt from the mass of physical inquirers who had preceded him, is his study of the universe as a harmonious whole, and his search for the laws of order, beauty, and majesty beneath the apparent confusion and contradictions of isolated appearances....'

We may well ask, If Humboldt was so widely celebrated and so beloved during his long life..., why has he been largely forgotten in our own time?....

Above all he was a generalist, intent on examining every natural process and shaping the myriad discordant data into a coherent whole, as in *Cosmos*. However, by the mid-nineteenth century, science... was increasingly becoming the province of specialists, as shown by the trend to replace university departments of *Natural Philosophy* with the narrower disciplines that we know today (27:327-330).

Indeed, this trend has led to spectacular failures and deeply entrenched problems ranging from the maladaptive contrivance of the 'social sciences' to the *Transformative Hermeneutics of Quantum Gravity* (28, cf. 29-32). Although Sir Karl Popper, Frederich August von Hayek, Garret Hardin, and other great problem-solvers have fought to correct these errors,

it is easy to call for interdisciplinary syntheses, but will anyone respond? Scientists know how to train the young in narrowly focused work; but how do you teach people to stitch together established specialties that perhaps should not have been separated in the first place (33:682)?

Our *theory of value* unifies all so-called subject matters. Perhaps most notably, this theory re-unites economic principles with the 'Unity of Nature' which had been recklessly divided following some very bad advice from Condorcet (cf. *GLOSSARY: Denaturalization of Economics*). * Although my interest in natural history was rather accidental, looking back now, it's easy to see that the evolution of this interest was quite *natural*. I had set off more than a decade ago in search of a solution to what I thought was an 'economic' problem, but, over time, I recognized that the problem was insoluble through the narrow lens of 'economics,' and, moreover, that 'economics' and the other so-called 'social sciences' were essentially, *creating* the problem I was struggling to solve (cf. *APPENDIX III: ON THE PROBLEM OF IVORY TOWERS*). Birds are a part of

who believed that there existed a method, if not of finding a true theory, then at least of ascertaining whether or not some given hypothesis was true; or (even more sceptical) whether some given hypothesis was at least 'probable' to some ascertainable degree.

I assert that no scientific method exists in any of these three senses. To put it in a more direct way:

- (i) There is no method of discovering a scientific theory.
- (ii) There is no method of ascertaining the truth of a scientific hypothesis, *i.e.*, no method of verification.
- (iii) There is no method of ascertaining whether a hypothesis is 'probable', or probably true (26:5-6).

* The term *social science* was coined only in the 1780's, by Condorcet, and did not enter the English language until the early nineteenth century... The factors that led to the emergent field of social science were part and parcel of the process by which economics detached itself from natural philosophy (34:5).

nature, as are the nests they construct— that is straightforward enough for most to grasp. Humans – and the houses, cars, ICBM’s, *etc.* – are *also* part of nature, but this is not so readily grasped. Humans are not ‘encroaching’ upon nature – *we are part of it*. This has been clear since 1859. When gray wolves (*Canis lupus*) or the wild dogs of Africa (*Lycaon pictus*) fight, form packs, and hunt collectively, and claim territory with urine, we recognize this behaviour as pack-hunting, but when *Homo sapiens* fight, form packs, and hunt collectively (by waging wars and claiming territory with national boundaries, for example), the analogy eludes us more often than not.

But in any case, with these introductory remarks in mind, let’s set off on our exploration of evolution, economics, and relative insularity. As Orr reflected, “What now are the major outstanding problems in speciation?... We must (i) find the genes that cause reproductive isolation and (ii) identify the evolutionary forces that drove their divergence.” (35:10).

I’m afraid I’m unable to shed much light upon (i) but I have made progress regarding (ii) since *The Principle of Relative Insularity* represents no less than the law which regulates *The Struggle for Life*.

Though I am a citizen of the United States of America and a member of *The American Society of Naturalists*, little deliberation was required in consideration of the appropriate audience for this letter.* The fact that two of the most significant papers in natural history were communicated to the world by Fellows of The Linnean Society of London naturally solidified this decision. Although I need not comment upon the first paper (36), I suspect the content and significance of the second may remain largely unknown. Furthermore, given that *Naturae Discere Mores* serves as your guiding light and that you ‘embrace the entire sweep of natural history,’ I will endeavour to bring this lost treasure and its universal relevance to your attention, and begin to relate how it charts a clear, evolutionary stable course in our never-ending *Search for a Better World*.

Last summer, I presented a paper (37-38) which sketched my findings (39), and although I have naturally refined this theory, the central thesis has remained unchanged since May of 2008...

* The Linnean Society of London is the world’s oldest active biological society. Founded in 1788, the Society takes its name from the Swedish naturalist Carl Linnaeus (1707-1778) whose botanical, zoological and library collections have been in its keeping since 1829....

The Society uniquely embraces the entire sweep of natural history. It promotes the study of all aspects of the biological sciences, with particular emphasis on evolution, taxonomy, biodiversity and sustainability (13:3-4).

Ålandsvägen 26

AX - 22 100 Mariehamn

ÅLAND†

Dear Ålanders:

I love islands. But I do not love all islands equally, I do not love all islands unconditionally, and there are in fact many islands which I don't even like, much less love.

I love Iceland, St. Helena, the Faroes, Île aux Coudres, St. Pierre, Miquelon, Newfoundland, Fogo, Chiloe, Isla Grande de Tierra del Fuego, the Falklands, Necker, Shetland, Orkney, and Manhattan—but I am not fond of Key West, the Balearics, nor Cuba.

Yes, I love some islands, don't care for others, and many of the 'islands' I love most are not typically considered so, such as Los Alamos,[‡] the Fakahatchee Strand, the U.S. Constitution, Vermejo Park, the Flying D, Collon Cura, and Parker Ranches (*cf.* 43); the island-like province of Alberta, the independent states of Maine, New Hampshire (*cf.* 43:*Live Free*),[§] Vermont, Alaska,^{**} Wyoming, Montana, South Dakota, and the independent, island-like cantons of Switzerland.

I love Gibraltar, the land-locked 'islands' Austria and Andorra, the doubly land-locked island of Lichtenstein, the Gaspé and Kamchatka^{††} peninsulas, the Naknek (*cf.* 43:*Alaska*) and Cascapedia Rivers, Great Slave Lake,^{‡‡} Lake Chataqua, the Engadin valley, Zurich, Vienna, a mile-long stretch of undeveloped shoreline along Lake Gogebic (*cf.* 43), Ottawa, Katmai, Acadia, Glacier, and Joshua Tree National Parks, Baxter State Park, Norway, Finland, Estonia, the Alpine Convention Region,^{§§} and the pedestrian villages of Zermatt and Mackinack.

* AICIS... is an Åland based, international and independent, research institute which explores the economic and institutional aspects of insular entities - mainly from a comparative point of view. It operates, on a network basis, in close cooperation with other island institutes and academic institutions, as well as with a variety of economic and policy milieus, all over the world. AICIS... is an independent foundation, set up by a number of leading Ålandic companies: Åland Mutual, Alandia Corporations, Bank of Åland, and Åland Investment Ltd (40).

† Åland functions... similar to an independent state with its own legislation and administration (41:684).

‡ The design and development of an atomic bomb required enhanced security. Such a site needed to be safe from any chance of bombing by enemy aircraft and equally safe from curious citizens. General Leslie Groves ordered a search for such a site conducted throughout the western United States. Jemez Springs, New Mexico, met the basic requirements, but upon closer inspection in November 1942, Groves and Oppenheimer rejected the site because it was too confined by the high canyon walls and lacked a good road. Oppenheimer suggested another site, not far away, called Los Alamos. Groves approved.... Los Alamos seemed ideal. It was isolated, access to and from the site could be controlled....

At Los Alamos, they found the Los Alamos Ranch School, a residential boys' school that emphasized outdoor education for children of parents who could afford to give them the experience.

A light snow was falling, and the students and their teachers were on the playing fields in shorts. The school had a number of buildings that might be suitable for housing scientists, and generous views to the east and of the Sangre de Cristo mountains. This, Oppenheimer thought, would provide inspiration to the scientists (42).

§ The words *Live Free or Die*, written by General John Stark, July 31, 1809, shall be the official motto of the state (44, *cf.* 43:*Live Free, Bretton Woods*).

** Presently only Vermont and Alaska fully recognize the evolutionary stability of the Second Amendment.

†† The Kamchatka Peninsula's high insularity has provided the cradle (birthplace) for ≈70% of the Earth's salmon (*Salmonidae*), and offers a natural habitat which yields, amongst a cornucopia of biodiversity, the highest concentration of brown bears (*Ursus arctos horribilis*) on Earth.

‡‡ Great Slave Lake is massive, the 10th largest lake in the world, and forms part of the headwaters of the Mackenzie River. It lies smack in the middle of Canada's boreal forest, a 1.4 billion-acre swath of woods and waters that mantles northern America like a green crown, from Newfoundland all the way to the Yukon. 'The boreal,' as it is known, is one of the planet's last healthy and whole landscapes. It holds a quarter of the planet's intact forests and freshwater resources (45:83).

§§ The Federal Republic Of Germany, The French Republic, The Italian Republic, The Republic Of Slovenia, The Principality Of Liechtenstein, The Republic Of Austria, The Swiss Confederation, And The European Economic Community, AWARE that the Alps are one of the largest continuous unspoiled natural areas in Europe, which, with their outstanding unique and diverse natural habitat, culture and history, constitute an economic, cultural, recreational and living environment in the heart of Europe, shared by numerous peoples and countries, RECOGNIZING that the Alps constitute the living and economic environment for the indigenous population and are also vitally important for extra-Alpine regions, being the site of important transport routes, for example, RECOGNIZING the fact that the Alps constitute an essential habitat and last refuge for many endangered species of plants and animals AWARE of the substantial differences existing between national legal systems, natural conditions, population distribution, agriculture and forestry, the state and development of the economy, the volume of traffic and the nature and intensity of tourism, AWARE that the evergrowing pressures caused by man are increasingly threatening the Alpine region and its ecological functions, and that the damage is either irreparable or rectifiable only with great effort, at considerable cost and, as a rule, over a long period of time, CONVINCED of the need for economic interests to be reconciled with ecological requirements (46).

Some of my favourite islands happen to be islands within islands, such Bermuda's Fairmont Southampton (*cf.* 43:*Bermuda*),* Lyford Cay, The Ocean Reef Club (*cf.* 43), Katahdin Lake Wilderness Camps, Woburn Abbey, Haddon Hall, Berkeley, Lindisfarne, and Alnwick Castles, the National Park on the north shore of Prince Edward Island (*cf.* 43:*Island Life*)—and the three cottages on Hummingbird Lane, tucked within the borders of this national park—and thus, essentially, three islands within an island on an island.

But at the pinnacle, above all others, there is a very special class of islands which I love the most: the United States and the United Kingdom,‡ Mustique (*cf.* 43), Greenland, Newfoundland, Catalina Island, Skorpios, Kodiak Island, Baffin Island, the Svalbard Archipelago, Mago, Molokai, the big island of Hawaii, the diminutive Entry Island, Ile aux Coudres, Forsythe, Funk (49) the Moonsund, Roque, Vinalhaven-North Haven archipelagos, Monhegan, New Zealand,§ Waiheke, Tasmania, Kangaroo, Japan,** the Azores,†† San Marino, Lofoten, Gotland, Koster, Fårö, Ekerö, Orust,‡‡ and each and every one of the six thousand five hundred Åland Islands.

And so I thank you for the opportunity to present this paper and my forthcoming seminar at your second annual conference, *Islands of Competence – Branding Identities in a Globalized World*. It will be a great privilege and honour to visit Åland and the Baltic Sea, which, to date, I have only been able to admire from afar.

Why do I love Åland? Why do I love some islands and dislike others?

This is the story I would like to share with you....

Although time will presently not enable us to scratch the surface of the islands I love most, we will explore specific inter-dependencies relating to several, and, moreover three fundamental qualities which relate to them all: (i) The inhabitants of these islands have demonstrated exceptional and enduring preferences for relative insularity, (ii) they have maintained this preference through independence, *Darwinian fitness (Resource Holding Power, 53)*, and (iii) thus these islands are *relatively valuable*.

* Comprising over 100 acres and rising to an elevation over 100 feet above sea level, the Fairmont Southampton is the highest, driest, and largest contiguous piece of private property in Bermuda (47).

‡ When great powers are separated by large bodies of water, they usually do not have much offensive capability against each other, regardless of the relative size of their armies. Large bodies of water are formidable obstacles that cause significant power-projection problems for attacking armies. For example, the stopping power of water explains in good part why the United Kingdom and the United States... have never been invaded by another great power. It also explains why the United States has never tried to conquer territory in Europe or Northeast Asia, and why the United Kingdom has never attempted to dominate the European continent. Great powers located on the same landmass are in a much better position to attack and conquer each other. That is especially true of states that share a common border. Therefore, great powers separated by water are likely to fear each other less than great powers that can get at each other over land (48:44).

§ The two great islands which mainly constitute New Zealand are together about as large as the kingdom of Italy. They stretch over thirteen degrees of latitude in the warmer portion of the south-temperate zone, their extreme points corresponding to the latitudes of Vienna and Cyprus. Their climate throughout is mild and equable, their vegetation is luxuriant... The geological structure of these islands has a decidedly continental character... Gold, silver, copper, tin, iron, and coal are plentiful.... The position of New Zealand, in the great Southern Ocean, about 1,200 miles distant from the Australian continent, is very isolated (50:434-435).

** The Japanese Islands occupy a very similar position on the eastern shore of the great Euro-Asiatic continent to that of the British Islands on the western, except that they are about sixteen degrees further south, and having a greater extension in latitude, enjoy a more varied as well as a more temperate climate. Their outline is also much more irregular and their mountains loftier, the volcanic peak of Fusi-yama being 14,177 feet high ; while their geological structure is very complex, their soil extremely fertile, and their vegetation in the highest degree varied and beautiful (50:357).

†† 'Not a beach destination or otherwise susceptible to mass tourism; indeed, its capricious climate probably impedes the flow of tourists. The islands' green volcanic mountains and picturesque black-and-white towns look set to remain unspoiled....'

'Remote and temperate, the Azores remain lightly toured.... The ecosystem—from the beautiful hydrangea-covered hills of Flores to the rock-bottomed bays of Terceira—is in great shape' (51).

‡‡ The largest island on the western coast of Sweden, Orust covers a mere 45 square miles and has only about 16,000 residents. Yet the island produces more than 50 percent of Sweden's sailboat exports; roughly half of the island's tradesmen build sailboats (52).

On The Principle of Relative Insularity

In short, the *Struggle for Life* on the islands I love, those I do not, and the island of Earth alike, is regulated—past, present, and future—by the merciless law which has been keeping me up at night.

The principle which has regulated life on earth for the past 4.5 billion years is the very same law which regulates the survival of every living organism on earth yet today, the very same law which regulates the survival of men, women, children, dragonflies, bison, hedge funds, ranches, islands, nations, island nations, currencies, and inhabitable planets alike; this theory clearly illuminates the true nature of the nonrandom gauntlet all organisms must run, but casts an especially bright light upon *Homo sapiens* and nations ('individual' nations, that is, which neither connotes nor denotes *The Theory of Group Selection*).^{*} *The Principle of Relative Insularity* demonstrates how *Darwinian fitness* (*cf. GLOSSARY*) is won and lost through the deployment or failure to deploy *evolutionary stable strategies*, to gain and maintain *relative insularity* with *Resource Holding Power* (*RHP, cf. GLOSSARY*).[†]

(39) offers the 'evolutionary stable strategy' (*ESS, cf. GLOSSARY*) for *The Problem of Human Survival*, a 'strategic equilibrium' (*GLOSSARY*) which informs, naturally, strategies for all derivative problems, such as *The Problem of Global Warming*, a problem which, when we apply our powers of reason, we may recognize more generally and fruitfully as one mere aspect of *The Problem of Sustainable Economic Development*.

Prior to our theoretical, comparative and quantitative exploration of 'relative insularity,' we should offer a few preliminary remarks, as this term is loaded with many preconceived – and often false – notions. Thus, please indulge a few definitive points which may help frame our discourse. The entry in my beloved and generously discounted (*cf. 43: Governing Idea II*) *Oxford English Dictionary* speaks volumes of this word, but the three definitions most relevant to our theory are as

^{*} No other potential object of selection has been as frequently the source of argument as the group. From the synthesis to the 1960s no evolutionist was a champion of group selection. It is not supported, indeed not even mentioned, by Dobzhansky (1937) or in my widely used text... It is not listed in the index of either volume. I fail to find a whole-hearted adoption of group selection in any other publication in contemporary evolutionary biology. Group selection is upheld only in some publications in behavioral biology and ecology. Konrad Lorenz frequently stated that some trait was favored by selection because it was 'for the good of the species.' The ecologists also tended to typological thinking, and one finds frequent references in the ecological literature (Allee, Emerson, Brereton, *etc.*) that amount to a support for group selection. These statements in general were ignored in the evolutionary literature. This all might well have changed when Wynne-Edwards published in 1962 a vigorous promotion of group selection. He claimed that in animals, particularly in birds, and specifically in red grouse, many life history traits had been acquired by group selection. This claim was at once, point by point, vigorously refuted by David Lack in a superb analysis (1966). Lack was not the only one to reject the group selection thesis. G. C. Williams devoted an entire book... to this purpose.... Together with Lack's refutation this was the end of Wynne-Edwards's ill-founded claims (54:146-147).

[†] Although genomic studies suggest that natural selection in humans is ongoing, the strength of selection acting on particular characteristics in human populations has rarely been measured. Positive selection on male wealth appears to be a recurrent feature of human agrarian and pastoralist societies, and there is some evidence of it in industrial populations, too.... Even the weakest selection gradients observed for male wealth in humans are as strong as or stronger than selection gradients reported from field studies of other species. Thus, selection on male wealth in contemporary humans appears to be ubiquitous and substantial in strength (55:abstract).

follows:

1. a. Of or pertaining to an island; inhabiting or situated on an island. 1611 COTGR., *Insulaire*, Insular, Iland-like; of, or belonging to, an Iland...
- b. *Phys. Geog.* Of climate: Of the moderate or temperate kind which prevails in situations surrounded and tempered by the sea. 1830 LYELL *Princ. Geol. I. 97 An alteration from what has been termed an 'insular' to an 'excessive' climate. 1880 HAUGHTON Phys. Geog. iii. 118 The term 'Insular Climate' has been always given to climates in which the annual range of temperature is small...*
2. Of the nature of an island; composing or forming an island.
3. a. *transf.* Detached or standing out by itself like an island; insulated (56).

'Insulated' is indeed our touchstone of choice, and, going forward, perhaps the most relevant conjecture to consider is that "insularity is a condition that offers a balance of advantages and disadvantages, opportunities and threats, whether applied to islands, communities, areas or economies" (57:368). Furthermore, insofar as sustainable economic development is concerned, we may wish to take in a bit more food for thought and plant a few seeds in the backs of our minds:

It can be argued that development is a relative term, to be compared with other socio-economic and political contradictions, or that it is not a relative concept, but simply the name we give to structural change. However this may be, development is neither new nor old, but a fact of life. What relationships can we discern between development and insularity? How does insularity affect the development process and the development condition of a society? How can insularity be studied within a framework provided by the concept of development? What effects has insularity, viewed both as a physical and political-economic condition and as a psychological element, exerted upon the openness to innovations (57:11)?

Perhaps I should also offer a good example of the type of entirely false notion to which I had referred. For example, it is commonly suggested that

insularity can be largely defined as a situation deriving from the nature of insular areas or islands, whereas islands are strictly bounded areas with specific geographical characteristics such as land discontinuity, distance from the mainland and remote location at sea. These characteristics have negative effects on the economic and social development of insular areas and constitute a basic environmental feature; isolation is generally regarded in human terms as a disadvantageous situation, and therefore development planning are often orientated towards its reduction (58:171).

Yes, "insularity is normally considered to be economically disadvantageous" (59:195). But we shall soundly refute and falsify this widely held à-priori assumption—both in terms of the principles of economics, and the syllogistic core of *Natural Selection (GLOSSARY)*. This task it not difficult to accomplish on the evolutionary front (*cf.* 54 ; 60)— especially in light of the fact that I am preaching to the choir; thus my challenge rests with, and will thus be focused upon, the falsely

held notions of many influential economic theorists and the hecatombs of civilization under their sway.*

Although my letter to the Ålanders attempted to illustrate the dominant role relative insularity has played in the natural histories of many of the islands I love most, here I will focus upon one: a small, arid, *treasure island*—an island, ironically—amongst the ‘lesser’ of the lesser Antilles: *Mustique*.

Which brings us to the second priceless account of natural history to which I had referred.

(38) chronicled the unearthing of a treasure,

a paper out of the University College, London, which was accepted for publication in April of 1973 in what seems to this writer to be the single-most appropriate Journal for any such gem: *The Biological Journal of the Linnean Society*.† This paper is *The Ecologist's Role in Development for Tourism: A Case Study in the Caribbean* (62).

I opened this treasure-chest, carefully assessed the glimmering stones and nutritious minerals within, and, when I had had my fill and was about to close the lid, a faint sparkle on the final page caught my eye...

LLEWELYN-DAVIES, WEEKS, FORESTIER-WALKER & BOR, 1970. *Mustique: proposals for a development study*. Unpubl. Rep.

Well now. What was this?

I googled for hours, emailed for days, searched for months, but, alas, I could not put my hands on it. My enthusiasm faded. I tried to forget about it. But I couldn't.

Yes, I suspected it may be valuable. But I certainly did not recognize, and could not imagine that it was the very grail I had set off in search of over a decade ago.

* Now that the Nobel Memorial Prize for economic science has been created, one can only be profoundly grateful for having been selected as one of its joint recipients, and the economists certainly have every reason for being grateful to the Swedish Riksbank for regarding their subject as worthy of this high honour.

Yet I must confess that if I had been consulted whether to establish a Nobel Prize in economics, I should have decidedly advised against it.

One reason was that I feared that such a prize, as I believe is true of the activities of some of the great scientific foundations, would tend to accentuate the swings of scientific fashion.

This apprehension the selection committee has brilliantly refuted by awarding the prize to one whose views are as unfashionable as mine are.

I do not yet feel equally reassured concerning my second cause of apprehension.

It is that the Nobel Prize confers on an individual an authority which in economics no man ought to possess.

This does not matter in the natural sciences. Here the influence exercised by an individual is chiefly an influence on his fellow experts; and they will soon cut him down to size if he exceeds his competence.

But the influence of the economist that mainly matters is an influence over laymen: politicians, journalists, civil servants and the public generally (61:1).

† The *Biological Journal of the Linnean Society* is a direct descendant of the oldest biological journal in the world, which published the epoch-making papers on evolution by Darwin and Wallace. The *Journal* specializes in evolution in the broadest sense and covers all taxonomic groups in all five kingdoms. It covers the whole range of techniques used to study evolution, including whole-organism, molecular, theoretical and practical.

The *Biological Journal of the Linnean Society* publishes papers concerned with the process of organic evolution in the broadest sense. It particularly welcomes contributions that illustrate some of the unifying concepts of evolutionary biology with evidence, either observational or theoretical, from the fields of genetics, systematics, biogeography, or ecology. The *Biological Journal* succeeded (in 1969) the *Proceedings of the Society*, the journal in which Darwin and Wallace published their seminal papers in 1858 (13).

On the Unity of Nature

Since ‘all things living are in search of a better world’ (3), and in light of the fact that the ‘better world’ I sought was a bio-geo-politico-economic model far more descriptive than any mathematical model could offer (*cf. GLOSSARY: Mathematics*),* a ‘little world in itself’ capable of modelling the ‘unity of nature’† on the big island (*moku nui*) we refer to as ‘Earth’; I soon recognized that I had no choice but to set sail for the torrid zone‡ (*cf. APPENDIX IV: IN SEARCH OF A BETTER WORLD*):

For Humboldt, ‘the unity of nature’ meant the interrelation of all...sciences....

Instead of trying to pigeonhole the natural world into prescribed classifications, Kant had argued, scientists should work to discover the underlying scientific principles at work, since only those general tenets could fully explain the myriad natural phenomena.... Humboldt agreed with Kant that a different approach to science was needed, one that could account for the harmony of nature... The scientific community, despite prodigious discoveries, seemed to have forgotten the Greek vision of nature as an integrated whole.... ‘Rather than discover new, isolated facts I preferred linking already known ones together,’ Humboldt later wrote. Science could only advance ‘by bringing together all the phenomena and creations which the earth has to offer. In this great sequence of cause and effect, nothing can be considered in isolation.’ It is in this underlying connectedness that the genuine mysteries of nature would be found.

This was the deeper truth that Humboldt planned to lay bare... For only through travel, despite its accompanying risks, could a naturalist make the diverse observations necessary to advance science beyond dogma and conjecture. Although nature operated as a cohesive system, the world was also organized into distinct regions whose unique character was the result of all the interlocking forces at work in that particular place. To uncover the unity of nature, one must study the various regions of the world, comparing and contrasting the natural processes at work in each.

The scientist, in other words, must become an explorer (26:23-27).

Yes, I did explore.** And yes, I did eventually find it (65, *cf. APPENDIX V: THE MUSTIQUE CO. DEVELOPMENT*

PLAN). Moreover, as I have implied, I found much, much more.

* Civilization advances by extending the number of important operations which we can perform without thinking about them. This is of profound significance in the social field. We make constant use of formulas, symbols, and rules whose meaning we do not understand and through the use of which we avail ourselves of the assistance of knowledge which individually we do not possess (63:519-530).

† For Humboldt, ‘the unity of nature’ meant the interrelation of all... sciences... which the scientist unravelled by discovering patterns in myriad, painstakingly collected data. This ambition to view nature as a whole wasn't unique to Humboldt, though. It was a quest that historians believe had begun with the ancient Greek philosopher Thales of Miletus, in the sixth century B.C. Recognized as the founder of Greek geometry, Thales also taught that all matter is ultimately composed of water. Though dead wrong, the theory was still an intellectual turning point, since it marked the first time anyone had tried to explain natural phenomena without appeal to religious dogma. It was also the first time that anyone had tried to explain the whole, divergent physical world in one grand unifying principle (26:23-24).

‡ I was anxious to contemplate nature...; and the hope of collecting some facts useful to the advancement of science, incessantly impelled my wishes towards the luxuriant regions spread under the torrid zone (64:8).

** It were erroneous to believe, that countries, because they have been already visited, are therefore known. A penetrating and capacious mind finds every where new materials for observation. The work, of which I now offer... relates to regions of which the greater part have never till now been described by a scientific and learned traveller (64:1).

On Nobility of Purpose in the Search for Truth Under Adverse Circumstances

Many have found the logical implications* which readily bubble to the surface from *The Principle of Relative Insularity* distasteful, disconcerting, and unacceptable. My discussions, papers, and seminars (37-38 ; 67-78) have proven rather unpopular.† But I am aware of the fact that the bulk of human beliefs are founded upon irrational grounds,‡ and that the hecatombs of human civilization are not prescient enough to understand the world in which they live.§ I have also taken refuge in the sage counsel of many great men** and women who have maintained nobility of purpose throughout the ages—

* When we propose a theory, or try to understand a theory, we also propose, or try to understand, its logical implications; that is, all those statements which follow from it. But this... is a hopeless task: there is an infinity of unforeseeable nontrivial statements belonging to the informative content of any theory, and an exactly corresponding infinity of statements belonging to its logical content. We can therefore never know or understand all the implications of any theory, or its full significance.

This, I think, is a surprising result as far as it concerns logical content; though for informative content it turns out to be rather natural.... It shows, among other things, that understanding a theory is always an infinite task, and that theories can in principle be understood better and better. It also shows that, if we wish to understand a theory better, what we have to do first is to discover its logical relation to those existing problems and existing theories which constitute what we may call the “problem situation”.

Admittedly, we also try to look ahead: we try to discover new problems raised by our theory. But the task is infinite, and can never be completed (66:26).

† Sent 25 Apr 2008 at 15:13:21-0300, Subject: Your Seminar [cf. 67]

Dear Matt...I received a disturbing e-mail from [your friend] in which he said that you had felt under attack for the whole of the seminar [cf. 67] and largely from a left-wing ideological cabal among the students. I am truly sorry that you left feeling... disheartened. You are too gifted a student, Matt, to be thrown off course in any way. And it is so undeserving. You have a remarkable thirst for learning, a rare intellectual craving, and, above all the courage to navigate difficult and uncharted waters. Your intellectual energy is apparent to all and, I would say, an inspiring example to all. I replied to [your friend] that I was not aware of how pervasive this ideological left-wing view is in the programme, but I have been aware of it from time to time on particular issues such as Cuba. I regard ideology as the enemy of critical thinking. It is usually self-righteous and conspiratorial. Because it is seamless in its connections to all questions, it is thoroughly predictable. And [your friend] is right when he complains that it is truly unsatisfying to attempt a genuine exchange with someone who is so bound by a formula. I thought your exploration of insularity was thoughtful, innovative and challenging.... I would be truly sorry if you... were to avoid these seminars in the future because they should be one of the more exciting aspects of a graduate programme. But, above all, you should not let yourself be wounded in this way. The programme owes a great debt to your contribution. You bring energy, deep reflection and, above all, insight to every class. And everyone in that room should be grateful... It was a very lively exchange. Although I am sure that you were frustrated that it seemed to go all over the map and often far from your paper which so many had not even read. There may be a case for having a moderator to ensure that the discussion stays on course. In any case, Matt, you have a truly promising future ahead of you, including success at the Ph.D. level. Of that, I could not be more confident.

‡ It is customary to suppose that the bulk of our beliefs are derived from some rational ground, and that desire is only an occasional disturbing force. The exact opposite of this would be nearer the truth: the great mass of beliefs by which we are supported in our daily life is merely the bodying forth of desire, corrected here and there, at isolated points, by the rude shock of fact. Man is essentially a dreamer, wakened sometimes for a moment by some peculiarly obtrusive element in the outer world, but lapsing again quickly into... happy somnolence (79:14).

§ History shows that our theories have been wrong more often than right, resulting in the demise of whole civilizations when we have misinterpreted what is happening to us....

It would be comforting to believe that humans have been prescient enough to understand what is happening to themselves and act accordingly. But... the way the mind understands the external environment—the beliefs humans construct to explain the external world are frequently incorrect, particularly if the changes are creating really novel situations. And clearly, humans have evolved environments radically different from anything that existed before (80:1).

** To those great men, who thus framed the Constitution, and secured the adoption of it, we owe a debt of gratitude, which can scarcely be repaid. It was not then, as it is now, looked upon, from the blessings which... it has bestowed, with general favor and affection. On the contrary, many of those pure and disinterested patriots, who stood forth, the firm advocates of its principles, did so at the expense of their existing popularity.... Many of them went to their graves, without the soothing consolation, that their services and their sacrifices were duly appreciated (81:55).

‡‡ ‘I, Galileo, son of the late Vincenzo Galilei, Florentine, aged seventy years, arraigned personally before this tribunal, and kneeling before you, Most Eminent and Reverend Lord Cardinals, Inquisitors-General against heretical depravity throughout the entire Christian commonwealth, having before my eyes and touching with my hands, the Holy Gospels, swear that I have always believed, do believe, and by God's help will in the future believe, all that is held, preached, and taught by the Holy Catholic and Apostolic Church. But whereas -- after an injunction had been judicially intimated to me by this Holy Office, to the effect that I must altogether abandon the false opinion that the sun is the center of the world

including Galilei,[‡] Swift,^{*} Russell, Einstein,[†] Darwin,[‡] Carlquist, Oppenheimer, Popper, Hayek, Goodall, Carson and yet another of your fellow islanders, Alfred Marshall, “who wrote: ‘Students of social sciences must fear popular approval: Evil is with them when all men speak well of them’” (61:1).

Yes, some of you may not like what I have discovered.

But perhaps some of you—and *hopefully perhaps even two-thirds of you*[§]—may see some beauty in the truths enclosed herewith. I considered glossing over the logical implications of my discovery—but in the end, of course, I must communicate the truth, the whole truth, and nothing but the truth.

And thus what I ask of you may not be easy.

But then again, what is asked of us is never easy.

What is asked of us is not easy. The openness of the world derives its character from the irreversibility of learning; what is once learned is part of human life. We cannot close our minds to discovery; we cannot stop our ears so that the voices of far-off and strange people can no longer reach them... Neither our integrity as men of learning nor our humanity allows that. In this open world, what is there, any man may try to learn.

This is no new problem. There has always been more to know than one man could know; there have always been modes of feeling that could not move the same heart; there have always been deeply held beliefs that could not be composed into a synthetic union. Yet never before today have the diversity, the complexity, the richness so clearly defied hierarchical order and simplification; never before have we had to understand the complementary, mutually not compatible ways of life and recognize choice between them as the only course of freedom. Never before today

and immovable, and that the earth is not the center of the world, and moves, and that I must not hold, defend, or teach in any way whatsoever, verbally or in writing, the said false doctrine, and after it had been notified to me that the said doctrine was contrary to Holy Scripture -- I wrote and printed a book in which I discuss this new doctrine already condemned, and adduce arguments of great cogency in its favor, without presenting any solution of these, and for this reason I have been pronounced by the Holy Office to be vehemently suspected of heresy, that is to say, of having held and believed that the Sun is the center of the world and immovable, and that the earth is not the center and moves:

Therefore, desiring to remove from the minds of your Eminences, and of all faithful Christians, this vehement suspicion, justly conceived against me, with sincere heart and unfeigned faith I abjure, curse, and detest the aforesaid errors and heresies, and generally every other error, heresy, and sect whatsoever contrary to the said Holy Church, and I swear that in the future I will never again say or assert, verbally or in writing, anything that might furnish occasion for a similar suspicion regarding me....

I, the said Galileo Galilei, have abjured, sworn, promised, and bound myself as above; and in witness of the truth thereof I have with my own hand subscribed the present document of my abjuration, and recited it word for word at Rome, in the Convent of Minerva, this twenty-second day of June, 1633....’

Legend has it that as Galileo rose to his feet, he said under his breath, ‘*Eppur si muove*’—‘*And yet, it moves.*’ The remark captivated scientists and scholars for centuries, as it represented defiance of obscurantism and nobility of purpose in the search for truth under the most adverse circumstances (82).

* When a true genius appears in the world, you may know him by this sign, that the dunces are all in confederacy against him (83).

† Great spirits have always encountered violent opposition from mediocre minds. The mediocre mind is incapable of understanding the man who refuses to bow blindly to conventional prejudices and chooses instead to express his opinions courageously and honestly (84)

‡ [Darwin] brought several intellectual virtues to the task at hand. Instead of brushing off objections to his theory, he thought about them obsessively until he had found a solution (14).

§ No person shall be declared to be elected a Fellow who has not received the votes of two-thirds of the number of Fellows and other eligible Members voting (85:19).

has the integrity of the intimate, the detailed, the true art, the integrity of craftsmanship and the preservation of the familiar, of the humorous and the beautiful stood in more massive contrast to the vastness of life, the greatness of the globe, the otherness of people, the otherness of ways, and the all-encompassing dark.

This is a world in which each of us, knowing his limitations, knowing the evils of superficiality and the terrors of fatigue, will have to cling to what is close to him, to what he knows, to what he can do, to his friends and his tradition and his love, lest he be dissolved in a universal confusion and know nothing and love nothing. It is at the same time a world in which none of us can find hieratic prescription or general sanction for any ignorance, any insensitivity, any indifference. When a friend tells us of a new discovery we may not understand, we may not be able to listen without jeopardizing the work that is ours and closer to us; but we cannot find in a book or canon—and we should not seek—grounds for hallowing our ignorance. If a man tells us that he sees differently than we, or that he finds beautiful what we find ugly, we may have to leave the room, from fatigue or trouble; but that is our weakness and our default. If we must live with a perpetual sense that the world and the men in it are greater than we and too much for us, let it be the measure of our virtue that we know this and seek no comfort. Above all, let us not proclaim that the limits of our powers correspond to some special wisdom in our choice of life, of learning, or of beauty.

This balance, this perpetual, precarious, impossible balance between the infinitely open and the intimate, this time—our twentieth century—has been long in coming; but it has come. It is, I think, for us and our children, our only way.

This is for all men. For the artist and for the scientist there is a special problem and a special hope, for in their extraordinarily different ways, in their lives that have increasingly divergent character, there is still a sensed bond, a sensed analogy. Both the man of science and the man of art live always at the edge of mystery, surrounded by it; both always, as the measure of their creation, have had to do with the harmonization of what is new with what is familiar, with the balance between novelty and synthesis, with the struggle to make partial order in total chaos. They can, in their work and in their lives, help themselves, help one another, and help all men. They can make the paths that connect the villages of arts and sciences with each other and with the world at large the multiple, varied, precious bonds of a true and world-wide community.

This cannot be an easy life. We shall have a rugged time of it to keep our minds open and to keep them deep, to keep our sense of beauty and our ability to make it, and our occasional ability to see it in places remote and strange and unfamiliar; we shall have a rugged time of it, all of us, in keeping these gardens in our villages, in keeping open the manifold, intricate, casual paths, to keep these flourishing in a great, open, windy world; but this, as I see it, is the condition of man; and in this condition we can help, because we can love, one another (4:143-146).

On Method

Yes, I am going to tell you of a new discovery which some of you may not be able to hear without jeopardizing beliefs which are closer to you, but before Oppenheimer's majestic spirit of openness fades away, I must not fail to disclose that you may all love at least one aspect of the truths I have discovered, as these truths clearly suggest that one of the best ways we might all find the means to help and love one another is by adopting evolutionary worldviews. There is, after all, a *method*, so to speak, to all of this madness, so I humbly request a little patience in seeing it through; as a fellow islander offered upon review of (38),

yes, there is clearly a method to the madness. It will be exasperating to most readers, because you really walk the talk when it comes to dismantling disciplinary boundaries. Your treatise does range from 'astronomy' to 'zoology'.

I realize the page-count, copious and discursive footnotes, and appendices which appear in this letter of introduction and short discourse enclosed herewith may appear excessive at first glance, but I trust my fellow naturalists may recognize

that—given the scope of this vast undertaking—it is all quite necessary, and thus it would be disingenuous to offer an apology, since *every* truthful treatise *must* range from astronomy to zoology. All assumptions must be carefully defined, all positions must be meticulously developed, and nothing short of consilience and data cascades will do (*cf.*

GLOSSARY:consilience).

I might also suggest that, if it were possible to condense this communiqué to a dozen pages, if it were possible to accurately and effectively introduce – much less communicate in a concrete fashion – a unified theory of value and tenable solution to *The Problem of Sustainable Economic Development* in an academic paper or refereed journal article, then it seems it would have been done so by now (*cf.* 86). * Furthermore, although it may take some time to read, I trust my theory is not difficult to understand, because, as noted, I am a follower of the Enlightenment,[†] a fellow naturalist, and I have used islands to do exactly what they do best: help simplify[‡] and clarify the complex world in which we live.[§]

How teach again... what has been taught correctly and incorrectly learned a thousand thousand times, throughout the millenniums of mankind's prudent folly? That is [our] difficult task...

The easy thing is to commit the whole community to the devil and retire again into the heavenly rock-dwelling, close the door, and make it fast. But... [this] work... cannot be avoided (2:218).**

Generally speaking, we require nothing more than the method of the naturalist to accomplish this feat:

Darwin was first and foremost a naturalist. His favourite method was also that of the naturalist. He made a series of observations and developed a conjecture from this evidence.... Actually, perhaps the closest to the truth would be to say that Darwin was a pragmatist and used whatever method he thought would bring him the best results. Darwin was a very keen observer, and there is no doubt that observation was his most productive approach (89:488-489 ; *cf.* 90).

My analysis of what is generally regarded as ‘economic’ phenomena is in line with the highly unfashionable methods of

Natural Philosophy, Austrian economics (*GLOSSARY*), and 18th century ‘economists’, naturalists, and moral philosophers,

* If the problems of land degradation could have been solved by research and reports alone, they would have disappeared long ago. It has been [sixty] years since some of the first seminal works on environmental degradation were written..., and perhaps [twenty] to [twenty-five] since the high-water mark of environmental movements in the United States and Europe was reached (87:xxvii).

† Every intellectual has a very special responsibility. He has the privilege and the opportunity of studying. In return, he owes it to his fellow men (or ‘to society’) to represent the results of his study as simply, clearly and modestly as he can.... Anyone who cannot speak simply and clearly should say nothing and continue to work until he can do so (3:83).

‡ Compared with continents... [islands] have a restricted area and definite boundaries, and in most cases their biological and geographical boundaries coincide. The number of species and of genera they contain is always much smaller than in the case of continents, and their peculiar species and groups are usually well defined and strictly limited in range... their relations with other lands are often direct and simple and even when they are more complex are far easier to comprehend than those of continents (50:241-242).

§ I do not dispute that arguments should be simplified to their maximum potential; but people often confuse complex ideas that cannot be simplified into a media-friendly statement as symptomatic of a confused mind. MBAs learn the concept of clarity and simplicity—the five-minute manager take on things. The concept may apply to the business plan for a fertilizer plant, but not to highly probabilistic arguments—which is the reason I have anecdotal evidence in my business that MBAs tend to blow up in financial markets (88:36-37).

** Scientists... have a responsibility for the communication of the truths they have found (4:91).

including your namesake Carl Linnaeus,* Alexander von Humboldt, David Hume, and Adam Smith.† However, contemporary game-theory represents a considerable exception to this rule, as these popular and priceless tools for the analysis of conflict (cf. 91: introduction) prove especially useful, since economic “development is closely associated with conflict” (57:9).

And although (39) offers a detailed introduction to ‘game theory’ (cf. GLOSSARY), I will offer a few brief notes: Some may find it fruitful to conceptualize our games as asymmetric (cf. 92, 93:107), bounded delay supergames (cf. 94:224) with incomplete information, but “those readers who are unacquainted with [these] technicalities will find that they can manage quite well by ignoring them” (95:129). Our theory is founded upon a revolutionary, brief communiqué from 1950 (96, cf. 97) and two elegant, well-established‡ proofs (98:177 ; cf. 99); a few terms and concepts may be peculiar, but fluency in game theory may be acquired in short order; and although one foundational work (100) may offer an interesting historical perspective, those interested in setting off upon an introductory exploration of *The Theory of Games* may bypass this well-known treatise: As several early investigators rightfully concluded following a fruitful experiment, “it is extremely difficult to tell whether or not the observed results corroborate the von Neumann-Morgenstern theory. This is partly because it is not quite clear what the theory asserts” (101:23). In fact, (102) may offer a snapshot sufficient enough for this discourse.

Imagination is the sole prerequisite.

* Linnaeus, interestingly, also cultivated an account of economic development that was rooted in the German cameralist tradition. But, in many respects, he provides us with the first full-fledged description of an economy, only it is a description of an economy that encompasses everything, including plants [and] animals... This helps underscore all the more the close links between economic thought and natural philosophy that prevailed in the eighteenth century (34:20).

† The two most prominent Scottish political economists [were] Hume and Smith... [and their efforts were largely] to join economics to nature. Numerous scholars have emphasized the fundamental importance of natural science in the development of moral philosophy among the Scottish Enlightenment writers.... [Emerson] points out that most of the leading professors at the Scottish universities who taught moral philosophy were also versed in natural science (34:21).

‡ Most economists enter this market in new ideas, let me emphasize, in order to obtain ideas and methods for the applications they are making of economics to the thousand problems with which they are occupied: these economists are not the suppliers of new ideas but only demanders. Their problem is comparable to that of the automobile buyer: to find a reliable vehicle. Indeed, they usually end up by buying a used, and therefore tested, idea.

Those economists who seek to engage in research on the new ideas of the science – to refute or confirm or develop or displace them – are in a sense both buyers and sellers of new ideas. They seek to develop new ideas and persuade the science to accept them, but they also are following clues and promises and explorations in the current or preceding ideas of the science. It is very costly to enter this market: it takes a good deal of time and thought to explore a new idea far enough to discover its promise or its lack of promise. The history of economics, and I assume of every science, is strewn with costly errors: of ideas, so to speak, that wouldn’t run far or carry many passengers (11:529-530).

** cf. APPENDIX IV, 3-5 ; 11-12 ; 16-18 ; 26-32 ; 34 ; 36 ; 50 ; 54 ; 57 ; 60 ; 61-66 ; 75-76 ; 88-105 ; GLOSSARY: *Austrian Economics, Games, Game Theory, Science, Scientific Method*.

Finally, I might also note that our unified approach requires wide-ranging methodological tools, ** but in light of the fact that *Scientific Method* (*GLOSSARY*) does not exist, searching for a ghost may prove uneconomical: As Hayek (103, *cf.* 104) observed long ago, *The Mind-Body Problem* does not enable us to know the method by which we come to know what we know, and therefore the probability that we might accurately recount these methods in a meaningful manner to others – with ‘mind-body problems’ of their own – *is less than zero*.

Thus, perhaps the most relevant remark on method was scribbled on a note in Brazil in 1952:

First figure out why you want the [readers] to learn... and what you want them to know, and the method will result more or less by common sense (105:xx).

On the Problem of Survival on Earth

I will offer a brief preview of *The Earth Island Survival Game* to help set the stage (the Earth) upon which our subgame, *The Island Survival Game* takes place:

The Earth Island Survival Game consists of two classes of ‘players’, ‘Globalized Economic Military Superpowers’ (*GEMS*, *cf.* *GLOSSARY*) and ‘Relatively Insular States’ (*RIS*, *cf.* *GLOSSARY*); although *The Island Survival Game* is a game played by individuals (*Homo sapiens*) on a single island, we shall briefly compare and contrast both global players from the larger and more complicated game. To begin with, it may prove helpful to conceptualize these two player classes as ‘Continental’ (*GEMS*) and ‘Island’ (*RIS*) based economies. (i) Astrophysical uncertainty, and (ii) the fact that the Earth is a planet lacking central authority both further complicate *The Earth Island Survival Game*, and although we have much to discover in our forthcoming exploration (39) of these stochastic elements, for the time being we’ll merely contextualize them in outline form:

WHAT IS THE NATURE OF THE GAME?

GEMS vs. GEMS

GEMS vs. RIS

RIS vs. RIS

GEMS ∪ RIS vs. Universe

WHAT IS THE OBJECT OF THE GAME?

GEMS = Survival → $+(I_R)$

RIS = Survival → $+(I_R)$

Universe = ?

HOW IS THE OBJECTIVE ATTAINED?

$$GEMS = RHP$$

$$RIS = RHP$$

$$Universe = ?$$

WHAT STRATEGIES ARE AVAILABLE?

S_1 : *Maximum Economic Development (MED)*

S_2 : *Maximum Ecological Preservation (MEP)*

ESS?

$RIS = \text{Maximum Ecological Preservation (MEP)}$

$GEMS = \text{Maximum Economic Development (MED)}$

For the time being, please tentatively accept that survival is attained by ‘ $\rightarrow +(\text{I}_R)$ ’, an indirect proof of *The Principle of Relative Insularity* (and our theory of value based upon relative insularity) is detailed in (39) ; these arguments are extensive and necessarily exhaustive. However, to make a very long argument very short, (39) demonstrates that *Value (V)* is a *derivative function (f’)* of *relative insularity (I_R)*, $\Rightarrow V = f'(I_R)$, and this, in a nutshell is why our objective is: ‘ $\rightarrow +(\text{I}_R)$ ’

When rational play unfolds, equilibrium is attained when players pursue respective rational, opposing *ESS*, offering optimal windfall: *RIS*-driven *ecological* protection and *GEMS*-driven *planetary* protection. In essence, this non-cooperative, strategic equilibrium paves the way for rational, mutually beneficial, cooperative behaviour, yields higher ecological and planetary insularities, and thus maximizes (i) economic value and (ii) *Darwinian fitness/RHP*. *RIS* maximize (i & ii) by pursuing self-interests, by struggling for *maximum ecological insularity & economic value* (through ecological preservation, politico-economic independence, self-sufficiency). *GEMS* maximize (i & ii) by pursuing self-interests, by fighting for *maximum economic development* (i.e. ‘globalization’), and *planetary insularity*.*

Surplus value is maximized through strategic transparency: *If (a)* all players recognize the value of respective, opposing, and antithetical, rational strategies and employ the *ESS*, *then (b)* all players maximize economic value & Darwinian fitness, negotiate, struggle, fight, communicate, and cooperate more rationally, more efficiently, more peacefully, and thus (c) maximum sustainable economic development is achieved and human survival prospects are maximized.†

As introduced in (37-38), roughly sketched here, and detailed in (39), perhaps the most revelatory feature of sub-

* Global defence, extraterrestrial exploration, and extra-planetary threat mitigation, such as the finance, R&D, the deployment of Asteroid Tugboats, *SHIELDS*, and, ultimately, inter-planetary long-distance dispersal.

† When the goal is to give advice to all of the players in a game (i.e., to advise each player what strategy to choose), any advice that was not an equilibrium would have the unsettling property that there would always be some player for whom the advice was bad, in the sense that, if all other players followed the parts of the advice directed to them, it would be better for some player to do differently than he was advised. If the advice is an equilibrium, however, this will not be the case, because the advice to each player is the best response to the advice given to the other players (99:3999).

game play is that *GEMS ESS* and *RIS ESS* are antithetical, yet in light of *The Problem of Induction*, we discover these naturally opposing – and complementary – strategies represent the *strategic equilibrium*, the most tenable, rational solution possible.

How is it possible that the two classes of players derive two *different*, antithetical, optimal strategies when utilizing the same theory of value?

Simply because they both happen to represent the dominant (best) strategy for each player class to achieve *greater insularity*: $\rightarrow +(\mathbb{I}_R)$.

For example, when *RIS* employ *GEMS ESS*, as they invariably have and continue to do (*cf.* 38), given their inherent disadvantages in terms of economies of scope, scale, and location theory, through the deleterious effects of the amplification by compression of negative externalities, they destroy their ecology and, in rather short order, their economies, as well. Their trajectory, in short, becomes $\rightarrow -(\mathbb{I}_R)$.

Although some may be willing to entertain the conjecture that *RIS ESS* = Maximum Ecological Protection (*MEP*), perhaps many may find my inherently controversial finding that *GEMS ESS* = Maximum Economic Development (*MED*) unpalatable. Again, although *The Earth Island Survival Game* (39) is not our focus here, I will briefly remark that, although *Human Survival* (*cf.* *GLOSSARY*) ultimately depends upon a single, unified, life-giving sphere of insularity, it must ultimately be defended on *two inherently uncertain* levels: (i) insularity pertaining to the biosphere (*i.e.* Ecology, the ‘whole world’ according to the principles of ‘ecological economics’), and (ii) insularity pertaining to the *semi-closed* island of Earth, including stochastic political phenomena (warfighting) and stochastic planetary and extra-planetary phenomena (meteorites, volcanoes, chaotic gravitational forces, supernovas, stochastic and anthropogenic climate change, the Earth’s inherently unknown and unknowable lifespan, etc.). Thus, resources must be split between two contradictory, yet complimentary objectives, but it is impossible to determine how much to allocate to each over time (6).

On the Problem of Survival on Islands

States, Microstates and Islands tables a widely held and generally accepted conjecture:

Theoretically, an island country has two options. It can remain a small closed society... Alternatively it can... [become] integrated with the world economy through the promotion of the type of development which allows for greater and more beneficial exchange. In fact, the first is not really an option. There are few, if any, small islands which having had access to certain amenities have rejected them (106:155).

Although it is true that, theoretically, there are indeed just two development options for an island to pursue (*MEP* and *MED*)—the conclusion tabled above is entirely unfounded: In reality, the first option (*MEP*) is the *only* option, as the second

(*MED*) – though it may stimulate a flurry of short-term economic gains – will invariably degenerate into *The Tragedy of the Commons* (*GLOSSARY*). Furthermore, once this truly tragic and depauperative state has been reached, few options – other than political revolution are available to the island population in order to stave off ecological and (eventually) economic collapse.

Ceteris paribus, *RIS* may select only one *pure* development strategy. Once a pure strategy has been selected and put into motion, it is extraordinarily difficult to switch development strategies after the corresponding linkages – industries, institutions, and trade – develop and inter-dependencies become entrenched (which is why we play ‘delay’ games). This dilemma is exacerbated by the fact that most political decisions are made to maximize value on a *very* short-term basis, rarely exceeding four-year windows of politico-economic development opportunity (as in the case of a single term for U.S. Presidency), but, in many worst-case constitutional scenarios, elections may be called at virtually *any* time, such as in the case of the election of the Prime Minister’s of Canada.*†

Given this constitutional arrangement, *RIS* democratic majorities invariably elect present consumption (*MED*) over future preservation (*MEP*) and, especially if the climate is right for the tourist trade (*i.e.* the Caribbean), rapidly degenerate into *The Tragedy of the Commons*.

Yes, theoretically, an island country has two options – *MED* and *MEP* – and, this is the expected payoff matrix:

<u><i>RIS Strategy</i></u>	<u><i>Short-Term Payoff (1-40 years)</i></u>	<u><i>Long-Term Payoff (20-30) years</i></u>
<i>Maximum Economic Development</i>	<i>\$-Rich/Land-Poor</i>	<i>\$-Poor/Land-Poor</i>
<i>Maximum Ecological Preservation</i>	<i>Land-Rich/\$-Poor</i>	<i>Land Rich/\$-Rich</i>

Table 1: ‘Island’ Economic Development Strategy Payoff Matrix

* Perhaps the most haunting lines in Canada’s history were written in 1858: ‘It will be observed that the basis of Confederation now proposed differs from that of the United States in several important particulars. It does not profess to be derived from the people but would be the constitution provided by the imperial parliament...’ These words are from a letter signed by three Fathers of Confederation, George-Etienne Cartier, Alexander Galt, and John Ross....

So deep are their current differences on fundamental questions of political justice and collective identity that Canadian may now be incapable of acting together as a sovereign people (107:3-5).

† Twenty years ago... I was teaching a university course on the American and Canadian constitutions. I covered the Canadian material while a colleague, Walter Berns, presented the American side. We attended classes together, each listening to and commenting on one other’s account of his country’s constitutional experience. One day after I had been going on for some time about Canada’s constitutional debate, Walter turned to me and said, ‘Peter, you Canadian have not yet constituted yourselves a people.’ I have been brooding about Bern’s remark ever since.

As the years rolled by and Canada’s constitutional debate went on and on and on, with rising levels of intensity, I had to concede that Berns was right. The debate has continued so long without resolution because Canadian have never squarely faced the question whether they share enough in common to form a single people consenting to a common constitution (107:ix).

Shortly, we will explore the bio-geo-politico-economic models and the corresponding politico-economic development strategies which informed this payoff matrix; and although (106)'s observation that 'few, if any' small islands have elected *MEP* over *MED* is quite accurate, there are at least a half-dozen islands (Mustique, Molokai, and several small islands off the coast of Maine, *e.g.*) known to this author who have elected the first option.

Let's take in an overview of the structure of *The Island Survival Game* before moving on to our models:

WHAT IS THE NATURE OF THE GAME?

Islander vs. Islander

Islander vs. Invader

WHAT IS THE OBJECT OF THE GAME?

Islander = Survival $\rightarrow +(\mathbb{I}_R)$

Invader = Survival $\rightarrow +(\mathbb{I}_R)$

HOW IS OUR OBJECTIVE ATTAINED?

Islander = RHP

Invader = RHP

WHAT STRATEGIES ARE AVAILABLE?

S_1 : *Maximum Economic Development (MED)*

S_2 : *Maximum Ecological Preservation (MEP)*

ESS?

MEP: Maximum Ecological Preservation

The Island Survival Game is an asymmetric, bounded delay supergame.

The game is bounded by a finite duration of $\approx 50,000$ years, and a 'delay' of 87 years transpires between moves, in other words, once a strategy has been selected, the opportunity to 'switch' strategies does not come along for another 87 years. The logic behind the 'boundedness' of our game follows from the paper enclosed herewith (*cf.* 6, *Axiom V*). "The distinction between bounded and unbounded delay supergames is theoretically important," (94:202); for example, the central thesis of 'ecological economics' is founded upon a false, a-priori assumption that the truly noncooperative game of life on Earth is 'unbounded'— but it is not, because "an upper bound... can be named for the survival of any economic situation," (94:224), and as detailed in the paper enclosed herewith, $\approx 50,000$ years represents the logical upper limit for the survival of both the evolutionary and economic situation on Earth. The game is over — *quite literally* — in $\approx 50,000$ years.

As far as the 'delay' is concerned, as Selten remarked, "it does not really matter exactly how long the delays are,

choosing one delay period over another is largely insignificant” (94:202); the purpose is merely to help illustrate the fact that, once economic development strategies are selected and the resultant inter-dependencies become entrenched, under democratic rule, it is extremely difficult to switch strategies—the delay helps conceptualize and emphasize the long-lasting effects of these strategic decisions. For example, as we shall momentarily discover, the politico-economic development strategies currently being deployed on the two islands which model our problem and solution are the same strategies which were put into play in 1970—and there is no sign that either islands intends (and, moreover, is able) to ‘switch’ strategies anytime in the near future. Thus, the ‘delay’ for these two living and evolving bio-geo-politico-economic models, is > 40 years. In any case, however, for the purpose of our analysis, it seems the most fruitful delay may be between 70 and 100 years—the somewhat arbitrary delay of 87 years was selected in-part for sentimental reasons.*

Our games are ‘asymmetric’ (cf. 92-93) because, naturally, the conflicts at hand are asymmetric: If a home is listed for sale on the island of Mustique for \$50MM USD, the strategies employed for contesting for this property will not be ‘mixed’ – they will be informed by the readily apparent asymmetries relating to RHP (\$) ; mixed (random) strategies – such as knocking on the front door and boldly proclaiming ownership, attempting to take the home by force, or writing a long, eloquent, and flattering letter to the owner, begging for this territory and shelter as a gift – are all highly unlikely to result in the legal transfer of deeded title – and thus control, of this scarce resource. Likewise, as we discover in *The Earth Island Survival Game* (39), the Seychelles, for example, would not employ a ‘mixed’ strategy (such as flipping a coin) when deliberating whether or not to declare war upon The United States and China for refusing to be held accountable to the Kyoto Protocol. The nature of these contests are also clearly asymmetric (in the case of *The Earth Island Survival Game*, RHP = \$ = *military power*).†

* Four score and seven years ago our fathers brought forth, upon this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.

Now we are engaged in a great civil war, testing whether that nation, or any nation, so conceived, and so dedicated, can long endure. We are met here on a great battlefield of that war. We have come to dedicate a portion of it as a final resting place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this.

But in a larger sense we can not dedicate -- we can not consecrate -- we can not hallow this ground. The brave men, living and dead, who struggled, here, have consecrated it far above our poor power to add or detract. The world will little note, nor long remember, what we say here, but can never forget what they did here. It is for us, the living, rather to be dedicated here to the unfinished work which they have, thus far, so nobly carried on. It is rather for us to be here dedicated to the great task remaining before us -- that from these honored dead we take increased devotion to that cause for which they here gave the last full measure of devotion -- that we here highly resolve that these dead shall not have died in vain; that this nation shall have a new birth of freedom; and that this government of the people, by the people, for the people, shall not perish from the earth (108, cf. 109-110).

† Economic power, unlike military power, is not primary, but derivative. Within one State, it depends on law; in international dealings it is only on minor issues that it depends on law, but when large issues are involved it depends upon war or the threat of war...

Apart from the economic power of labour, all other economic power, in its ultimate analysis, consists in being able to decide, by the use of

One final – yet crucial – pre-game announcement is that, *ceteris paribus*, ‘islanders’ wield a *natural* ‘home-court’ advantage over ‘invaders.’ (cf. 93).

With these introductory notes in mind, *The Island Survival Game* serves as an excellent learning tool.

Although we will not delve into specific gameplay scenarios, the game-theoretical negotiations common to all games (communication, cooperation, conflict, resolution, *etc.*) are detailed in (39), but readers may refer to (93) as a relevant resource in the meantime. If we use a bit of imagination at this juncture, however, the nature of the game, and thus gameplay, may already be clear.

Moreover, we may also recognize that, *ceteris paribus*, based upon revealed 20th & 21st century preferences, with very few notable exceptions – default *RIS* strategy (*MED*) has been sub-optimal/maladaptive. This assessment applies to nearly all of the warm-water, small island developing states* and sub-national island jurisdictions. With the exception of cold-water islands (cf. 112) and other extremely remote islands (*i.e.*, St. Helena, Pitcairn, Tristan da Cunha, *etc.*), *RIS* players operating in the real world have nearly all discovered and/or are in the process of discovering that “the short-term advantages of free riding may fulfil Hardin’s prediction that ‘freedom in the commons brings ruin to all’” (113:2294).

However, with one significant exception (industrial agricultural production, cf. 6, *Axiom V*), 20th & 21st century *GEMS* strategy has, contrary to prevailing sentiments, been optimal. In other words, in several regards, the global prognosis is not nearly as dire as many influential theorists (*e.g.*, 114) have led many to believe (though it is perhaps more dire in many regards which they have failed to detect).

On The Tragedy of the Commons

This problem remains one of the most-cited concepts because it represents the very essence of *The Problem of Sustainable Economic Development*. Yes, this problem is complex, but I hope we may have begun to demonstrate that it may be fruitfully simplified with the bio-geo-politico-economic models we refer to ‘islands’. And perhaps one of the most accurate and descriptive models of our problem is Prince Edward Island.

The Development Plan for Prince Edward Island (APPENDIX VI), in contradistinction to *The Mustique Co. Development Plan (APPENDIX V)*, offers an extraordinary comparative study.

armed force if necessary, who shall be allowed to stand upon a given piece of land and to put things into it and take things from it (79:95).

* About one fifth of all politically independent countries are small island developing states. For these countries, sustainable development is not a matter of choice, it is imperative (111: *dust jacket*).

Prince Edward Island (in conjunction with *APPENDIX VI*) also happens to offer one of the most accurate, realistic, descriptive, and readily studied bio-geo-politico-economic models of *The Problem of Sustainable Economic Development*.

(115) chronicles the ten-year debate,* scientific investigations, and end-game decision[‡] to construct a one billion dollar bridge[§] from Prince Edward Island** to New Brunswick.^{††}

Objections to building the bridge were many,^{‡‡} but perhaps the most significant objection was over the substantial empirical and theoretical evidence which indicated that building the bridge would destroy the south-shore fishery,^{§§} arguably the island's most valuable economic resource (38).

PEI Premier Ghiz had assured his fellow islanders throughout the ten-year process that the province would defer to

* The machinations of the federal and provincial governments and the development consortium comprise a saga of deceit, dishonesty and undemocratic action (115:4).

‡ Often the insular progeny of colonizing organisms has lost the ability to migrate and has become incapable of competing with more effective continental organisms, and is thus in danger of extinction as soon as it comes into contact with such organisms, as happened to the dodo (*Raphus cucullatus*), a wingless bird related to pigeons endemic in Mauritius, rapidly destroyed at the time of the early European expansion in the Indian Ocean, not only by hunting sailors but also by feral cats and dogs (57:33).

§ A bridge, a stretch of tar, is a contentious subject, especially for islands and islanders. Murray... does not mince his words: the convenience of the bridge is obtained at too high a price, since it irrevocably transforms otherwise whole islands into mere parts, fractions of mainlands (116:324 ; cf. 117).

** Even the official motto belies its aspirations. The motto of Prince Edward Island, *Parva sub ingenti*, 'the small under the protection of the great,' is an apt metaphor for Canada's smallest province. It is also a bitterly paradoxical expression of the Island's status as a 'have not' province, largely dependent on others for its survival, first as a colony under British rule and then as a somewhat reluctant new province of Canada. As Prince Edward Island comes to the end of the 20th century, the goal of greater self-sufficiency and self-reliance remains as elusive as ever (118:175).

†† The Confederation Bridge, linking Prince Edward Island (PEI) to New Brunswick (NB) across the Northumberland Strait... has probably been the most keenly debated and most traumatic event in the modern history of PEI, Canada's smallest province (116:329).

‡‡ In *A Geography of Islands*, Royle dedicates the first photo in his book to the 14-km Confederation Bridge, linking PEI (and its 140,000 citizens) to mainland New Brunswick since 1997... To judge from the lead-up, many Islanders held high hopes from the completed structure. 'Our Island province is about to experience a transition to a new frontier of vigorous expansion and renewed community vitality,' PEI Premier Pat Binns predicted at the official opening. 'Our traditional sectors of agriculture and the fishery will be enhanced by a marked improvement in transportation infrastructure....'

The decision to bridge the gap (that is, the Northumberland Strait) was by no means universally popular, however... Prominent islanders like Betty Howatt campaigned vigorously against the bridge—because she saw 'a loosening of the social fabric in the province' and claimed that 'people no longer have that sense of place that they once had...' In a January 1988 plebiscite, 40 percent of islanders voted against a fixed link. For many of these, a fixed attachment was a violation of a natural order of things; a forced and permanent alternation of an intimate and fundamental spatiality... A key perceived threat was to the impact that a bridge would have on the island's unique and distinct 'way of life.' The latter may escape definition, although Ansel Ferguson, an island fisherman, describes it as 'a little more friendliness, a little more community, a little less crime...' Critics argued that easy access to the island province would damage the tranquility, natural beauty and charm of island life. Islanders did not want the green fields and red soil to be tarnished by the hotdog stands and jukebox joints that would transform the place into another Coney Island... A fixed connection would allow New Brunswick and Nova Scotia firms to truck their products more efficiently to PEI, as well as encourage Islanders to go shopping in such places as Moncton or Halifax, undercutting the island's smaller producers and retail outlets. Fishers complained that any solid structure in the strait would affect fish stocks, shellfish beds and especially lobster (116:329).

§§ For an island that depends so much on its natural resources (sea, land)... [and tourism] to support its economy, it is not surprising that much concern was raised on the environmental impact of the bridge, especially in the sensitive Northumberland Strait. There are now tell tale signs of 'ecological collapse' in that stretch of water... Many are claiming that the bridge is to blame for a 'sick strait'... The Federal Environmental Assessment Review Office had concluded, in 1990, that '... in terms of the marine ecosystem of the Northumberland Strait, the risks associated with the proposed bridge concept are unacceptable' (116:321-322).

the guidance of the one and only official and impartial *Report of the Environmental Assessment Panel*, which was commissioned and published in August of 1990. This report,

which resulted from over a year of study and public hearing into... [the] bridge proposal... is quite explicit and clear-cut about the proposed bridge: On two occasions the report said, in bold print, **“The Panel recommends, therefore, that the project not proceed”** (115:6).

And, ironically, a testament to this recommendation was nearly visible to the naked eye from PEI: across the Northumberland Strait stands the Canso causeway, a link whose history offered much to help inform the Confederation bridge strategy a half-century prior:

In 1944, a federal committee recommended that a fixed link be constructed... During the remainder of the 1940s, Post-Record publisher H. P. Duchemin was relentless in his use of his editorial space to promote and push for a fixed link... On 28 February 1944, Duchemin wrote that lack of an alternative to the ferry crossing ‘...is an insurmountable hurdle to the industrial progress of the Province....’

On 1 March 1944 Duchemin said there was ‘great necessity for this long overdue modernizing’ and quoted Nova Scotia Premier MacMillan as admitting that ‘no post-war work... would take care of more men than this job’... Duchemin pointed to the ‘saving of carriage costs’ that would be realized by a fixed link, thereby improving the ‘industrial progress’ of the province.... On 10 June 1944 he stated that the crossing is long-overdue and to continue to ignore the need was to condemn Nova Scotia to ‘industrial stagnation and economic inferiority’ (119:72-73).

When the Canso Causeway was built and opened for all to see, admire, and cross, on 13 August 1955, Transport Minister George Marler said that Nova Scotians could finally

‘look forward to the future with profitable optimism...’ as the Causeway would foster trade and stimulate new industries and ‘make it possible to visit, more easily than before, this inviting and friendly vacationland.’ Premier Henry Hicks waxed more poetic: ‘Demands of increasing population have always stirred men to overcome difficulties that have seemed barriers to progress.’ (119:76).

But the savings did not come. The tourists did not come. The profit did not come.

But economic and ecologic decimation did.

Flashing forward, to 1990, the time that the *Report of the Environmental Assessment Panel* ‘recommended, therefore, that the [Confederation Bridge] project not proceed,’ fellow islanders across the Northumberland Strait on Cape Breton Island had long-since began to “associate the Causeway with decimating industrial activity and, as a result, reducing populations” (119:73). The Causeway, ironically, had also been linked to the collapse the local fishery.

The Canso Causeway may have tied Cape Breton to mainland Nova Scotia, but the Island’s economic situation did not improve; rather, the link is one that exacerbated a culture of colonialism and dependence, where the central powers extract the resources and the best minds out of its ‘most despised hinterland’... With official unemployment handing steadily at between 17 and 20 per cent, outmigration endemic, and no real changes in sight, economic prosperity is an elusive goal. Linking the Island to the mainland did not seem to improve the relationships between the entities, even after fifty years conjoined.

Industry did not expand significantly, population declined... As an industrial development tool, the Canso

Causeway failed (119:81).

If one were to turn around and look in the other direction – to Quebec – two more enlightening lessons were to be found in the St. Lawrence. And if one were to heed von Humboldt's call to become an explorer, heading down to Florida's Gulf Coast would have offered yet three more islands. Moreover, if one looked beyond the shores of North America, to Sweden, literally *hundreds* of illustrative lessons were to be learned (of which, more to follow).

Needless to say, the same pomp and circumstance, the same political rhetoric – nearly verbatim – conspired against the islands on Prince Edward Island (115). And yes, the Confederation Bridge linking Prince Edward Island to Nova Scotia was built and stands yet today.

Within a decade after completion of the bridge, the south shore fishery, once amongst the most productive in Canada, collapsed; all commercial species on the south shore are now commercially extinct. Economic and ecologic collapse have also occurred much more rapidly and with far more destructive power than that caused by the Canso Causeway. Although this decimation has analyzed and chronicled (*cf.* 38 ; 75 ; 78), it is not surprising that several – if not most – of the aspects relating to this collapse have eluded analysis (*cf.* 115), as the same inductive methods which have been utilized to inform economic development strategy for the past century (*i.e.* methods lacking a theory of value, founded upon the inherently false and sandy inductive foundation of the 'social sciences'), have been utilized to assess the post-construction economic performance. Although I have reported upon this curious phenomena (*cf.* 75), no other economic analysis has commented upon the fact the mandate to drive monocrop potato production has worked-out fabulously well – PEI boasts the highest density potato production in North America, with acres in production nearly doubled since the completion of the Confederation Bridge – but it has come at an evolutionarily unstable price: potato blight fungicides are amongst the most toxic chemicals on Earth.*

Alas, this spectacular, Naru-esque tragedy plays on yet into the present: the industrial agricultural objective set into motion in 1970 and brought into full fruition with the construction of the Confederation Bridge has plagued PEI with the

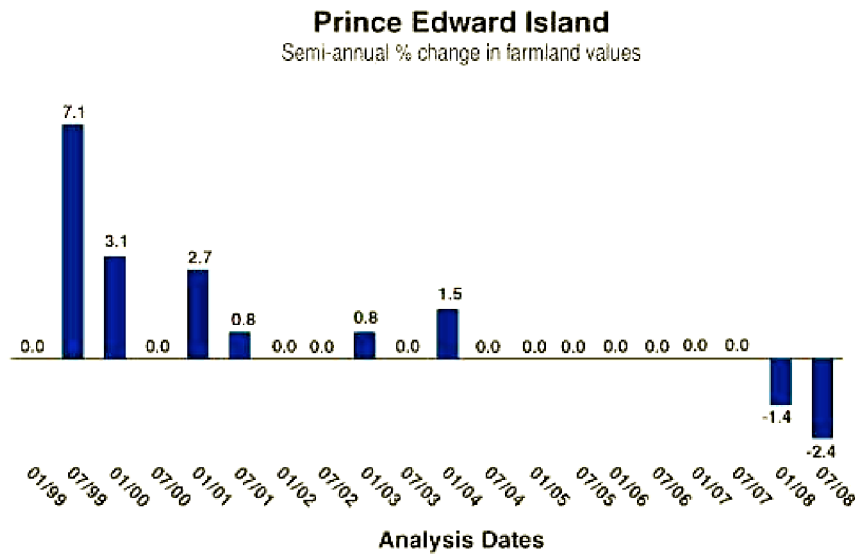
* The historical development of island peoples bears always in greater or less degree the stamp of isolation; but this isolation may lead to opposite cultural results. It may mean in one case retardation, in another accelerated development. Its geographical advantages are distinctly relative, increasing rapidly with a rising scale of civilization. Therefore in an island habitat the [human] factor may operate with or against the geographic factor in producing a desirable historical result. If the isolation is almost complete, the cultural status of the inhabitants low, and therefore their need of stimulation from without very great, the lack of it will send them deeper in barbarism than their kinsmen on the mainland (120).

poorest water quality (75),* poorest economy (38), poorest populace (38 ; 78), and highest cancer rates in Canada (75).

Needless to say, PEI is suffering great losses and staggering defeats on a daily basis,† not the least of which is marketing itself as the ‘green island,’ or ‘gentle isle.’

Although there is no need to repeat analysis I’ve already produced in exhaustive detail (*cf.* 75), I will offer three quick economic snapshots – two now, and the third in due course.

First, recall that the ‘agricultural economic miracle’ the premier promised was to commence with the completion of the Confederation Bridge in 1997:



And of course the greatest tragedy – the element which gives this drama it’s tragi-comedy quality, is that industrial agriculture is untenable on PEI under the best conditions. Farmers are restricted – by law – to ownership of 3,000 acres or less. The last time I checked, the largest potato farmer in Idaho was working a little over 100,000 acres. In general, PEI farmers are unable to *produce* agricultural commodities for less than they’re *selling* for on the Chicago Board of Trade. If it weren’t for subsidies, perhaps they’d all be out of business (even with subsidies, many are folding). Thus, the irony is that

* The quest for high-quality water has been an objective of human society going back to prehistoric times. Early humans gathered in locations with readily accessible sources of water and *if the water was believed to be of questionable quality, entire settlements would be abandoned* (121:513).

† Sorry I haven’t been able to read your many emails and get back to you since my expedition to Åland [*cf.* 37], but I’ve been working through a dilemma, and, alas, I’ve concluded: *ESS ≠ PEI*. I wish I had time to offer you all the considerations which were involved in arriving at this difficult conclusion, but I will note my final decision came at the end of my seminar in Åland. After detailing our rather extraordinary economic and ecological problems, at the end of my seminar, a PEI native (and UPEI ‘island studies’ professor, no less) said, ‘I disagree with Funk’s assessment, I can’t explain it, but I just wanted to state that I disagree.’ And that’s when it occurred to me that she – and countless islanders just like her – actually don’t think or aren’t capable or can’t handle thinking – that these problems exist! It doesn’t matter how much evidence piles up, the dissonance is too painful. But this thoroughly predictable commentary was truly a gift, because, for the first time, another native islander seated in the audience – my wife – was able to see the true nature of the problem as well. I hope I’m wrong, but I’m afraid the problem won’t be solved in my lifetime, as it seems (i) *The Tragedy of the Commons*, (ii) *The Canadian Constitution* [*cf.* 107 ; also *cf.* the 10th Amendment of the U.S. Constitution], (iii) *Religion*, and perhaps even (iv) *The Founder Effect* brew quite a toxic stew. Sorry I won’t have the opportunity to offer further assistance with your research. Farewell and good luck—Matt.

the islanders are poisoning themselves and – to add insult to injury – losing money while they’re at it. At least the Albertans are making \$ from the oilsands (much of which, ironically comes back to PEI in the form of provincial transfer payments).

The second snapshot, released 22 April 2009, really says it all:

Corporate Knights released the first comprehensive environmental report card today for... Canada's provinces...

The Green Provincial Report Card, which considered environmental performance across ten equally weighted categories – including greenhouse gases, organic food, green energy, green jobs, water use, biodiversity and car dependency—ranked BC at the top of the class with an overall score of 69 per cent for being tops in green jobs, green buildings, organic food, and energy efficiency.

Although the survey methodology adjusted for size of population and economy, Prince Edward Island pulled in at the bottom of the class due to poor energy efficiency, high car dependency, extreme paucity of protected land, and a dearth of certified green buildings (122).

PROVINCE	TOTAL	GRADE
BC	69%	C+
ON	67%	C+
NT	66%	C+
YT	57%	C-
NU	56%	C-
AB	55%	C-
NS	53%	D
SK	50%	D
QB	49%	F
MB	46%	F
NB	40%	F
NL	38%	F
PE	32%	F

Last year, a *Globe & Mail* cover-story exclaimed: *PEI'S KILLING FIELDS*:

Every summer Islanders hear about... thousands of fish dying in our rivers and streams... Wednesday, three more sites were added to the initial list of 13 rivers and streams plagued with the stench of rotting... fish. And apparently the problem is getting worse. Environment Minister George Webster concedes that ‘the trend is escalating’ and ‘there seem to be higher numbers’ (123:A6).

Two weeks later, on your Author’s 40th Birthday (13 August 2008), *The Guardian* asked: *Fish kills in our rivers: Are we heeding the warning?*

The first comprehensive Atlantic salmon survey on Prince Edward Island in almost a decade has revealed an alarming trend. The report, *A Conservation Strategy for Atlantic Salmon in Prince Edward Island*, warns of disappearing... salmon.

‘Eleven *PEI* rivers have lost their salmon since the early 1990s,’ says Daryl Guignon, the report’s author. ‘Only 22 rivers presently have Atlantic salmon and stocks in seven of those are very precarious. With the current rate of loss, in a few years, Atlantic salmon will likely disappear from Prince Edward Island.’

Todd Dupuis, director of regional programs for the Atlantic Salmon Federation, says the report is an eye-opener. ‘We need to do something quickly if Islanders are to continue to enjoy Atlantic salmon in this province,’ said Dupuis. ‘We know that salmon stocks in Northumberland Strait rivers in New Brunswick and Nova Scotia remain relatively strong therefore it seems there is something different on *PEI* that is causing this rapid decline.’

The recent federal-provincial report on the high levels of nitrates in provincial groundwater and surfacewater should come of no surprise.

As a member of the provincial Round Table on Resource Land Use and Stewardship, I regularly heard the issue raised at public presentations. Nitrates were seen as a threat to the quality of Prince Edward Island's water and received attention in our 1997 report. Ten years later, the problem continues to get worse (124:A7).

Why did this come of no surprise? Why does this problem persist?

*Because the poor, alas, deviate more.**

Why was the Confederation Bridge build despite the peril which it so clearly posed?

Because it was a *one billion dollar bridge*—one billion dollars worth of jobs and infrastructure contracts for 'have not' islanders (jobs which were not even given to them in the end – but that's another long, sad story). *The Tragedy of the Commons* may be readily taken in on any given day one (reluctantly) chooses to open *The Guardian*. A few weeks ago I was invited to offer a guest-lecture (69) and as I had hoped to make this very point, I opened *The Guardian* that morning and was not surprised to find an illustrative example (see *APPENDIX VII: ON THE TRAGEDY OF THE PRINCE EDWARD ISLAND COMMONS*). The point that this article made was this: Rustico, PEI, announced in the paper that morning that they had decided to sell-off some land as a new housing development, despite the fact that they happen to have many well-known problems which should have informed otherwise, two of which are (i) insufficient fresh-water supplies (which, thanks to increasing salt-water intrusion, are dwindling by the day) and (ii) a sewage system operating well over over-capacity. Yes, they decided that a new housing development was the solution to their ills; yes, the daily news on Prince Edward Island attests (*e.g.*, 75 ; 38 ; 69 ; 111-112 ; 117-121 ; ; *APPENDIX VII*) and continues to attest, the poor deviate more.

Populations with hungry mouths to feed and little to feed them with choose economic development over ecological preservation almost every time (though the people of Molokai offer a brilliant and inspiring exception to this rule).

In *Islandness*, PEI islander David Weale contended that

economically, socially, psychologically, the construction of a fixed link will reduce our insularity. It moves in the direction of peninsularity, which as the work itself expresses, is a state of being almost an island (126: 82).

It seemed to me that Weale was on to something—that his intuition and survival instincts served him well—but that he was unable to fully express a very important message, and thus unable to make his case with sufficient conviction. It

* A variety of sources indicate that 'the poor deviate more.' If the average person violates neoclassical assumptions, the average welfare recipient violates them to a markedly greater degree....

Once you accept the idea that you can hurt people by giving them more choices, you cannot dismiss the idea that you can help them by taking some of their choices away. In practice, of course, the latter is much more costly and intrusive than the former (125:503).

appeared that Weale was struggling to describe a desirable, *evolutionary stable degree of relative insularity*: the institutions, communities, people, economies, wildlife that biogeographical *and* politico-economic insularity engender.

I began to wonder if Weale's promethean apprehension was founded upon an intuitive understanding that a drastic reduction in relative insularity represented evolutionarily unstable strategy.

In the end I concluded that Weale was right: In short, the islanders (i) failed to recognize that they had evolved and adapted to live within niches of high insularity (as did Dodos and Great auks), (ii) failed to understand the value of relative insularity, and thus (iii), failed to adequately assess the consequences of a dramatic reduction in relative insularity. Yes, Weale was on to something, and game theory happens to offer support for the critical point he and others* tried so desperately to make.†

Furthermore, as I pondered Weale's conundrum, I began to wonder if relative insularity could be *quantified*? What if Weale had been able to *quantify* what this loss of insularity might mean? *The Funk-Carlquist Formula (GLOSSARY)* represents my on-going search for a quantitative solution.

When islands chase continental economic mirages, such as the pursuit of commercial agriculture, sooner or later, they lose money *and* the benefits their island ecology once offered: through amplification-by-compression, they experience *greater* pollution-related externalities than continental counterparts, form greater trade-related interdependencies, and thus become more vulnerable to financial shock as well.

The simple solution for island development is this: Do as little as possible, disturb as little as possible, foster the healthiest environment possible, for that *is* and *almost always will* be an island's greatest asset! 'Islandness' is any island's greatest competitive advantage – insularity is perhaps the single, scarce commodity with which 'globalized economic military superpowers' simply cannot compete!

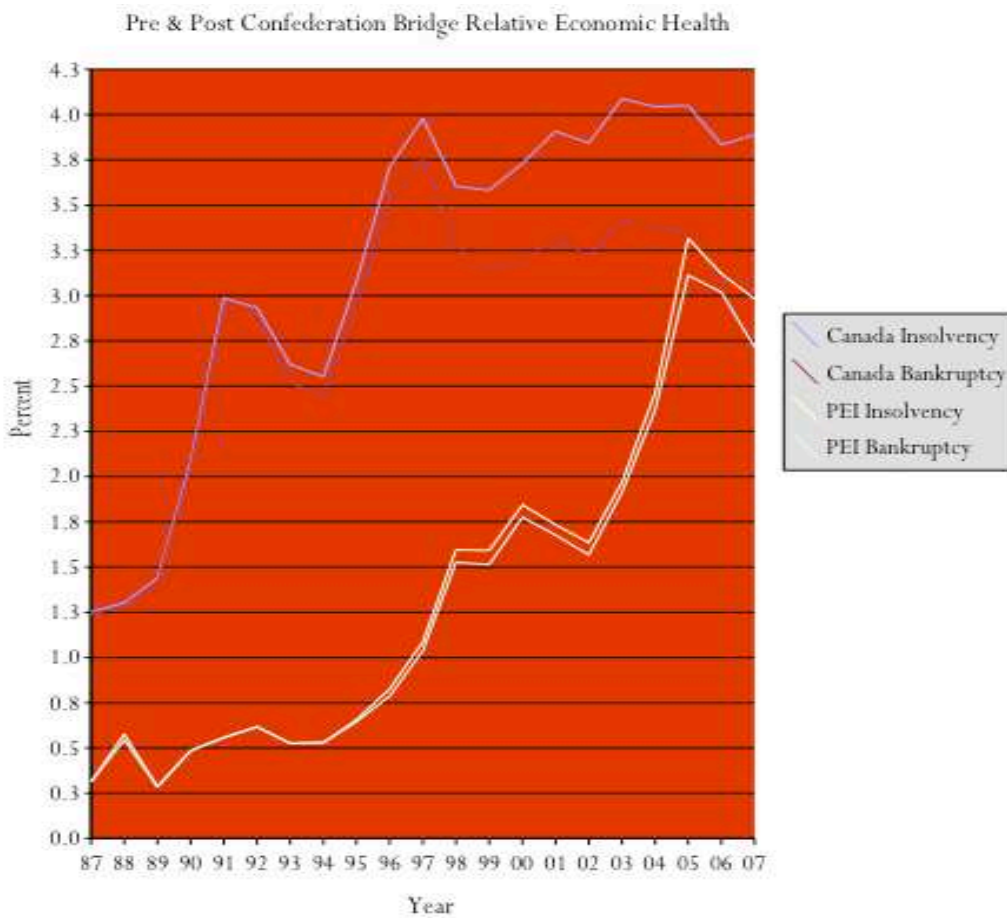
* The potential for dysfunctions were equally difficult to calculate. If a fixed link made it easier for Island exporters to penetrate Mainland markets, would it not also be easier for Mainland producers to penetrate Island markets? Was travel time and boat fare not a useful buffer against Mainland competition? Remove it and local manufacturers might be crushed under Mainland competitors' larger economies of scale. Many of these arguments were encapsulated in a submission made by Harry Baglole to the Conservative Task Force on Transportation in 1987. A fixed link, speculated Baglole, would encourage an economic centrifuge in which 'diversity and flexibility suffer and energy and resources tend to flow from the smaller and weaker toward the larger and stronger, away from the extremities and toward the centre.... Among the affected industries Baglole identified were fish processing, meat packing, and potato processing (127:38).

† What imitation rules [should] an individual... choose when she now and then has the opportunity to imitate another individual in the same player position but is otherwise constrained by severe restrictions on information and memory? ...If the individual wants a learning rule that leads to non decreasing expected payoffs over time in all stationary environments, then the individual should (a) always imitate (not experiment) when changing strategy, (b) never imitate an individual whose payoff realization was worse than her own, and (c) imitate individuals whose payoff realizations are better than her own with a probability that is proportional to this payoff difference (128:9).

Stewart Shepherd, one of the five economists hired (remarkably, all economists were from Europe, none had ever been to PEI) to develop and write the ill-fated plan of 1970 (*cf. APPENDIX VI*) confirmed my finding. Shepherd noted the plan was initiated because *per capita income* was lower on PEI than in the other provinces of Canada. But as Shepard remarked, *life expectancy and the standards of living were not lower*.

Moreover, standards of living may actually have been much better than the rest of Canada, relatively speaking, prior to building the bridge. In either case, however, as previously noted, per capita income data is inherently meaningless with no Theory of Value (11).

Perhaps some relatively useful economic data, however, is data which shines light upon *economic survival*:



As you may see, prior to the ‘economic miracle’ known as the Confederation Bridge, insolvency and bankruptcy was nearly unknown to Prince Edward Islanders, those thrifty sons and daughters of your highland, lowland, and island Scots (for example, my island wife’s father is Campbell and her mother is a McDonald). But isn’t it curious that c. 1997, just as insolvency and bankruptcy rates across Canada were falling and levelling-off, both took meteoric rises on PEI?

But dollars and sense are now perhaps the least of PEI’s woes, as ecological destruction has rendered any and all

economic arguments moot points – relevant analysis insofar as Prince Edward Island and Prince Edward Islanders are concerned are more fruitfully directed towards how they might best migrate to greener fields elsewhere across Canada.

In the past, ecological preservation has invariably taken place by accident, not design. For example, consider the fact that

the 17th century saw several attempts to develop the PEI fisheries through grants made by the French crown for monopoly fishing or sealing rights... *Because of PEI's remoteness, its poor north shore harbours, and political squabbling, none of these projects was ever realized* (129).

This 'accident' helps illustrate the self-defeating nature of employing 'continental' (*MED*) economic development strategies on islands. From an islanders economic perspective, this 'failure' was actually an *economic miracle*. The relative access to the deep water harbours on PEI's south shore have helped turn the Northumberland Strait into a lifeless sewer, but the *poor north shore harbours* have *preserved* the north shore's ecology and its economy. PEI's most productive fishery, most desirable tourist destinations, most desirable (valuable) real estate, *relatively* healthy water-sheds (still amongst the most polluted in Canada), are a direct result of these 'poor' north shore harbours (130).

Meanwhile, following the Gulf stream to the north-east, extraordinarily high levels of natural (biogeographic) insularity played out in an even more advantageous fashion:

Compared to Newfoundland, Iceland's domestic fisheries remained at very low levels of effort and catches until the early 20th century... In the period 1905-1909, Icelandic groundfish landings averaged only 48.4 thousand metric tonnes, or about a quarter of those of Newfoundland (129:101).

As the 'accessible' Newfoundland fishery collapsed, the Icelandic cod fishery was *preserved* by it's insularity. In the years which followed, by the way, Iceland complemented biogeographical insularity by augmenting it with political insularity by waging the cod wars.

I attempted to convey the essence of this counter-intuitive finding in my conclusion to a long letter to the Ålanders:

The fact that your per-capita income ranks so highly is admirable,* but largely irrelevant – pay as little attention to this inherently meaningless [11] figure as possible, for if it should rise to number-one, in reality you may be worse off, and if it should fall precipitously, you may in fact be better off. The best indicator of your great success is plain for all to see: *Your health*.† As the years pass, keep an eye on this benchmark, for, ideally, it should *always* be on the rise. If it should remain flat, be concerned. If it should fall, be alarmed (38).

* In 2003, the [per capita GDP] was €34 193 (£22 556, US\$44 423), the highest in the Nordic countries (41:684).

† Its health statistics are good. The average life expectancy is 2–3 years higher than in the rest of Finland. For women it is the highest in the Nordic countries (41:684).

Of course PEI is not an exceptional case, it is merely an accurate, highly descriptive, and relatively simple model of the maladaptive politico-economic development strategy that has been (and remains) employed on most islands throughout the world. Maladaptation is the norm – not the exception – amongst island nations and sub-national island jurisdictions, for *The Tragedy of the Commons* is so utterly *common* that it is extraordinarily difficult to find an exception to this rule, which is referred to regionally by various names, including *The Coney Island Effect*, *The Key West Effect*, and *Balaericization*.^{*} Even the Galapagos are ‘under siege’ by a ‘growing flock of well-meaning ecotourists’ (131:WI), and, furthermore (and somewhat ironically), since tourism is the number one industry in the world and, naturally #1 on most islands, islanders also have a tendency to work hard to obfuscate these truths – which, of course, ends up making the problem more difficult to solve.

There are several infamous and notorious examples – from Easter Island to Nauru – in which *The Tragedy of the Commons* plays out until the very bitter end; and islands such as Phuket, Key West, Malta, Oahu, St. Martin, Ibiza, St. Thomas, Bermuda, Jamaica, Carriacou (*cf.* 132), Barbados (of which, more to follow), and, in fact *most* Caribbean islands (*cf.* 57:98-100) find themselves face-to-face with the final curtain-call for the final act in this play.[†] The highest point on Malta – visible from all points on the island – is the summit of the central landfill. Throughout St. Vincent and the Grenadines, ‘tipping’ is the waste-disposal method of choice: Utilizing modified pick-up truck beds, islanders back-up to a cliff, and ‘tip’ their waste into the sea. This practice has been a source of particular embarrassment on St. Vincent, since the most popular tipping cliff towers above an otherwise inaccessible beach at the mouth of the harbour: As cruiseship passengers arrive daily (by the *thousands*, of course), their introduction to the splendours of St. Vincent are the rolling hills of rubbish along this beach.

The challenge, of course, is to identify a significant exception to this rule, and see what lessons it may have to offer—and I have done just that.

^{*} Even when agriculture, fisheries and commerce have done their best, in the various stages of civilisation, to increase the food supply, yet insular populations tend to outgrow the means of subsistence procurable from their narrow base (18:459).

[†] The specific colonial history of most islands has created an artificial economy which had meaning only within the imperial context....

Since the 1950’s, in particular, there have been disturbing signs of a new crisis affecting the viability of an increasing number of islands, both those within the developed world and those colonial and ex-colonial islands mainly concentrated in tropical latitudes. This crisis is reflected in the increasingly marked tendency to use emigration as a safety-valve to reduce population pressure when it becomes incompatible with the maintenance of living standards, given local economic systems and capacities....

For many islands the post-war period brought the culmination of a long set of policies and circumstances which were inimical to long-term sustainable growth. Centuries of deforestation, erosive plantation monoculture, marine exploitation, natural disasters and policy neglect had resulted in the progressive loss of renewable resources, diminished biological productivity and diversity, and the abandonment of traditional resource husbandry. This ecological crisis was often combined with a crisis of subsistence agriculture which, after the 1950s and 1960s, no longer appealed to island populations as a viable way of life (57:102-103).

Though Molokai and the big island of Hawaii offer admirable exceptions with impressive sustainable economic development track-records and extraordinary relative insularity, Molokai's success is based upon *cultural cohesion*, and although this appears to have offered a solid foundation for Icelandic* ESS† for ≈1000 years, the most recent chapter in Iceland's history suggests perhaps *cultural cohesion* ≠ ESS afterall.

The *moku nui* of Hawaii is naturally well endowed—in fact *The Funk-Carlquist Formula* (GLOSSARY) suggests the big island may represent the single-most insular island on Earth. But this fortunate case is only *partly* by design (*i.e. privatization* *viz.* The Parker Ranch)—it is in large part due to the fact that destructive agricultural industrial enterprises and high-density housing developments are uneconomical/impractical/impossible on the summits and flanks of 13,000 foot volcanoes: *The Funk-Carlquist Formula* suggests that the big island's extraordinary *relative insularity* is attributable to interdependent factors all working in unison to foster extraordinary evolutionary & economic value: *Hegemon Military Status*,‡ vast land-area, the Pacific Basin,§ wonderful isolation,** extraordinary fresh water reserves, considerable natural resources, high elevation (and thus, an unprecedented range of ecological zones, convection rainfall, *etc.*), a high percentage of forested Land Area, considerable Land Area protected by nature preserve, relatively low industrial agriculture production, no irrigated agricultural production, great solar and wind resources, low population density, and the fact that ≈10% of the island (≈30%

* Settled by Norwegian and Celtic... immigrants during the late 9th and 10th centuries AD, Iceland boasts the world's oldest functioning legislative assembly, the Althing, established in 930. Independent for over 300 years, Iceland was subsequently ruled by Norway and Denmark. Fallout from the Askja volcano of 1875 devastated the Icelandic economy and caused widespread famine. Over the next quarter century, 20% of the island's population emigrated... Limited home rule from Denmark was granted in 1874 and complete independence attained in 1944. Literacy, longevity... and social cohesion are first-rate (133).

† Looking back at all the different island problems, my understanding is that most of these could be best solved if the island community develops and sustains a sense of unity, which may manifest itself in civic mobilization. Iceland won the cod [*Gadus morhua*] war because all the Icelanders were prepared to fight against the British fishing fleet and thus conserve their basic resource. Had there been any disagreement on this within the Icelandic population, they would never have won (134: 337-342).

‡ The main metrics of world power... are gross domestic product (GDP), population, defense spending, and a less precise factor that includes innovation in technology. Power is summed as a percentage of total global power: Fourteen nations hold at least a 1 percent share. The United States holds about 20 percent of global power; the European Union (considered as a unified actor) and China, about 14 percent each. India holds about 9 percent. Brazil, South Korea, and Russia hold about 2 percent each. In moving toward 2015, the United States will first gain power, then decline somewhat, ending up at about where it is now. The EU, however, will lose power, as will all non-U.S. members of the G-8. The gainers will be China and India. The assessment identifies possible alliances that could match the power of the United States acting alone or with its traditional allies. It also examines the most likely locations for future conflict. Asia is by far the most dangerous region, with six of the eight conflict-prone bilateral balances involving China (135: *abstract*).

§ Many thousands of islands, totally more than one million square miles of land area, are strewn over the third of the earth's surface that comprises the Pacific basin....

Any consideration of Pacific islands must begin with the immensity of the water area that surrounds them, the largest single earth feature, whose area is greater than all the land above sea level on the face of the globe (136:7).

** When great powers are separated by large bodies of water, they usually do not have much offensive capability against each other, regardless of the relative size of their armies. Large bodies of water are formidable obstacles that cause significant power-projection problems for attacking armies. For example, the stopping power of water explains in good part why the United Kingdom and the United States... have never been invaded by another great power. It also explains why the United States has never tried to conquer territory in Europe or Northeast Asia, and why the United Kingdom has never attempted to dominate the European continent. Great powers located on the same landmass are in a much better position to attack and conquer each other. That is especially true of states that share a common border. Therefore, great powers separated by water are likely to fear each other less than great powers that can get at each other over land (48:44).

of all arable land) was under the *private stewardship* of Parker Ranch from the mid-19th century until the present: *The Tragedy of the Commons* has not been able to wreak a fraction of the havoc it has wreaked upon Oahu and Maui.

But a truly descriptive model for *RIS ESS (MEP)* requires a smaller, far more controlled experiment; an island with a natural history guided more by the hand of human agency than by Mother nature, a politico-economic realm of insularity which evolved and is evolving from a clearly stated, politico-economic development strategy from day one, *and* had and maintains the enforcement mechanisms in place to achieve it.

Stewart Shepherd, whom I have discovered to be a truly wise economist, gentleman, and a scholar, readily concedes the PEI development plan failed to consider ecological factors. And although he was almost entirely correct when he acknowledged and defended this error by noting that there weren't any economists on Earth factoring ecological considerations in 1969, there was at least one economic development plan being drafted – at the exact same point in time – which did.

There are 34 islands in the Grenadine archipelago,* which possess very similar levels of relative insularity, almost no natural resources (many even lacking fresh water), and all fall under the same bio-geo-politico-economic umbrella of the St. Vincent and the Grenadines (*SVG*) flag.†

SVG is the second-poorest nation in the *OECS*, and “it is notable that there are currently no comprehensive policies or mechanisms that address sustainable development in St. Vincent” (139:2). Thus *SVG* offers one of the finest laboratory for a relatively controlled, comparative island study of sustainable economic development; furthermore, the extraordinary value of comparative island study cannot be overemphasized (*cf.* 17-18 ; 50 ; 60 ; 64 ; 78 ; 89-90 ; 92 ; 107 ; 117-118 ; 129-130 ; 135-137 ; 139-151 ; &c. !!!).

* The Grenadine Islands extend between the islands of St. Vincent in the North and Grenada in the south. They lie on the Grenada Bank and belong to two countries, St. Vincent and the Grenadines and Grenada. St Vincent and the Grenadines (*SVG*) is an archipelago of 34 islands and islets located in the Eastern Caribbean at 13° 15 N, 61° 12 W. St. Vincent, the mainland, is 133 sq. miles, while the Grenadine islands which run for forty miles to its southwest are in total 17 sq. miles. The... islands consist of a number of private and state-owned islands with Bequia, Mustique, Canouan, Mayreau, Union and Palm Islands and Petit St. Vincent being inhabited. Four other islands make up the Tobago Cays Marine Park... The Grenadine islands of Grenada include Petit Martinique and Carriacou... The entire Grenadines are well known for their beautiful scenery, spectacular beaches and diverse marine habitats. All islands have a variety of surrounding fringing, patch and barrier reefs, and there are numerous offshore reef shoals on the bank. St. Vincent and the Grenadines is highly dependent on agriculture (mainly bananas) as a main source of income. However, growth in tourism has made that industry the current highest income generator in the country. In 2002, revenue from visitor expenditure amounted to approximately EC \$219.46 million, while that from banana export amount to EC \$38, 918,908.57... At present there is no integrated plan within which development and conservation will be pursued in either country. In many instances, development is taking place haphazardly and often without the input of relevant stakeholders. Both governmental and non-governmental organizations lack the capacity to develop an integrated framework for development (137:1).

† For a comprehensive history of *SVG*, *cf.* 138.

SVG lies in the *lesser Antilles*, denoted as such because they were, quite literally, worth *less* in the eyes of early European explorers than the natural resource rich, greater Antilles (Cuba, Jamaica, Dominica, Puerto Rico) – unable to merit large-scale agricultural production. And Mustique is certainly one of the lesser of the lesser Antilles: 1400 desert acres, very little fresh water,* no *EEZ*, no minerals, no oil nor natural gas, heavy salt spray, no inductive rain-fall, no geothermal energy, no deep water harbours, no financial sector, no manufacturing sector, a runway too short for jets, one 16-room hotel, one 4-room B&B, one general store, two restaurants, and one bar. Furthermore, *SVG* doesn't provide waste, medical, educational, police, water, fire, power, nor infrastructure support.† Mustique is an 'outlier,' a data-set economists often 'toss out' as irrelevant.

But the case of Mustique could not be any more relevant. By the central theorems and principles of economics, Mustique's economic value could be naturally expected to be as low or lower (due to the lack of fresh water) than many sister islands in the Grenadines, and far lower than on St. Vincent, the main island which possesses nearly all of *SVG*'s natural resources and 90% of the 'human capital.'[‡]

But this is not what we discover on Mustique.

And this is exactly why this 1400 acre desert island models *RIS ESS* so well.

Evolutionary Stable Strategy

First and foremost, Mustique demonstrates that the foundation to any proposed plan for *RIS* successful economic development *must* commence with a medium-to-long term carrying-capacity study, *and* facilitate the means for *enforcing* the plan's strategy: Mustique has had both items in place from day-one (1970) to the present.

The Mustique Co. Development Plan is indeed truly extraordinary, and, to my knowledge, unprecedented, as it marks

* The Grenadines are faced with several challenges. Because the islands are so small, they attract very little rainfall, have no permanent rivers or streams and due to their calciferous nature, do not support water retention.... Approximate annual rainfall on the mainland island ranges from 1700 mm on the dry coast to 7000 mm in the wet central mountains. In contrast, the Grenadines may experience as little as 460 mm per annum... Hence, there is very little surface water (137:10).

† The island of Mustique is well known as a privately owned island as well as a conservation area by a number of shareholders of The Mustique Company. Although Mustique is part of the Grenadines Islands and has a small population. It has its own Act that deals with matters relating to Mustique specifically. However, section 24 ensures that the laws of St. Vincent and the Grenadines apply to Mustique in the same manner that they apply to the other islands. This keeps Mustique under the ultimate jurisdiction of St. Vincent, but its individual Act allows for matters associated with a privately owned island and conservation area to be addressed adequately.

In the Act, the Mustique Company has a number of responsibilities to fulfil. Since the Mustique Company owns the entire island and it is inhabited, they also have a duty to manage, develop and maintain infrastructure and provide services that are normally the responsibility of public authorities. Infrastructure includes but is not limited to the airport, jetty, roads, and recreational as well as conservation areas (139:89).

‡ Insularity has significant links with conflict.... Very few well-developed islands have strong economies and societies... Most islands are not so lucky. ... Weakness has often led to economic peripherality, dependence and external aggression (57:13).

the only known instance of the ecologically planned development of an uninhabited island.

The Island Survival Game assists our search for *RIS ESS*, an island-based economic development strategy which cannot be ‘invaded’. In other words, the ‘island’ – be it in the middle of the Pacific or landlocked in the middle of the Alps, cannot be ‘taken away’ (from the ‘islander’s point of view, *i.e.*, those presently ‘holding’ the territory) – by force, purchase, or effectively lost as a result of pollution, deforestation, *etc.*

With this object in mind, consider the fact that Mustique was once held by Arawaks, taken away by the Caribbes, taken away by the French and the English,* then, remarkably, was taken and held for some time by one man with a promethean vision and considerable *RHP* – alas, however, not enough. Neither tribes nor nations nor man were able to deploy *ESS*. But the island was ultimately taken away once again, by *The Mustique Co.*, a private organization which *did* deploy *RIS ESS*, the *RIS* solution to the *Tragedy of the Commons*, and thus, ultimately, the solution *The Problem of Sustainable Economic Development*.

At this juncture I should also underscore that possessing an ‘unbeatable’ strategy \neq being literally ‘unbeatable,’ because *ESS* is merely theoretical. Mustique is fairly vulnerable to ‘attack’ from several fronts: it has almost *no natural insularity*, and very little *political insularity*.[†] The only insularity it has is the insularity *it created* through privatization—by fencing off the *commons*. The good news, however, is that the only ‘invaders’ Mustique has to worry about are (i) Natural disasters, and (ii) political disasters (*e.g.* invasion or SVG attacking via nationalization). The greatest threat – *the commons* – has been effectively eliminated through privatization.[§]

But even if a hurricane, VE-2+ eruption on St. Vincent, or a military coup should wipe out the ‘value’ meticulously and *purposefully* created on Mustique, (65) *still* models the *theoretical solution* to our problem.

The ‘founder colony’ of Prince Edward Island, in contrast, is losing *The Island Survival Game*. This fact is, however, not readily apparent, because Canada’s smallest province has generally achieved population growth over the past decade, but this growth is deceiving: the ‘founder population’ – in this case, the descendants of Scottish Islanders who were deeded this

* Resistance by native Caribs prevented colonization on St. Vincent until 1719. Disputed between France and the United Kingdom for most of the 18th century, the island was ceded to the latter in 1783. Between 1960 and 1962, Saint Vincent and the Grenadines was a separate administrative unit of the Federation of the West Indies. Autonomy was granted in 1969 and independence in 1979 (133).

† No regular military forces; Royal Saint Vincent and the Grenadines Police Force, Coast Guard (133).

§ 90 shareholders each own their homes plus 1/90th of *The Mustique Co.*, the free-hold owner and operator of the island of Mustique. Properties average 10-20 acres, and may not be subdivided. Any proposed new development must receive a 2/3rd majority vote from the shareholders

island six generations ago – do not presently exhibited sufficient RHP to ‘hold the island’, and ‘invaders’ are rapidly taking it from them — although the founder population held steady (*naturally*) at ≈100,000 for nearly 150 years, economic development strategy founded without a *Theory of Value* is only able to prescribe endless growth – thus, despite the fact that the present population – 134,000 is well over the island’s carrying-capacity, politico-economic incentive nonetheless offer ‘invaders’ significant incentives (Canadian citizenship) to ‘invade’ in order to maintain population growth! The irony, of course, is that this ‘growth’ actually amounts – from the islanders perspective – to ‘loss.’

At least one Prince Edward islander apparently sees some value in the learning tool our game readily produces.*

I will briefly sketch two more excellent examples of widely practiced, maladaptive politico-economic development strategy: My wife and I were fortunate enough to spend a week of 2007 on the beautiful island of Bermuda—but as we rode to our hotel one night after dinner, we heard a sad story which happens to represent the rule, not the exception amongst Bermudans. Our taxi driver, dressed in a fresh-pressed suit and tie, also happened to be a certified public accountant (I asked for his business card – and his story checked out); alas, however, he confided that, at 54 years of age, *after working both jobs for the last decade, he had finally given up on the prospect of home ownership.*

Off-shore finance, often seen as a quick-fix and big dollar idea in island jurisdictions – like so many such contrivances, is prone to *The Law of Unintended Consequences*. Bermuda’s insurance sector writes more than \$100MMM USD in premiums per annum. The tiny capital city of Hamilton boasts over 3.5 million square feet of office space. These are indeed the kinds of numbers which get economists and politicians excited – but it doesn’t get *Bermudans* excited: These dollars do not, generally speaking, benefit *Bermudans*. In fact, they often work against them in the form of dominant RHP (\$) – those who own and come to work for the largest insurance companies in the world (primarily from the UK) have superior ‘firepower’, so to speak. Bermudans have unwittingly – and quite effectively – priced themselves out of their own market and are thus losing *The Island Survival Game*.

* ----- Original Message -----

Sent Mon, 21 July 2008 03:22 at pm:

Hey Matt, Just finished reading....

I like... *The Island Survival Game*. Yes, the farmer would want to sustain and protect their farm for genetic survival. I never thought of it in terms of PEI's founder population decreasing, therefore it is an evolutionary unstable strategy driving the founder population extinct. (I am a member of the founder population, and yes we are going extinct!). I liked how you explained: Drastic reduction in relative insularity represents unstable evolutionary strategy, and then used the Bridge as an example. I agree Islanders evolved to live with the niches of insularity, because I feel it... It was a great... example, explaining how the problem of the Bridge represent the universal worldwide problem. PEI should conduct a carrying capacity study. I didn't know about that point. Very interesting. I think it is great that [you discovered] Mustique..., and I am with you 100%, island ecological health = island economic health.

The Funk Line

The inhabitants of Barbados are losing, too, and this is rather ironic (though perhaps predictable), considering the fact that “the country enjoys one of the highest per capita incomes in the region” (133); although this counter-intuitive finding is detailed in an exhaustive (though admittedly unrefined) discourse (38). And, since a picture tells a thousand words, I have animated this illusive dilemma with 174,000 words in four minutes and 19 seconds by producing a brief overview (literally), a round-trip flight from Barbados to Mustique. This magic flight* offers a stunning visual introduction to the amplified nature of *The Tragedy of the Commons* on islands, *RIS ESS*, and a contemporary overview of the value propositions diametrically opposed economic development strategies (*MED* and *MEP*) offer. This short, silent film also introduces *The Funk Line*, the bio-geo-politico-economic equivalent of *The Wallace Line*.

The Funk Line (151) brings the human agency (politico-economics, *i.e.*, land-use policy, *etc.*) into the biogeographical evolutionary equation, clearly demonstrating that, when comparing Mustique to Barbados, St. Vincent, the other 33 islands of the Grenadine chain, the remainder of the lesser Antilles, all of the greater Antilles, and almost *every* other warm-water island on Earth,

there is no other example on the globe of an island so closely surrounded by other islands on every side, yet preserving such a marked individuality in its forms of life;... it is, so far as yet known, absolutely unique (50:426).

Cold water islands – such as the Faroes and Lofoten (51:110) – are often applauded for their sustainability, but cold water island ecological preservation is, more often than not, a function of natural consequences (low tourist demand, few ecologically degrading industrial and agricultural opportunities to exploit, *etc.*), not human agency (though the Svalbard archipelago may represent a notable exception).

Mustique achieved and maintained *ESS* through (i) Colin Tennant’s *privatization* and promethean vision, (ii) the ecological principles Tenant and Money-Coutts established by commissioning *The Mustique Co. Development Plan*, (iii) the prudent management and execution of this development plan —with an emphasis upon *gradualism* – by the Honourable Brian Alexander, (iv) the relative insularity protected, fostered, and insured by ample *RHP* (\$, The Mustique Co.) and (v) the constitutional and contractual agreement (free-hold land title) honoured by *SVG*.

Alexander was kind enough to critique my positions regarding Mustique (*cf. APPENDIX IV*), and his most

* If the hero in his triumph wins the blessing of the goddess or the god and is then explicitly commissioned to return to the world with some elixir for the restoration of society, the final stage [(the magic flight)] of his adventure is supported by all the powers of his supernatural patron (2:170).

fundamental criticism was that Mustique's success was only possible *with extraordinary capital reserves*. Others have suggested that Mustique does not model sustainability because it is not *self-sufficient*. However, as demonstrate in the short discourse enclosed herewith (6), it is theoretically *impossible* for any 'island' on Earth to be self-sufficient (though a relatively high degree of self-sufficiency does = ESS).

Furthermore, the object of the game – *RHP* – makes no normative assumptions regarding self-sufficiency nor any other 'traditions which satisfy the canons of rationality embraced by socialists' (of which, more to follow).

In any case, returning to our thread regarding the essence of *RIS ESS*, contrary to findings tabled across the board in neoclassical economic theory, islands are not in fact *cursed* by geography, from an '*Islands*' economic perspective, small-island societies are clearly *saved* by the *miracle* of biogeography, by the miracle of *insularity*.

Moreover, as time moves forward, the few 'islands' willing and able to embrace *The Principle of Relative Insularity* (willing and able to make an economic sacrifice in the present for economic and ecological value in the future), stand to watch the value of their evolutionary *and* politico-economic (political stability, economic insularity, *etc.*) assets (such as the increasingly rare and precious asset known as potable water) increase and become ever-more sought-after as healthy, inhabitable environments, tourist destinations, *etc.*

Why is tourism the largest industry on Earth? Because humans consistently reveal the universal preference for relative insularity.

In many—if not most—regards, *The Prince Edward Island Development Plan* was executed brilliantly – over the past forty years this “Federal-Provincial Program for Social and Economic Advancement” has achieved very near what it was formulated to do. The problem was and remains, however, that it adopted a strategy based upon economic principles which were not supported by any theory of value (11). The Mustique Co. Development Plan demonstrated an intuitive understanding of the true value of relative insularity. The PEI plan does not.

These diametrically opposed plans yielded completely opposite and unintended results.

Remarkably, *The Prince Edward Island Development Plan*, which set the path for the intense economic development of an island (relatively rich in natural resources – *i.e.* the fisheries and some of the most fertile, tillable soil in all of Canada) with no regard for the ecology. The result was short-term economic gain followed by both ecological & economic collapse, and dwindling *RHP* (the population is rapidly aging, out-migrating, fertility rates falling, cancer rates rising, and population growth has only been achieved through offer incentives to 'invaders'). Despite its mounting ecological problems, rapidly

deteriorating fresh-water supply, and despite the fact that tourism now represents the largest industry (≈ 1 MM tourist visits per year), to this date, *PEI* has never commissioned nor conducted a carrying-capacity study.

The Mustique plan, however, mandated the ecological preservation of a relatively worthless scrap of desert surround by water (the island was generally viewed uninhabitable when Tenant purchased it in the 1950's; moreover, in reality, without The Mustique Co.'s *RHP*, it would remain uninhabitable), with very little, entirely secondary emphasis upon economic development—the plan also clearly stipulates that economic success would only be achievable through extraordinary measures ecological preservation and extraordinarily strict land-use-policies.

Furthermore, you need not take my word nor the curious case of Mustique alone, for several recent investigations offer various degrees of support to my central thesis: comparative studies on Cape Breton Island (*cf.* 119), Honeymoon, Caladesi, & Anclote (*cf.* 148), Sweden,* and two curious little gems in the St. Lawrence River, Ile d'Orleans and Ile aux Coudres (150), all testify – offering various degrees of support – to the value of relative insularity, and, moreover, support this hypothesis: *RIS ESS=MEP*. Also, though this letter would could easily double itself with an illustrative exploration of Iceland, it does not seem to require much imagination to see how the Icelanders tragic plight attests to my principle of relative insularity; several colleagues have also generously offered testimony.^{††*}

* Is it good or bad for an island to be linked to the mainland? The common view in most parts of the world seems to be that it is good when it comes to 'hard' values such as economy and population growth, but perhaps bad when it comes to 'soft' values such as quality of life.

In the Swedish context, one may mention the Koster Health Project... which was initiated to investigate what characterized 'a good living environment' and 'a healthy human being.' The small and relatively isolated Koster islands, north of Gotenborg, were chosen as the main test site for this study because they were found to be amenable to a focused examination of the interplay between human beings and their environment.... The islanders seemed to have a remarkably high quality of life, in spite of illness and nonexistent social and medical facilities on the islands. Having compared the island and mainland 'state of health, [it was concluded] that the Kosterites:

Had a more wholesome lifestyle, more modest material and economic needs, an a higher quality of life (fewer subjective symptoms of bad health than did the city dwellers. The people of Koster usually had someone's hand to hold if there was a crisis. The nuclear family was alive and well and spread security. That favoured a good quality of life....

The Swedes were no surprised that quality of life was found to be high on the Koster islands. Sweden is a scarcely populated Nordic nation, rather peripherally situated, with inhabitants who claim they live relatively close to nature, and they love nature. For example, a traditional and common belief among the population is that most Swedes really enjoy strolling in silent, dark, and huge forests which would frighten other Europeans, while noisy and polluted European cities would scare the Swedes. It is not surprising that islands, representing nature, are still often seen as positive symbols, as areas yet unspoilt by modern civilization....

The conflict between calm island life and exploitation is beautifully captured in the children's story *Viktor bigger en bro* (*Viktor builds a bridge*), written by Jan Loof, one of Sweden's most popular writers of children's stories. Apart from offering a Swedish solution [which, by the way, supports the solution derived herewith] (149:254-255).

† ----- Original Message -----

Subject: Re: Relative Insularity, Sent on Tue, 30 Sep 2008 07:18:55 -0300:

Yes - the events these last few days vindicate your thesis.

‡ ----- Original Message -----

Sent on Mon, 8 Sep 2008 09:39:49 -0300:

Hi Matt....I don't think we've ever formally met... I saw your email address in the mailing list of Godfrey's most recent mail-out and am using that to contact you. I am still working on my thesis... and am engaged in PEI economic development research... I happened upon a paper you submitted to the 2008 Åland Islands Conference and was quite intrigued with your thoughts about the value of relative insularity and approaches

And now that we have developed clear concept of *RIS ESS*, we may begin to recognize that several other ‘islands’ which have employed our counter-intuitive strategy in-part of in whole: Molokai, the Alpine Convention Region, many of the islands along the coast of Maine and, not surprisingly, many privately held islands, such as Lyford Cay, half of Key Largo (The Ocean Reef Club), the river systems your British Isles, Ireland, Iceland, and the Cascapedia[†] - which I am, thankfully, able to enjoy from time to time. In short, once again, (i) the inhabitants of these islands have demonstrated exceptional preferences for relative insularity, (ii) they have fought for, guarded, and maintained this relative insularity through privatization and fierce independence, and thus (iii) these islands are thus *relatively valuable*.

Most importantly, of course, we begin to recognize the manner in which we may deploy this strategy. How was ESS achieved on Mustique? By simply fencing off the ‘commons’; theoretically, *The Tragedy of the Commons* can not occur on Mustique: there is no ‘commons’ – it has been fenced off and would require a 2/3rd’s majority vote (by the shareholders of The Mustique Co.) to re-instate.

Many have suggested that this solution is impossible to achieve on islands under the control of democratic action. At first blush, it may seem that this is a valid point—but it is not. In fact, this economic development strategy is incredibly *easily* to deploy – it’s just that *most* societies are unwilling to endure elect the short-term *sacrifices* necessary to achieve it. It has – and is presently, afterall, being effectively achieved on the island of Molokai, and would most highly recommend those interested in this extraordinary case to explore it thoroughly; but our exploration today is limited to the exploration of the theoretical model – not a practical applications thereof. Let’s take a moment to review Table 1:

to economic and/or sustainable development pursued by islands. Powerful stuff! In that paper, you mention that there are two more parts of this ‘trilogy’ of work and that you could send copies to conference-goers. I wonder if you could email me those two other parts of the work to me?... I would look forward to discussing your research some time....

I look forward to hearing from you and I wish you success.

* ----- Original Message -----

Sent on Thu, 6 Nov 2008 09:39:49 -0300:

Hello Matt...I read your paper today, I spent a long time on it, almost all day. I am glad I did, it's very insightful and interesting. I admire the intelligence with which you construct your argument and the unbelievable amount of reading you have done. I don't think one can argue with you... I attached my comments. I am happy to discuss further with you...

The thing you must be aware of is that this paper can't be read quickly if one wants to understand it. If one tries to read it quickly, I don't think one can understand it because the arguments are carefully constructed and need careful following.

† Many mistakes had been made since the late eighteenth century in husbanding the river systems of the eastern United States. Very little land had been reserved by the successive governments for the exclusive use by private fishing clubs with a vested interest, and many hearty salmon populations were over-harvested, and virtually wiped out by 1850. The Canadian government was increasingly aware that it was unable to provide the resources to properly supervise the many rivers and lakes within the province. On many of the better salmon rivers, a private leasing system was established by the late 1860s, offering good salmon water on over two-dozen rivers to men of means. This early ‘privatization’ of salmon rivers by sportsmen brought with it a spirit of enlightened self-interest, leading to self-imposed conservation measures. The private clubs that began to take hold on many rivers by the late 1880s were often the catalyst that saved the fishery of those important Canadian Rivers (152:11 ; cf. 153).

<i>RIS Strategy</i>	<i>Short-Term Payoff (1-40 years)</i>	<i>Long-Term Payoff (20-30) years</i>
<i>Maximum Economic Development</i>	<i>\$-Rich/Land-Poor</i>	<i>\$-Poor/Land-Poor</i>
<i>Maximum Ecological Preservation</i>	<i>Land-Rich/\$-Poor</i>	<i>Land Rich/\$-Rich</i>

Table 1: 'Island' Economic Development Strategy Payoff Matrix

Based upon my current estimates, Mustique, a small, water-less, natural resource-void island satellite of one of the most impoverished Caribbean nations, commands undeveloped (bare-land) values amongst the highest *anywhere* on Earth (\$2MM USD/undeveloped acre and approximately \$20MM USD/home). Their ecosystem is perhaps the healthiest in the Caribbean, standards of living are easily the highest, *and* it is the second-largest employer in SVG (second only to the government)!

But it did not happen by accident, it did not happen overnight, and it may come of little surprise that The Mustique Co. was cash-flow negative from 1958-1988.

MEP requires *sacrifice*, a sacrifice the homogenous inhabitants (perhaps a key trait) of Molokai have, once again – time after time – elected to endure for the sake of their children's children.

If you take a moment to review the opening of my letter to the Ålanders, you may recognized that many of the 'islands I love' have 'fenced-off' 30-75% 'commons' by designating it as nature preserve. That's all it takes!

For example, although we will not burdened ourselves with detailed strategies which are decidedly unwanted, the Prince Edward Island provincial government could, for example, simply do what they did in 1970: *buy land*. But this time around, instead of clearing all the hedgerows and forest tracts, then repackaging them as monocrop potato farms, they could simply add to the miniscule 3% of land area under protection as nature preserves, or, once again, they did throughout the 1970's, repackage the land in *smaller* package with a few strings attached (land-use policies, *i.e.*, certified organic designation) attached. The government, if effectively ruled by rational people, could simply perform the same function The Mustique Co. has provided – *protection from the commons*. Alternatively, any private citizen, corporation, or cooperative with adequate *RHP* (\$) could perform the same function – that's exactly what Percival P. Baxter and several others did in the U.S. state of Maine (*cf.* 154-155), and that is exactly what Ted Turner has done with *two million rangeland acres – rangelands totalling more than twice the size of Prince Edward Island*.

Yes, the solution is simple.

But the problem is that most people would rather have a little money now (even at the expense of the environment in which they live), rather than a lot of money (and a healthy environment) later.

So the tragedy plays on. Remarkably, PEI has no comprehensive land-use policy to this very day.

But I must also emphasize that, although the Confederation Bridge has amplified innumerable, inter-connected problems for Prince Edward Islanders, it is neither the *true source* of the problem and the problem is far from insoluble. It seems that I should re-state that the bridge was merely the extension of *The Prince Edward Island Plan for Economic Development* which had commenced in earnest in 1970. As a wise Fulbright scholar recently discovered (while exploring the lack of relative insularity on Prince Edward Island and the differing insularities of three islands off the Gulf coast of Florida):

The romance of islands is often used by marketers of tourism as an enticing characteristic of their advertised destination. According to Tom Baum, small islands are popular tourist destinations because of their remoteness, boundedness, and insularity—a combination of characteristics David Weale calls *islandness*. Royle and others comment that this concept of islandness can be diminished or lost altogether when a fixed link, such as a bridge, causeway, or tunnel is established between the island and the mainland.

Ilan Kelman states that insufficient research has been done regarding the degree to which an island's insularity, or islandness, is lost when it is linked to the mainland:

In debating the construction of fixed links, fears are often expressed about the expected loss of island characteristics. Working out how much 'islandness; has been lost due to a fixed link is difficult....

Proponents of the link have said that it will only enhance the Island way of life. That is quite absurd. You might reasonably argue that it will enhance the economy of the province, or that it will make travelling on an off the Island more convenient, but you cannot reasonably argue that it will enhance the Islandness of our way of life. You can no more enhance the Island way of life by building a fixed link than you can enhance the forest by cutting down the trees. Economically, socially, psychologically, the construction of a fixed link will reduce our insularity.... There is nothing wrong with that, but we should not pretend that it makes no difference (*cf.* 156:3).

Yes, the bridge has helped reduce insularity to the nadir of evolutionary instability – but of course this bridge is a powerful lever which can be pulled in either direction: For example, as feared by many promethean islanders, the bridge has opened the gates for low-cost and pork which have decimated island farms and farmers. And, presently, the toll for a transport truck is not much more than that for a passenger vehicle (\$42 CAD). Want to increase insularity for island farmers? Increase relative insularity by raise the toll for transport trucks as needed (*e.g.* \$500, \$1000, \$5000). Want to give the islanders a competitive advantage? Wipe out their tolls entirely (\$0) as demanded and received by the inhabitants of Skye. My point is that it is actually possible to increase islandness to a point in which it is actually *greater* than it was prior to the building of the bridge.

And, to close on another positive note I'll very briefly illustrate yet another sketch of one more archipelago which I love above all others: the Roque archipelago. This illustration is especially excellent, as we're able to see how recognizing

The Principle of Relative Insularity often is so close to so many, yet dangles just out-of-reach. Consider, for example, this passage from my June 2009 issue of *Blue Water Sailing*:

Roque island is a special place... What makes it so special has to be the combination of remoteness and appearance of almost a mile of white pine-topped, craggy islands all around it (157:39).

Although I do agree with this author that Roque is ‘a special place’, this ‘combination’ is not what ‘makes it so special’. However, a bit further down the page the author stumbled upon the truth: “The island and surrounding islands are private and have been in the same family for almost 200 years” (157:39).^{*} We may also speculate that, perhaps our fellow blue water sailor was aware of this profound truth, *but was afraid to say it*. As I’ve noted, these truths are unpopular, and writers and publishers who want to sell popular magazines often side-step unpopular truths. Even worse yet, many writers cater to man’s innate desire for fairy-tales by telling lies.

In fact, although one may presume that telling lies may be difficult – as it requires a certain amount of cunning and a straight poker-face – in reality, it may be far easier than telling the truth, because this feat requires no less than a thunderbolt for a weapon (*cf. APPENDIX VIII*), which ‘the germ of corruption’ may render impotent.[†]

^{*} For a long time, Roque Island has been the ultimate goal of sailors cruising Down East—perhaps because of its beautiful, mile-long white sand beach, perhaps because there is the sense of something special about this island, perhaps because it takes determination to sail east of Schoodic and Petit Manan.

Roque is the centerpiece of an archipelago that includes Great and Little Spruce, Lakeman, Marsh and Bar, Double Shot, Anguilla, and Halifax Island—all set in a body of water called Chandler Bay to the west and Englishman Bay to the east. Shaped roughly like an H, the Roque archipelago offers a delightful variety of anchorages. The great southern beach on Roque Harbor is the most familiar. Lakeman Harbor to the east, surrounded by Lakeman, Marsh, and Bar Island, provides a secure anchorage. Tiny, landlocked Bunker Cove is to the west. Another sand beach curves around Shorey Cove, on the north side of the island.

Indians were the earliest-known summer inhabitants of Roque, and numerous shell heaps have been studied here by archaeologists. Joseph Peabody acquired Roque in 1806, and for almost two centuries the island has served as a resort and retreat for his descendants, the Gardner and Monks families. The old family buildings and farmhouses, red and yellow, are on the eastern side of Squire Point, overlooking Shorey Cove. There is a private boatyard, with a dock, metal and woodworking shops, and a small fleet at the moorings. Boats are hauled by attaching a farm tractor to a great old anchor half-buried in the ground and winching them up the ways.

Roque is a working farm, and it is almost self-sufficient, with cattle, sheep, pigs, geese, chickens, pigeons, and other animals. Products of the island include milk, butter, eggs, wool, beef, pork, squab, raspberries, rhubarb, herbs, and vegetables. The caretaker and the owners take pride in both frugality and ingenuity, and the farm has some marvelous Rube Goldberg contraptions, including a continuous conveyor belt built from scrap material to cut, carry, and split firewood.

In summertime, it is not unusual to see family members traveling in a horse-drawn carriage. During the winter, the resident Clydesdales haul guests on old blue sledges. As John Peabody Monks said in his book *Roque Island, Maine—A History*: “The visitor to Roque forgets the urgencies of time and place.”

‘Perroquet’ is the French word for parrot, and it seems plausible that, as Samuel Eliot Morison suggests, Roque was named by the French explorers for the puffin, or sea parrot. Or perhaps the origin was “rogue,” considering the pirates who were based nearby.

When Joseph Peabody bought Roque, he made good use of it. First he built a tidal dam across Paradise Cove to power a gristmill and a sawmill. Several large vessels were built for him at a shipyard in the little bight at the mouth of Paradise Cove, just west of Point Olga. At one time, Peabody owned 63 ships and employed more than 3,000 men in his various shipping and trading enterprises.

In 1868, John and Catharine Gardner sold Roque Island for reasons unknown. Ten years later, two of their sons bought it back for double the price, and the island has been in the family ever since. Shortly thereafter, the Gardners bought Great and Little Spruce, Lakeman, Anguilla, and the little Bar Islands. Double Shot was acquired in the 1930s (158:349).

[†] I had, in a moment of inadvertence, created for myself a tie. How to define it precisely I don't know. One gets attached in a way to people one has done something for. But is that friendship? I am not sure what it was. I only know that he who forms a tie is lost. The germ of corruption has

Although we will not delve too deeply into *The Problem of Induction* at this late stage in the game, I will briefly contextualize this problem (as it relates to telling lies) by connecting the dots between ‘man’s crushing desire (and willingness to pay) for certainty’ and those liars willing to sell it, with an excerpt – *in medias res* – from a long email I transmitted to my father in February:

----- Original Message -----

Date: Tue, 03 Feb 2009 14:38:52 -0400, Subject: Re: SELL

...you may recall that, over the past years, I have offered several strong warnings concerning the soundness of Warren Buffett’s strategy, the last of which was on January 9th:

-----Original Message-----

Date: Fri, 09 Jan 2009 05:41:54

“Stock prices have reached what looks like a permanently high plateau. I do not feel there will be soon if ever a 50 or 60 point break from present levels, such as they have predicted. I expect to see the stock market a good deal higher within a few months.”

—Irving Fisher, Yale University, October 17, 1929

“Today, people who hold cash equivalents feel comfortable. They shouldn't. They have opted for a terrible long-term asset, one that pays virtually nothing and is certain to depreciate in value... Equities will almost certainly outperform cash over the next decade, probably by a substantial degree.”

—Warren Buffett, Berkshire Hathaway, October 17, 2008

And...

----- Original Message -----

Subject: RE: Buffett Says Now Is the Time to Buy U.S. Equities, Date: Sat, 18 Oct 2008 02:41:46-0300,

From: Matt Funk <mat@mattfunkisland.org> To: warren@berkshirehathaway.com

Funk says Buffett is wrong.

I had copied several recipients with this correspondence, and I received one reply which simply remarked “Brk will be fine.”

Although I didn't have the opportunity to offer a reply in return, if I had, I would have remarked:

You *could* be right - but of course that is *The Problem of Induction*, we don't have a crystal ball, but I've suggested for over a year that that Buffet will not be fine, because it has clearly demonstrated his worldview is fundamentally flawed, and, as you've probably noted over the past few weeks, his ship may be beginning to list; here's a 25 January headline: ‘Berkshire Hathaway: Failing Business Model Points to a 35% Decline’.

Of course whether or not Buffett’s ship actually sinks or not is irrelevant, the problem is that his model is flawed, because he does not grasp the most fundamental, open problem in economics.* You may also come to recognize this if you have a chance to review the paper I sent several months ago. But in any case, as you are no doubt aware, Buffet’s *value* investment strategy is founded upon Benjamin Graham's *The Intelligent Investor*, a *Value-based* investment strategy which has worked for Buffett so well throughout *most* of his career. The problems,

entered into his soul (159:215).

* In economics the most fundamental of these central problems is the theory of value. The theory of value must explain how the comparative values of different goods and services are established. Until that problem is solved, it is not possible to analyse for scientific purposes what will be produced and in what quantities, how the resources will be employed in producing the menu of outputs, and how the resources will be valued. Without a theory of value the economist can have no theory of international trade nor possibly a theory of money (11:61).

however, are manifold, inter-dependent, and insurmountable—but I only need to bring one to your attention. In light of (10:61), it is easy to see that Buffett has absolutely no idea what he is talking about—he has no tenable theory of value, thus, despite his incessant conjectures to the contrary, he does not know if something is *under* or *over valued*. I might also note that this is the fundamental problem I have been working on for the past decade, and have indeed solved this problem, and the solution I have derived illustrates that it is theoretically impossible for anyone to ever know – at any particular point in time – if any tradable equities are ‘over’ or ‘under’ valued. But one deduction I am able to make is that, given (i) the inherently unstable nature of our extended economic order, and (ii) the fact that chaos increases as time moves forward, that (iii) all tradable financial instruments are, by nature, inherently *over-valued*.

The “Brk will be fine” comment also reminded me of something someone we’ll refer to as ‘Induction’ said to me in Iceland in the summer of 20007. I brought Ben Funk a copy of Taleb's new book, *The Black Swan* (recall that I've given both of his books to you as well), and I was really excited about it because Taleb has the uncanny ability to deliver a useful, enlightening discourse on *The Problem of Induction* in a very entertaining way. In any case, as I was making a great fool of myself, gushing about the book, Induction glibly chimed in “That guy doesn't make money.”

I offered neither rebuttal nor defense, because I’ve concluded that most people are simply incapable of following this argument. However, in brief, what was rather ironic, was the fact that Induction's error is exactly same the type of error which Taleb illustrated so well in his first book, *Foiled by Randomness*: For several years, Taleb's friend, Princeton economist Robert Shiller, author of *Irrational Exuberance* (another great book I gave to you years ago, by the way) was regularly *ridiculed* (on television, in the papers, *etc.*) for *predicting a housing bubble*. Although one could argue that he may have made a mistake by *predicting* the year in which he expected the bubble to burst, *nobody is ridiculing him anymore!*

You see, Induction’s conjecture that “That guy doesn't make money” was and off-base because, not only was any time-series that Induction may have had in mind insufficient (let's say 5 or 10 years), Warren Buffett's *entire lifetime* represents a totally insufficient time-series with which to make any meaningful observations.

Thus you may begin to see dubious nature of Buffet’s prophecies:

----- Original Message -----

Sent on Mon, 24 Nov 2008 00:40:41 -0400, To: Ben Funk <bfunk@liongatecapital.com>

Greetings Human...Recall my 18 October 2008 comment (‘Funk says Buffett is wrong.’) after he absurdly announced that ‘Now is the time to buy U.S. equities.’

Think about it: When would the biggest, most experienced player in the biggest poker-game on earth announce that he's going to *start* buying U.S. equities? If he had been telling the truth, he would have only made the announcement *after* he had already bought them!!!

Sadly, so many have been fooled into believing his ‘track-record’ actually represents a relevant time-series.

For the life of me, I can't imagine why anyone wouldn't actively be engaged in an average-out program; does anyone actually believe this market is going to run away from them?

Anyway, the CDS market smells a rat, too (see *Forbes* article, attached herewith). It's curious that the man who warned the world about derivatives (2002 annual report- I sent it your way last fall) is getting hammered by them.

As someone pretending to be me said long ago, “Watch out for false prophets. They come to you in sheep's clothing, but inwardly they are ferocious wolves”.

I hope this may help clarify an important point I’ve been struggling to make for the past several years. Furthermore, in essence, Buffett's theories are founded upon making money; my theories are founded upon the dream of learning to fly, and the implications surrounding this difference are far-reaching:

This spiral of interactions or feedback mechanisms is influenced by our developing theories and by our dreams. An example is the shaping, the creation, the invention of Leonardo’s bird: of what we all know today as the aeroplane. It is important to notice that it is the dream of flying that leads to flying, and not, as the materialistic conception of history of Marx and Engles would doubtless suggest, the dream of thereby making money—Sir Karl Popper

In any case Dad, although I offer no apology for relating difficult truths, I am sorry that this news is all that I have had time to report. In a nutshell, all is quite well. I hope that you're feeling better, and hope that I might be able to see you later this week or over the weekend, as I'm coming to Chicago for William's birthday party on Saturday: Of course you're all invited! And, to leave you on a positive note, things could be worse, you could be here:

Queens County PEI, Issued at: 11.00 AM AST Tuesday 3 February 2009

Winter storm warning in effect.

Today: Cloudy. Snow beginning this afternoon. Amount 2 cm. Wind becoming north 20 km/h gusting to 40 this afternoon. Temperature falling to minus 9 this afternoon.

Tonight: Snow at times heavy and blowing snow. Amount 15 to 25 cm. Wind northeast 40 km/h gusting to 70 becoming northwest 30 gusting to 50 overnight. Low minus 9.

Wednesday: Cloudy with 60 percent chance of flurries. Becoming cloudy periods in the evening. Blowing snow in the morning.

Love...Matt

On 'Ö', the Swedish Word for Island

I offer no apology for the previous digression, as I trust you may soon recognize that it was all quite requisite for our fruitful expose of a common liar by the name of Alan AtKisson. This also offers an opportunity to clarify some disclosure which may have mystified some: Last Summer, I began a discussion by stating,

Hello, my name is Matt Funk, I'm 39 years old, and I've only solved one problem in my entire life—but don't feel sorry for me, because I'm actually quite pleased with my success, as I've solved the most fundamental, open problem in economics.

(BEAT)

I don't have any big corporate clients and nobody *paid* me to be here—and *I will even suggest this may work-out in your favour*; I'm here because I want to be here, because I love islands, because I want to share a few of the things that I have learned about them, and to hear what you have to say about them as well (37).

The 'corporate sponsorship' bit received a few laughs, because the previous day AtKisson opened his keynote speech by rattling off a long list of corporate and government clients. He also said many things which made me feel sorry for the islanders who had paid him to lie to them. AtKisson recently regurgitated some nonsense from his keynote speech in a paper he circulated to conference attendees:

In Swedish, the word for 'island' is a single letter, itself a small island: ö.

When one comes upon it in reading, this little 'o' with two dots over it appears suddenly and alone in a surrounding sea of words — tiny, yet redolent with linguistic meaning and personal associations. Ö seems to long for company, and to be happily self-contained (160).

If AtKisson were a poet, perhaps a reasonable defense may be erected upon the grounds of artistic license. But the problem is that AtKisson pawns himself off as a 'sustainability expert',* charging handsome fees to islands and

* Alan AtKisson has been working at the forefront of sustainability initiatives since 1988. As an author, consultant, speaker, and musician, Alan continually seeks new ways to communicate the complex challenges facing our world, and new ways to empower the change agents who are

corporations alike (*cf.* 161) for his subjectivist BS* on this difficult, complex, inter-dependent problem:

We can extend the concept of island almost indefinitely – and indeed, it is useful to do so. Planet Earth is, after all, an island. It floats alone in the sea of space, experiencing ‘limited accessibility’ to the rest of the universe (or even to its nearest neighbours), even if its location appears quite ‘favorable’ relative to the nearest star, our sun. And of course, it requires only a reminder – and not a lengthy explanation – that nearly all the properties of islands described above could be easily applied to our planet as a whole (160).

To the contrary, I hope that I have clearly demonstrated ‘a lengthy explanation’ is exactly what was needed—and that’s exactly what I’ve done. If it seems like I’m being a bit too harsh on AtKisson, please trust me, I’m not, because

If we are to safeguard the reputation of science, and to prevent the arrogation of knowledge based on a superficial similarity of procedure with that of the physical sciences, much effort will have to be directed toward debunking such arrogations, some of which have by now become the vested interests of established university departments. We cannot be grateful enough to such modern philosophers of science as Sir Karl Popper for giving us a test by which we can distinguish between what we may accept as scientific and what not - a test which I am sure some doctrines now widely accepted as scientific would not pass (162).

Those familiar with this ‘test’ will quickly grasp the unforgivable nature of AtKisson’s grift:

Near the end of his Keynote speech, AtKisson unleashed wheel-barrel full of arrogated knowledge and superficial pretense, including a flurry of inductive inferences which immediately set-off my BS (163) detector. The most memorable was a prophecy which played to a minor hysteria of the moment and thus catering to those whom paid him to be all-knowing. In light of the fact that oil was trading at an all-time high in the early June of 2008 – around \$140 USD/barrel, AtKisson glibly declared that it was “headed over \$150, then on to \$200 and \$300.”

That’s when I left the auditorium to get some fresh air.

The next day, after mocking AtKisson as noted in my introductory remarks (37), I offered another necessary jab at the end of my talk: I said that, Ö does not ‘long for company’, it longs for relative insularity, and furthermore, that it is not ‘happily self-contained’, but rather inextricably inter-dependent. AtKisson had also said something fruity about what he thought the two dots represented (I apologize I cannot remember), but, I may have further mystified my audience by objecting to his analysis, and wrote ‘Ö’ on the blackboard, stating that the two dots represented (*i*) an incoming ICBM and

working to address them. In all his work, he blends the discipline of a researcher, the fun and creativity of an artist, and the people skills of a strategic advisor and organizational leader. As CEO and President of The AtKisson Group, Alan works with his colleagues and partners around the world to “mainstream sustainability” by empowering people to make beneficial changes in their corner of the world (161).

* One of the most salient features of our culture is that there is so much bullshit. Everyone knows this. Each of us contributes his share. But we tend to take the situation for granted. Most people are rather confident of their ability to recognize bullshit and to avoid being taken in by it. So the phenomenon has not aroused much deliberate concern, nor attracted much sustained inquiry. In consequence, we have no clear understanding of what bullshit is, why there is so much of it, or what functions it serves. And we lack a conscientiously developed appreciation of what it means to us. In other words, we have no theory (163:1).

(ii) a keyhole asteroid instead (37). If you've had the opportunity to review (6), I trust you may recognize the problem to which I was referring. Also, nearly a year later, my thoughts flew back to the poor Ålanders who had paid a prince's ransom to be baffled by BS (163) when, at 2:33 AM on 21 April 2009 the following crossed the Associated Press wire:

SIoux FALLS, S.D. — Oil prices plunged to their lowest levels in more than a month Monday as investors, nervous about a week chock-full of corporate earnings reports, sought safer havens in gold and the dollar.

Benchmark crude for May delivery fell \$4.45 to settle at US\$45.88 a barrel on the New York Mercantile Exchange. With trading on the May contract ending Tuesday, most of the trading has shifted to the June contract. Benchmark crude for June delivery dropped \$3.96 to settle at \$48.51 a barrel.

And, by the way, oil closed the day before yesterday (2 July 2009) at \$64USD and change.

Needless to say, AtKisson doesn't know any more about *The Problem of Sustainable Economic Development* than he does about the price of oil (or the price of tea in China, for that matter)—to tackle this problem one must be willing and able to fight theoretical Ogre's which AtKisson is not well-armed enough to fight (*cf. APPENDIX VIII :A THUNDERBOLT FOR A WEAPON*). Where did AtKisson go wrong? How does my approach differ? This is a long story in of itself, but, in short,

two roads diverged in a wood, and I—
I took the one less travelled by,
And that has made all the difference (164:20).

For those strong enough to face difficult truths, for those who have not let germs of corruption enter into their souls, the solution to *The Problem of Sustainable Economic Development*—arguably the most fundamental problem on earth—requires little more than recognizing *The Principle of Relative Insularity*, understanding and adopting the ESS which best *attains and maintains relative insularity*—by applying strategy, which has, to various degrees, been successfully deployed by many rational individuals, nations, institutions, and corporations throughout the ages in islands (such as Mustique, Molokai, Roque, and North Haven) and on continents alike (38), including Vegetius (165), King George III, Kamehameha the Great,* the

* Kamehameha thoroughly observed the place which had been entirely farmed, which was unimaginably large (*'a'ole no I kana mai ka nui maoli no*), and he said to himself, but was heard by some of his *ali'i* who were waiting for him: 'This work of farming is really a headache, yet it is the work by which benefit is gained by the patient person....'

When Kamehameha arrived at the place where the food was prepared, the people and the chiefs murmured about the true vastness of that farm made by Kamehameha and perhaps for this reason it was called Kuaheaw, or vast, until this very time in which we live...

At the end of the meal Kamehameha spoke these important words to his people and his *ali'i*:

E na ali'i me a'u mau keiki [Pay heed my chiefs and children]. It is well that you have farmed and planted crops. When the time comes that our crop has matured and you begin to pull it up, or perhaps break off the sugar cane clumps, or take the bananas which we all have planted, here is my command to you: pull up the *kalo* and break off the top (*huli*) neatly, and then tuck it back into the soil rather than throw it out of the garden and let it just dry up. As to the sugar cane, the *ali'i* desires you who break off the sugar cane, to thrust the cutting back into the earth. Also when cutting the banana stalk to take the fruit, take care lest the shoots be trampled. If you do as I have directed you, then you will continue to consume the vegetable food, the sugar cane, and the bananas and will not die of starvation. And when you see the weeds growing up, then dig them up.

Where the garden is covered with fern leaves, cover them again with new fern leaves as these are good actions which will expel starvation from the calabashes of men. Here is another instruction, O chiefs and my children: do not oppress the women, take good care of them (166:346-

Vikings, Theodore Roosevelt, Winston Churchill, Margaret Thatcher, Albert Einstein (167), J. Robert Oppenheimer, The Los Alamos National Laboratory, the Allied powers of World War II, John Nash, The Mustique Company, Edw. J. Funk & Sons, Super Crost Seeds, Oracle, Fairmont Minerals, * Liongate Capital Management, † The Gordon & Betty Moore Foundation, Parker Ranch, ‡ The Cascapedia Society, The Brown Company, § Austin Corbin II, ** Adam Smith, †† and perhaps America's greatest patriot and conservationist since Teddy Roosevelt and Percival P. Baxter: Ted Turner. ††

In all cases—be it managing a ranch, a small island's natural resources, a hedge fund, a standing army, or a half-dozen allied armies—the tools, considerations, and mechanisms are straightforward and largely the same: (i) *Carrying-Capacity*, (ii) *Gradualism*, (iii) *Optimum Habitat Condition* (174), and (iv) *RHP*.

The problematic dichotomy, however, perhaps the most counter-intuitive and surprising revelation (6) offers (explored in detail in 38), is that deploying this ESS at the *planetary* level (and thus *GEMS ESS*), that *preserving and maintaining the relative insularity* of the planet Earth, is not nearly as straight-forward as has been presumed until this 12th day of February 2009: I'm afraid many 'ecologists', 'ecological economists' and 'conservation biologists' may not like what I

347).

* Enduring business prosperity is the result of business practices that value responsible resource management, quality of life and environmental health. When a company commits to contributing to the world's social, economic and environmental needs, it can realize greater performance in all aspects of its business (168:2).

† The best managers... generate profits using original ideas. Managers should have a strategy we understand.... Sustainable, good performance takes both an unwavering commitment to finding managers with a competitive investment advantage in their target market, and, additionally, a commitment to intelligent aggressive portfolio management (169:1).

‡ AW made early, strategic decisions that guaranteed the continued growth of the ranch. Among them, in addition to acquiring land, was the procuring of superior seed stock in dairy and beef cattle, horses, and sheep, while initiating an early and permanent preventive health program for the stock. The following is from an editorial from the *Honolulu Advisor* in 1932: 'In the history of these islands, no greater economic development of a single property through the efforts of one man has ever been accomplished (170:181).

§ WR Brown... studied forestry science and investigated the techniques of respected high-ranking forest officers in Germany.

Previously, loggers had clear-cut and moved on. Brown was the first executive in the timber industry to hire a professional forester...

By the 1920's, the Brown Paper Co., owned 3.75 million acres of forest in northern New England and Canada, the precise number of acres WR Brown figured he would require to meet the needs of his New Hampshire and Quebec paper mills, 'without ever cutting the forest faster than it was growing' (171:126-127).

** In 1888, Corbin bought... twenty-five thousand acres... to establish a wild game preserve....

In hard economic times, local residents chided such extravagance, referring to the land as 'Corbin's folly.' Despite his preservation aims, Corbin was criticized in New York newspapers for his purchase of 'a big worthless chunk of New Hampshire wilderness populated by wild animals and thickly scattered with granite boulders.' Undaunted by such criticism, Corbin hired renowned natural scientist and bird defender Ernest Harold Baynes as the naturalist for his private game preserve.

Because he had witnessed firsthand the vanishing of bison on the plains of Iowa, Corbin had his original mission the desire to save the American bison or buffalo, a species rapidly becoming extinct (171:124-125).

†† A state may sometimes derive some part of its public revenue from the interest of money, as well as from the profits of stock. If it has amassed a treasure, it may lend a part of that treasure, either to foreign states, or to its own subjects....

The unstable and perishable nature of stock and credit, however, render them unfit to be trusted to, as the principal funds of that sure, steady and permanent revenue, which can alone give security and dignity to government. The government of no great nation, that was advanced beyond the shepherd state, seems ever to have derived the greater part of its public revenue from such sources.

Land is a fund of a more stable and permanent nature: and the rent of public lands, accordingly, has been the principal source of the public revenue of many a great nation that was much advanced beyond the shepherd state (172:Book V)

‡‡ I'm often reminded of Scarlett O'Hara's father in *Gone With the Wind*, who told her, 'Why, land's the only thing in the world worth fighting for, worth dying for, because it's the only thing that lasts.' I've realized this to be true (173:275).

have found, because an economist or ecologist who fails to take into account military strategy and astrophysical phenomena is as lost as military strategist or astrophysicist who fails to consider the ecology. The ‘Unity of Nature’ may elude most, but she stands tall, shimmering, basking in the radiant beauty on Earth for those able to see, for those unencumbered by ideological blinders (*cf.* 6). Despite what many may contend,

it is not mathematically possible to maximize for two (or more) variables at the same time. This was clearly stated by von Neumann and Morgenstern, but the principle is implicit in the theory of partial differential equations, dating back at least to D’Alembert (1717–1783). (175:1443).

The Problem of Induction (*cf.* GLOSSARY)* both limits our theoretical range of knowledge to a more restrictive realm than has been generally considered, and requires that we consider a theoretical realm rarely acknowledged and/or thoroughly misunderstood.† For example, despite my confused countryman’s extremely popular – *yet wildly illogical* – closing arguments (*cf.* 177:607): ‘We’ are *not* the ‘Death Star,’ we are our *only* hope!

And, to this very point, all hope is far from lost, as our unified theory of value (39) does indeed inform ESS for islands and continents alike, thus offering a tenable solution to *The Problem of Sustainable Economic Development* on Earth.

The Principle of Relative Insularity (38) also offers much insight for each and every individual, as, true to its unified nature, this powerful analytical tool is as applicable at the individual level as it is at the national level, and may be utilized to inform tactics and strategies for countless common problems, such as: (a) selecting insular human habitats,‡ (b) personal investments,§ (c) identifying evolutionary unstable currencies,* (d) selecting relatively insular vacation destinations,† (e)

* It took a remarkably long time before the novelty of the intellectual situation was grasped. Few realized what had happened. David Hume...saw that a great step forward had been taken, but he did not understand just how great and how radical this advance in human knowledge really was. *I am afraid that even today many people still do not fully understand this* (3:36).

† We all know that, in the pursuit of our individual aims, we are not likely to be successful unless we lay down for ourselves some general rules to which we will adhere without re-examining their justification in every particular instance. In ordering our day, in doing disagreeable but necessary tasks at once, in refraining from certain stimulants, or in suppressing certain impulses, we frequently find it necessary to make such practices an unconscious habit, because we know that without this the rational grounds which make such behavior desirable would not be sufficiently effective to balance temporary desires and to make us do what we should wish to do from a long-term point of view. Though it sounds paradoxical to say that in order to make ourselves act rationally we often find it necessary to be guided by habit rather than reflection, or to say that to prevent ourselves from making the wrong decision we must deliberately reduce the range of choice before us, we all know that this is often necessary in practice if we are to achieve our long-range aims.

The same consideration apply even more where our conduct will directly affect not ourselves but others.

The burden of choice that freedom imposes, the responsibility for one’s own fate that a free society places on the individual, has under the conditions of the modern world become a main source of dissatisfaction (176).

‡ ESS = A relatively self-sufficient working ranch. Otherwise, the “only one thing worse than living in a gated community [is] not living in a gated community” (178:2).

§ USD, US Treasuries, RMB, XAU (*i.e.* 2009 US Mint ultra-high relief Double-Eagles, Krugerrands, *etc.*), Well-insulated, energy efficient homes, a bio-geo-politico-economic diversified second-home, US and Canadian rangelands and wildlife production systems west of the 100th meridian (excluding California), Argentinean, British, Swiss, Icelandic, and French certified organic farmlands, rangelands, wildlife production systems and riparian rights. Wild fish, game, and organic produce for personal consumption, Education, Healthcare, a boxed-frame SUV or ¾-ton pickup (of which, more to follow), camping, fishing, & hunting gear, especially 9mm & .30/06 ammunition (179-180, *Si vis pacem, para bellum*).

identifying unstable destinations to avoid at all costs,[‡] (f) choosing well-insulated personal transportation (See *APPENDIX IX: ON THE PROBLEM OF HEAD-ON COLLISIONS*), (g) hydration and homeostasis tactics strategy (*cf.* 121; 185-186), (h) identifying insulation problems that coolers, fish-boxes, and ice can't help,[§] (i) insular footwear considerations for unexpected situations,^{**} (j) evolutionary stable leisure-time activities (hunting, fishing, camping, hiking, sailing), (k) 'rethinking island development' (189-190 ; *APPENDIX V*), and most generally, (l) understanding how relative insularity frames strategic decision-making under uncertainty.

A Few Heroic, Independent Islanders

In closing I'll offer one more quality which I believe you may all appreciate: Many of my heroes—the brave, fierce, and independent explorers who have influenced me the most—invariably possessed one or two additional qualities, and often both: (i) they were born or lived in the British Isles, or (ii) they loved and explored (many still loving and still exploring) the 'islands' of the world:

Charles Darwin,^{††} Alfred Russel Wallace,^{**} J.D. Hooker (191), Charles Lyell, Alexander von Humboldt, Adam

* EUR, CAD, NZD, AUD, JPY, and ISK.

† Vermejo Park Ranch, Hawai'i (Waimea & North Kohala in particular), Mustique, Mackinac Island, Maine, New Hampshire, Vermont, Joshua Tree National Park, Theodore Roosevelt National Park, Molokai, the Azores, Iceland, Finland, Åland, Lofoten, Skye, Isle of Man, Estonia, Bermuda, Greenland, the Apostle Islands, the Gaspé, Kamchatka, and Kenai peninsulas, Ungava and Coleur Bays, and Newfoundland.

‡ Sub-Saharan Africa, the Sahara desert, the Ivory coast, Haiti, Key West, Cuba, Jamaica, Dominican Republic, India, Thailand, Indonesia, Venezuela, Guatemala, the Seychelles, the Gulf of Aden, and Indian Ocean (also, *cf.* 181-184).

§ The most stringent recommendation, for farmed salmon from northern Europe, [is] for consumption of at most one meal every 5 months in order to not exceed an elevated risk of cancer of more than 1 in 100,000. Farmed salmon from North and South America triggered advisories of between 0.4 and one meal per month. Retail market samples, in general, reflect levels found in regionally farmed fish, although much of the US salmon comes from Chile, which had somewhat lower contaminant levels than the North American farmed samples.... The advisories are driven by the nondioxin-like PCBs and pesticides and not by dioxins/furans and coplanar PCBs. For noncancer effects for contaminants where USEPA has provided a reference dose only endrin and PCBs triggered any significant advisory. For both of these in the worst case, farmed salmon from northern Europe, the advice was not more than three meals per month (187:abstract).

** He instinctively yanked the wheel right. The car veered into and over the guardrail, skidded across a snowy swale, and after rotating clockwise came to a stop facing into the woods. The airbags had deployed. Dodds had banged his head, and he thought he smelled smoke....

He remembers little of what happened next....

After climbing a steep hill his legs felt wooden and he couldn't go on. He was wearing a grey fleece jacket over a dress shirt. *His khaki pants and black dress shoe (he'd lost the other) and socks were soaked.* But it was dark and cold and he had no idea where he was, or how far he'd come....

He found a hemlock tree and lay down under a bough in some leaves, and fell unconscious (188:78).

†† Some of the most remarkable and interesting facts in the distribution and affinities of organic forms are presented by islands in relation to each other and to the surrounding continents. The study of the productions of the Galapagos — so peculiar, and yet so decidedly related to the American continent — ...had a powerful influence in determining the direction of Mr. Darwin's researches into the origin of species (50:10-11).

‡‡ Islands possess many advantages for the study of the laws and phenomena of distribution. As compared with continents they have a restricted area and definite boundaries, and in most cases their geographical and biological limits coincide. The number of species and of genera they contain is always much smaller than in the case of continents, and their peculiar species and groups are usually well defined and strictly limited in range. Again, their relations with other lands are often direct and simple, and even when more complex are far easier to comprehend than those of continents ; and they exhibit besides certain influences on the forms of life and certain peculiarities of distribution which continents do not present, and whose study offers many points of interest. In islands we have the facts of distribution often presented to us in their simplest forms, along with others which become gradually more and more complex; and we are therefore able to proceed step by step in the solution of the problems they present. But as in studying these problems we have necessarily to take into account the relations of the insular and continental faunas, we also get some knowledge of the latter, and acquire besides so much command over the general principles which underlie all problems of distribution, that it is not too much to say that when we have mastered the difficult presented by the peculiarities of island life we shall find it comparatively easy to deal with the more complex and less clearly defined problems of continental distribution. (50:229-230).

Smith,* Stephen Hawking, Bertrand Russell,† Sir Raymond Firth, Dame Jane Goodall, R.A. Fisher, J.B.S. Haldane, Richard Dawkins, David Lack, David Hume, Alfred Marshall, J.M Keynes, W.F. Lloyd, Clive Granger, F.B. Goldsmith, Captains James Cook & George Vancouver, Kamehameha the Great,‡ Kekuhaupi'o, Father Damien, Edie Akua, Isaac Davis, John Young,§ Adelbert von Chamisso,** Gregory A. Cunningham (Interpretive Ranger, *Pu'ukohala Heiau*), Richard Wisniewski, Stanford B. Dole, Steven Desha, John and Linda Harris, John Harrison,†† Erik the Red, Leif Eriksson,‡‡ Thorvald,§§ Bjarni,***

* Smith... provided so broad and authoritative an account of the known economic doctrine that henceforth it was no longer permissible for any subsequent writer on economics to advance his own ideas while ignoring the state of general knowledge (11:59).

† A follower of the Enlightenment speaks as simply as possible: we want to be understood. In this respect Bertrand Russell is our great master (16:206).

‡ Captain Cook decided to exhibit the nature of the cannons placed along the sides of the ship. He commanded his officers to prepare to load the cannons... When the Hawai'i chiefs and Kalani'opu'u saw the powder being inserted in those cannons they were amazed...:

'How now, the black sand is being inserted in those cannons, and what are those people with the flashing eyes engaged in doing?

When they saw the flaming rag being whirled by a certain person close to those cannons, those Hawai'i chiefs asked themselves: 'What is this fire which that person with the cornered head is whirling? These flashing-eyed people are doing something we do not understand....' At that time Captain Cook gave the order to his gunnery officer to fire, and... the cannon... flashed like lightning, with a thundering sound. This terrified those high chiefs of Hawai'i and some of them flattened themselves on the deck in terror and those standing near the gunwales of the ship leaped into the sea and swam to their canoes....

Captain Cook... regarded Kamehameha with admiring eyes, because he was the only one who was not mystified at the thundering cannon of the foreigners....

Kamehameha turned and said to Kekuhaupi'o: *E Kekuhaupi'o e*, do you understand the nature of this great canoe of the foreigner and of our little war canoes? Our canoes are like little pieces of wood alongside this great canoe of the foreigner. How shall we get a large canoe like this? (166:54-55).

§ An Englishman named John Young, wandered away from the shore party and was apprehended by Kamehameha's warriors....

Young and Davis quickly caught the keen eye of Kamehameha who needed skilled seamen for his newly acquired foreign vessel. Despite an unsuccessful escape attempt, the two foreigners were well treated. Gradually adjusting to their fate, they taught Kamehameha's warriors how to use the cannons and muskets aboard the *Fair American*. They coached the king on foreign dress, life style and custom. They even taught him tricks in trading with ever-increasing number of ships calling on the islands. Given wives, land and the equivalent status of chiefs, Davis and Young exerted tremendous influence on the ambitious king and later became his confidential advisors (192:16).

** [Liholiho] was young (about 22), had a reputation as a gambler and a playboy, and had an affliction for the foreigners' whiskey....

With the rule of the land now divided between Liholiho and Kaahumanu and the custody of the war god, *Ku*, no longer in possession of the person who also ruled the land, the prediction of a well-known German naturalist named Adelbert von Chamisso who had accompanied Kotzebue on his visits to the islands, seemed about to come true: '...after the death of the old hero, his kingdom, founded and kept together by force, will fall to pieces, the partition of it being already decided upon, and prepared [This statement was made between 1816 and 1817, after Kamehameha the Great had formally proclaimed Liholiho as his successor and named a new custodian for the war god, *Ku*] (192:24).

†† So little is known of the early life of John Harrison that his biographers have had to spin the few thin facts into whole cloth.

These highlights, however, recall such stirring elements in the lives of other legendary men that they give Harrison's story a leg up. For instance, Harrison educated himself with the same hunger for knowledge that kept young Abraham Lincoln reading through the night by candlelight (193:62).

‡‡ Erik the Red (tenth century) was a Norwegian sailor who founded Norse colonies on Greenland about 985. His son, Leif Erikson, landed in Vinland, often identified as Newfoundland, c. 1000. Both men are the subject of Icelandic sagas (57:13).

§§ A great swarm of skin-boats was then heading towards them down the fjord.

Thorvald said, 'We shall set up breastworks on the gunwales and defend ourselves as best we can, but fight back as little as possible.'

They did this. The *Skraelings* shot at them for a while, and then turned and fled as fast as they could.

Thorvald asked his men if any of them were wounded; they all replied that they were unhurt.

'I have a wound in the armpit,' said Thorvald. 'An arrow flew up between the gunwale and my shield, under my arm—here it is. This will lead to my death. I advise you now to go back as soon as you can. But first I want you to take me to the headland I thought so suitable for a home. I seem to have hit on the truth when I said that I would settle there for a while (194:60-61).

*** Then Bjarni said that the people who were to go should be chosen by lot, and not by rank.

But everyone tried to get into the boat. The boat, however, would not hold them all and so they agreed to this suggestion... When the lots were drawn it so happened that Bjarni himself, along with nearly half the crew, drew a place, and these all left the ship for the boat.

When they were in the boat one young Icelander who had been Bjarni's companion said, 'Are you going to leave me here, Bjarni?'

'This is how it has to be,' replied Bjarni.

Sir Karl Popper, FA von Hayek, Lord Glenconner,* Lord Latymer,† the Honourable Brian Alexander,‡ Mick Jagger,§ King George III,** Queen Victoria, Winston Churchill, Margaret Thatcher, William Wallace, Ayn Rand,†† Edward Saxon, Susan Orlean, Charlie Kaufman,‡‡ Haldor Laxness,§§ Florence Peake, Ernest Hemingway,* Norman Maclean, Robert Frost, Robert

The Icелander said, 'But that is not what you promised when I left my father's farm in Iceland to go with you.'

'I see no other way,' said Bjarni. 'What do you suggest?'

'I suggest we change places; you come up here and I shall go down there.'

'So be it,' said Bjarni. 'I can see that you would spare no effort to live, and are afraid to die.'

So they changed places. The Icелander stepped into the boat and Bjarni went back on board the ship; and it is said that Bjarni and all those who were on the ship with him perished (194:103-104).

* Tourism after the war was the setting up of large hotels..., imposed from the outside.... In Mustique I tried building from the inside outwards and events proved I was ahead of my time (195).

† Hugo Money-Coutts – as he was known before he inherited the ancient barony of Latymer in 1987 – did not follow his father and grandfather into the directors' room of Coutts & Co., the exclusive private bank in the Strand which traces its origins to 1692...

Instead, he made his early career with the merchant banking house of Robert Fleming, where he specialized in investment business. In 1963, however, at the age of 37, he left... his job... to sail his 39 ft ketch *Heliousa*, first to Majorca and then, via the Panama Canal, to Australia....

'I suppose my friends will think I'm crazy,' Money-Coutts remarked at the time, 'but I'm tired of fighting my way across London's traffic and tussling with people in the Underground. Everything has come easy to me in life so far, now I want to try it the hard way. Perhaps my friends may envy me, but while they are lashing into large dinners at the Savoy in a year's time, I might be on the dole in Australia.'

Nothing so tiresome came to pass, however...

For some years he diverted a large part of his energies to Mustique where, as managing director and co-owner of the island's development company, he helped his Eton contemporary Colin Tennant (Lord Glenconner) to turn Mustique into an exclusive holiday paradise (196).

‡ The Honourable Brian Alexander has been Managing Director of The Mustique Company... since 1979. He began his long relationship with the island in 1968 while working for the J. Arthur Rank Organization in London. It was here that he first met Colin Tennant, former owner of Mustique.... Mr. Alexander brings a wonderful charm and enthusiasm to his position as he guides Mustique through its constantly evolving, yet controlled growth (197:1-2).

§ There are many small islands throughout the world that people have attempted to develop, but not always with the interests of the environment in mind. Since its inception in 1968, *The Mustique Company* has recognized both the aesthetic and economic value of a healthy environment and has tried to protect the island from *ad hoc* and adverse development. This was accomplished by partitioning the island into a limited number of plots, having the island and surrounding waters to one kilometer offshore declared a Conservation Area, and commissioning studies and reports to monitor environmental issues and concerns as they arose. The result of this is an island that is still mostly covered with green space, nearly 70 percent with a diverse collection of plant communities, habitats, and the creatures that depend upon these. The dominant categories of vegetation on Mustique remain unchanged, these being the sheltered forests and the windswept forests alike (198:foreword).

** GEORGE THE THIRD by the Grace of God of the United Kingdom of Great Britain and Ireland King Defender of the Faith TO ALL WHOM these presents shall come Greeting

WHEREAS several of our loving Subjects are desirous of forming a Society for the Cultivation of the Science of Natural History in all its branches... having subscribed considerable Sums of money for that purpose have humbly besought us to grant unto them and such other persons as shall be approved and elected as hereinafter is mentioned Our Royal Charter of Incorporation for the purposes aforesaid; KNOW YE, that We being desirous to promote every Kind of Improvement in the Arts and Sciences have of our special Grace certain knowledge and mere motion given and granted And We do hereby give and grant... others as shall from time to time be appointed and elected in the manner hereinafter directed and their Successors be and shall for ever hereafter continue and be by virtue of these presents one Body politic and Corporate by the Name of 'The Linnean Society of London' (85:3-4).

†† Man's profound need of art lies in the fact that his cognitive faculty is conceptual, *i.e.*, that he acquires knowledge by means of abstractions, and needs the power to bring his widest metaphysical abstractions into his immediate, perceptual awareness. Art fulfills this need..., it concretizes man's fundamental view of himself and of existence. It tells man, in effect, which aspects of his experience are to be regarded as essential, significant, important. In this sense, art teaches man how to use his consciousness (199:38-45).

‡‡ You know why I love plants? Because they're so mutable, so adaptable. Adaptation is such a profound process. (beat) Adaptation means you figure out how to survive in the world. People aren't to good at that sometimes (200:42).

§§I was travelling in the south of Sweden a few weeks ago, when I heard the rumor that the choice of the Swedish Academy might possibly fall on me. Alone in my hotel room that night, I naturally began to ask myself what it would mean to a poor wanderer, a writer from one of the most remote islands in the world....

I spent my entire childhood in an environment in which the mighty of the earth had no place outside story books and dreams. Love of, and respect for, the humble routine of everyday life and its creatures was the only moral commandment which carried conviction when I was a child....

My thoughts fly to the old Icelandic storytellers who created our classics, whose personalities were so bound up with the masses that their names, unlike their lives' work, have not been preserved for posterity. They live in their immortal creations and are as much a part of Iceland as her

Edward Turner II, Robert Edward Turner III, Karen Blixen, Father Mark de Silva, Robin Mahon, Joshua Slocum,[†] Ben & Zarina Funk, Randall Dillard, my wife (Marcy), my son (William), Barney, Edward J., William E., Arlene, Don, Nancy, Dan, Grith, Aline, Luke, Katya, and the rest of my fellow Funks, Clarence and Frieda Holley, Charlotte and Charles Fowler, James Damron, Harry MacLauchlan, Harvey Livingston, Shawn Skinner, Danny Williams, Godfrey Baldacchino, Barry Bartmann, Brian Hoyle, Lorraine Guay, Russell Fielding, Anders Kallgard, Colin MacIntyre, Simone Stahel-Webster, Jordan Walker, Hans Connor Natalie deJong, the Campbells, Fowlers, Ryans, Spellmens, Martins, Roberts, Fitzpatrick, Safais, Lewis, Davis, Grants,[‡] Furgesons, Kafers, and McDades, Sherwin Carlquist (*cf.* 206-212),[§] John Maynard Smith,^{**} Nicholas Barton,^{††} Bryan Clarke,^{‡‡} Rachel Carson,^{§§} Sandra Knapp, Sarah Darwin, Jos Barlow, and Jim Mallet.^{***}

landscape. For century upon dark century those nameless men and women sat in their mud huts writing books without so much as asking themselves what their wages would be, what prize or recognition would be theirs. There was no fire in their miserable dwellings at which to warm their stiff fingers as they sat up late at night over their stories. . . . While their hearts remained warm, they held on to their pens (201).

* The house built on the highest part of the narrow tongue of land between the harbor and the open sea. It had lasted through three hurricanes and it was built solid as a ship. It was shaded by tall coconut palms that were bent by the trade wind and on the ocean side you could walk out of the door and down the bluff across the white sand into the Gulf Stream (202:3).

† It was the season for fruit when I arrived at the Azores, and there was soon more of all kinds of it put on board than I know what to do with. Islanders are always the kindest people in the world, and I met none anywhere kinder than the good hearts of this place. The people of the Azores are not a very rich community. The burden of taxes is heavy, with scant privileges in return, the air they breathe being about the only thing that is not taxed. . . .

The day after my arrival at Horta was the feast of a great saint. . . . The deck of the *Spray* was crowded from morning till night. . . . On the day after the feast a kind-hearted native harnessed a team and drove me a day over the beautiful roads about Fayal, 'because,' said he, in broken English, 'when I was in America and couldn't speak a word of English, I found it hard till I met someone who seemed to have time to listen to my story, and I promised. . . that if ever a stranger came to my country, I would try to make him happy' (203:56).

‡ Peter Grant FLS FRS and. . . Rosemary Grant FRS. . . have been studying Darwin's finches on the Galápagos islands since 1973. Their fieldwork is designed to understand the causes of an adaptive radiation. It combines analyses of archipelago-wide patterns of evolution with detailed investigations of population level processes (204:7-8 ; *cf.* 205).

§ If Darwin thought that islands were the laboratory for studying evolution, Carlquist took advantage of this concept and has used islands as his personal laboratory. . . Among his best-known contributions is his 1974. . . *Island Biology*, which framed his ideas about dispersal, establishment and radiation of biota into new environments. He further expanded this approach. . . in *Hawaii: A Natural History* (213: introduction).

** John Maynard Smith FRS, FLS. . . was by far the most influential British evolutionary biologist of the second half of the 20th century. Architect of the world-leading Sussex University school of 'mathematical selection', he elevated to a higher plane the mathematical population genetics approaches developed in the UK by RA Fisher, and then compounded this remarkable achievement by applying the previously economically focused game theory to evolutionary problems. These breakthroughs prompted. . . several technically rigorous but readable books (204:8-9).

†† Professor Barton's early research was on the narrow zones of hybridization that subdivide many populations; this involved work on a variety of species, including grasshoppers, butterflies, and toads. More recently, his research has been mainly theoretical and aimed at understanding the influence of selection on complex traits, models of speciation, the evolution of sex and recombination, and the coalescent process (204:6).

‡‡ Bryan Clarke FRS, FLS. . . has had a long and distinguished career as a population geneticist and evolutionary biologist. He is best known for his work on frequency-dependent selection. . . His research on snails in Moorea, Tahiti and other islands, combined with behaviour and genetics research in the lab, is a classical study of speciation and adaptive diversification (204:7).

§§ *It is often outsiders who see a problem first.* This may be because an inventor is rightly keen to have his invention applied, and may therefore overlook its possibly undesirable consequences. Thus, certain chemical inventions proved very successful against mosquitoes and other insects, but with the undesirable result that songbirds died of starvation. The American naturalist Rachel Carson reported all this in her excellent book *Silent Spring* (16:101).

*** Although our primary interests are in genetic and systematic studies of populations, geographic forms, and speciation, many of our results have obvious implications for conservation of endangered taxa. I remain committed to and interested in topics such as insecticide resistance, safety concerns about the release of genetically modified organisms. . . , and in the biodiversity and conservation applications of our work (214).

On Fellowship

Although I am clearly not British, I am a resident of Prince Edward Island—a landed immigrant in your Commonwealth—I love to explore the islands of the world, and, despite whatever truths you may or may not find within this long letter, the short paper enclosed herewith (*cf.* 6), I hope you may find that my interest in natural history is unquestionably *active*,^{‡‡‡} that I endeavour to ‘learn the ways of nature,’ and that you may thus consider extending an invitation to this wayward and unapologetically American naturalist to join you as a Fellow of The Linnean Society of London (See *APPENDIX X: RECOMMENDATION?*).^{§§§}

Like my fellow American who shared Darwin’s sympathies and date of birth,^{****} I grew up in a log cabin along the Iroquois River in Northwest Indiana. The cabin was built by a writer by the name of George Ade, who was born and raised in my hometown of Kentland, Indiana. Years later, when I arrived at The University of Southern California, I fell into a group of like-minded fellows and was soon surprised to discover that Ade was their ‘brother,’ so to speak, and, moreover, that one hundred years prior he had penned their creed (*APPENDIX XI: ON THE BOND OF FELLOWSHIP*). In due course (and more than two decades ago), I pledged that these fellows had “given me favour and distinction” and that I would “endeavour to so build myself and so conduct myself that I will ever be a credit” to this society—and I remain a loyal member to this day. I trust this letter may suggest that I took this Fellowship to heart, and, to this point, that if you should see fit to grant me your favour and distinction, I would continue to endeavour to so build myself that I will ever be a credit to The Linnean Society as well. If you have interest in reviewing my works in greater detail, I would be happy to forward any or all of my papers, including an exhaustive exploration of insularity and evolutionary stable solution to *The Problem of Sustainable Economic Development on Earth*, expanded upon in one very long, perhaps even entertaining – but no doubt somewhat ridiculous and

‡‡‡There are no prerequisites for becoming a Fellow other than an active interest in natural history (13).

§§§Every Candidate for Election as a Fellow shall be proposed and recommended by at least one Fellow who shall sign and cause to be delivered to the Executive Secretary a completed *Certificate of Recommendation* (85:19).

**** Darwin was aware of Lincoln. The Englishman’s wealthy grandfathers, physician-inventor Erasmus Darwin and pottery-maker Josiah Wedgwood, were early, powerful activists against slavery, a cause Darwin also embraced.

‘He followed the Civil War through newspapers and rooted for the Union side all the way’ (1:5).

arguably shameful* argument—a revolutionary† letter from one islander (yours truly) to another (President Barack Obama), entitled: *The Principles of Economics & Evolution: A Survival Guide for People who Live on Small Islands, Including the Inhabitants of the Small Island of Earth* (217).§

Fortune willing, I will send (39) under separate cover.

* I am undertaking a work which has no example, and whose execution will have no imitator. I mean to lay open to my fellow-mortals a man just as nature wrought him; and this man is myself. . . .

I have made the first step and the most painful in the obscure and dirty maze of my Confessions. It is not the criminality we are most unwilling to divulge; it is what is ridiculous and shameful. Henceforward I am sure of myself; after what I have dared to disclose, nothing can be able to stop me (215:3-15).

† There have been and always will be books which are truly revolutionary—that is to say, inspired and inspiring. They are few and far between, of course. One is lucky to run across a handful in a lifetime. Moreover, these are not books which invade the general public. They are the hidden reservoirs which feed the men of lesser talent who know how to appeal to the man in the street. The vast body of literature, in every domain, is composed of hand-me-down ideas. (216:11).

§ Our civilisation depends, not only for its origin but also for its preservation, on what can be precisely described only as the extended order of human cooperation, an order more commonly, if somewhat misleadingly, known as capitalism. To understand our civilisation, one must appreciate that the extended order resulted not from human design or intention but spontaneously: it arose from unintentionally conforming to certain traditional and largely moral practices, many of which men tend to dislike, whose significance they usually fail to understand, whose validity they cannot prove, and which have nonetheless fairly rapidly spread by means of an evolutionary selection – the comparative increase of population and wealth – of those groups that happened to follow them. The unwitting, reluctant, even painful adoption of these practices kept these groups together, increased their access to valuable information of all sorts, and enabled them to be ‘fruitful, and multiply, and replenish the earth, and subdue it’ (Genesis 1:28). This process is perhaps the least appreciated facet of human evolution.

Socialists take a different view of these matters. They not only differ in their conclusions, they see the facts differently. That socialists are wrong about the facts is crucial to my arguments. . . . I am prepared to admit that if socialist analyses of the operation of the existing economic order, and of possible alternatives, were factually correct, we might be obliged to ensure that the distribution of incomes conform to certain moral principles, and that this distribution might be possible only by giving a central authority the power to direct the use of available resources, and might presuppose the abolition of individual ownership of means of production. If it were for instance true that central direction of the means of production could effect a collective produce of at least the same magnitude as that which we now produce, it would indeed prove a grave moral problem how this could be done justly. This, however, is not the position in which we find ourselves. For there is no known way, other than by the distribution of products in a competitive market, to inform individuals in what direction their several efforts must aim so as to contribute as much as possible to the total produce.

The main point of my argument is, then, that the conflict between, on one hand, advocates of the spontaneous extended human order created by a competitive market, and on the other hand those who demand a deliberate arrangement of human interaction by central authority based on collective command over available resources is due to a factual error by the latter about how knowledge of these resources is and can be generated and utilised. As a question of fact, this conflict must be settled by scientific study. Such study shows that, by following the spontaneously generated moral traditions underlying the competitive market order (traditions which do not satisfy the canons or norms of rationality embraced by most socialists), we generate and garner greater knowledge and wealth than could ever be obtained or utilised in a centrally-directed economy whose adherents claim to proceed strictly in accordance with ‘reason’. Thus socialist aims and programmes are factually impossible to achieve or execute; and they also happen, into the bargain as it were, to be logically impossible.

This is why, contrary to what is often maintained, these matters are not merely ones of differing interests or value judgements. Indeed, the question of how men came to adopt certain values or norms, and what effect these had on the evolution of their civilisation, is itself above all a factual one, one that lies at the heart of the [matter]. . . . The demands of socialism are not moral conclusions derived from the traditions that formed the extended order that made civilisation possible. Rather, they endeavour to overthrow these traditions by a rationally designed moral system whose appeal depends on the instinctual appeal of its promised consequences. They assume that, since people had been able to generate some system of rules coordinating their efforts, they must also be able to design an even better and more gratifying system. But if humankind owes its very existence to one particular rule-guided form of conduct of proven effectiveness, it simply does not have the option of choosing another merely for the sake of the apparent pleasantness of its immediately visible effect. The dispute between the market order and socialism is no less than a matter of survival. To follow socialist morality would destroy much of the present humankind and impoverish much of the rest (218:6-7).

In the meantime, please find the preview enclosed herewith (6).

Furthermore, not only am I open to any and all criticisms, I would be most grateful to hear them:

Many of the views which... [follow] are highly speculative, and some no doubt will prove erroneous; but I have in every case given the reasons which have led me to one view rather than to another. It seemed worth while to try how far the principle of evolution would throw light on some of the more complex problems in the natural history of man. False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for every one takes a salutary pleasure in proving their falseness: and when this is done, one path towards error is closed and the road to truth is often at the same time opened (18).*

I hope to have the opportunity to meet you all at Burlington House soon.†

Yours very truly,

(Matt Funk)‡§

Enclosure: *On the Truly Noncooperative Game of Life on Earth: In Search of the Unity of Nature & Evolutionary Stable Strategy* (6).

* The writer's object in putting forward his views in the present imperfect manner is to submit them to the test of other minds, and to be made aware of all the facts supposed to be inconsistent with them. As his hypothesis is one which claims acceptance solely as explaining and connecting facts which exist in nature, he expects facts alone to be brought to disprove it; not à-priori arguments against its probability (219:191).

† Once elected, all Fellows and Associates must come to the Society personally to be formally admitted within the space of six months....

When a Fellow is admitted, his or her name and interests are read to the meeting during which the Fellow signs the Roll and Charter Book (these books contain the signatures of every Fellow Formally Admitted since the Society was instituted in 1788). The President takes the Fellow by the right hand and says, 'A.B. by the Authority and in the Name of the Linnean Society of London, I admit you a Fellow thereof.' This sentence was introduced by Dr Samuel Goodenough, the first Treasurer, in 1791 (220:3).

‡ There is something else I should like to say.... Reality is problematic for all of us. And we all continuously send out signals to be sure that we are not dreaming and that we live in a real world. We are like bats: although we do not quite have the technology of bats, we do have something similar. For example, I constantly change my position: it is one of my various techniques of signal transmission, and from the momentary return signals that I actively integrate, I learn that I am not dreaming and that reality does indeed make this strange impression (16:52).

§ See APPENDIX XII: FELLOWSHIP

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APPENDIX I GLOSSARY

[PROBLEM:] *Economic theory has suffered in the past from a failure to state clearly its assumptions. Economists in building up a theory have often omitted to examine the foundations on which it was erected. This examination is, however, essential not only to prevent the misunderstanding and needless controversy which arise from a lack of knowledge of the assumptions on which a theory is based, but also because of the extreme importance for economics of good judgement in choosing between rival sets of assumptions (1:386).*

[SOLUTION:] *In... economics the most fruitful work may be that of careful, patient description; indeed this may be by far the largest domain for the present and some time to come....*

*Economic problems [have been and are often] not formulated clearly and are often stated in such vague terms as to make mathematical treatment a priori appear hopeless because it is quite uncertain what the problems really are. There is no point in using exact methods where there is no clarity in the concepts and issues to which they are to be applied. Consequently the initial task is to clarify the knowledge of the matter by further careful descriptive work (2:2-4).**

Austrian Economics

(a). Yet, perhaps the most important lesson, which I have learned from Mises, was a lesson located outside economics itself. What Mises taught us in his writings, in his lectures, in his seminars, and in perhaps everything he said, was that economics—yes, and I mean sound economics, Austrian economics—is primordially, crucially important. Economics is not an intellectual game. Economics is deadly serious. The very future of mankind—of civilization—depends, in Mises' view, upon widespread understanding of, and respect for, the principles of economics.

This is a lesson, which is located almost entirely outside economics proper. But all Mises' work depended ultimately upon this tenet. Almost invariably, a scientist is motivated by values not strictly part of the science itself. The lust for fame, for material rewards—even the pure love of truth—these goals may possibly be fulfilled by scientific success, but are themselves not identified by science as worthwhile goals. What drove Mises, what accounted for his passionate dedication, his ability to calmly ignore the sneers of, and the isolation imposed by academic contemporaries, was his conviction that the survival of mankind depends on the development and dissemination of Austrian economics...

Austrian economics is not simply a matter of intellectual problem solving, like a challenging crossword puzzle, but literally a matter of the life or death of the human race (4).

(b) What made Vienna the distinctive city that it was, as much as any other the fount of Western culture, is a question to be kept in mind...What we might observe is that a milieu such as that in which Hayek spent his childhood and youth, a society in which family and associates, position and accomplishment, knowledge and history were so tightly intertwined, meant that the members of such a society were quickly and always apprised of what *mattered*. This is no small feat, as any teacher of the present generation of youth knows too well. It is the *significance* of knowledge and information that leads to the evolution of understanding (5:5).

(c). Cf. *The Austrian Economists* (6).

Consilience/Data Cascade

(a) Of the two major methods for inferring history from single configurations, consilience calls upon a greater range of evidence. This word, coined by William Whewell in 1840, means 'jumping together.' By this term, Whewell referred to proof by coordination of so many otherwise unrelated consequences under a single causal explanation that no other organization of data seems conceivable. In a sense, consilience defines the larger method underlying all

* I shall endeavour to explain, as fully and distinctly as I can, [these] subjects..., for which I must... earnestly entreat both the patience and attention of the reader: his patience in order to examine a detail which may perhaps in some places appear unnecessarily tedious; and his attention in order to understand what may..., after the fullest explication which I am capable of giving..., appear still in some degree obscure. I am willing to run the hazard of being tedious in order to be sure that I am perspicuous; and after taking the utmost pains that I can to be perspicuous, some obscurity may still appear to remain upon a subject in its own nature extremely abstracted (3:32).

Darwin's inference from historical records. In a more specific context, I use consilience... for Darwin's principal tactic of bringing so many different points of evidence to bear on a single subject, that history wins assent as an explanation by overwhelming confirmation and unique coordination (7:104).

(b) [Darwin] granted even more importance to his relentless presentation of dense documentation for the factuality of change - for only such a cascade of data would force the scientific world to take evolution seriously.... Facts literally pour from almost every page of the *Origin*.... In some parts, the *Origin* reaches an almost frenetic pace in its cascading of facts, one upon the other....

Whenever he introduces a major subject, Darwin fires a volley of disparate facts, all related to the argument at hand... This style of organization virtually guarantees that Whewell's 'consilience...' must become the standard method of the *Origin*. Darwin's greatest intellectual strength lay in his ability to forge connections and perceive webs of implication (that more conventional thinking in linear order might miss). When Darwin could not cite direct evidence for actual stages in an evolutionary sequence, he relied upon consilience - and sunk enough roots in enough directions to provide adequate support for a single sturdy trunk of explanation (7:109).

Darwinian Fitness

(a) The term Darwinian fitness refers to the capacity of a variant type to invade and displace the resident population in competition for available resources (8:abstract).

(b) Imagine... two... [people] are contesting a resource of value V . By 'value', I mean that the Darwinian fitness of an individual obtaining the resource would be increased by V . Note that the individual which does not obtain the resource need not have zero fitness. Imagine, for example, that the 'resource' is a territory in a favourable habitat, and that there is adequate space in a less favourable habitat in which losers can breed. Suppose, also, that animals with a territory in a favourable habitat produce, on average, 5 offspring, and that those breeding in the less favourable habitat produce 3 offspring. Then V would equal $5-3=2$ offspring. Thus V is the *gain* in fitness to the winner, and losers do not have zero fitness (9:11-12).

Denaturalization of Economics

[During] the late eighteenth century and the mid-nineteenth,... economic theorists [came] to posit and identify an economy as a distinct entity and maintain that it was subject, not to natural processes, but to the operation of human laws and agency. ...Until the mid-nineteenth century, economic theorists regarded the phenomena of their discourse as part of the same natural work studied by natural philosophers. *Not only were economic phenomena understood mostly by drawing analogies to natural phenomena, but they were also viewed as contiguous with nature.* Economic discourse was, in short, considered to be part of natural philosophy and not, as we would now deem it, a *social* or *human* science. It did not then address an autonomous sphere as it does today.

How and why political economists came to see the economic domain as severed from the physical world, as the product of human action, human deliberation, and human institutions, ...[is] the... *denaturalization* of the economic order (10:2).

Earth Island Survival Game

This asymmetric, non-cooperative game unbounded supergame with incomplete information models *The Problem of Sustainable Economic Development* on Earth, and, theoretically any/all inhabitable planets. Thus our master island set includes all known planets capable of supporting human life. To date this set includes a single element, the island of Earth: $\{I_1\}$. All bio-geo-politico regions on Earth are distinguishable by various degrees of relative insularity, and thus, all regions on Earth - islands, continents, and oceans alike - make up the 'island' sub-set: $\{i_1, i_2, i_3, \dots, i_n\}$. In other words: $\{i_1, i_2, i_3, \dots, i_n\}$ is a sub-set of $\{I_1\}$.

Evolutionary Stable Strategy - ESS

(a) Maynard Smith and Price (1973) [12] introduced the concept of an evolutionarily stable strategy (ESS). Initially they were not aware of the relationship between the concept of an ESS and that of a Nash equilibrium. Rational game theory looked at mixed strategies as produced by conscious randomization. Nash's interpretation of a mixed equilibrium as a mass action phenomenon was buried in his unpublished dissertation and not found in textbooks on game theory. In biology the mass action interpretation is very natural and guided the work on evolutionary stability already from its beginning.... They defined an ESS as a strategy prescribed by a symmetric equilibrium point (11:168).

(b) An ‘evolutionarily stable strategy’, or *ESS*... can be defined as a strategy such that, if all members of a population adopt it, no ‘mutant’ strategy can do better. A number of simple models of contest situations are analyzed from this point of view. It is concluded that in ‘symmetric’ contests the *ESS* is likely to be a ‘mixed’ strategy; that is, either the population will be genetically polymorphic or individuals will be behaviourally variable. *Most real contests are probably asymmetric, either in pay-off to the contestants, or in size or weapons, or in some ‘uncorrelated’ fashion; i.e. in a fashion which does not substantially bias either the pay-offs or the likely outcome of an escalated contest. An example of an uncorrelated asymmetry is that between the ‘discoverer’ of a resource and a ‘late-comer’.* It is shown that the *ESS* in asymmetric contests will usually be to permit the asymmetric cue to settle the contest without escalation. Escalated contests will, however, occur if information to the contestants about the asymmetry is imperfect (9:abstract).

(c) One of the great discoveries of game theory came in the early seventies, when the biologists John Maynard Smith and George Price realized that strategic equilibrium in games and population equilibrium in the living world are defined by the same equations. Evolution be it genetic or memetic – leads to strategic equilibrium (13:352).

(d) The first explicit use of game theory terminology in this context was by Hamilton (1967), who sought for an ‘unbeatable strategy’ for the sex ratio when there is local competition for mates. Hamilton’s ‘unbeatable strategy’ is essentially the same as an *ESS* as defined by Maynard Smith & Price (1973) (9:2).

(e) Despite Nash’s remarks in his thesis about a possible evolutionary interpretation of the idea of a Nash equilibrium, attention at the time was focused almost entirely on its interpretation as the only viable outcome of careful reasoning by ideally rational players. . . .

Fortunately... Maynard Smith’s book *Evolution and the Theory of Games* directed game theorists’ attention away from their increasingly elaborate definitions of rationality (14:1).

Funk-Carlquist Formula

First, I must emphasize that this formula was *named in honour* of the great long-distance dispersal advocate, Professor Sherwin Carlquist, and though this formula was fundamentally influenced by Carlquist’s insights and he may thus rightly share in praise for any value this formula may offer, it was developed independently, and thus any and all deficiencies are to be attributed to Funk, not Carlquist.

This formula, which remains in an early, untested, beta release state, is merely *possibly* a practical heuristic for quantifying *Resource Holding Power* (Darwinian fitness). This value also serves to determine *RIS* and *GEMS* status (though, in most instances, the distinction between the two is clear without further analysis). The formula is derived in light of our discovery that *Value* (V) is a derivative function of *relative insularity* (I_R): $V = f'(I_R)$.

I_R may theoretically be determined by multiple regression analysis of: *Military Power* ($GDP + population + annual defense spending + soldiers + NPT Treaty status$, cf. 15), *Land Area* (km^2), *Distance from nearest Continent* (km), *Distance from nearest Neighbour* (km), *Nearest Neighbour Military Power*, *Nearest Neighbour Land Area* (km^2), *Elevation* (m), *Renewable Water Resources* ($m^3/person/year$), *Food Imports* (%), *Population Density* (p/km^2), *Exclusive Economic Zone* (km^2), *International Airports* (n), *Deep Water Harbours* (n), *Marine Links*, (n) *Land Links* (n), *Forests* ($\% km^2$), *Fishery* ($Kg/person/year$) *Commercial Agriculture* ($\% km^2$), *Organic Agriculture* ($\% km^2$), *Nature Preserve* ($\% km^2$), *Tourist Visits* ($Land Area/n$), *Irrigation I* ($m^3/person/year$) *Irrigation II* ($\% km^2$), *Industrial Water Consumption* ($m^3/person/year$), *Organic Water Pollutants* ($Land Area/grammes/p/day$), and *Cultural Homogeneity* (%). Depending upon research objectives (especially on relatively small islands), two additional qualitative inputs – Sovereign Status and Constitutional balance—may be considered. Multiple regression analysis offers (inherently limited insight to) Darwinian fitness—the economic and evolutionary value for each corresponding bio-geo-politico-economic ‘island.’ This value suggests *resource holding power* (*RHP*) – the ability for citizens of each, corresponding politico-biogeographic ‘island’ to protect, maintain, and hold (through *Economic Power* and sustainable harvest practices alike, for example) *property rights* (Land Area, EEZ, Forests, Renewable Water Resources, Nature Preserves, etc.).

Although the scope of our inquiry is focused upon human interests, a reformulation for other species may be derived with modest alterations – *military power*, for example, is re-formulated as *hunting power* ($size + population$), and EEZ, land links, airports, etc. are merely excluded.

Game Theory

(a) It is conventional to call these situations ‘games’ when they are being studied from an abstract mathematical viewpoint. Here the original situation is reduced to a mathematical description, or model. In the abstract ‘game’

formulation only the minimum quantity of information necessary for the solution is retained. What the actual alternative courses of action are among which the individuals must choose is not regarded as essential information. These alternatives are treated as abstract objects without special qualities and are called 'strategies.' Only the attitudes (like or dislike) of the two individuals towards the ultimate results of the use of the various possible opposing pairs of strategies are considered (16:128-129).

(b) Game theory is a theory of *strategic interaction*. That is to say, it is a theory of *rational behavior* in social situations in which each player has to choose his moves on the basis of what he thinks the other players' *countermoves* are likely to be.

After preliminary work by a number of other distinguished mathematicians and economists, game theory as a systematic theory started with von Neumann and Morgenstern's book, *Theory of Games and Economic Behavior*, published in 1944. One source of their theory was reflection on *games of strategy* such as chess and poker. But it was meant to help us in defining rational behavior also in *real-life* economic, political, and other social situations (17:136).

Globalized Economic Military Superpowers - GEMS

By definition, at any point in the game, there is only one true, dominant player (hegemon with dominant *RHP*, and therefore *ESS*). Presently, the United States and Russia hold 95% of the world's offensive nuclear materials, but in our negotiation model, players include all five signatory members of the *UK-USA* agreement (*UK*, *USA*, Canada, Australia, and New Zealand), often referred to as *AUSCANZUKUS*, and six additional nations which have developed, detonated, and presently maintain nuclear weapons (Russia, France, China, India, Pakistan, and North Korea). Naturally, these roles change hands throughout time and that it would be mark an obvious logical error to succumb to the belief that hands these hands will not change again. Also see: *RIS*.

Human Survival

It is a striking and profoundly meaningful fact that organisms are so constructed, so function, and so behave that they survive and perpetuate themselves in a certain range of environments frequently enough for their species not to become extinct for long periods of time....

Zoologists, and in fact all biologists, should never lose sight of this one highly peculiar, and yet remarkably interesting, animal species—*Homo sapiens*. The worth and utility of biology, and, indeed, of science and of intellectual endeavor as a whole, will perhaps, in the fullness of time, be judged by the contribution they will have made to man's understanding of himself and of his place in the universe....

Man seeks to understand himself. The pursuit of self-understanding is a never-ending quest. Darwin's work marked a turning point in the intellectual history of mankind because it showed that mankind was a product of a biological history. The evidence for this is now overwhelmingly convincing... But just how and why man's bodily structures, physiological functions, and mental capacities have developed as they did is by no means well understood. The working hypothesis now in vogue is that the process of adaptation to the environment is the main propellant of evolutionary change. Evidence is rapidly accumulating which, in my opinion, substantiates the hypothesis. It remains, however, not only to convince the doubters but, what is more important, to discover just how the challenges of the environment are translated into evolutionary changes.

Man is interested in his future no less than in his past. Evolution is not only a history, it is also an actuality. Of course, *Homo sapiens* evolves culturally more rapidly than it evolves biologically. Man must, however, face the problem of adapting his culture to his genes, as well as adapting his genes to his culture. Man is being forced by his culture to take the management and direction of his evolution in his own hands. This is perhaps the greatest challenge which mankind may ever have to face...

The big question remains: What is Man? It remains not because it is hopelessly insoluble, but because every generation must solve it in relation to the situation it faces. Biology is here relevant; a solution based only on biology way well be wrong, but, surely, no solution ignoring either the organismic or the molecular biology can be right and reasonable (18:450-451).

Islands - I_n / i_n

The foundation to our game theoretical approach to cultural evolution and politico-economic analysis rests on the principles of set theory, and our primary island set includes all known planets capable of supporting human life. To date this set includes a single element, the island of Earth: $\{I_1\}$. All biogeographical regions on Earth are

distinguishable to various degrees of relative insularity, and thus, *all* regions on Earth – continents, and oceans alike – make up the sub-set: $\{i_1, i_2, i_3, \dots, i_n\}$. Thus, the ‘islands’ of Earth are a subset Earth Island: $\{i_1, i_2, i_3, \dots, i_n\}$ is a sub-set of $\{I_1\}$.

Island Survival Game

A subgame of *The Earth Island Survival Game* which models *The Problem of Sustainable Economic Development* on RIS. Darwinian fitness is measured by *Resource Holding Power*, the ability to achieve sustainable economic development by protecting and sustaining property and natural resource rights through time, thus overcoming *The Tragedy of the Commons*. RIS are elements of the island set: $\{i_1, i_2, i_3, \dots, i_n\}$, and, like *GEMS*, are a sub-set of the island of Earth: $\{I_1\}$. In other words: $\{i_1, i_2, i_3, \dots, i_n\}$ is a sub-set of $\{I_1\}$.

Mathematics

(a) The problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess. The economic problem of society is thus not merely a problem of how to allocate ‘given’ resources-if ‘given’ is taken to mean given to a single mind which deliberately solves the problem set by these ‘data.’ It is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of the utilization of knowledge not given to anyone in its totality. *This character of the fundamental problem has, I am afraid, been rather obscured than illuminated by many of the recent refinements of economic theory, particularly by many of the uses made of mathematics* (19:519-520).

(b) What has gone wrong with the development of economics as a science? Answer: There was a bunch of intelligent people who felt compelled to use mathematics just to tell themselves that they were rigorous in their thinking, that theirs was a science. Someone in a great rush decided to introduce mathematical modelling techniques...without considering the fact that either the class of mathematics they were using was too restrictive for the class of problems they were dealing with, or that perhaps they should be aware that the precision of the language of mathematics could lead people to believe that they had solutions when in fact they had none (20:177).

(c) We may also observe that part of the feeling of dissatisfaction with the mathematical treatment of economic theory derives largely from the fact that frequently one is offered not proofs but mere assertions which are really no better than the same assertions given in literary form. Very frequently the proofs are lacking because a mathematical treatment has been attempted of fields which are so vast and so complicated that for a long time to come... there is hardly any reason at all to expect progress more mathematico (2:5).

(d) It is an interesting speculation to think what direction the development of Menger’s thought would have taken if he had been acquainted with these founders of mathematical analysis. It is a curious fact that, so far as I am aware, he has nowhere commented on the value of mathematics as a tool of economic analysis. There is no reason to assume that he lacked either the technical equipment or the inclination. On the contrary, his interest in the natural sciences is beyond doubt, and a strong bias in favour of their methods is evident throughout his work...He does not even refer to the mathematical method in any of his writings on methodology...Must we conclude that he felt rather sceptical about its usefulness? (21:15).

(e) In... *Principles*, Marshall confined his use of diagrams and other mathematical notations to footnotes and appendixes so as not to allow his mathematics to detract from his economics. He was interested above all in plain communication—with businessmen as well as with students. Moreover, he was acutely aware that over reliance on mathematics ‘might lead us astray in pursuit of intellectual toys, imaginary problems not conforming to the conditions of real life: and, further, might distort our sense of proportion by causing us to neglect factors that could not easily be worked up in the mathematic machine’ (22:341).

Natural Selection

(a) The cornerstone of Darwin’s paradigm of evolution was the theory of natural selection. Yet, of all his theories this was the last one to be adopted by his followers. It took some eighty years before it was fully accepted by biologists and, of course, even today it still encounters a good deal of resistance among laypersons, particularly those with religious commitments. Actually at the beginning there were good reasons for resistance. Most importantly, for a long time there was little convincing evidence for the occurrence of selection in nature. Such evidence has now been provided abundantly, both in the field and in the laboratory... But there was also considerable uncertainty

about various specific aspects of the selection process. I will not present a full treatment of the subject natural selection in this chapter for I have done so quite recently in *What Evolution Is...*. Instead I will single out for special treatment various aspects of selection about which there are still uncertainties...

In view of the persistent controversies, from 1859 on, concerning the nature of selection, it would seem most helpful to begin with a concise definition of selection, but this cannot be done owing to the arguments on the nature of this process. In 1963 I defined natural selection as nonrandom “differential reproductive success.” And this is even today a valid formulation, but it stresses the outcome of this process rather than its mechanism. For Darwin and most of his followers for the next sixty years, natural selection was a rather simple process. Owing to the struggle for existence, there was enormous mortality in every generation and only the best survived. Fortunately, nature offered a virtually inexhaustible supply of variation and through the survival of the best there was steady evolutionary advance. Darwin borrowed the term selection from the vocabulary of the animal breeders and plant cultivators. But he overlooked that the breeders actually utilized two very different approaches to improve their stocks and so does nature. According to one of these approaches, those individuals are selected as breeding stock for the next generation that had special characteristics that represented the ideal of what the breeders aimed for in their selection. They would simply say that they would choose “the best individuals” of their flocks as their breeding stock. It was this method that Darwin apparently had in mind when he used the word “select.” However, the breeders often used instead a different method to which they referred as “culling.” In this method only the truly inferior individuals were eliminated and all the remaining individuals were used for breeding. This, of course, was not at all a “selection of the best.” Nature uses the same two methods. In a harsh year as far as survival factors are concerned, only the best individuals survive; all others are eliminated. In a mild year only the worst are culled and most individuals survive. At the beginning of the next breeding season, as a result of such great survival a much more diversified population is available for the action of sexual selection and for selection contingencies. The existence of this culling method was soon pointed out by Herbert Spencer when he called natural selection a “survival of the fittest.” He should have said “survival of the fitter.” The survivors are those left over after all the inferior individuals have been eliminated. This elimination process is not at all a “selection of the best.” Curiously, it has never been remarked that the consequences of an elimination process may be quite different from those of a selection process. A selection process results in the survival of the truly best and there will be only relatively few individuals that qualify for such a designation. In a process of actual selection a bird with a cumbersome tail such as that of a peacock would never emerge as “the best.” By contrast, elimination would leave in an average year a much larger percentage of survivors than would the selection of only the best. This large pool of survivors provides ample material for sexual selection and for chance. It provides an explanation for the haphazardness of much of evolutionary change. Evolution by elimination provides a far better explanation for the actual course of events during evolution than the “selection of the best” of the classical evolutionary literature. The elimination of the inferior takes place, of course, simultaneously with the selection of the best, but it differs in strength in different situations. The unpredictability of much of evolution, described so graphically by Gould in his *Wonderful Life...*, is well explained by the process of elimination but could not be accounted for by a restriction to the selection of the best. Actually a selection of the best and an elimination of the worst take place simultaneously. The two processes also can be conceived of as occurring in parallel (23:133-135).

(b) By the ‘syllogistic core’ of natural selection (‘the bare-bones argument’), I refer to the standard... presentation of the abstract mechanism of the theory as a set of three undeniable factual statements followed by the inference of natural selection... as a logical entailment of the three facts, viz:

1. Superfecundity: all organisms produce more offspring than can possibly survive.
2. Variation: all organisms vary from other conspecifics, so that each individual bears distinguishing features.
3. Heredity: at least some of this variation will be inherited by offspring (whatever the mechanism of hereditary transition—a mystery to Darwin, but the argument only requires that heredity exist, not that its mode of action be known (7:125).

Problem of Induction

(a) [Problem:] Our foregoing method of reasoning will easily convince us, that there can be no demonstrative arguments to prove, that those instances, of which we have had no experience, resemble those, of which we have had experience (24:137).

(b) [Solution:] According to a widely accepted view... the empirical sciences can be characterized by the fact that

they use 'inductive methods', as they are called. According to this view, the logic of scientific discovery would be identical with inductive logic, i.e. with the logical analysis of these inductive methods. It is usual to call an inference 'inductive' if it passes from singular statements (sometimes also called 'particular' statements), such as accounts of the results of observations or experiments, to universal statements, such as hypotheses or theories. Now it is far from obvious, from a logical point of view, that we are justified in inferring universal statements from singular ones, no matter how numerous; for any conclusion drawn in this way may always turn out to be false: no matter how many instances of white swans we may have observed, this does not justify the conclusion that all swans are white.

The question whether inductive inferences are justified, or under what conditions, is known as the problem of induction. The problem of induction may also be formulated as the question of the validity or the truth of universal statements which are based on experience, such as the hypotheses and theoretical systems of the empirical sciences....

Scientific statements can only attain continuous degrees of probability whose unattainable upper and lower limits are truth and falsity.' At this stage I can disregard the fact that the believers in inductive logic entertain an idea of probability that I shall later reject as highly unsuitable for their own purposes. I can do so because the difficulties mentioned are not even touched by an appeal to probability. For if a certain degree of probability is to be assigned to statements based on inductive inference, then this will have to be justified by invoking a new principle of induction, appropriately modified. And this new principle in its turn will have to be justified, and so on.

Nothing is gained, moreover, if the principle of induction, in its turn, is taken not as 'true' but only as 'probable'. In short, like every other form of inductive logic, the logic of probable inference, or 'probability logic', leads...to an infinite regress (25:31-35).

Relatively Insular States - RIS

This category includes sovereign island nations, sub-national island jurisdictions, insular provinces (*e.g.* Newfoundland & Labrador), states (*e.g.* Hawaii), municipalities (*e.g.* Vancouver Island), and relatively insular jurisdictions (*e.g.* The Alpine Convention region) We divide geopolitical regions based upon relative insularity, designating two players (*i*) *RIS* and (*ii*) *GEMS*, but in reality, naturally, the true relative insularity of each bio-geopolitico-economic niche (*i.e.* 'ecological niches' of human habitation) along a sliding scale with true *GEMS* at one end (such as the continental United States and China) and a true *RIS*, such as St. Helena, Molokai, Iceland, and the big island of Hawaii at the other.

Resource Holding Power - RHP

The view is examined that the adaptive value of conventional aspects of fighting behaviour is for assessment of relative *RHP* (resource holding power) of the combatants. Outcomes of aggressive disputes should be decided by each individual's fitness budget available for expenditure during a fight (determined by the fitness difference between adoption of alternative strategies, escalation or withdrawal without escalation) and on the rate of expenditure of the fitness budget if escalation occurs (determined by the *RHPs* of the combatants). Thus response thresholds for alternative strategies ('assessments') will be determined by natural selection on a basis of which opponent is likely to expend its fitness budget first, should escalation occur. This 'loser' should retreat (before escalation) and the winner should stay in possession of the resource. Many aggressive decisions depend on whether one is a resource holder, or an attacker. Assuming the *RHP* of the combatants to be equal, there are many instances of fitness pay-off imbalances between holder and attacker which should weight the dispute outcome in favour of one or other opponent by allowing it a greater expendable fitness budget. Usually the weighting favours the holder; the attacker therefore needs a correspondingly higher *RHP* before it may be expected to win. This is not invariably the case, and much observed data fits the predictions of this sort of model. If assessments are perfect and budget expenditure rates exactly predictable, then there would never seem to be any case for escalation. Escalation can be explained in terms of injury inflictions (expenditures) occurring as discrete events; i.e. as 'bouts' won or lost during fighting. Assessment can give only a probabilistic prediction of the outcome of a bout. A simple model is developed to investigate escalation situations. Each combatant assesses relative *RHP*; this correlates with an absolute probability of winning the next bout (*cabs*). The stake played for is infliction of loss of *RHP* and is determined by the fitness budgets of the opponents. (Each individual plays for the withdrawal of its opponent.) This defines a critical probability of winning (*ccrit*) for each combatant, above which escalation is the favourable strategy ($cabs > ccrit$) and below which withdrawal is favourable ($cabs < ccrit$). Escalation should occur only where $cabs - ccrit$ is positive

for both combatants. This model gives predictions compatible with the observations, indicating that *RHP* loss alone can be adequate to explain withdrawal: escalation behaviour. Withdrawal tendency will be increased by low searching costs. Escalations should be restricted to closely matched *RHP* opponents if *RHP* disparity is the major imbalance. Outside the 'escalation range' of a given individual, the higher *RHP* individual wins and the lower one loses (*i.e.* it should withdraw after conventional display). *RHP* disparity and holder: attacker imbalance should both interact to shape the observed pattern, though their relative importances will depend on species and situation. In some instances selection may favour immediate withdrawal from an occupied territory even without assessment of *RHP* (26:abstract).

Science

The central idea I should like to present in this talk may be expressed in the following way.

The natural as well as the social sciences always start from *problems*, from the fact that something inspires *amazement* in us, as the Greek philosophers used to say. To solve these problems, the sciences use fundamentally the same method that common sense employs, the method of *trial and error*. To be more precise, it is the method of *trying out* solutions to our problems and then discarding the false ones as erroneous. This method assumes that we work with a large number of *experimental* solutions. One solution after another is put to the test and eliminated.

At bottom, this procedure seems to be the only logical one. It is also the procedure that a lower organism, even a single-cell amoeba, uses when trying to solve a problem. In this case we speak of testing movements through which the organism tries to rid itself of a troublesome problem. Higher organisms are able to *learn* through trial and error how a certain problem should be solved. We may say that they too make testing movements – mental testings – and that to learn is essentially to try out one testing movement after another until one is found that solves the problem. We might compare the animal's successful solution to an *expectation* and hence to a *hypothesis* or a *theory*. For the animal's behaviour shows us that it expects (perhaps unconsciously or dispositionally) that in a similar case the same testing movements will again solve the problem in question (27:3).

Scientific Method

(a) As a rule, I begin my lectures on Scientific Method by telling my students that scientific method does not exist. I add that I ought to know, having been, for a time at least, the one and only professor of this non-existent subject within the British Commonwealth.

It is in several senses that my subject does not exist, and I shall mention a few of them.

First, my subject does not exist because subject matters in general do not exist. *There are no subject matters; no branches of learning—or, rather, of inquiry: there are only problems, and the urge to solve them.* A science such as botany or chemistry (or say, physical chemistry, or electrochemistry) is, I contend, merely an administrative unit. University administrators have a difficult job anyway, and it is a great convenience to them to work on the assumption that there are some named subjects, with chairs attached to them to be filled by the experts in these subjects. I do not agree: even serious students are misled by the myth of the subject. And I should be reluctant to call anything that misleads a person a convenience to that person.

So much about the non-existence of subjects in general. But Scientific Method holds a somewhat peculiar position in being even less existent than some other non-existent subjects.

What I mean is this. The founders of the subject, Plato, Aristotle, Bacon and Descartes, as well as most of their successors, for example John Stuart Mill, believed that there existed a method of finding scientific truth. In a later and slightly more sceptical period there were methodologists who believed that there existed a method, if not of finding a true theory, then at least of ascertaining whether or not some given hypothesis was true; or (even more sceptical) whether some given hypothesis was at least 'probable' to some ascertainable degree.

I assert that no scientific method exists in any of these three senses. To put it in a more direct way:

- (i) There is no method of discovering a scientific theory.
- (ii) There is no method of ascertaining the truth of a scientific hypothesis, *i.e.*, no method of verification.
- (iii) There is no method of ascertaining whether a hypothesis is 'probable', or probably true (28:5-6).

(b) (i) The method of the social sciences, like that of the natural sciences, consists in trying out tentative solutions to those problems from which our investigations start. Solutions are proposed and criticized. If a proposed solution is not open to objective criticism, then it is excluded as unscientific, although perhaps only temporarily.

(ii) If the proposed solution is open to objective criticism, then we attempt to refute it; for all criticism consists in attempts at refutation.

- (iii) If a proposed solution is refuted through our criticism we propose another solution.
 - (iv) If it withstands criticism, we accept it temporarily; and we accept it, above all, as worthy of further discussion and criticism.
 - (v) Thus the method of science is one of the tentative attempts (or brain-waves) to solve our problems which are controlled by the most severe criticism. It is a critical development of the method of 'trial and error' (27:66-67).
- (c) The past and the present are intertwined. History cannot be written 'as it actually took place.' One has to weigh and select, and this means that one inevitably uses filters. Historians who pretend to be neutral merely are saying they have never seriously questioned their biases. Facing our biases does not abolish them, but this is the only way to try to attenuate the effect of filters (29:xiii).

Strategic Equilibrium

What do I mean by 'strategic equilibrium'? Very roughly, the players in a game are said to be in *strategic equilibrium* (or simply *equilibrium*) when their play is *mutually optimal*: when the actions and plans of each player are rational in the given strategic environment – i.e., when each knows the actions and plans of the others. For formulating and developing the concept of strategic equilibrium, John Nash was awarded the 1994 Prize in Economics Sciences in Memory of Alfred Nobel, on the fiftieth anniversary of the publication of John von Neumann and Oskar Morgenstern's *Theory of Games and Economic Behavior* (13:352).

Theory

- (a) Every scientific theory is a system of sentences...or ASSERTED STATEMENTS (30:3).
- (b) The empirical sciences are systems of theories. The logic of scientific knowledge can therefore be described as a theory of theories.

Scientific theories are universal statements. Like all linguistic representations they are systems of signs or symbols. Thus I do not think it helpful to express the difference between universal theories and singular statements by saying that the latter are 'concrete' whereas theories are merely symbolic formulae or symbolic schema; for exactly the same may be said of even the most 'concrete' statements.

Theories are nets cast to catch what we call 'the world': to rationalize, to explain, to master it. We endeavour to make the mesh finer and finer (25:37-38).

- (c) A theory attempts to identify the factors that determine a class of phenomena and to state the permissible relationships among the factors as a set of verifiable propositions. A purpose is to simplify our education by substituting one theory for many facts. A good theory points to possible factors and relationships in the real world that would otherwise remain hidden and thus stimulates new forms of...research (31:5).

Tragedy of the Commons

- (a) See APPENDIX IV: ON THE TRAGEDY OF THE PRINCE EDWARD ISLAND COMMONS for a short discourse.
- (b) Hardin 1968 (32) remains 'one of the most influential articles written in the last half century' (33), but this important citation presents a hereto undetected problem: Hardin 1968 is not a single theory, but rather *four* major theories in a dark and stormy sea of a myriad of auxiliary conjectures. Hardin's central thesis—the theory presented first and foremost—is his restatement of Oxford economist W.F. Lloyd's 1832 (34) original problem statement: *The Tragedy of the Commons*. Hardin offers a strong defense for this useful, illustrative, conceptual tool—as have thousands of problem-solvers who have followed his footsteps for the past forty years. However, Hardin also forwards four other significant theories in this work—two of which may be readily defended, but the third and fourth, however, are readily falsified and refuted. In five short pages, Hardin also erected a myriad of minor conjectures upon small, scenic, sandy patches of theoretical shoreline which have since eroded into the sea. This creates a special problem for writers who issue unlimited 'Hardin 1968' citations (without limiting the theoretical range) without carefully considering the logical implications of their citation.

The solution is simply not to reference Hardin 1968 at all, but rather to cite the original and thus proper source: Lloyd 1832.

- (c) William Forster Lloyd (1794-1852)... made a lasting if long unrecognized mark in economics... From 1832 to 1837 Lloyd held the Drummond chair of political economy at the University of Oxford. A collection of his lectures... were first published in 1833 in Oxford under the title *Two Lectures on the Checks to Population*.... The chief original contribution in Lloyd's discussion of population issues is his recognition and incisive analysis of the deleterious consequences that ensue 'when the constitution of society is such that as to diffuse the effects of

individual acts throughout the community at large, instead of appropriating them to the individuals, by whom they are respectively committed.’ Lloyd’s discussion of this problem... [is] best known to modern readers through Garrett Hardin’s influential 1968 article... ‘*The Tragedy of the Commons*’ (34: 473).

(d) It should be clear by now that the idea of the commons did not suddenly arise out of nothing in the year 1968. Passing references to the problem occur as far back as Aristotle, and Lloyd certainly saw it clearly in 1833. H. Scott Gordon’s work in 1954 saw the beginning of a new concern with the problems presented by this politico-economic system. Yet the fact remains that a widespread recognition of these problems did not develop until after 1968. Why the delay? Two reasons are apparent. First, a favourable climate of opinion was needed for remarks about the commons to be noticed. This was created in the 1960’s by the rapid growth of the environmental movement, which alerted people to the consequences of distributional systems. Second, it was necessary that the properties of the commons be stated in no uncertain terms if people were to consider the matter seriously. It was necessary that the human tragedy of adhering to a commons-type distribution be emphasized.

A good, solid fortissimo minor chord had to be sounded. Before 1968 most of the sounds were either mere grace notes or extended passages played pianissimo. The down-playing was for good reason, of course: the clear message of the commons threatened cherished beliefs and practices. Abandoning any traditional practice requires a political upset (though revolution may be too strong a word) (35:1) [And Stewart (36) “saw the beginning of a new concern with the problems presented by this politico-economic system” in 1925!].

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APPENDIX II: PRINCIPLES OF DISPERSAL & EVOLUTION

1. Disharmony in composition of an insular biota is considered a prime source of evidence for the occurrence of long-distance dispersal.
2. Positive adaptations for long-distance dispersal and for establishment are the key to disharmony, and disharmony is thus not a negative concept. All elements in disharmonic biotas such as those of oceanic islands are capable of long-distance dispersal or are derived from ancestors that were capable of it.
3. Long-distance dispersal is probably not achieved invariably by only a single individual or disseminule, but may in some instances be expected to result from simultaneous (or nearly simultaneous) introduction of more than one individual or disseminule. This could be said to constitute a single "dispersal event."
4. Among organisms for which long-distance dispersal is possible, eventual introduction to an island is more probably than nonintroduction.
5. Elements are present in proportion to not only dissemination ability but also to establishment ability. Establishment ability is a characteristic of every species and group but cannot be viewed except in relation to the ecological conditions provided by the recipient island.
6. Migration to islands is governed by probability, and ordinary concepts of migratory routes and biological provinces do not apply well to many islands.
7. Guyots and other now-vanished high islands or lands more extensive formerly than now may have aided dispersal to oceanic islands as subsidiary source areas or "stepping-stones" but not as dry land bridges. Continental drift does not explain oceanic island patterns, and even inter-continental disjunctions are more easily explained by long-distance dispersal, in many cases.
8. The size and systematic composition of insular biotas are determined by many factors that differ in relative importance from island to island.
9. Relicts in the strictest sense are few or absent on oceanic islands, although every immigrant group has a history, and once can designate older island autochthones as "recent relicts."
10. Immigrant species must overcome the restriction of genetic material related to the very small size of the initial population if effects such as inbreeding are to be countered; in any case, the portion of the genetic content of a species that the insular establishment represents will influence the nature of the resulting insular population.
11. Rapid evolution of island immigrants is not only possible but frequent. Change after arrival is inevitable.
12. Situations new to immigrants will dictate their course of evolution on islands — if they can cross ecotones into them. Adaptive radiation is the inevitable result on an island or archipelago where a small number of immigrants meets a broad spread of ecological opportunities.
13. An immigrant group that is not faced with, or cannot enter, because of inherent limitations, a broad spectrum of ecological opportunities on an island may evolve into one or a few niches.
14. New growth forms evolve among plants on oceanic islands. Most conspicuously, there is a tendency toward increased stature.
15. Changes in form, size, and color of animals often occur in islands: gigantism, dwarfism, changes in body proportions, and melanism are among the changes represented.
16. Dispersal mechanisms and dispersal ability may be lost during the evolution of plants on oceanic islands.
17. Flightlessness may evolve in volant groups of animals in response to insular conditions. Ecological shift may produce equivalent restriction to insular areas.
18. Competitive ability is often decreased slightly to markedly among endemics of oceanic islands.
19. Means for outcrossing tend to be highly developed in at least the long-term autochthonous biotas of oceanic islands. Species without potential for outcrossing are probably doomed to shorter tenures.
20. Natural hybridization acquires a positive value in evolution of the waif flora and, in some cases, fauna.
21. Pollination relationships correspond to and change with respect to availability of insects and other pollinating agents on islands.
22. Some mutations that would be lethal or disadvantageous in continental environments have a more nearly neutral value in the less competitive environment of an oceanic island.
23. Endemism, although high on oceanic islands, is not itself a criterion for identification of an island as oceanic. There are various relations for high and low endemism. The nature of endemism may prove informative as a way to illustrate certain features concerning insular biotas.
24. Evolutionarily plastic groups are sensitive indicators of directions of evolution in the biota that results from colonization by means of long-distance dispersal (1:6-35).

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APPENDIX III: ON THE PROBLEM OF IVORY TOWERS

My dear son,

I am appalled, even horrified, that you have adopted Classics as a major. As a matter of fact, I almost puked on the way home today. I suppose that I am old-fashioned enough to believe that the purpose of an education is to enable one to develop a community of interest with his fellow men, to learn to know them, and to learn how to get along with them. In order to do this, of course, he must learn what motivates them, and how to impel them to be pleased with his objectives and desires.

I am a practical man, and for the life of me I cannot possibly understand why you should wish to speak Greek. With whom will you communicate in Greek? I have read, in recent years, the deliberations of Plato and Aristotle, and was interested to learn that the old bastards had minds which worked very similarly to the way our minds work today. I was amazed that they had so much time for deliberating and thinking, and was interested in the kind of civilization that would permit such useless deliberation. Then I got to thinking that it wasn't so amazing - - after all they thought like we did because my Hereford cows today are very similar to those ten or twenty generations ago. I am amazed that you would adopt Plato and Aristotle as a vocation for several months when it might make pleasant and enjoyable reading to you in your leisure time as relaxation at a later date. For the life of me I cannot understand why you should be vitally interested in informing yourself about the influence of the Classics on English literature. It is not necessary for you to know how to make a gun in order to know how to use it. It would seem to me that it would be enough to learn English literature without going into what influence this or that ancient mythology might have upon it. As for Greek literature, the history of Roman and Greek churches, and the art of those eras, it would seem to me that you would be much better off by learning something of contemporary literature and writings and things that might have some meaning to the people with whom you are to associate.

These subjects might give you a community of interest with an isolated few impractical dreamers, and a select group of college professors. God forbid!

It would seem to me that what you wish to do is to establish a community of interest with as many people as you possibly can. With people who are moving, who are doing things, and who have an interesting, not a decadent, outlook.

I suppose everybody has to be a snob of some sort, and I suppose you will feel you are distinguishing yourself from the herd by becoming a Classical snob. I can see you drifting into a bar, belting down a few, turning around to the guy on the stool next to you - - a contemporary billboard baron from Podunk, Iowa - - and saying, 'Well what do you think about old Leonidas?' Your friend, the billboard baron, will turn to you and say, 'Leonidas who?' You will turn to him and say, 'Why, Leonidas, the prominent Greek of the twelfth century.' He will, in turn, say to you, 'Well, who the hell was he?' You will say, 'Oh, you don't know about Leonidas?' and dismiss him, and not discuss anything else with him the rest of the evening. He will feel that you are a stupid snob and a flop; you will feel that he is a clodhopper from Podunk, Iowa. I suppose this will make you both happy, and as a result of it, you will wind up buying his billboard plant.

There is no question that this type of useless information will distinguish you, set you apart from the doers of the world. If I leave you enough money, you can retire to an ivory tower, and contemplate for the rest of your days the influence that the hieroglyphics of prehistoric man had upon the writings of William Faulkner. Incidentally, he was a contemporary of mine in Mississippi. We speak the same language - - whores, sluts, strong words and strong deeds.

It isn't really important what I think. It's important what you wish to do with your life. I just wish I could feel that the influence of those oddball professors and the ivory towers were developing you into the kind of a man we can both be proud of. I am quite sure that we both will be pleased and delighted when I introduce you to some friend of mine and say, 'this is my son. He speaks Greek.'

I had dinner during the Christmas holidays with an efficiency expert, an economic adviser to the nation of India, on the Board of Directors of Regents at Harvard University, who owns some 80,000 acres of valuable timber land down here, among his other assets. His son and his family were visiting him. He introduced me to his son, and then apologetically said, 'He is a theoretical mathematician. I don't even know what he is talking about. He lives in a different world.' After a little while I got talking to his son, and the only thing he would talk to me about was his work. I didn't know what he was talking about either so I left early.

If you are going to stay on at Brown, and be a professor of Classics, the courses you have adopted will suit you for a lifetime associated with Gale Noyes. Perhaps he will teach you to make jelly. In my opinion, it won't do much to help you learn to get along with people in this world. I think you are rapidly becoming a jackass, and the sooner you get out of that filthy atmosphere, the better it will suit me.

Oh, I know that everybody says that a college education is a must. Well, I console myself by saying that everybody said the world was square, except Columbus. You go ahead and go with the world, and I'll go it alone.

I hope I am right. You are in the hands of the Philistines, and dammit, I sent you there. I am sorry.

Devotedly,

Dad (1:34-36).

1. Turner T (2008) *Call Me Ted* (Grand Central, New York).

APPENDIX IV
IN SEARCH OF A BETTER WORLD



-----Original Message-----

From: Matt Funk, Sent: Wednesday, March 19, 2008 12:05 PM, To: rmahon@caribsurf.com, Subject: Mustique^{sss*}

Greetings from Prince Edward Island, Robin...I've been studying your work for the past several months, and, as I'm headed to Barbados on Saturday, and then heading over to Mustique on Monday, I hope that you may have some time to meet. Over the past year I've developed a *Universal Theory of Value* based upon relative insularity – and although most of those efforts have been informed by observations of various bio-geo-politico-economic mechanisms at work on Prince Edward Island, Iceland, Hawaii, and the Gaspé peninsula, when my good cousin Ben brought the curious case of Mustique to my attention, I realized it may serve as the most descriptive model[†] for a theoretical solution to

* Mustique is in the Lesser Antilles, and is administratively part of the State of St. Vincent [SVG].... Mustique is small (1400 acres) [and] privately owned... It is one of the outer, older arc of volcanic islands, free from the threat of renewed volcanic activity..., and not exceeding 480 feet in height. The eastern windward side is very exposed to the prevailing easterly winds but the whole coast consists of very attractive white coral sand beaches dissected by rocky headlands. The interplay between these and the green of forest and scrub produces an extremely beautiful landscape. In the late 18th and early 19th centuries the island was intensively cultivated for sugar-cane and more recently for cotton, but these land-uses have been abandoned and now all except the flattest land is covered with secondary forest and scrub (1:266-267).

† What has gone wrong with the development of economics as a science? Answer: There was a bunch of intelligent people who felt compelled to use mathematics just to tell themselves that they were rigorous in their thinking, that theirs was a science. Someone in a great rush decided to introduce mathematical modelling techniques...without considering the fact that either the class of mathematics they were using was too

The Problem of Sustainable Economic Development I've encountered to date. I've attached an Abstract and the slides from a presentation I gave last week [3] (no doubt you'll recognize some insights from your works!).

While on Mustique, I intend to develop a study which I may begin, but plan to conduct in earnest when I return in November. Generally speaking, I'm looking to assess the relative successes and failures (my preliminary research, as you will see from my two attachments, anticipates I may discover more successes than failures) as they relate to the adherence to the development suggestions set forth in LLEWYN-DAVIES, WEEKS, FORESTIEK-WALKER & BOR, 1970. *Mustique: proposals for a development study*, unpublished [4]. To date, however, I have not been able to obtain a copy of this original report. (Of course I would be very glad to hear if you knew where I might find one. I would also be grateful to know who commissioned this report). Thus my research endeavours will most likely be based upon the details from Goldsmith's 1973 *The ecologist's role in development for tourism: a case study in the Caribbean* [5]* (which, I'm sure you may know, is a review of this 1970 report; if you haven't reviewed this, I'll forward it. Naturally, I would be very grateful for any general insights you may have to offer, and if you have time to get together on either island, that would be great. In any case, we'll be on Barbados the 22nd -24th (arriving this Saturday), then on to Mustique for a week late on the 24th.

Are there any library and/or bookstore (UWI? CERMES?) resources I should explore while on Barbados? I have not yet procured a good topo map nor a nautical chart - would I find these on Barbados as well? Also, if you have any relevant papers which are not archived on the CERMES site (I have read your excellent works posted there), I would also be grateful for those. Any other suggestions? Also, has anyone surveyed the turtle populations on Mustique? Are there any notable and relatively readily surveyed Mustique endemics?

Finally, I will note that I hold your *Coastal resources and livelihoods in the Grenadine Islands: Facilitating Change in Self-organizing Systems* [3] in utmost high-regard, and it has greatly enriched my research. If you think any of your co-authors on this piece (or anyone else for that matter) would find mutual benefit in exchanging ideas and drinking iced tea with me (on Barbados, Mustique, or elsewhere in the Grenadines), please feel free to forward my email and/or attachments.

Sincerely...Matt Funk

-----Original Message-----

On March 21, 2008 at 10:55 PM Matt Funk wrote:

Thanks for the great insight, Robin - and the contacts.

I'm sorry I won't have the opportunity to meet you on this trip, I hope we can connect in November...

Too bad to hear The Mustique Co. is not particularly interested, especially considering it would even serve selfish interests, as the transboundary externalities are problematic for all Caribbean islands – SVG in particular.† I

restrictive for the class of problems they were dealing with, or that perhaps they should be aware that the precision of the language of mathematics could lead people to believe that they had solutions when in fact they had none (2:177).

* Ecologists are increasingly in demand to provide both background information to development and to conduct validity studies prior to funding. This paper describes an advisory study [2] conducted on the Caribbean island of Mustique prior to development for tourism. It is argued that the ecologist uses biological as well as physical indicators to assess suitability of different areas for development and to anticipate possible problems. In this study the primary environmental determinants and biological and human factors have been interpreted to identify the distribution and degree of seriousness of exposure, erosion potential and water yield and quality. The compatibility of physical and ecological factors with different categories of proposed development have been assessed, and maps of vegetation, soil and exposure transferred onto gridded overlays. The use of these overlays combined with a consideration of the compatibilities permitted the degree of restraint to the various categories of development to be presented in map form. The problems that are likely to be encountered as a result of development are discussed, and finally it is suggested that the development be subjected to regular ecological monitoring (5:abstract).

† Informal interviews conducted as well as personal experience have presented a myriad of problems when dealing with legislation throughout [St. Vincent and the Grenadines, and Grenada]. A significant and potentially detrimental issue is the lack of coordination between many Ministries and Departments. Coordination is necessary and is exemplified in Grenada where the country's Forestry Act currently falls under both the Department of Forestry and the Ministry of Tourism. Although the relative remoteness of the islands forces dispersal of human resources, having relevant officials to distribute, make available or even enforce the laws in each island is an essential element in the quest for good governance. In addition, gaining and maintaining public interest has emerged as a critical factor in these islands.

The comprehensive government website of St. Vincent and the Grenadines must be noted, which contains digital copies of some environmental legislation as well as printable copies of application forms for various activities. As the world enters a new digital age, the availability of electronic documents represents a significant step towards this era.

Since these islands are all located in close proximity, disasters that occur in one state can have an effect of the same magnitude on neighbouring islands. Environmental disaster preparedness can become more efficient if both parties form an alliance to combat and deal with

actually find it rather odd that they wouldn't be at the forefront of conservation efforts in SVG, especially the near-neighbouring islands.

In any case, thanks again and enjoy your holiday with your family!

Happy Easter...Matt Funk

----- Original Message -----

From: Matt Funk, Sent: Mar 18, 2008, at 3:53 AM, To: Mark De Silva, Subject: Mustique

Greetings from Prince Edward Island!

Just wondering if you have completed your Bio-Inventory of Mustique? Do you have a report and/or checklist available? What's the status of your study? I'll be on Mustique on the 24th, conducting a bit of research of my own – let me know if I may be of any assistance, as I hope to conduct an informal, general ecological survey.

Thanks! Matt Funk

----- Original Message -----

On Mar 19, 2008, at 3:18 AM, Matt Funk wrote:

Excellent, they were already holding a copy for me! Wow, I only realized who you were after receiving your reply - I've been studying your work for the past month. Indeed, it would be really great to meet – I believe you may find that our common interests are heavily aligned! Over the past year I've developed an *Unified Theory of Value* based upon relative Insularity - and when I discovered Mustique several months ago, I realized it may serve as a more descriptive model for my solution than any island I've encountered to date. I've attached the Abstract for a current working paper, and the slides from a presentation I gave last week [3].

While on Mustique, I intend to develop a study which I may begin, but plan to conduct in earnest when I return in November. Generally speaking, I'm looking to assess the relative successes and failures (my preliminary research, as you will see from my two attachments, anticipates I may discover more successes than failures – but of course I realize how prone we are to error!) as they relate to the adherence to the development suggestions set forth in LLEWYN-DAVIES, WEEKS, FORESTIEK-WALKER & BOR, 1970. *Mustique: proposals for a development study*, unpublished [4]. To date, however, I have not been able to obtain a copy of this original report. (Of course I would be very glad to hear if you knew where I might find one. I would also like to know who commissioned this report. Tennant? Money-Coutts? The Mustique Co.? I would also very much like to know your opinions regarding the most influential and effective custodian/s of Mustique's ecology?). Thus my research endeavours will most likely be based upon the details from Goldsmith's 1973 *The Ecologist's Role in Development for Tourism: A Case Study in the Caribbean* [5].

Naturally, I would be very grateful for any general insights you may have to offer, and of course would love to have a personal introduction to Mustique (and/or the Tabogo Cays). Depending upon which day may be available, we may have an extra room for you and a guest. In any case, we'll be on Barbados the 22nd -24th (arriving this Saturday), then on to Mustique for a week late on the 24th. Thanks again for your reply, Mark, I hope to meet you next week!

Sincerely...Matt Funk

Mark de Silva flew to Mustique to meet with me. He joined our party for a picnic lunch under a palapa on windswept Pasture Bay: fruit, mixed salads, home-made pizza slices, and a fine assortment of refreshments and French wines set on linen, china, silver, crystal, and served with cheer by four members of the house staff. We had several hours of great conversation; Fr. de Silva imparted very interesting anecdotes, filled in some gaps in my research, and expressed great interest in my endeavour, paying me a far greater compliment than I deserve by exclaiming "I've been waiting all my life for someone to tell this story!" He then led us on an excellent tour of the lagoon and nature preserve, and kindly gave me two copies of his excellent new book: "The Spiders and their relatives of St. Vincent & the Grenadines" [7] (and I in turn gave one copy to my generous cousin Ben!).

----- Original Message -----

Subject: Sustainable Economic Development, From: Matt Funk, Date: Mon, 10 Mar 2008 12:01:49 -0300, To: Brian Alexander

Greetings from Prince Edward Island! For the past several years I have been utilizing islands to model various problems and solutions relating to the problem of sustainable economic development; much of my research has

possible disasters. This will not only assist in creating a comprehensive plan, but will also deal with matters such as liability and will clearly identify responsibilities of each parties. These countries have relatively small populations and thus can tackle environmental issues on a more personal level (:90).

focused upon the strategic advantages relative insularity offers on islands and other relatively insular states, and over the past several months Mustique has emerged as the most descriptive model of my theoretical solution to this global problem. In the course of my research, I have developed a unified (economic and evolutionary) *Theory of Value* based upon relative insularity, which I believe you may find rather interesting. And, regarding Mustique in particular, I have reached a conclusion that (i) privatization, (ii) stringent land-use policy based upon a thorough carrying-capacity study & inter-related economic development plan, (iii) amendments to this plan based upon the principle of *gradualism*, and (iv) your management of Mustique have been largely responsible for this sustainable development and pursuant success. Of course I realize nothing would have been remotely possible without Lord Glenconner's initial purchase (*i.e.* fencing off the 'commons' through privatization), commitment, vision, tireless enthusiasm, deep pockets, and extraordinary efforts. Indeed, events *have proved he was way ahead of his time!* It seems that Lord Latymer, Mr Neumann, and the more recent efforts from individuals such as Mick Jagger may also certainly be credited as well, but I would be very interested in hearing your thoughts on these and several other points. I will head to Mustique on the 24th (for one week) to conduct some field research, and if you have any time available I would be very grateful to discuss your island endeavours, struggles, and extraordinary accomplishments. I plan to spend most of the week taking stock of the island in regards to the original ecological development report Goldsmith (1973) outlined in *The Ecologist's Role in Development for Tourism: a Case Study in the Caribbean*. If possible, I would also be very grateful to review a copy of LLEWELYN-DAVIES, WEEKS, FORESTIER-WALKER, BOR (1970) *Mustique: Proposals for a Development Study* [4], and/or any other documentation you believe might serve my research purposes well. I will be on Barbados for two days prior to my arrival on Mustique; if you are aware of any special library collections there, please advise. Also, I am giving a seminar at The University of Prince Edward Island tomorrow entitled *On the Problem of Islandness: Lessons from Mustique* [5], and I am submitting a proposal to deliver [8] a paper [9] at the Åland International Institute of Comparative Island Studies entitled *On the Problem of Connectivity: The Value of Relative Insularity & lessons from Mustique*. Naturally, if you should have any interest, I would be happy to share any of my research and/or seminars with you and/or your board members. I look very forward to visiting Mustique later this month!

Sincerely...Matt Funk

-----Original Message-----

From: Matt Funk, Sent: 18 March 2008 22:47, To: Brian Alexander, Subject: [Fwd: RE: Mustique Presentation...]

Greetings Brian....Not sure if you received my email last week, so I wanted to follow up in hopes that we might be able to visit. I also thought perhaps you may be more inclined to visit with me if I were able to paint a better picture of my research endeavour. I've attached a pdf copy of a recent presentation of my research on Mustique [3].

It seems likely that you have had an extraordinarily positive impact upon the sustainable development of Mustique, and I would like the opportunity to document your contribution in my research.

Also, I have been waiting to hear back from your rental department regarding the availability of Fort Shandy for this November. I would also be very keen to learn if the property is for sale. Otherwise, I would also be interested in any property able to demonstrate cash-flow independence (if, that is, such a property should exist).

I'll call your office Thursday to see if you have the time or interest in meeting with me next week.

Sincerely...Matt Funk

-----Original Message-----

On 21 March 2008 at 22:41 Matt Funk wrote:

Thank you for your reply and offer to get together with me, Brian. We leave for Barbados tomorrow, then on to Mustique on Monday. My cousin Ben and his wife, Zarina have graciously invited us to spend the week with them at *Windwords*. If you have time to come over for lunch, that would be great, otherwise perhaps we could meet somewhere for a bite or drink? In any case, I realize I'm catching you in the middle of your busy season, and I'd appreciate any time you might have available.

I'm sorry you didn't receive my previous email; I'll sketch an outline of my rather unusual research interest:

I'm conducting research here on Prince Edward Island, and over the past year I've developed a unified Evolutionary & Economic *Theory of Value*, based upon relative insularity - and when my cousin, Ben Funk, brought Mustique to my attention several months ago, I realized it may serve as a very accurate and descriptive model for my theoretical solution to *The Problem of Sustainable Economic Development* (not only on islands, but at the global level as well). You kindly reviewed the presentation slides I forwarded, but I imagine that, out of context and without

the dialogue, at best they may merely hazily outline my efforts; thus I've attached the Abstract from a current working paper which may also shed some light on my research.

While on Mustique, I hope to distil a general assessment and develop a study which I may begin, but would like to conduct in earnest when I return in November. Generally speaking, I'm looking to assess the rather extraordinary – perhaps even *singular* – success Mustique has achieved through privatization, initial carrying-capacity assessments, strict land-use policies, a community of stakeholders with heavily aligned values, resource holding power, and prudent management (which is, of course, where I believe your efforts factor heavily in the equation) as they all relate to the adherence of the development plan outlined in LLEWYN-DAVIES, WEEKS, FORESTIEK-WALKER & BOR, 1970, *Mustique: Proposals for a Development* [4]. To date, I have not had the fortune of reviewing this report. If you are aware of a copy that I may be able to review, I would be extraordinarily grateful.

Thus my research objectives have been based upon the only source of the early planning stage that I am aware of: Goldsmith's 1973 *The Ecologist's Role in Development for Tourism: A Case Study in the Caribbean* [5]. (which, I'm sure you're well aware, is a review of the LLEWYN-DAVIES report; if by chance you're not familiar with this study, I'll attach it to this email as well.

Naturally, I would be also be very grateful for any general insights, direction, archives, or opinions you may have to offer.

Also, I should note that I've discovered that my central thesis seems rather controversial in certain circles (for I have discovered that many are very uncomfortable considering the conjecture that individuals with relatively extraordinary means may offer the dominant solution to global ecological degradation (and thus, in the long run, human survival, as well). But I have also discovered that, for others, Mustique simplifies a powerful – yet illusive – solution to perhaps the single greatest complex problem facing human civilization.

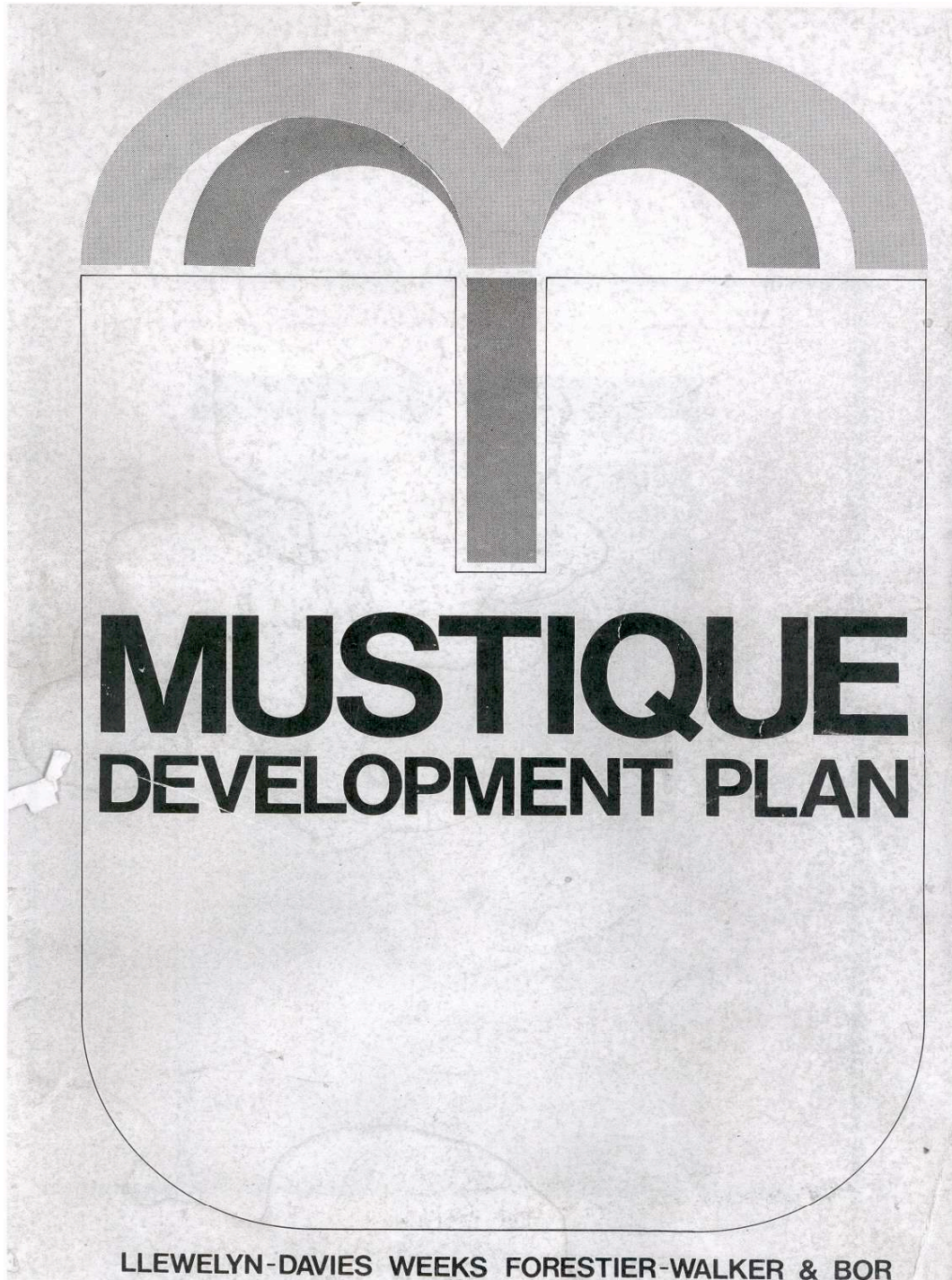
Thanks again Brian, I look forward to meeting and speaking with you next week.

Happy Easter...Matt Funk

I met with the Hon. Brian Alexander at the Mustique Co. Office, and we engaged in a long, interesting, and enlightening conversation (Mr Alexander was equally generous with his time, spirit, and insights) about the developmental history of Mustique, and Mr Alexander offered his insights regarding my research, which he had kindly reviewed. His secretary went off to photocopy the original development plan [4] by hand, and returned with my copy just as we were wrapping up our conversation! Mr Alexander also gave me a parting gift: a fine reproduction of Billingham's 1804 Mustique map, as cited in The Mustique Development Plan and Goldsmith 1973! The Mustique Co. has a framed print of the same map on the wall just outside of Mr Alexander's office. As Fortune would have it, I made it back to PEI with the plan and the map in perfect condition—the plan was never beyond arm's-reach during our entire trip home!

1. Mahon R, et al. (2002) Coastal resources and livelihoods in the Grenadine Islands: Facilitating Change in Self-organizing Systems. *Proc Gulf Caribb Fish Instit* 55:1-11.
2. Taleb N (2001) *Foiled by Randomness* (TEXERE, New York).
3. Funk M (2008) *On the Problem of Islandness*. Seminar presented to the Faculty of Arts, 11 March 2008, 11:00 AM. The event program noted: "A *Theory of Value* based upon relative insularity is introduced by outlining its various aspects as they affect Mustique. The island's positive features, which have altered its isolation and peripherality into economic assets, will be discussed" (UPEI, Charlottetown).
4. Llewelyn-Davies, et al. (1970) *Mustique Developmet Plan* (The Mustique Co., Mustique).
5. Goldsmith F (1973) The Ecologist's Role in Development for Tourism. *Bio J Linn Soc* 5:265-287.
6. Mattai, I Mahon R (2006). [CERMES Technical Report No. 15: Review and Interpretation of Environmental and Sustainable Development Legislation for the Grenadines Islands](#) (CERMES, Barbados).
7. Silva M, et al. (2006) *The Spiders and Their Relatives of St. Vincent & the Grenadines* (Mayreau Environmental Development Organization, Kingstown).
8. Funk M (2008) *On the Problem of Connectivity: The Value of Relative Insularity*. A seminar delivered 11 June 2008, 1:00 PM, at the Åland International Institute of Comparative Island Studies Annual Conference, "Islands of Competence: Branding Identities in a Globalized World," Parliamentary Building, Mariehamn, Åland (AICIS, Åland).
9. Funk M (2008) [On the Problem of Sustainable Economic Development I: A Tenable Solution to this Prisoners Dilemma in an Open Letter to the Åland International Institute of Comparative Island Studies](#) (AICIS, Åland).

APPENDIX V
THE MUSTIQUE CO. DEVELOPMENT PLAN



TERMS OF REFERENCE

I

In December 1970 the Mustique Company, sole owners of the Eastern Caribbean Island of Mustique, appointed the firm of Llewelyn-Davies Weeks Forestier-Walker & Bor to prepare a 20-year Development Plan for the island by May 1971. It was stressed that the study should concentrate on establishing the feasibility of low density high-income residential tourist development with small hotels both for the international and the local market. Proposals for immediate action were also required.

Within these wide terms of reference we have attempted to produce a Plan that is both a document showing existing and proposed use of land, and an instrument that embodies social, economic and ecological policies.

Despite the small size of the island a study of this kind involves consideration of most of the interacting components of a much larger system and similar or perhaps greater problems in making projections for future development.

We have felt therefore that the Plan should afford as much freedom as possible for the Mustique Company to respond to future opportunities, while at the same time providing policies that are firm and clear enough to guide development and to offer assurances to those investing.

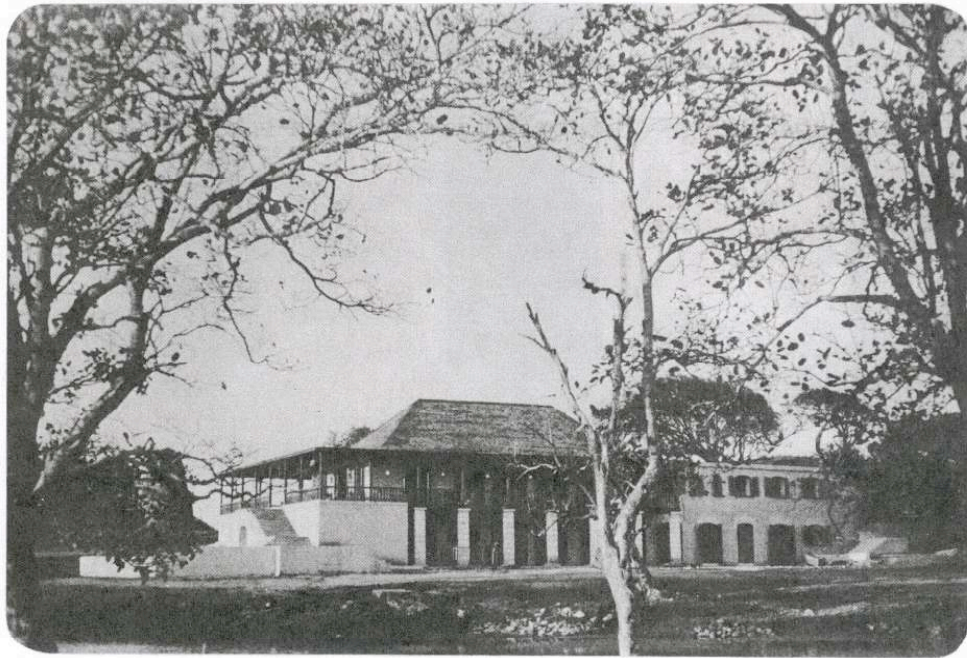


FIGURE 1: MUSTIQUE 1970 : THE COTTON HOUSE HOTEL

The development of Mustique involves the relationship of 3 groups of people: the Vincentians, the Visitors and the Mustique Company. The plan will need to assure potential investors that the proposals offer them the facilities they need within a context of reasonable long-term environmental and socio-economic stability.

This study has therefore attempted to identify the ecological and socio-economic constraints to development on the island and to make proposals that will offer a framework for maximising return on investment taking into account those constraints.

The goals of the plan have therefore been seen as:

- 1 To identify that sector of the potential regional market that will complement rather than compete with development elsewhere in the St Vincent Grenadines and provide suitable residential, recreational and service facilities on Mustique.
- 2 To minimise disturbance to the ecology of the island by achieving the most suitable relationships between proposed uses and the natural resources, and ensuring that the capacity of the island is not exceeded.
- 3 To maximise returns on capital invested by the Mustique Company within the constraints, ensuring that at each stage investments can be seen to be related to specific returns.
- 4 To adopt generally a policy of gradualism so that the effects of development can be carefully monitored; and in the short-term, to optimise the use of already existing and committed infrastructure.
- 5 To maximise the benefits accruing to the people of St Vincent from the development of Mustique.

[Key content:]

Since Mustique is a small island under single ownership..., development will be inherently expensive. But it will also offer the opportunity of preserving an especially high quality of environment

Although we have found some indications from the regional demands and projections, it is the nature of the island itself that must determine the actual quality and quantity of the potential demands that should be accommodated, firstly in terms of environment, secondly in terms of service problems and costs....

The charm of Mustique derives largely from its hilly topography. These hills, acted upon by the sea and the prevailing winds have divided the island's 1400 acres into a number of distinctly different microclimates, and have given rise to a curving coastline that is long (12 miles) in relation to the area it encloses....

The variety of these separate places, with their interplay of forest, rocky headland, sandy bay and turquoise sea, creates an impression that makes the island seem much larger than it actually is. The hills also afford fine views of the white beaches and out over the neighbouring islands....

In order to discover the most suitable use for the land and achieve the best fit between the activities of man and the natural systems, an ecological survey was undertaken..., for it is obvious that the varied geology, vegetation and wild life of Mustique and the sea around are crucial to the attractiveness of the island....

The aim of this study was to identify areas of special interest for conservation, and to find ecological indicators for the degree of intensity and type of use for which the land is best suited....

It is necessary to ensure that no unique species or features of outstanding natural beauty are destroyed by development. Similarly the extent and variety of the vegetation on Mustique contributes greatly to the charm of the island, and must be preserved....

Mustique is an extremely beautiful island and one which is very rich biologically. At the same time, the natural resources of the island are in limited supply or extremely sensitive to development. The challenge that must be met by

the developers is to utilize its charm and habitat richness whilst maintaining its delicately balanced ecosystems in as natural a state as possible....

Several primary physical features of the island combine to determine the range of possibilities for development. These are, most notably, the availability of water, the pronounced alternation of wet and dry season, the physical make-up of soils, wind velocity, salt spray and soil salinity. These same features also determine the kind and distribution of the naturally renewable resources of plant and animal communities and, at the same time, determine their response to various kinds of development. Careful exploitation and management will be required to ensure that the biological habitat-types represented in the island's ecosystems continue to contribute to the beauty and interest of the environment...

The biotic component of the island's ecosystems is seen as a resource in its own right. It contributes to the quality of the landscape and contains plants and animals in a little-disturbed, semi-natural environment which justify conserving in their own right. It is difficult to make an assessment of the conservation status of Mustique from a scientific point of view without a more extensive survey of neighbouring islands and literature. However, it is clear that some individual species obviously deserve protection and these include the turtles and iguana. More important, in the context of the proposed future development, and as an important contribution to the island's character, is the conservation of a range of habitat types and these should include more mature areas of forest, coastal scrub, sea-grape communities, and mangrove swamp...

There appears to be universal agreement that the scenery on Mustique is superb and this beauty is derived from an interplay of forest, rocky headland, sandy bay and turquoise sea. The quality is partly the result of the small scale of this heterogeneity and the feeling of being on a small, secluded island and yet one so little exploited that an excursion to any beach or headland requires a half-day expedition. This sensation of being on both a very small and a very big and varied island is important to preserve.

Secondly there is a smaller scale of beauty and interest. This is totally attributable to biological components of the environment such as the widely distributed solitary cacti, the palm plantations, epiphytic plants, windswept distorted trees, and the occasional tortoise, humming-bird or butterfly. Thirdly there is interest that derives from past and present forms of land-use. Relics of the past include an abandoned village, Fort Shandy, Carib remains, a solitary cannon, a sugar-cane press, old wells and water-tanks. Present day activities also contribute to the interest of the landscape and most visitors will appreciate seeing cattle and ponies, fields of pigeon pea and cassava, scattered mangoes and tamarinds, citrus groves and banana plantations....

The case for maintaining and developing the agriculture of the island partly rests on the importance of preserving the feeling for the visitor of being part of a functioning system as well as to open-up views and increase diversity in the landscape....

Most visitors would appreciate interpretative facilities to enable them to understand more of the variety and richness of the flora, fauna and history of the island. We suggest that an information centre be provided and short, self-guided nature trails from natural focal points such as beaches and the lagoon. These should not be *too* arduous and should provide an alternative route back to the starting point....

Mustique is a special and unusual place. The natural resources of this beautiful island must be safeguarded, and all development carefully designed to complement the landscape. We have tried in this report to create a planning framework of which the principles are comprehensible as a kind of language of "the way things are done here".

In this report we have particularly concerned ourselves with the relationship between peoples and places. We feel that for the charm of the present day Mustique to grow into a special identity that can be comprehended by people arriving on the island, the development of tourism must be seen to enhance the landscape and benefit the local islanders. Only if the planning framework is administered by people who care about this, will visitors wish to belong there and participate in the island's plan for growth. For when people belong to a place and feel that they can interact with it, the place will grow fruitfully. We hope that the principles outlined in this report, both physical and methodological, will help ensure a harmonious and profitable future for Mustique (1:7-43).

1. Llewelyn-Davies, *et al.* (1970) *Mustique Developmet Plan* (The Mustique Co., Mustique).

APPENDIX VI

DEVELOPMENT PLAN FOR PRINCE EDWARD ISLAND

A 15-YEAR FEDERAL-PROVINCIAL PROGRAM FOR SOCIAL AND ECONOMIC ADVANCEMENT

AGREEMENT COVERING DEVELOPMENT PLAN FOR PRINCE EDWARD ISLAND

THIS AGREEMENT made this seventh day of March, 1969.

BETWEEN: THE GOVERNMENT OF CANADA, (hereinafter referred to as "Canada")... AND: THE GOVERNMENT OF THE PROVINCE OF PRINCE EDWARD ISLAND, (hereinafter referred to as the "Province")...

[Key content:]

DEVELOPMENT STRATEGY

CURRENT SITUATION

The Province of Prince Edward Island, with an area of some 2,200 square miles, had a population in 1966 of 109,000 and an estimated labour force of 35,400. Levels of unemployment are consistently 3% to 7% above the national average, on an annual basis, and seasonal unemployment usually ranges between 15% and 20% in February and March.

In addition to indicated unemployment there is, in the Province, a substantial degree of underemployment. The economy is characterized by a heavy dependence upon land based resource industry, particularly agriculture, and the resources of the sea. The small amount of manufacturing is related almost entirely to these resources and is organized in small production units. Output per worker in all sectors is well below the national average, by as much as 50% in agriculture. Accordingly, per capita income ranges between 60% and 70% of the national average. Aggregate output in the commodity sectors has been growing very slowly, averaging about 2.2 % per year over the period from 1961 to 1965.

STRATEGY

This Plan is based on a development strategy that would bring about full economic exploitation of the Island's large and potentially profitable resources for agriculture. Other main features of the strategy are: a considerable development of tourist facilities; better utilization of forest assets; rationalization of fisheries; extension of education programs and training for the full development of the labour force potential; increased efficiency and some expansion in processing and manufacturing industry; investment in housing, health and welfare services and other infrastructure required for effective development.

The common aim of these programs is to create conditions in which the people of Prince Edward Island can create viable economic enterprises for themselves.

The programs for the renewable resource sectors of agriculture, forestry and tourism are based on land use adjustment, in response to land capabilities and market demands, and on policies and measures to promote development. To encourage the reallocation of land to its most profitable use, as indicated by Canada Land Inventory data and other detailed socio-economic information, a resource management team is being formed to work directly for the farmers and others concerned. The team will include agriculture, recreation, and forest specialists; soil and water engineers; geographers and counsellors.

The programs available to assist this reallocation include land acquisition and resale, commercial leases, commercial credit, management training, technical assistance, training and mobility for other employment, and pensions.

The objective is to reallocate some 93,000 acres of poor agricultural land to forestry, tourist and wildlife use and to add, over time, approximately 270,000 acres of unused good agricultural land to the 550,000 acres presently being farmed. There will be zoning control and licensing to concentrate tourist and recreation developments in the most suitable areas, where they will not detract from the best use of farm land.

Development in the resource sectors will be further fostered by basic improvements in marketing facilities for

agriculture, by some stand improvement and management inputs into forestry, and through assistance to the tourist industry by technical advice on design and credit, quality regulation, and some investments in public facilities. In addition, a careful effort will be made to foresee and encourage the development of manufacturing and processing related to the resource base.

Taken together, these programs can be expected to attract substantial private development capital into the resource sectors of the Island economy....

Arising out of these basic programs are requirements for roads, water supply, power, housing and community improvements and changes in health and welfare programs. Road requirements are linked directly to the activities they serve....

The growth in levels of economic activity is expected to reduce the rate of net emigration from the Province. The projected effect will be to increase the population of the Island from the 1966 level of 109,000 to approximately 124,000 in 1978 and 129,000 in 1983. This is approximately 7% above the levels which might be expected in the absence of the Plan....

RESOURCE ADJUSTMENT AND DEVELOPMENT

The historical pattern of land ownership in Prince Edward Island is badly adapted to the needs of modern technology for agricultural, forestry and tourist development. Holdings are small and often scattered and the market mechanism for allocating land between these three sectors has been ineffective.

In this environment the first step required, to permit full development of the Island's resources, is a Province-wide land management program. This must be designed to remove the barriers to efficient land reorganization and reallocation to more effective uses. The projects below outline three areas of activity which together will provide the data for a single, broadly based geo-information system which will serve as the guide for land use decisions and investments....

Under the direction of the management group, and with funds provided by ARDA, staff of the Policy and Planning Branch of the Department of Energy, Mines and Resources are conducting an intensive survey of property ownership, land use, and ownership characteristics. Through this survey all property ownerships of five acres or more in size are mapped with the aid of air photos and local interviews. In addition to the ownership information, a detailed socio-economic interview is conducted with each property owner to establish age, income sources, family size, future plans and other information. The ownership information is transferred to 1:50,000 topographic map bases which are correlated with the socio-economic information and the Canada Land Inventory land capability information in the central data bank.

A staff of approximately 40 people will analyze this information to plan the most effective uses of land. Of these 40, 10 to 12 will be professional in the fields of agriculture, forestry, recreation, legal aid, appraisal economics and farm management. This process will lead to full implementation of the resource development projects described below. These projects, together with some of the other programs described in this program guide, provide the necessary conditions in which individual men and women can undertake the reallocation and efficient management of the Island's resources....

DEVELOPMENT OF LAND BASED RESOURCES SECTORS

Agriculture is the base of the economy of Prince Edward Island. An analysis of Canada Land Inventory data indicates that, from a physical point of view, there is a substantial amount of high quality land available for expansion and that there is capacity for intensifying agricultural land use.

In addition, the analysis of future markets for Island products indicates that many of them can be sold in greatly increased quantities provided that production is efficient and provided that better mechanisms for handling, grading, processing and transportation are developed. If these conditions are met, the limiting factor on the rate of development will not be markets so much as the rate at which it proves possible to achieve the structural and social adjustments required to use the Island's agricultural resources more fully.

OBJECTIVES AND STRATEGY

In the light of these factors, the objective of the measures to be implemented for agriculture is to double net value added to \$48 million by 1976. This income may be produced from a resource base farmed by 2,500 commercial farm units. By 1983, it is expected that value added will have approximately tripled, to \$68 million. In order for this program to be effective, the main restructuring of the sector must take place in the first seven years. The second period will be a rapid growth period, with continuing adjustments as required....

IMPLEMENTATION

Land Consolidation and Improvement: The main function of the integrated land management program is to provide the guidelines for land consolidation and farm enlargement in agriculture. There must also be mechanisms to assist the actual transfers of land.

Essentially, this can be reduced to two requirements. The first is to enable those who wish to leave farming to release their land when they wish, and to allow those who want to expand their holding to acquire such land when and as they are able to manage it. The second requirement is to ensure that sufficient credit is available. Because of the present low level of returns from the industry and because many of the people who will participate in this sector are young, credit becomes a crucial factor in making such land transfers possible.

Accordingly, it is intended that, as far as necessary, the Government will act as an intermediary, standing ready to buy land offered for sale by individuals within or outside the integrated land management program. The Government will then improve and lease or sell good agricultural land in units of viable size. This land will be available to qualified farmers and to those who become qualified as a result of training. Through these transactions, the Government will play an active role in financing where there are gaps in the present credit system.

The Province will offer owners of low income farms the market value of farm land and buildings. This value will be determined by an agreed professional appraisal process with appropriate audit....

On the basis of the surveys and the age and income structure of the population, it is estimated that over a ten year period a total of 411,600 acres of land could be offered to the Province. Of this land 306,000 acres would be land Class 2 and 3, of which 157,000 acres would be improved and 149,000 acres unimproved. In addition, there will be 17,000 acres of improved Class 4 soils suitable for crop production and about 93,000 acres that should be withdrawn from the agricultural sector and diverted to alternative uses such as forestry, recreation, wildlife and watershed management.

Before sale or lease of agricultural land, it is intended that improvements such as soil erosion control, and hedgerow and fence removal, will be undertaken by the Province. The Province will also make provision for clearing and improving the 149,000 acres of Class 2 and 3 land acquired and approximately 121,000 acres which can be brought into production by farmers clearing on their own property.... Lands acquired will be consolidated by the Development Corporation, improved, and resold or leased as farm units or for the enlargement of existing farm units which are potentially economic.

The Corporation will also, on request, make arrangements for clearing land owned by farmers who have the capability and intention to expand....

OBJECTIVES AND STRATEGY

The objective of the program, therefore, is to assist the development that must take place in the face of the pressure of demand and to provide the degree of regulation necessary to optimize the returns to the Island's economy....

1. Canada (1970) *Development plan for Prince Edward Island : A 15 year federal-provincial program for social and economic advancement, 1970* (Queen's Printer for Canada, Ottawa).

APPENDIX VII

ON THE TRAGEDY OF THE PRINCE EDWARD ISLAND COMMONS

*Solving Island Problems with Island Solutions:
Amplification by Compression, Complex Systems, & Cultural Evolution
IST 604 Research Methods & Designs for Island Studies
Main, 311, 6:00 PM, 26 January 2009
Matt Funk*

On the Tragedy of the Commons & The Problem of Induction on Prince Edward Island

North Rustico Moving Ahead on Housing Development

NANCY WILLIS

The Guardian

Last updated at 12:34 AM on 26/01/09

NORTH RUSTICO — The village of North Rustico is taking a pro-active route in dealing with the current economic slowdown by creating a 63-lot housing development that *will* attract new families to the community.

Village chairman David Blacquiere and his commission received approval from residents at a recent public meeting, giving the OK to launch the project and move ahead on funding arrangements with a local financial institute.

The development will be located on property that borders land already owned by the village.

This will be a two-fold project involving green space and targeting affordable housing for young families.

“We have a good school and a declining population and we want to reverse,” Blacquiere said.

“One way is by attracting them to this available land we have left.”

The development would allow for 63 individual lots, however, the village is not opposed to including some cluster-type housing for seniors or other sorts of occupation.

Blacquiere said he was pleased with the turnout for the public meeting, which saw over *50 residents, 90 per cent of whom cast their vote in favour of the development.*

He said players in the industry seem to think this is the right time to get into this type of thing and he is not afraid the village might be left holding a load of property it can't sell.

“Both the federal and provincial governments are encouraging home construction right now, and *this slowdown is not expected to last beyond a few years, then things will pick up again.* Because this development is not going to happen overnight, we will be right in the right place and time when it does.”

The municipalities of Miscouche and Kinkora have had success with housing development.

Blacquiere is meeting with these councils to review their activities.

“We are doing our homework, you can be sure.”

The commission is also looking at the possibility of hiring a project manager.

North Rustico's outlook is to the future.

“You can sit on a commission and be a caretaker, or move forward and bring in more revenue, and the only way to do that without increasing taxes is by bringing in more people,” said Blacquiere, adding that's what North Rustico intends to do.

[All italics mine, MF]

Dr Michael Anastasio, *Director*
Las Alamos National Laboratory
Post Office Box 1663
Los Alamos, New Mexico, 87545

12 February 2009

RE: On the Problems of National Security, Human Survival, & Job Number: 216210

Sir:

Last Monday I delivered a *Scientific Method* lecture, *Solving Island Problems with Island Solutions: Amplification-by-Compression, Complex Systems, & Cultural Evolution* to graduate students at The University of Prince Edward Island. At the end of my talk, after I had thanked them for “letting someone who knows so little speak for so long,” Canada’s research chair in Island Studies, Godfrey Baldacchino, paid me one of the greatest compliments I have ever received. After offering undue praise for the earnest and manner in which I attempted to impart several difficult truths*—to illuminate the complex inter-dependencies which regulate the *Struggle for Life* on earth—Baldacchino said, “*I wish we were recording your lectures...*”

Solving Island Problems with Island Solutions

27 January 2009

Yesterday my lecture ‘on Method’ commenced with the circulation of the previous page, a news release from that morning’s edition of *The Guardian*, and I politely requested that all present read it before we set off, noting that we would conclude our talk by considering it in light of my talk.

While my gracious attendees were busy reading, I spread out a dozen books and papers before me, face-down and open to the pages which I had planned to weave into the narrative I had been arranging in my mind for several days.

Baldacchino is gifted with Promethean vision, pays attention to detail, and, true to these qualities, had brought along the copy of *In Search of a Better World* (1) which I had given him as a gift last year, and had inscribed a note on the title page, suggesting that the first three pages captured the essence of life and scientific method, alike; he remarked that he agreed with this conjecture and passed the book around the class. Baldacchino’s thoughtfulness accompanied my introduction quite well, as I began by stating,

The central idea I should like to present in this talk may be expressed in the following way.

The natural as well as the social sciences always start from *problems*, from the fact that something inspires *amazement* in us, as the Greek philosophers used to say. To solve these problems, the sciences use fundamentally the same method that common sense employs, the method of *trial and error*. To be more precise, it is the method of *trying out* solutions to our problems and then discarding the false ones as erroneous. This method assumes that we

* In science, a mistake we make – an error – consists essentially in our regarding as true a theory that is not true... to combat the mistake, the error, means therefore to search for objective truth and to do everything possible to discover and eliminate falsehoods. This is the task of scientific activity. Hence we can say: our aim as scientists is objective truth; more truth, more interesting truth, more intelligible truth. We cannot reasonably aim at certainty. Once we realize that human knowledge is fallible, we realize also that we can *never* be *completely certain* that we have not made a mistake (1:4).

work with a large number of *experimental* solutions. One solution after another is put to the test and eliminated.

At bottom, this procedure seems to be the only logical one. It is also the procedure that a lower organism, even a single-cell amoeba, uses when trying to solve a problem. In this case we speak of testing movements through which the organism tries to rid itself of a troublesome problem. Higher organisms are able to *learn* through trial and error how a certain problem should be solved. We may say that they too make testing movements – mental testings – and that to learn is essentially to try out one testing movement after another until one is found that solves the problem. We might compare the animal's successful solution to an *expectation* and hence to a *hypothesis* or a *theory*. For the animal's behaviour shows us that it expects (perhaps unconsciously or dispositionally) that in a similar case the same testing movements will again solve the problem in question (2:1)

These words were read from the transcript of a talk given on North German Radio (NDR) on 7 March 1972, published on the first page of *All Life is Problem Solving* (2), Popper's sequel to *In Search of a Better World* (1).

I further remarked that these two slim volumes, Popper's clear, concentrated, distillations and reflections on his long, fruitful journey, may represent the two best introductions to 'Scientific Methods,' and though this may be true, I will further note that I dedicated a full year studying the collected works of Karl Popper (and his intellectual brother, F.A. von Hayek), and, as Henry Miller knew well,* there are no shortcuts: a comprehensive review of these considerable works (addressed in due course) may represent the only true path.

The second two points I'd like to offer are (i) an expansion upon a element within the previous point, and (ii) to offer a notable discovery regarding *The Tragedy of the Commons*, as this great tragedy is particularly germane to this thesis. The point I would like to expand upon is the critical role correction-of-error plays in scientific discovery.

Following this methods guest lecture, I recognized that I had made an error, and though I had set-off to write an email to Baldacchino and his class, calling the error to their attention; however, not long after sitting down to offer my written apology and correction-of-error, I recognized that the error and related problem I had identified was significant enough to warrant a thorough exploration (and thus this appendix). Therefore, I must also apologize to Baldacchino *et. al.* for the delay in this offering. Also, though this point is not especially complex, we must spin a fair yarn, so I will offer an abstract for the remainder of this appendix...

* In this age, which believes that there is a short cut to everything, the greatest lesson to be learned is that the most difficult way is, in the long run, the easiest (3:12 ; cf. 4).

PRÉCIS

Garrett Hardin's 1968 *Tragedy of the Commons* remains one of the most frequently cited works in most research communities, but this wide-spread acceptance presents a hereto undetected problem: Hardin 1968 is not a *single* theory, but rather four (4) major theories in a dark and stormy sea of auxiliary conjecture. Hardin's central thesis—the theory presented first and foremost—is his restatement of Oxford economist W.F. Lloyd's 1832 original problem statement: *The Tragedy of the Commons*. Hardin offers a strong defense for this useful, illustrative, conceptual tool—as have thousands of problem-solvers who have followed his footsteps for the past forty years. However, Hardin *also* forwards three *other* significant theories in this work—two of which may be readily defended, but the third, however, is readily falsified and refuted. In five short pages, Hardin also erected a myriad of minor conjectures upon small, scenic, sandy patches of theoretical shoreline which have subsisted into the sea. This creates a special problem for thousands of writers who have, and who continue to issue unlimited “Hardin 1968” citations (without limiting the theoretical range) without carefully considering the logical implications of their citation. We investigate this problem and offer two solutions: Lloyd 1832 and Stewart 1925. In closing, we also offer a brief abstract of our evolutionary stable solutions to Hardin's *Population Problem* (which we discover was not in fact a problem after all) and, moreover, to *The Problem of Sustainable Economic Development*.

As noted, this discovery began as I sat down to write an email, which I have preserved in it's original, unsent form:

Hi Godfrey,

Thanks again for inviting me in for our discussion on Monday night, I really enjoyed it, appreciated my attentive and gracious audience, and I hope to see you all again soon!

And, thanks to you and our round-table discussion, I've also discovered that I made a mistake. Please consider forwarding this email to your class, because (i) I would like to offer a correction, and (ii) because I believe it may help solidify a point I made at the outset: If you'll recall, at the beginning of my talk I remarked that my presentation itself was in fact part of my *Method* - my approach to problem solving, was essentially a process of *trial and error*. A bit more specifically, I can roughly identify six methodical steps associated with the delivery of my presentation: (i) Weighing the trials & tribulations associated with communicating my theories in the past, (ii) considering and planning my presentation, (iii) Delivering my talk (which, of course, is invariably different from iii for innumerable reasons), (iv), listing carefully to all comments, questions, criticisms, & praise, (v), attempting to detect any errors which may have occurred in stages these first five steps, (vi) attempt to correct those errors, and finally (vii), reporting any errors and, hopefully, any solutions I might find.*

And thus, I accept the responsibility of communicating my error and a more it to you and your class. And in this

* Oppenheimer certainly concurred with (vii), and I might at that *The Open Mind* represents another great, concise gem *On Methods* I most highly recommend.

case, since it relates to statements I made regarding *The Tragedy of the Commons*, it seems especially important, as I left with the sense that several students may be integrating this foundational concept into their own research endeavours. Before offering my correction, however, I should briefly attempt to re-emphasize the critical role *error* plays in the process, that it is not, as Popper suggested and many Nobel Laureates have agreed, something to hide from, but rather to rejoice: *the elimination of error serves as an indication that we're getting closer to the truth.*

In our discussion you made some excellent points and regarding *truth* and *knowledge*, and as I had emphasized the role *correction-of-error* plays in our search for truth, it may prove helpful to frame these abstract concepts within one concrete definition:

Knowledge consists in the search for truth—the search for objectively true, explanatory theories... It is not the search for certainty. To err is human. All human knowledge is fallible and therefore uncertain. It follows that we must distinguish sharply between truth and certainty.

That to err is human means not only that we must constantly struggle against error, but also that, even when we have taken the greatest care, we cannot be completely certain that we have not made a mistake.

In science, a mistake we make—an error—consists essentially in our regarding as true a theory that is not true... to combat the mistake, the error, means therefore to search for objective truth and to do everything possible to discover and eliminate falsehoods. This is the task of scientific activity. Hence we can say: our aim as scientists is objective truth; more truth, more interesting truth, more intelligible truth. We cannot reasonably aim at certainty. Once we realize that human knowledge is fallible, we realize also that we can never be completely certain that we have not made a mistake (1:4).

Now, I'll attempt to relate how I recognized my error. Although I have only recognized one significant error, several minor regrets come to mind which I'll mention first. First, in general, I noticed that, as I read key statements from a few of the books which I had brought along, recommended various texts and papers, and quoted other passages, titles, and dates from my questionable memory, several students were busy writing it down—I should have brought along copies of a selected bibliography which would have made this unnecessary. Also, looking back, it seems my attempt to bring *The Problem of Induction* (cf. *GLOSSARY*) into what was already a fairly complex presentation may have been a mistake, as there wasn't time to address it adequately, and, thus, it seems possible that I offered more confusion than illumination on this important topic. Alas, there is little I'm able to offer you all on this point other than an apology, an open offer to discuss it at another time, and to re-recommend (1) and (2) and, perhaps for those interested in an in-depth exploration, his magnum opus and original, detailed, revolutionary solution to this problem in *The Logic of Scientific Discovery* (5). I might also add that, since we have been recently graced by the presence of a rare black swan,* the present offers an opportune time in which to

* Thank you Mr. Chairman and members of the Committee.

begin to explore, and, most importantly, to grasp the true nature of this problem.

Otherwise, however, our discussion sat fairly well with me; that is, until I began to reply to an email yesterday: Colin had written to say thanks for passing along Popper's final response from his *Spiegel Verlag* interview in 1992, and tell me that he kindly planned to attend my *International Development Week* talk on Monday [10]. And, as I had thought of him (and even mentioned him in my talk, as you may recall) on Monday night when I recommended a great *Tragedy* paper (6) to your class, I began to reply as follows:

You're a good man, Colin, thanks! I'll look forward to seeing you there - it would be great to catch up!

How has your research been coming along? Did I ever send you Stewart's 1925 *A Land Policy for the Public Domain* [6]?

If not, you've got to check him out, because I think of your PEI historical narrative whenever it comes to my mind or I recommend it to someone. The article was from the premier issue of *Economic Geography*; it essentially offers a visual (the black and white photos are excellent) historical documentary of *The Tragedy of the Commons* as it played out on the rangelands of the American West.

I know that I've told this story before, but, although the tragedy was popularized by Hardin in 1968 [7], it was first theorized by Oxford economist W.F. Lloyd in 1832 [8]. I think Lloyd's contribution is very important to recognize and emphasize, because, as I noted my *Methods* guest-lecture on Monday, in 1832 the problem was still essentially theoretical (and it was still relatively unknown in 1925, when Stewart wrote his excellent piece). And although Hardin may be credited for broadcasting the pervasive nature of this problem, by the time he had written his work in 1968, Carson's *Silent Spring* (1962) had been out for over three years, and the problem of land degradation was already a very popular topic. Hardin and a few others since (most do not bother and/or do not seem to be aware of Lloyd's work, despite the fact that Hardin always credited Lloyd) have cited this work as '1833,' but I need to clarify this point in the APA style guide - Lloyd's lectures were delivered in 1832, but the paper wasn't published until 1833 - I'm not sure which dates to use....

But, as I was about to add a point about "*Hardin's solution*," something you [Baldacchino] said during my presentation on Monday began to weigh on me; as you may have noticed, *one of your comments had conflicted with one of my comments*.

When you and I simultaneously commented upon "*Hardin's controversial solution*," we each said two very different things: If, you may recall, you said, "population control," as I said, "privatization." If my sensory perception serves me faithfully, we looked at one another for a curious, perhaps even slightly awkward moment, then I moved on by relating Hardin's position on privatization.

Although I was generally familiar with Hardin's positions on population control, I simply—and quite erroneously—concluded that you had confused (7) with another paper.

The salient feature of the current financial crisis is that it was not caused by some external shock like OPEC raising the price of oil or a particular country or financial institution defaulting. The crisis was generated by the financial system itself. This fact—that the defect was inherent in the system—contradicts the prevailing theory, which holds that financial markets tend toward equilibrium and that deviations from the equilibrium either occur in a random manner or are caused by some sudden external event to which markets have difficulty adjusting. The severity and amplitude of the crisis provides convincing evidence that there is something fundamentally wrong with this prevailing theory and with the approach to market regulation that has gone with it. To understand what has happened, and what should be done to avoid such a catastrophic crisis in the future, will require a new way of thinking about how markets work (9:1).

But, as I was writing my reply to Colin (above), and about to convey another point about ‘Hardin's solution,’ your comment began to weigh on me. So, I did the only responsible thing a researcher can do at this juncture and I re-read (7).

As I began to read, I was relieved to discover that I was correct.

But as I read on, *I became shocked to discover that I was also incorrect!*

And as pressed on, thinking through the logical implications which this misunderstanding represents, I recognized that a may have identified a rather significant problem: *Hardin 1968 and/or The Tragedy of the Commons is an inherently flawed theory with unlimited potential to represent very different things to different people!*

The problem, as I was very surprised to discover under cursory examination, is that Hardin 1968 tables four (iv) major theories in one paper: One theory describes the problem (*The Tragedy of the Commons*), and three conjectures offer solutions. Two of these solutions relate to privatization, but the third does in fact table population control a the *most* tenable solution to *The Tragedy of the Commons*—which I have clearly falsified (6): The problem is that one, all, or any combination of these theories may be true or false, but they are invariably cited as one theory.

This may seem like a trivial matter, but the implications are significant. (7) remains one of the single-most influential (and most heavily cited) papers across the so-called ‘social’ and biological sciences. I have several dozen ‘Tragedy’ papers (several of which have become fairly influential in their own right) which address this problem from various angles and perspectives, and, when I reviewed them again to put this problem into perspective, I discovered that most merely cite *The Tragedy of the Commons*/Hardin 1968, but several define the “Tragedy” and it is *fairly* clear from the context in *most* of these articles that the writers *intend* to cite one of Hardin's four theories, (his description of the problem) but it is most often not completely clear, and, moreover, they have all unintentionally created a source of unnecessary and readily avoided confusion: As we try to understand problems and develop our solutions it is important that we develop crystal clear pictures of our problems, firm grasps upon our conceptual tools, and 'concrete' definitions (as Ayn Rand often said in her excellent lectures on writing) for all the terms that we utilize in our thoughts, speech, and our writings.

As you may have noted, all of my working papers feature a *GLOSSARY* with two quotations placed rather conspicuously at the over the entry-way to my glossaries (cf. *GLOSSARY*); thus, with this critical problem and much-needed solution in mind, please allow me to offer a correction of my error, an error committed by failing to state clearly my assumptions regarding *The Tragedy of the Commons* and Hardin 1968. I'll do so by briefly noting all four (iv) of Hardin's

theories.

The first theory, the theory I suggest most intend to imply in reference to *The Tragedy of the Commons* and/or

“Hardin 1968,” is his theoretical description of W. F. Lloyd's promethean problem statement of 1832 (8):

[i] Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy. As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, “What is the utility to me of adding one more animal to my herd?” This utility has one negative and one positive component.

a) The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.

b) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of -1.

Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons (7:1444).

And here Hardin calls forth several credible witnesses to offer unimpeachable testimony:

It is not mathematically possible to maximize for two (or more) variables at the same time. This was clearly stated by von Neumann and Morgenstern, but the principle is implicit in the theory of partial differential equations, dating back at least to D'Alembert (1717–1783). (7:1443).

The second theory is Hardin's first proposed solution: *privatization*.

[ii] What shall we do? . . . We might sell [the commons] off as private property (7:1444).

And, although at first glance this following three sentences may merely appear to offer support and description for

[ii], above, but, much to our horror, if we read carefully, we discover that Hardin fired off four more mini-theories in a

Mac-10 burst:

[iii] We must admit that our legal system of private property [iv] plus inheritance is unjust—but [v] we put up with it because [vi] we are not convinced, at the moment, that anyone has invented a better system. [vii] The alternative of the commons is too horrifying to contemplate. [viii] Injustice is preferable to total ruin (7:1448).

Indeed, if you read carefully, you'll find this five page pager is loaded with pot-shot-theories which, though we are all certainly free to table as many as we'd like, they typically require more than a half or whole sentence to substantiate.

Here's another example:

[ix] The laws of our society follow the pattern of ancient ethics, and therefore are poorly suited to governing a

complex, crowded, changeable world (7:1445).

Indeed, I stopped counting at this point, there are not doubt many more, but I believe I've illustrated my point—you're getting more (or, more accurately, *much less*) than you've likely bargained for by citing "Hardin 1968." This is exactly why Popper argued that the more simple a theory is, the more descriptive power it holds.

Perhaps Hardin's tenth theory (though we've stopped trying to count them all, we'll note a few more) offers is what I have classified as his second major theory, which offers an important defense for solution [ii] and, moreover, clarifies the simple mechanism which lends [ii] evolutionary stability:

[xi] The morality of bank-robbing is particularly easy to understand because we accept complete prohibition of this activity. We are willing to say "Thou shalt not rob banks," without providing for exceptions. But temperance also can be created by coercion. Taxing is a good coercive device. To keep downtown shoppers temperate in their use of parking space we introduce parking meters for short periods, and traffic fines for longer ones. We need not actually forbid a citizen to park as long as he wants to; we need merely make it increasingly expensive for him to do so. Not prohibition, but carefully biased options are what we offer him. A Madison Avenue man might call this persuasion; I prefer the greater candor of the word coercion. Coercion is a dirty word to most liberals now, but it need not forever be so. As with the four-letter words, its dirtiness can be cleansed away by exposure to the light, by saying it over and over without apology or embarrassment. To many, the word coercion implies arbitrary decisions of distant and irresponsible bureaucrats; but this is not a necessary part of its meaning (7:1447).

Here Hardin offers more poignant commentary on the *Tragedy*, and consider how his argument offers support for my Theory of Value based upon Relative Insularity, which I outlined Monday night (10):

Perhaps the simplest summary of this analysis of problems is this: the commons, if justifiable at all, is justifiable only under conditions of low-population density. As the human population has increased, the commons has had to be abandoned in one aspect after another. First we abandoned the commons in food gathering, enclosing farm land and restricting pastures and hunting and fishing areas. These restrictions are still not complete throughout the world. Somewhat later we saw that the commons as a place for waste disposal would also have to be abandoned. Restrictions on the disposal of domestic sewage are widely accepted in the Western world; we are still struggling to close the commons to pollution by automobiles, factories, insecticide sprayers, fertilizing operations, and atomic energy installations.

In a still more embryonic state is our recognition of the evils of the commons in matters of pleasure. There is almost no restriction on the propagation of sound waves in the public medium. The shopping public is assaulted with mindless music, without its consent. Our government is paying out billions of dollars to create supersonic transport which will disturb 50,000 people for every one person who is whisked from coast to coast 3 hours faster. Advertisers muddy the airwaves of radio and television and pollute the view of travelers. We are a long way from outlawing the commons in matters of pleasure. Is this because our Puritan inheritance makes us view pleasure as something of a sin, and pain (that is, the pollution of advertising) as the sign of virtue? Every new enclosure of the commons involves the infringement of somebody's personal liberty. Infringements made in the distant past are accepted because no contemporary complains of a loss. It is the newly proposed infringements that we vigorously oppose; cries of 'rights' and 'freedom' fill the air. But what does "freedom" mean?

When men mutually agreed to pass laws against robbing, mankind became more free, not less so. Individuals locked into the logic of the commons are free only to bring on universal ruin once they see the necessity of mutual coercion, they become free to pursue other goals. I believe it was Hegel who said, 'Freedom is the recognition of necessity' (7:1448).

Here's another D-flawless diamond Hardin unearths, which, I suggest, illuminates Einstein's commentary on *The Problem of Induction*: Recall that I related that Einstein once said, "Man has a crush desire for certainty, that's why Hume's message is [or perhaps 'was,' that comes, once again from memory] so crushing."

Here's Hardin's rendition of the same insight (and yes, no matter how self-evident it may appear, it represents in yet another theory):

[xii] In our day (though not in earlier times) technical solutions are always welcome. Because of previous failures in prophecy, it takes courage to assert that a desired technical solution is not possible(7:1443).

Up to this point, my theoretical findings, if you compare the positions I presented in my paper and my introductory commentaries upon my discoveries on Mustique, Prince Edward Island, and Iceland, are perfectly aligned and are confirmed by and offer confirmation for (7). My great error, however, is my failure to recall that Hardin had tabled on more very significant theory in this paper which my Theory of Value, by the way, single-handedly falsifies and refutes (this point being quite irrelevant to my current argument however, which is simply that Hardin tabled more theories than one).

Here's his third major theory (the thirteenth I've counted thus far):

[xiii] We can make little progress in working toward optimum population size until we explicitly exorcize the spirit of Adam Smith in the field of practical demography. In economic affairs, *The Wealth of Nations* (1776) popularized the "invisible hand," the idea that an individual who "intends only his own gain," is, as it were, "led by an invisible hand to promote . . . the public interest". Adam Smith did not assert that this was invariably true, and perhaps neither did any of his followers. But he contributed to a dominant tendency of thought that has ever since interfered with positive action based on rational analysis, namely, the tendency to assume that decisions reached individually will, in fact, be the best decisions for an entire society. If this assumption is correct it justifies the continuance of our present policy of laissez-faire in reproduction. If it is correct we can assume that men will control their individual fecundity so as to produce the optimum population.

To couple the concept of freedom to breed with the belief that everyone born has an equal right to the commons is to lock the world into a tragic course of action. Unfortunately this is just the course of action that is being pursued by the United Nations. In late 1967, some 30 nations agreed to the following: The Universal Declaration of Human Rights describes the family as the natural and fundamental unit of society. It follows that any choice and decision with regard to the size of the family must irrevocably rest with the family itself, and cannot be made by anyone else.

Yes, he's quite emphatic about [xiii]:

The most important aspect of necessity that we must now recognize, is the necessity of abandoning the commons in breeding. No technical solution can rescue us from the misery of overpopulation. Freedom to breed will bring ruin to all (7:1445).

And:

The optimum population is, then, less than the maximum. The difficulty of defining the optimum is enormous; so far as I know, no one has seriously tackled this problem. Reaching an acceptable and stable solution will surely require more than one generation of hard analytical work—and much persuasion (7:1443).

If you review... [6], you may discover my findings do not agree with [xii], Hardin 1968's third major theory, for which I thank you wholeheartedly for bringing to my attention. Considering the fact that I've been utilizing this theoretical tool for so long, it is somewhat embarrassing to realize the egregious nature of this mistake.

Though this should have been clear long ago, and for a far more significant reason, the most honest, scholarly solution is simply not to reference Hardin 1968 at all, but rather to cite the proper source for *The Tragedy of the Commons*: (8) (by the way, I did refer to the APA style guide, and have thus determined that Hardin's reference to (8) is inaccurate, as Lloyd's paper, though published by Oxford University Press in 1833, was presented at Oxford in two lectures in 1832. For proper citation, see Lloyd 1832). I should qualify this solution however: If your intention is in fact to cite all 14+ theories tabled in (7), then, by all means, perhaps that's what you're looking for after all.

However, it seems to me that there may be another, secondary, practical option. As Oppenheimer noted, since scientists tend to be teachers, too, (6) has much to offer for teachers and students, alike. My position on this second solution is certainly not as strong nor as well-founded as my first—I suppose what I'm really trying to do is bring this excellent, seemingly forgotten work to your attention.

And finally, I'll leave you with the answer to a question which Hardin quite clearly could not see, but I suspect now, that you may all be able to see:

Has any cultural group solved this practical problem at the present time, even on an intuitive level? One simple fact proves that none has: there is no prosperous population in the world today that has, and has had for some time, a growth rate of zero. Any people that has intuitively identified its optimum point will soon reach it, after which its growth rate becomes and remains zero (7:1444).

Yes, there is such a group who have solved this problem at the 'intuitive' and the 'practical' level, and, as my research shows, they live (or, perhaps more accurately, own second homes) on the island of Mustique. Furthermore, if you review the paper which I sent to you last week (*cf. ENCLOSURE*) you may conclude that perhaps I have in fact offered a theoretical solution to this problem.

Hardin failed to recognize two things, one of which seems inexcusable, the other for which we may offer a pardon. His first failure was a failure to recognize one of the most elementary principles of evolutionary theory, the *Principle of Superabundance*. Since (11) had clearly intuited this principle in 1798 and Darwin had clearly detailed it in 1859, it seems difficult to comprehend how a biologist failed to recognize this in 1968. The other failure, however, his inability to grasp

The Law Which Regulates the Introduction of New Species, is understandable, since I was not even born until 1968, and had not tabled my *Principle of Relative Insularity* until 2009!

Yes, (7) is collection of disparate theories—a few of which strike the bull's-eye, several of which miss the entire target—and I am grateful to you for bringing this elusive problem to my attention. I hope this letter clarifies any confusion I may have caused with my generous audience, and, moreover, offers a clear solution. If you have any questions or if I may be of assistance in your research endeavours, feel free to drop me a line.

Yours very truly....Matt Funk

1. Popper K (1994) *In Search of a Better World* (Routledge, London).
2. Popper K (1999) *All Life is Problem Solving* (Routledge, London).
3. Miller H (1957) *The Books in My Life* (New Directions, New York).
4. Llobera M, Sluckin, (2007) Zigzagging: theoretical insights on climbing strategies. *Journal of Theoretical Biology* 249:206-217.
5. Popper K (1959) *The Logic of Scientific Discovery* (Routledge, London).
6. Stewart G (1925) A Land Policy for the Public Domain. *Economic Geography* 1:89-106.
7. Hardin G (1968) [The Tragedy of the Commons](#). *Science* 162:1243-1248.
8. Lloyd W (1832) *Two lectures on the checks to population*. Reprinted in (1980) *Population and Development Review* 6.
9. Soros G (2008) *Statements of George Soros before the U.S. House of Representatives Committee on Oversight and Government Reform, 13 November 2008* (House of Representatives, Washington).
10. Funk M (2009) *On the Extinction of Species by Means of Insularity Lost, or The Law Which Regulates the Struggle for Life: Lessons from Mustique*. International Development Week presentation. 2 February 2009, 1:30 PM, Atlantic Veterinary College, Lecture Theatre A (UPEI, Charlottetown).
11. Malthus T (1798) [An Essay on the Principle of Population](#) (Johnson, London).

APPENDIX VIII

A THUNDERBOLT FOR A WEAPON

[A story] is told of a young prince who had just completed his military studies under a world-renowned teacher. Having received, as a symbol of his distinction, the title Prince Five Weapons, he accepted the five weapons that his teacher gave him, bowed, and, armed with the new weapons, struck out onto the road leading to the city of his father, the king. On the way he came to a certain forest. People at the mouth of the forest warned him. 'Sir prince, do not enter this forest,' they said, 'an ogre lives here, named Sticky-hair; he kills every man he sees.'

But the prince was confident and fearless as a maned lion. He entered the forest just the same. When he reached the heart of it, the ogre showed himself. The ogre had increased his stature to the height of a palm tree; he had created for himself a head as big as a summer house with bell-shaped pinnacle, eyes as big as alms bowls, two tusks as big as giant bulbs or buds; he had the beak of a hawk; his belly was covered with blotches; his hands and feet were dark green. 'Where are you going?' he demanded. 'Halt! You are my prey!'

Prince Five Weapons answered without fear, but with great confidence in the arts and crafts that he had learned. 'Ogre,' said he, 'I knew what I was about when I entered this forest. You would do well to be careful about attacking me; for with an arrow steeped in poison will I pierce your flesh and fell you on the spot!'

Having thus threatened the ogre, the young prince fitted to his bow an arrow steeped in deadly poison and let fly. It stuck right in the ogre's hair. Then he let fly, one after another, fifty arrows. All stuck right to the ogre's hair. The ogre shook off every one of those arrows, letting them fall right at his feet, and approached the young prince.

Prince Five Weapons threatened the ogre a second time, and drawing his sword, delivered a masterly blow. The sword, thirty-three inches long, stuck right to the ogre's hair. Then the prince smote him with a spear. That also stuck right to his hair. Perceiving that the spear had stuck, he smote him with a club. That also stuck right to his hair.

When he saw that the club had stuck, he said: 'Master ogre, you have never heard of me before. I am Prince Five Weapons. When I entered this forest infested by you, I took no account of bows and suchlike weapons; when I entered this forest, I took account only of myself. Now I am going to beat you and pound you into powder and dust!' Having thus made known his determination, with a yell he struck the ogre with his right hand. His hand stuck right to the ogre's hair. He struck him with his left hand. That also stuck. He struck him with his right foot. That also stuck. He struck him with his left foot. That also stuck. Thought he: 'I will beat you with my head and pound you into powder and dust!' He struck him with his head. That also stuck right to the ogre's hair.

Prince Five Weapons, snared five times, stuck fast in five places, dangled from the ogre's body. But for all that, he was unafraid, undaunted. As for the ogre, he thought: 'This is some lion of a man, some man of noble birth--no mere man! For although he has been caught by an ogre like me, he appears neither to tremble nor to quake! In all the time I have harried this road, I have never seen a single man to match him! Why, pray, is he not afraid?' Not daring to eat him, he asked: 'Youth, why are you not afraid? Why are you not terrified with the fear of death?'

'Ogre, why should I be afraid? for in one life one death is absolutely certain. What's more, I have in my belly a thunderbolt for weapon. If you eat me, you will not be able to digest that weapon. It will tear your insides into tatters and fragments and will kill you. In that case we'll both perish. That's why I'm not afraid!'

Prince Five Weapons, the reader must know, was referring to the Weapon of Knowledge that was within him....

'What this youth says is true,' thought the ogre, terrified with the fear of death. 'From the body of this lion of a man, my stomach would not be able to digest a fragment of flesh even so small as a kidney bean. I'll let him go!'

And he let Prince Five Weapons go (1:85-88).

1. Campbell J (1949) *The Hero with a Thousand Faces* (Bollingen Foundation, Princeton).

APPENDIX IX
ON THE PROBLEM OF HEAD-ON COLLISIONS

----- Original Message -----

Subject: On the Problem of Head-on Collisions*

Date: Wed, 24 Dec 2008 06:31:58 -0400

From: Matt Funk <matt@funkisland.org>

To: My loving Wife on Christmas Eve

Heavy stuff, baby: they're closing the 90 year-old assembly-line our Suburban rolled off last year in Janesville, Wisconsin, a small-town half way between Kentland and Lake Gogebic (see article [3], below). But fear not: although the road ahead will be considerable for many, opportunities may be considerable for those who grasp the value of relative insularity ;).

I also really like the first photograph in this piece – the American spirit remains strong! xoxoxoxo Matt

PS: [3] also highlights a counter-intuitive, silver lining: recall that choosing an automobile represents a classical case of the *Prisoner's Dilemma* [4] – that, although you may choose to drive a small, fuel efficient car, you cannot ‘communicate’, much less ‘control’ the other ‘prisoners’ (including, for example, the intoxicated driver swerving back and forth over the double-yellow, screaming at you at 100 mph from the opposite direction). Thus, alas, the rational solution to this Prisoner’s Dilemma– like all such dilemmas – is not the ‘best’ possible solution: ESS = the most mass, structural integrity, and tertiary safety features you’re able to afford (in our case, 6,000 lbs on a fully-boxed frame, air bags, traction control, *etc.*). Moreover, with fewer SUV’s on the road, the probability of our survival is thereby enhanced further yet, as we’re more likely to tangle with an intoxicated ecologist in a Prius (Google ‘Al Gore’s son Prius’ for more on that ironic note) than another SUV. Remember, NHSTA star ratings are based upon 30 mph collisions with a wall which is incredibly misleading: When was the last time you opened the paper to discover that four people were killed when their slow moving vehicle crossed the center-line and hit a brick wall? When a fully loaded, 80,000 lb. 18-wheeler hits a Smart Car head-on, it doesn’t ‘feel’ like a brick-wall to either driver: it feels like a sea-foam to the trucker and an asteroid impact to the ‘smart’ guy. *Ceteris paribus* (*i.e.* airbags, ABS, traction control, halogen lights, *On-Star*, head’s-up radio controls, *etc.*). Vehicle selection is more a matter of Newtonian physics than home economics or ‘environmentalism’, since millions of years of hominid evolution have produced a phenotype maladapted for travel at rates of velocity >20 mph (running like hell and to catch something to eat or running like hell from the jaws of a lion); our skinny necks offer little insufficient support in the event of rapid cerebral deceleration.

When I was sixteen or seventeen, before I knew anything of evolution or the theory of games (it was in fact a time in which I knew very close to nothing), Dad took Dan and I on a road-trip through the Appalachians in a custom Prevost bus he had just bought, and early in our tour, as we were cruising through Nashville, sitting drinking Cokes around the kitchen table when something suddenly occurred to me: “Jesus, Dad,” I said, “there are no seatbelts in here!” Dad swirled the ice cubes around in the drink in his hand (we had a driver behind the wheel), gazed down the street which we were headed, pointed to a car stopped at a traffic light at an intersection ahead and said, “See that car?”

I nodded—yeah.

“Well,” he said, “if that car pulls out in front of us, we won’t even spill our drinks.”

That, is relative insularity in motion—that also suggests how relative insularity is attained through RHP (\$)!

1. Levitt S, Porter J (2001) How Dangerous Are Drinking Drivers? *Journal of Political Economy* 109:1198–1237.
2. Hagen E, Hammerstein P (2006) Game Theory and Human Evolution *Theoretical Population Biology* 69: 339-348.
3. Bunkley N, Vlasic B (2008) Nearly the End of the Line for SUV’s. *The New York Times*. December 23, 2008.
4. Tucker A (1950) [A two*person dilemma](#) (Stanford).

* (a) The irrational plea to drive small, lightweight, fuel-efficient cars is an excellent example of *ideological environmentalism* gone awry, and it’s effects are especially malignant, given the mismatch effect (see *b*, below). The environmentalist creed asks that you surrender your will-to-survive for the ‘common good’. Traffic accidents represent the number one killer for North Americans between the ages of 3 and 34.

(b) Mismatch phenomena are well documented. The neurotoxins of many spiders and snakes, for example, were a real danger to ancestral humans, as well as our distant primate ancestors. Now, however, they kill less than 20 people a year in the US (virtually all of whom were owners of dangerous spiders and snakes), whereas automobile accidents kill about 40–50,000 people a year [1]... Yet decades of research have shown that fear of spiders and snakes is more readily learned than fear of contemporary dangers like automobiles..., a clear example of a mismatch. More generally, mismatches are successfully exploited by many large industries, including advertising and entertainment (2:342).

**APPENDIX X
RECOMMENDATION?**



CERTIFICATE OF RECOMMENDATION
For Election to Fellowship of the Linnean Society of London

This recommendation must be signed by one or more Fellows personally acquainted with the Candidate or his work, or by Officers of the Society. The full name of the Candidate, with the usual style of address, and place of residence, must be given, with any relevant qualifications, including degrees and the universities at which they were obtained. This is a permanent record so please print clearly.

Title and Full Name: *Matthew William Funk*

Date of Birth: *13 August 1968*

Qualifications: *A deep interest in Natural History, truth, problem solving, & survival; BS, MFA, MA.*

Profession and Position: *Naturalist, guest-lecturer, Department of Island Studies, The University of Prince Edward Island*

Address: *465 University Avenue, No. 21021, Charlottetown, PE, C1A-9H6, Canada, matt@funkisland.org, http://www.funkisland.org, attached to the study of Natural History of Mustique, Iceland, Hawaii, and other relatively insular bio-geo-polittico-economic 'islands,' (and where applicable the precise field of current research)*

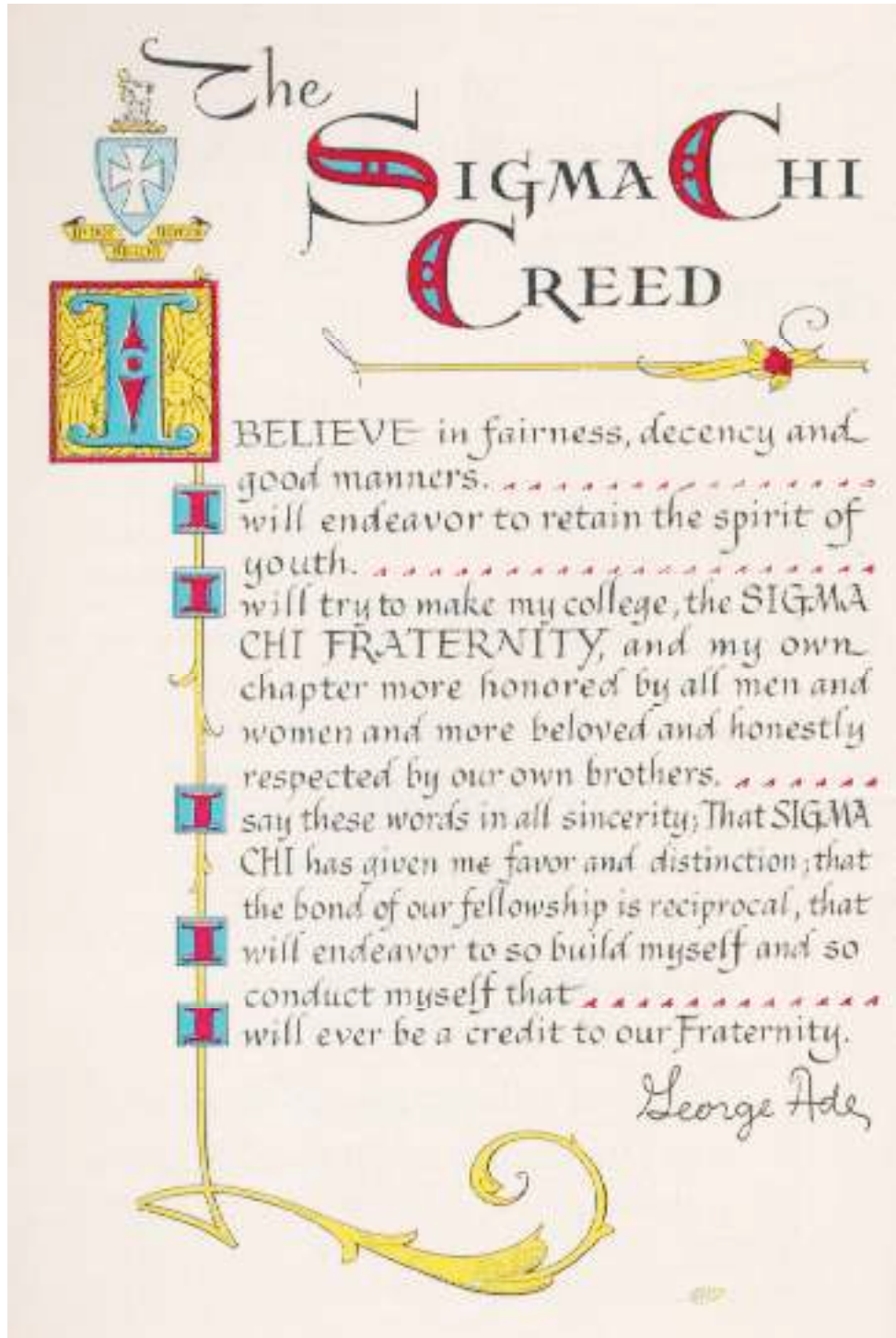
especially - - through comparative study - - as they clearly illustrate the evolutionary stable strategy for sustainable economic development and, thus, ultimately, offer to help foster human survival,

being desirous of becoming a Fellow of THE LINNEAN SOCIETY OF LONDON, those whose names are undersigned, beg leave to recommend h__ to that Honour

Name	Signature

This Certificate was received on _____
The Ballot will take place on the _____ day of _____

APPENDIX XI
ON THE BOND OF FELLOWSHIP



1. Ade G (1887) *The Sigma Chi Creed* (Sigma Chi, Lafayette).

APPENDIX XII

FELLOWSHIP



THE LINNEAN SOCIETY OF LONDON
FOUNDED 1788

for the Cultivation of the Science of Natural History in all its branches

MATTHEW WILLIAM FUNK

I have the honour to inform you that at a Meeting of the Society held yesterday you were elected a Fellow of The Linnean Society of London in accordance with the Charters and Bye-Laws.

Executive Secretary

20th March 2009