



Munich Personal RePEc Archive

**On the Truly Noncooperative Game of  
Island Life II: Evolutionary Stable  
Economic Development Strategy in Brief**

Funk, Matt

The Linnean Society of London

13 August 2009

Online at <https://mpra.ub.uni-muenchen.de/16771/>  
MPRA Paper No. 16771, posted 13 Aug 2009 15:02 UTC

# *On the Truly Noncooperative Game of Island Life II:*

*Evolutionary Stable Economic Development Strategy in Brief*

13 August 2009

*The Author's Birthday*

© Funk 2009

## **Author:**

Matt Funk,<sup>†\*\*</sup> Fellow

The Linnean Society of London<sup>††</sup>

*Naturae Discere Mores*

---

† 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.

\*\* Correspondence: [matt@funkisland.org](mailto:matt@funkisland.org)

†† Burlington House, Piccadilly, London W1J 0BF, United Kingdom

## PRÉCIS

This paper 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*

## On the Problem of Island Life

This short discourse presents an abridgement of an open letter to The Linnean Society of London (1), sent 12 February of 2009 (*cf.* 2); a critical and germane game-theoretical finding (3) was enclosed therein. (1) offers an exhaustive exploration of the problem and solution at hand, including a contextual introduction, a dozen in-depth appendices, a cornucopia of discursive and expansive footnotes, and a handy glossary. Please refer to this source for a more detailed and in-depth review of the theory presented herewith. (4) offers a supplementary glossary which may also prove useful.

## An the Nonexistence of Subject Matters (*cf.* 5)

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 (6:327-330).

Indeed, this trend has led to spectacular failures and deeply entrenched problems ranging from the maladaptive contrivance of the 'social sciences' (7) to the

*Transformative Hermeneutics of Quantum Gravity* (8, *cf.* 9-12). Although Sir Karl Popper, F.A. von Hayek 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 (13:682)?

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. Birds are a part of 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 quite clear since 1859. When gray wolves (*Canis lupus*) or the wild dogs of Africa (*Lycan 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 and/or EEZ, for example), the analogy eludes us more often than not.

Though I am a citizen of the United States of America and a member of *The American Society of Naturalists*, in light of the fact that the two island-based research papers which influenced this theoretical development the most were fruits of the Linnean Society of London, Burlington House seemed to offer the most appropriate address for this communiqué. Although I need not comment upon the first paper (14), I suspect the content and significance of the second may remain largely unknown.

Given the scope of our endeavour, we must cover much ground in little time, and thus, as noted in a letter (15) delivered (16) to the inhabitants of the Åland islands last summer:

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*, 17), and (iii) thus these islands are *relatively valuable* (15).

### 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 a principle which has regulated life on earth for the past 4.5 billion years, 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 is won and lost through the deployment or failure to deploy *evolutionary stable strategies*, to gain and maintain *relative insularity* with *Resource Holding Power*.

Although it may be ideal to consider the term ‘relative insularity’ at length – alas, this brief communiqué is not the proper forum, thus I must merely remark that ‘insulated’ represents our touchstone of choice insofar as ‘insularity’ is concerned, 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” (18:368). I must also offer a quick 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 (19:171).

Yes, “insularity is normally considered to be economically disadvantageous” (20:195). But we shall soundly refute and falsify this widely held à-priori assumption. This task is not difficult to accomplish on the evolutionary front; thus

our 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 (cf. 21).

(15) attempted to illustrate the dominant role relative insularity has played in the natural histories of many of the islands I value the 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.

(15) chronicled the unearthing of a treasure, a paper (22) 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*. I opened this treasure-chest (22), 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-DAVIE, WEEKS, FORESTIER-WALKER & BOR, 1970. *Mustique: proposals for a development study*. Unpubl. Rep.

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.

### In Search of the Unity of Nature

Since ‘all things living are in search of a better world’ (23), 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, a ‘little world in itself’ capable of modelling the ‘unity of nature’ on the big island we refer to as ‘Earth’; I soon recognized that I had no choice but to set sail for the torrid zone:

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 (6:23-27).

Yes, I did explore. And yes, I did eventually find it (24 ; cf. 1). Moreover, as I have implied, I found much more.

### 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*) and 'Relatively Insular States' (*RIS*); 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. Although (1) defines both *GEMS* and *RIS*, in this brief abstract we'll simply 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 explorations 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<sub>R</sub>)

*RIS = Survival* → +(I<sub>R</sub>)

*Universe = ?*

HOW IS THE OBJECTIVE ATTAINED?

*GEMS = RHP*

*RIS = RHP*

*Universe = ?*

WHAT STRATEGIES ARE AVAILABLE?

*S*<sub>1</sub>: *Maximum Economic Development (MED)*

*S*<sub>2</sub>: *Maximum Ecological Preservation (MEP)*

ESS?

*RIS = Maximum Ecological Preservation (MEP)*

*GEMS = Maximum Economic Development (MED)*

For the time being, please tentatively accept that survival is attained by '→ +(I<sub>R</sub>)', an indirect proof of *The Principle of Relative Insularity* (and our theory of value based upon relative insularity); these arguments are extensive, necessarily exhaustive, and beyond the scope of this abstract. However, to make a very long argument very short, *Value (V)* is a *derivative function (f')* of *relative insularity (I<sub>R</sub>)*, ⇒ V = f'(I<sub>R</sub>), and this, in a nutshell is why our objective is: '→ +(I<sub>R</sub>)'

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 (15-16), roughly sketched here, and detailed in (1), perhaps the most revelatory feature of sub-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*:  $\rightarrow + (I_R)$ .

For example, when *RIS* employ *GEMS ESS*, as they invariably have and continue to do, 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  $\rightarrow - (I_R)$ .

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* is not our focus here, I will briefly remark that, although human survival 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 (*cf.* 3).

### 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 (25:155).

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*. 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 (*cf.* 26).

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:

<i>Strategy</i>	<i>Short- Term Payoff</i>	<i>Long- Term Payoff</i>
<i>MED</i>	<i>\$-Rich / Land-Poor</i>	<i>\$-Poor / Land-Poor</i>
<i>MEP</i>	<i>Land-Rich / \$-Poor</i>	<i>Land Rich / \$-Rich</i>

Table 1: ‘Island’ Economic Development Strategy Payoff Matrix

Although (25)'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* → +(I<sub>R</sub>)

*Invader = Survival* → +(I<sub>R</sub>)

#### HOW IS OUR OBJECTIVE ATTAINED?

*Islander = RHP*

*Invader = RHP*

#### WHAT STRATEGIES ARE AVAILABLE?

S<sub>1</sub>: *Maximum Economic Development (MED)*

S<sub>2</sub>: *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 ≈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 (3). "The distinction between bounded and unbounded delay supergames is theoretically important," (27:202); 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," (27:224), and as detailed in (3), ≈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 ≈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" (27:202); 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 (28 ; *cf.* 29).

Our games are 'asymmetric' (*cf.* 30-31) 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* (*cf.* 1), 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* (*cf.* 1).

One final — yet crucial — pre-game announcement is that, *ceteris paribus*, 'islanders' wield a *natural* 'home-court' advantage over 'invaders' (*cf.* 31).

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, readers may refer to (31) 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 20<sup>th</sup> & 21<sup>st</sup> 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.* 32) 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’” (33:2294).

However, with one significant exception (industrial agricultural production, *cf.* 6, *Axiom V*), 20<sup>th</sup> & 21<sup>st</sup> 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.*, 34) have led many to believe (though it is perhaps more dire in many regards which they have failed to detect: *cf.* 1).

### 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* (*cf.* 1), in contradistinction to *The Mustique Co. Development Plan* (*cf.* 1), offers an extraordinary comparative study. Prince Edward Island 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*.

(35) 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 (*cf.* 15 ; 36-37).

PEI Premier Ghiz had assured his fellow islanders throughout the ten-year process that the province would defer to 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**” (35:6).

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’ (38:72-73).

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’ (38:76).

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 straight on Cape Breton Island had long-since began to "associate the Causeway with decimating industrial activity and, as a result, reducing populations" (38:73).

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 hanging 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 (38:81).

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 (35). 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.* 15 ; 36-37), it is not surprising that several – if not most – of the aspects relating to this collapse have eluded analysis, 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. 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 poorest water quality, poorest economy, poorest populace, and highest cancer rates in Canada. 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.'

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. Thus, the irony is that the islanders are poisoning themselves and – to add insult to injury – losing money while they're at it. At least Albertans are making \$ from the oilsands.

But this snapshot, released 22 April 2009, really says it all:

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 (39).

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' (40:A6).

Two weeks later (and exactly one year ago today, by the way), on your Author's 40<sup>th</sup> Birthday, *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 (41:A7).

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

*Because the poor, alas, deviate more (cf. 42).*

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*.

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 (43: 82).

It seemed to yours truly 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 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* (cf. 1) represents my on-going search for a quantitative solution.

(15) concluded that, 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!

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 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* (44 ; cf. 1). 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 [44] 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 (15).

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*.

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. 45), Barbados (of which, more to follow), and, in fact *most* Caribbean islands (cf. 18:98-100) 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.

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 big island of Hawaii is naturally well endowed—in fact *The Funk-Carlquist Formula* (cf. 1) 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* (46, cf. 47), 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% of all arable land) was under the *private stewardship* of Parker Ranch from the mid-19<sup>th</sup> 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” (48:2). Thus *SVG* offers one of the finest laboratory for a relatively controlled, comparative island study of sustainable economic development.

*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 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, their plan *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 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  $\approx 100,000$  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.’

### **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” (49). 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* (50) brings the human agency 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 (51:426).

Cold water islands – such as the Faroes and Lofoten – 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, and his most 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 I have previously demonstrated (3), 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 (44). 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 ( $\approx 1\text{MM}$  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.

Several recent investigations offer various degrees of support to our central thesis: comparative studies on Cape Breton Island, Honeymoon, Caladesi, & Anclote, Swedin and two curious little gems in the St. Lawrence River, Ile d’Orleans and Ile aux Coudres (*cf.* 1), all testify – offering various degrees of support – to the value of relative insularity, and, moreover, support this hypothesis: *RIS ESS=MEP*.

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 2/3<sup>rd</sup>’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 reflect back upon Table 1.

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 ( $\$2\text{MM USD/undeveloped acre}$  and approximately  $\$20\text{MM USD/home}$ ). 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.* 52-53), and that is exactly what Ted Turner (*cf.* 54) 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, interconnected 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.* 55:3).

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 (56:39).

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" (56:39, cf. 57). 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.

But 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 on many islands (such as Mustique, Molokai, Roque, North Haven, and on over two million acres of Ted Turner's 'island' ranches).

In all cases—be it managing a ranch or a small island's natural resources – the tools, considerations, and mechanisms are straightforward and largely the same: (i) *Carrying-Capacity*, (ii) *Gradualism*, (iii) *Optimum Habitat Condition* (58), and (iv) *RHP*.

However, despite the escalating din of ideological environmentalist, as clearly demonstrated in (1), (59-60) were both correct, the evolutionary stable economic development strategy for *GEMS* ≠ *MEP*—but we'll save that thought for another day.

"This sketch is most imperfect; but in so short a space I cannot make it better. Your imagination must fill up very wide blanks" (14:6).

- Funk M (2009) *On the Truly Noncooperative Game of Island Life: Introducing a Unified Theory of Value & Evolutionary Stable Strategy*. A Masters Thesis (Univ of Prince Edward Island, Charlottetown).
- Mullen W (2009) 1 Birthday, but 2 Incredible Lives: Influence of Charles Darwin, Abraham Lincoln Strong as their Bicentennial Nears. *The Chicago Tribune*. Sunday, 8 February 2009. Section 2.
- Funk M (2009) [On the Truly Noncooperative Game of Life on Earth: In Search of the Unity of Nature & Evolutionary Stable Strategy](#). Announced in *NEP: Resource Economics* 2009-08-08, and *NEP: Cognitive & Behavioural Economics* 2009-08-08 (MPRA: Munich).
- Funk M (2008) [On the Problem of Vague Terms: A Glossary of Clearly Stated Assumptions & Careful, Patient, Descriptions](#) (MPRA: Munich).
- Popper K (1983) *Realism and the Aim of Science* (Routledge, London).
- Helferich G (2004) *Humboldt's Cosmos: Alexander von Humboldt and the Latin American Journey that Changed the Way We See the World* (Gotham, New York).
- Schabas M (2005) *The Natural Origins of Economics* 2007 Ed (Univ of Chicago Press, Chicago).
- Sokal A (1996) [Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity](#). *Social Text* 46:217-252.
- Sokal A (1996) [A Physicist Experiments with Cultural studies](#) (NYU, New York).
- Sokal A (1996) [Transgressing the Boundaries: An Afterword](#). *Dissent* 43:93-99.
- Sokal A (2008) *Beyond the Hoax: Science, Philosophy, and Culture* (Oxford Univ Press, New York).
- Rowbottom D, Aiston S (2006) The Myth of 'Scientific Method' in Contemporary Educational Research. *Journal of Philosophy of Education* 40:137-156.
- Hardin G (1998) [Extensions of "The Tragedy of the Commons."](#) *Science* 280: 682-683.
- Darwin C, Wallace A (1858) [The Darwin-Wallace Paper](#). By Charles Darwin, Esq., FRS, FLS, & FGS, and Alfred Wallace, Esq. Communicated by Sir Charles Lyell, FRS, FLS, and J.D. Hooker, Esq., ... FLS, &c. The Darwin-Wallace paper was read before the Linnean Society July 1<sup>st</sup> 1858 and published in *Proceedings* Vol 3 1858. pp 45-62. In the original paper as published by the Linnean Society: Pages 45-46 consists of a letter of introduction by Charles Lyell and Joseph D. Hooker. Pages 46-50 consists of an Extract from an unpublished Work on Species, by C. Darwin, Esq., consisting of a portion of a Chapter entitled, *On the Variation of Organic Beings in a state of Nature; on the Natural Means of Selection; on the Comparison of Domestic Races and true Species*. Pages 50-53 consists of an Abstract of a Letter from C. Darwin, Esq., to Prof. Asa Gray, Boston, U.S., September 5<sup>th</sup> 1857. Pages 53-62 consists of the manuscript *On the Tendency of Varieties to depart indefinitely from the Original Type* By Alfred Russel Wallace (This latter known as *The Ternate Paper of 1858*).
- 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).
- 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).
- Demetrius L, Ziehe M (1984) The measurement of darwinian fitness in human populations. *Proc of the Royal Soc of London B* 222:33-50.
- Biagini E, Hoyle B, eds., (1999) *Insularity and Development: International Perspectives on Islands* (Pinter, London).
- Kostopoulou S (1999) *Transport Network Access Degrees of Insularity*. In Biagini E, Hoyle B, eds., *Insularity and Development: International Perspectives on Islands* (Pinter, London).

20. Pinder D, Edwards J (1999) *Island Locations and Economic Advantage: the Case of UK Energy Systems*. In Biagini E, Hoyle B, eds., *Insularity and Development: International Perspectives on Islands* (Pinter, London).
21. Hayek F (1974) [Banquet Speech](#) (Nobel Foundation, Stockholm).
22. Goldsmith F (1973) The Ecologist's Role in Development for Tourism. *Bio J Linn Soc* 5:265-287.
23. Popper K (1994) *In Search of a Better World* (Routledge, London).
24. Llewelyn-Davies, et al. (1970) *Mustique Development Plan* (The Mustique Co., Mustique).
25. Dommen E, Hein P, eds. (1985) *States, Microstates and Islands* (Croom Helm, London).
26. Russell P (1993) *Constitutional Edyssey: Can Canadians Become a Sovereign People*. 2<sup>nd</sup> Ed, revised and updated to cover the making and breaking of the Charlottetown Accord (Univ of Toronto Press, Toronto).
27. Selten R (1994) [Multistage Game Models and Delay Supergames](#) (Nobel Foundation, Stockholm).
28. Lincoln A (1863) The Gettysburg Address. 19 November 1863 (Library of Congress, Washington).
29. Barton W (1930) *Lincoln at Gettysburg: What He Intended to Say; What he Said; What He Was Reported to Have Said; What He Wished He Had Said* First Ed, Union League Club library (Bobbs-Merrill, Indianapolis).
30. Selten R (1980) A Note on Evolutionarily Stable Strategies in Asymmetric Animal Conflicts. *J Theor Biol* 84:93-101.
31. Maynard Smith J (1982) *Evolution and the Theory of Games* (Cambridge Univ Press, New York).
32. Baldacchino G (2006) Warm versus Cold Water Island Tourism: A Review of Policy Implications. *Island Studies J* 1:183-200.
33. Milinski, M et al. (2008) [The Collective-Risk Social Dilemma and the Prevention of Simulated Dangerous Climate Change](#). *Proc Natl Acad Sci USA* 105:2291-2294.
34. Gore A (2006) *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It* (Rodale, New York).
35. Begley L (1993) *Crossing that Bridge: A Critical Look at the PEI Fixed Link* (Ragweed, Charlottetown).
36. Funk M (2007) [On the Problem of Breathing, Eating, & Drinking Poison—An Introduction to Problem Solving, Nobility of Purpose under Adverse Circumstances, and the Search for Truth with Karl Popper](#). Announced in *NEP: Cognitive & Behavioural Economics* 2009-04-14, and *NEP: History & Philosophy of Economics* 2009-04-13 (MPRA: Munich).
37. Baldacchino G, Funk M (2008) *A Search for a Measure of the Quality of Life on Prince Edward Island: An Inter-Provincial 'Cost of Living' Inquiry* (MPRA, Munich).
38. Hunter M, Corbin C (2007) 'Built for Going Away' : The Canso Causeway Epic, in Three Acts: 67-84. In Baldacchino G, eds., *Bridging Islands: The Impact of Fixed Links* (Acorn Press, Charlottetown).
39. Huff D (2009) [Corporate Knights magazine releases Canada's first Green Provincial Report Card... BC claims title as Greenest Province; Ontario is #2; Nunavut is #3; PEI pulls up the rear; Alberta edges out Quebec](#) (Corporate Knights, Toronto).
40. MacDougall G (2008) Minding the canary in the mine. *The Guardian* August 2.
41. Schneider G (2007) We need action now to address nitrate problem. *The Guardian* June 6.
42. Beaulier S, Caplan B (2007) Behavioral Economics and Perverse Effects of the Welfare State. *Kyklos* 60:485-507.
43. Weale D (1991) Islandness. *Island Journal*, Maine, Island Institute, 8:81-82.
44. Stigler G (1982) [The Process and Progress of Economics](#). *J of Pol Econ* 91:529-545.
45. Richardson, B. (1975). The Over-development of Carriacou. *Geographical Review*, 65:390-399
46. Treverton G, Jones S (2005) [Measuring National Power](#) (RAND, Santa Monica).
47. Mearsheimer J (2001) *The Tragedy of Great Power Politics* (Norton, New York).
48. 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).
49. CIA (2009) *World Factbook* (Central Intelligence Agency, Langley).
50. Funk, M (2008) *The Funk Line*. Funkisland.org (Youtube.com).
51. Wallace A (1881) *Island Life* 1892 Ed (Macmillan, London).
52. Neff J (2006) *Katahdin: An Historic Journey* (AMC Books, Boston).
53. Silliker B (2002) *Saving Maine: An Album of Conservation Success Stories* (Down East Books, Camden).
54. Turner T (2008) *Call Me Ted* (Grand Central, New York).
55. Fielding R (2005) *Islandness, Fixed-Links, and Tourism Along Florida's Gulf Coast*. A Master's Thesis (Univ of Montana, Missoula).
56. Day G, ed. (2009) *Roque Island. Blue Water Sailing* 39.
57. Taft H, et al. (2002) *A Cruising Guide to the Maine Coast*. 4th Ed. (Diamond Pass, Peaks Island).
58. Bailey D (2005) Identification and Creation of Optimum Habitat Conditions for Livestock. *Rangeland Ecology & Management* 58:109-118.
59. Smith A (1776) [An Inquiry into the Nature and Causes of the Wealth of Nations](#) (Strahan & Cadell, London).
60. Hayek F (1960) *The Constitution of Liberty* (Routledge, London).