I will not cease from mental fight,
Nor shall my sword sleep in my hand
Till we have built Jerusalem
In England's green and pleasant land.

- William Blake
This is a version of the submission for the Wolfson Prize of 2014 from Andrés Duany, Paul Roberts and Professor Emily Talen. In an analogy with the Standard Model often cited by economists, this paper argues that the Garden City was conceived by Howard to be the Standard Model of human settlement. It rejects and re-interprets criticism of existing garden cities. The authors write that “All Standard Models should be understood as proposing a paradigm. In fact Howard’s own two implemented Garden Cities of Letchworth and Welwyn deviate from his Standard Model. But instead of being a disgrace of the concept … they should be understood through measurable deviations. It has been a grave strategic error to interpret their shortcomings as the signal to move on to across-the-board experimentation, which in retrospect has become a litany of disappointment...”
This paper remarks upon the extraordinary persistence of Howard’s Garden City idea. It proposes that this is a result of its being the golden mean of all positive urban and rural traits—such is the underlying logic of the "Three Magnets" diagram. That it is therefore impossible to avoid.

The paper suggests that the loss of confidence by (and in) the planning profession is the result of the permanent disappointment in the post-war New Towns Program. It then proposes that the bureaucratic processes created to control a mistrusted profession have become intractable impediments leading to a drastic shortage of housing.

As an alternative, the paper proposes that Howard's Garden City be deployed as a Standard Model from which all proposals could be measured by deviation from it. This might restore the standing of the planning profession which would then be associated with an explicit paradigm rather than with the failures.

A complete system of assessment requires technical instruments. What are the traits of the community, where it should be located, who is in control, and when should it achieve benchmarks? These questions, and others, throw new light on Howard’s diagrams, revealing that he had been engaged by them—if only on a preliminary basis.
This paper completes and updates Howard's technology and then tests it on six diverse communities, all in Hertfordshire. Two of them are cities of ancient foundation, two of them Garden Cities, and two of them post-war New Towns. Surprisingly their performance is more similar than would be imagined. The system that determines these differences might be recalibrated in the future to have a more polemical impact, but its results suggest that there is something else making a difference between the human experiences of St. Albans, Letchworth, and Stevenage. That is found in Howard's "designer," Raymond Unwin, in the 1909 book Town Planning in Practice. As a case study, this was tested in the transformation of Stevenage, with remarkable results.

Note that this publication requires the reading of the text and also the captions, as they do not overlap. The reading time of the entire book is designed to be less than two hours.
As the trappings of science further permeate all levels of power, the humanities no less than the technical fields have been compelled to establish rationalized protocols. Private investment and public funding recognize advantage insofar as analysis and proof can be supplied. Today, one is not surprised to find numerical tables associated to such humanities as linguistics and anthropology. One might even argue that the current high standing of ecology is a result of its commitment to metrics as well as to phenomenological description.

The field of urban planning that concerns this paper has long been committed to metrics at least since the rebuilding of Paris by Haussmann (1851-71)—and lately supercharged by statistical trolling, graphically presented by means of GIS (Geographic Information System).

But the increased commitment to quantitative analysis has not been commensurate with the success rate of recent planning efforts. Indeed, in the popular mind the proliferation of data has catalyzed a skepticism of expertise, a symptom of which is the institutionalization of "bottom up" planning.
This backlash may be a consequence of the raw data being dissociated from an authoritative paradigm. In the field of urban planning, the *City Upon the Hill* or the *Jerusalem* of ancient reference is no longer acceptable. With personal expression and relativism rampant, such a determination of virtue would be considered oppressive by all concerned—not excluding the "expert" in charge of "the process." As an example, at the Harvard Graduate School of Design, they teach "all the urbanisms," including suburban sprawl and the glass towers of Arabia. This absence of commitment has further emasculated the planning profession—its confidence already debilitated by the epic disappointment of the New Towns Program. Today any participant in a "public process" can make any statement and it would likely place the professional planner on the defensive. All propositions have equal standing in the absence of a paradigm.

In support of this hypothesis there is the interesting case of another profession that has not lost standing: the Dismal Science. This is the field of Economics, which retains credibility in the world's affairs (its anointed sages the only nerds in the known universe having star status *ex officio*). Economics is especially interesting because the errors of its predictions do not affect its leverage to correct the results. A premise of this paper is that the basis of this resilience is the deployment of the concept of a Standard Model. Economics’ Standard Model is the equivalent of the *City Upon the Hill* for urban planning. It is the paradigm from which deviations can be measured.

In the Standard Model, unemployment is calculated as deviating from the ideal of, say, 4.5%; the national debt as deviating from the ideal of, say, three times the GDP; the ideal growth rate to be maintained at, say, 3.5% *per annum* and inflation at, say, 2.1%, etc. When things go wrong (as in the recent Great Recession) the same kind of sage who was responsible
is called in to repair the problem. Their credibility is intact, as economists are assessed by their Standard Model and not by the distance from it, which constitutes the periodic recessions.

The economic profession’s enduring clout derives from their paradigm. The absence of an equivalent paradigm has crippled the planning profession, in spite of planners’ increasing ability. The Standard Model would provide the rigorous standards for evaluation, and the protocols for correction that planners need to reclaim authority.

If large-scale urbanism is to ever be implemented again in Britain, it will not be by a profession associated with open-ended questioning or with constantly starting anew—it must be one associated with ability to clearly describe what ought to be.

This paper proposes that Ebenezer Howard’s theoretical conception of the Garden City can provide such a Standard Model—indeed that it was conceived to be the Standard Model henceforth and everywhere. And furthermore, that the unique durability of the Garden City within a fickle discourse can best be understood not as an unattainable Platonic ideal but as an Aristotelian parametric discourse. The English sensibilities of virtue and reasonableness (so perfectly embodied in Howard’s person) should imprint themselves on the planning profession.

Indeed, nothing else about the Garden City, and especially not the personality of Howard himself, could explain the persistence of the concept. There are, after all, Garden Cities worldwide that proliferate beyond the reaches of Howard’s rhetoric—a sort of proof of its universality (see 1.1).

Howard’s theoretical Garden City could break through the current English impasse.

The key to the paradigm resides in the Three Magnets drawing (see 1.5). This, possibly the most famous diagram in
the field of urban planning (the equivalent of Serlio’s plate of the five classical orders), summarizes the positives and the negatives of the City and the Country and then the exclusively positive qualities of the Garden City. It is an exquisite paradox that the City Upon the Hill is achieved through compromise. What this Standard Model puts forth in this and his other diagrams is an equilibrium of the fundamental variables of urbanism—from the regional scale to the scale of architecture.

At the regional scale, a greenbelt and an urbanized area balance; an independent satellite town is dependent on the central city; the area for agriculture is adequate to feed the resident population; jobs are socioeconomically balanced with housing stock; governance comprises a participatory democracy, as well as top-down management; ownership is private with socialized appreciation of property value; transportation meets needs for both individual locomotion and public transport; shops are individually owned but centrally managed. Even the overall economic strategy is a hybrid, involving a public benefit company that would nevertheless guarantee a return to the investors. In fact, the only substantial void in this paradigm is its inattention to the balance of energy production and consumption and the recycling of the water—all of which have come to the fore as concerns only recently.

These variables are provisionally illustrated on an updated "magnet" (see 1.6).

The basis of this theory is Howard's paradigm of the Garden City, as opposed to the Garden City as implemented. All Standard Models, even reasonable English ones, are unattainable. Even Howard's own two implemented Garden Cities—Letchworth and Welwyn—by some measures deviate from the Standard Model. Indeed, there has been a great
deal of discussion in the planning literature on how these fell short. But instead of disgracing the Garden City concept and ultimately leaving the planning profession without a compass, they should be understood as deviations. It has been a grave strategic error to abandon this model *tout court* because of partial failure. Economics, in contrast, does not blight itself by engaging in the proper study of its manifest and manifold failures.

A standard protocol could inaugurate an analysis of Letchworth and Welwyn through their deviation from the Standard Model. It is also possible to take one of the more notorious New Towns, say Stevenage (which is in proximity to the Garden Cities), and subject it to the same analytical protocol. One might well be surprised at its performance in certain areas. This would be contrasted by an analysis of the kind of suburban sprawl supplied by conventional developers today: those housing estates and office parks all segregated from shopping centers. These would undoubtedly manifest a higher degree of deviation from the Standard Model—but they are not to be categorically discarded, as something about them is good enough that “the people choose” them. Such a rational analysis might reduce the demonizations that render the current debate so confusing to the public.

It would also be possible to execute a comparative study of some older cities such as St. Albans (also in Herts). In fact, in Herts alone one could compare Stevenage and Hemel Hempstead New Towns; Letchworth and Welwyn Garden Cities; and St. Albans and Harpenden as highly-regarded traditional cities. These results could then be assimilated objectively into the knowledge base of the profession, restoring its discourse as something other than a sequence inspired visions and failed experiments.
Such an undertaking must bring forth additional, more "scientific" filters for the assessment, all based on updates of Howard's family of diagrams. One would be Subsidiarity: "who" decides, so that the important variable of power can be compared. Is a community enabled top-down like Stevenage; or bottom-up like, say, Harpenden was? Another filter would be based on Patrick Geddes' Transect, probably the second most famous diagram in planning. "Where" is this proposition located? A settlement in the rural hinterlands cannot be held to the standards of one in proximity to a metropolitan center. Then there is the matter of Succession: "When" can a settlement 100 years old be compared to one of 10 years since its inauguration? Who is to say that Stevenage will not one day become like the West End? And, if not, we need to know why. After all, London began as a series of shantytowns and was able to evolve into the capital of a commercial and cultural empire. Will Letchworth or Stevenage become so?

The Standard Model posited by Howard as the "What" is updated as a General Theory of Urbanism by the additional filters of Transect, Succession and Subsidiarity: "Where," "When," and "Who." And yet another must ultimately be engaged: the “Why”, the ethical argument, which brings up the possible virtue of equilibrium: neither less, nor more, than necessary—which, today seems the deep structure of the ecological imperative.

NOTE: Howard’s Garden City is Aristotelian in two ways. The first is the distinction made in the Poetics, between the way things are, or could be, and the way they ought to be. The way things ought to be implies a paradigm, and the Garden City is clearly a paradigm: it is a proposal for what urbanism ought to be "tomorrow". This is contrasted to the deficien-
cies of the way things are (were) in the town or the country "today". The last distinction—the way things could be—has become threatening in ways unknown to Howard. A fascination for what could be has led to the privileging of artistic exploration, which has thoroughly confused the field of urban planning. While the subjectivity of the artist (the self-expression) may be warranted at the scale of architecture, it should never be justified in the field of urbanism, where failures have adversely affected too many for too long.

The second Aristotelian definition, made in the *Ethics*, is that of virtue as the position between the deficiency and the excess of a trait. This is not conceived as an average, but as an equilibrium. Indeed, Howard's Garden City paradigm is defined as an equilibrium obtaining the positive traits of both the country and the city.

Also in the *Ethics*, virtue is manifested in the action of doing the right thing, at the right time, in the right way. These Aristotelian conceptions permeate the ideas of Howard, forming the basis of the General Theory of Urbanism. They are the opposite of all Platonic conceptions, particularly those derived from Le Corbusier's Ville Radieuse, with its high-rises in the park. This concept is newly refurbished, but density does not urbanism make.
1.1 THE PERSISTENCE: The recent omnibus on the Garden City by Robert A.M. Stern documents 954 garden cities in 34 countries. (Stern is a man who does not waste his time on trivial pursuits.) There has been nothing like the Garden City idea in history; neither the Roman nor the British nor the Mormon Empires equal this performance. Apart from the sheer quantity, the cross-cultural acceptance of the Garden City supports it as a basis for a general theory of urbanism.
1.2 THE SOURCE: One of the early editions of a book that has rarely been out of print—and never out of mind. The Garden City here proposed has been at the heart of the planning discourse for over a century. One may be for it or against it, but it is impossible to ignore. No other urban planning concept has been so present. Today with the coalition government’s designation of three new Garden Cities, Howard’s concept should be updated.
1.3 HOWARD’S STANDARD MODEL: This diagram deploys the principal traits as polemic. There is the urbanised area, with some minimal but logical differentiation within. There is a hard-edge transition to a surrounding greenbelt—which is also differentiated. There is the diversity of transportation. There is a notional urban area of 1,000 acres with a population of 32,000 persons, which would be supplied by a surrounding agricultural area of 5,000 acres. Such metrics, especially today, establish credibility in the political realm. This diagram established numerical equilibrium as urban virtue.
1.4 THE MAN: Ebenezer Howard, whose personality permeates the theoretical conception of the Garden City (implementation was left to others). Note the equilibrium of the pose, the repose of the visage, and the perfect symmetry of the hands. This is the standard model of the English Gentleman, calm equilibrium in all things being a virtue.
1.5 THE THREE MAGNETS: This is the most important of Ebenezer Howard’s famous diagrams. The metaphor of magnets (“The People: Where Will They Go?”) sets out traits (both good and bad) for the “Town” and the “Country”, and then the selection of the best traits of each for “Town-Country” which is the Garden City. The variables that Howard deploys are full of meaning, if less than taxonomically consistent; but not all of them are current concerns.
1.6A THE THREE MAGNETS: A detail of the Town-Country magnet—the theoretical Garden City. The coordination of the positive traits of the city and country magnets requires the reconciliation of opposites. The general intention of achieving equilibrium as a paradigm may be gleaned from the text of Howard’s book, such as the agricultural land being sufficient to feed the population. The nine variables newly proposed (1.6B) are derived not from this magnet, but from the writings in Garden Cities of Tomorrow, and also from the implementation of the actual Garden Cities of Letchworth and Welwyn.

To establish a truly comparative protocol, to the “What” of the Town-Country must be added the “Where” by means of the Transect and the “When” of Succession; as well as the “Who” of Subsidiarity and the “How” of diversity. These five protocols form the basis of the General Theory of Urbanism.
1.6B GENERAL THEORY: WHAT  

The paradigm of the Garden City determines the principal constituent elements of urbanism, providing the “What.” There are nine traits (others may be added). Howard’s polemical triad is eliminated, as neither “Town” nor “Country” today manifests intrinsically negative characteristics—only suburban sprawl does. Retained is Howard’s proposition of an equilibrium of the opposing elements.

In the Standard Model the deviation from this equilibrium can be measured for purposes of analysis and projective design or policy (see 2.2-2.5). This permits an implemented garden city such as Welwyn to be compared with a contemporary builder’s housing estate, or an ancient county seat, or a New Town.
1.7A REGIONAL DIAGRAM (ABOVE)
Howard's diagram shows the regional model: satellite cities distant, but dependent on the central city, separated by country and connected by rail. Notably, the Garden Cities are conceived as dependent on each other for completion.

1.7AA THE ORIGINAL TRANSECT (BELOW)
About the time of Howard's book, Patrick Geddes drew his famous "Valley Section", a generic transect taken from a ridgeline to shoreline — what today would be called a "watershed". This is the first transect that associates natural conditions with human presence.
1.7B GENERAL THEORY: WHERE A modern Regional Plan requires a more complete declension of urban types than Howard’s simplistic dichotomy of “Central City” and “Garden City” in dialectic relationship with “Country.” Evolving scientific and political circumstances require ethical or perhaps “scientific” criteria for the placement of the urban types. Locational criteria are provided in this diagram—which may not be as alien to Howard’s as it might seem from the graphics. The principal difference is that criteria (provided by GIS) are both social and environmental. (See also 4.1.)
1.8A SECTION & CENTRE OF THE GARDEN CITY: This is the most detailed drawing of Howard’s urban conception, including even the street widths. It is, alas, not the work of someone with a decent sense of design. For that, Unwin is to be consulted (see 6.1A). Although many of Howard’s concerns are trivial or unrealistic—such a crystal palace and a repeated exedrae of shops—the plan does contain important ideas, such as subdivision into wards (a.k.a. neighbourhoods) and a notion of differentiation from edge to center. This has been filtered through Geddes (see 1.7AA) to become the modern Transect: a taxonomic device that can place into useful order all the component elements of urban design.
1.8B GENERAL THEORY:
WHERE The Modern Transect is an update of Geddes. It technically integrates all traits of urbanism. (See the Transect as a taxonomic engine in www.transect.org.) It is particularly useful in assessment at the most abstract level in environmental theory, as shown in application 4.1. It also provides the basis for the spatial allocation of elements as in the Urban Design Compendium (see 6.1B) and the American SmartCode (see smartcodecentral.org).

<table>
<thead>
<tr>
<th>WHERE: URBAN TRANSECT</th>
</tr>
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<tbody>
<tr>
<td><strong>T-6 Urban Core Zone</strong> consists of the highest density and height, with the greatest variety of uses, and civic buildings of regional importance. It may have larger blocks; streets have steady street tree planting and buildings are set close to wide sidewalks. Typically only large towns and cities have an Urban Core Zone.</td>
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<tr>
<td><strong>T-5 Urban Center Zone</strong> consists of higher density mixed use building that accommodate retail, offices, rowhouses and apartments. It has a tight network of streets, with wide sidewalks, steady street tree planting and buildings set close to the sidewalks.</td>
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<tr>
<td><strong>T-4 General Urban Zone</strong> consists of a mixed use but primarily residential urban fabric. It may have a wide range of building types: single, sideyard, and rowhouses. Setbacks and landscaping are variable. Streets with curbs and sidewalks define medium-sized blocks.</td>
</tr>
<tr>
<td><strong>T-3 Sub-Urban Zone</strong> consists of low density residential areas, adjacent to higher zones that some mixed use. Home occupations and outbuildings are allowed. Planting is naturalistic and setbacks are relatively deep. Blocks may be large and the roads irregular to accommodate natural conditions.</td>
</tr>
<tr>
<td><strong>T-2 Rural Zone</strong> consists of sparsely settled lands in open or cultivated states. These include woodland, agricultural land, grassland, and irrigable desert. Typical buildings are farmhouses, agricultural buildings, cabins, and villas.</td>
</tr>
<tr>
<td><strong>T-1 Natural Zone</strong> consists of lands approximating or reverting to a wilderness condition, including lands unsuitable for settlement due to topography, hydrology or vegetation.</td>
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ILLUSTRATIONS: UPDATING THE MODEL

1.9A YESTERDAY, TO-DAY, TO-MORROW:
Howard’s polemical diagram implies a timeline for reform, which is at the heart of the Garden City as a movement. While evolutionary progress is implied, this is not about urban Succession but a depiction of a generalized conceptual progress. Howard shows the dismal world of Yesterday (satanic pollution everywhere urban), the imperfect world of Today (clean suburbs, yet commuting to still-polluted urban workplaces), and a Tomorrow consisting entirely of a “sun-drenched” Garden City. It can today be assumed (in the West at least) that local industrial poison is not an issue (Amen). The problem is now the global crisis of climate change. Since climate change is propelled by transportation emissions, the interpretation of "progress" under the new circumstances is that as the urbanism matures, it becomes denser, more complex, and thereby walkable. Succession, which has been intrinsic to urbanism, can no longer be taken for granted. Regulatory, political and financial protocols assure that urbanism remains at the inaugural condition of a low-density, single-function housing estate.
1.9B GENERAL THEORY: WHEN Succession is in the suite of a General Theory of Urbanism. Most cities were inaugurated in circumstances similar to those of a current shantytown. Over time the original site—most often retaining the same transportation thoroughfare structure—moults and moults again, until achieving a sort of climax condition (upon which a call for heritage status might emerge). Without factoring the stages of Succession, it is not possible to compare a new town of 30 years’ standing with a city that is 300 years old. That would ignore the crucial element of time, which, no less than scale and diversity, is a component of urbanism. True urbanism (London is the world-class example) is able to evolve, while a suburban housing estate cannot. Welwyn could evolve—somewhat. It is essential to establish expectations of evolution as part of the assessment protocol.
1.10A THE MASTER KEY: The Master Key is an unpublished diagram where Howard explores in a very preliminary manner the management structure necessary to build and subsequently govern a Garden City. Unfortunately, the categories that appear on the metaphorical Key are a taxonomic hodgepodge. Governance was eventually resolved at Letchworth and Welwyn as a combination of top-down management and bottom-up democracy—typical of Howard’s Standard Model.

This original democracy/management equilibrium was eliminated when the two Garden Cities were assimilated into the top-down regime of the post-war New Towns program.
1.10B GENERAL THEORY: WHO  In the field of urbanism, management is the software that activates the hardware of design. Letchworth, which was induced by a committee of amateurs, cannot be compared to the Viceregal authority that created New Delhi, and neither can it be compared to the countercultural collective that generated Findhorn in Scotland—all three being Howard’s progeny.

Subsidiarity is one of the assessment tools of the General Theory. There are implications when decisions are made by an authority in a single design campaign, or when they are made sequentially and by disparate groups. The theory of Subsidiarity analyses the appropriate level for decision-making.

Note: Subsidiarity proposes that a decision is best made by the smallest competent group, at the most local level and at the latest practical moment. This diagram hypothesizes that groups qualified to make decisions can be convened by the level of the city and county. The vertical line is the "barrel" of Howard’s diagram.
1.11A SITE PLANNING: This famous diagram by Raymond Unwin engages housing density, infrastructure and open space provision. It accompanied an influential essay, “Nothing Gained By Overcrowding”, proposing a formula regarding costs of each component. Unwin’s premise is that everyone would desire to have a large yard and substantial public space besides. This may be criticised in several points, but the most obvious is that providing only one dwelling type is a form of oppression. Furthermore, such a community would be a brittle socioeconomic monoculture. Unwin’s proposed quantity of open space as an unquestioned good makes even less sense today, with suburban sprawl as a factor contributing to ecological degradation.
1.11B GENERAL THEORY: HOW The equilibrium of the Standard Model calls for a socioeconomically diverse blend of housing types, approaching that of contemporary demographics. Howard did not take a position on this important matter and Unwin misconceived it in the pursuit of green space as an unalloyed good. The proposed block delivers 12 dwelling units per acre, which was the housing density of Unwin’s diagram (and which was the official British policy target until recently). It shows six dwelling types which are common and desirable today, and the proportion in which they could be delivered to attain the density.
The positive variables or traits that interest Howard must be updated (see 1.6A and 1.6B). Howard's paradigm—the equivalent of the Standard Model in economics—would presumably hold opposing traits within a range of equilibrium. A diagrammatic illustration of this concept would show standard deviation from a zero point of perfect balance (see 2.2). Note that the nine traits are independent of density (this works for all urbanisms from the city to the ecovillage). In the assessment protocol, the higher the number, the greater the distance from equilibrium. This is not the proposal for a simplistic absolute rating (gold, platinum) but a basis for comparison. Note that this calibrates the "What" provided by Howard (see 1.6). The "Where," the "When," the "Who," and the "How" are to be further developed in subsequent papers. This is in the family of the current Greenprint protocol fielded by the B.R.E. (Appendix, 7.1).
2.1 HERTFORDSHIRE COUNTY: Herts is an excellent laboratory to test the General Theory protocol because the important regional variable of proximity to a metropolis is held constant. Apart from the only two built Garden Cities directly associated with Howard, Herts has two of the complete post-war new towns and two superb historic cities. These six, which are at once similar and different, can be comparatively analyzed. For the "What", see (2.2-2.5).
APPLICATION: STANDARD DEVIATION

2.2 HOWARD’S STANDARD MODEL

HOWARD’S STANDARD MODEL

EQUILIBRIUM

<table>
<thead>
<tr>
<th>Dependence on Centre</th>
<th>Complete Community</th>
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<tbody>
<tr>
<td>Quantity of Open Space</td>
<td>Intensity of Urbanization</td>
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<tr>
<td>Range of Jobs</td>
<td>Range of Housing</td>
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<td>Social Housing</td>
<td>Market Housing</td>
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<td>Private Transportation</td>
<td>Public Transportation</td>
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<td>Food Consumption</td>
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<tr>
<td>Recreational Facilities</td>
<td>Civic Facilities</td>
</tr>
<tr>
<td>Financial Benefactors</td>
<td>For-Profit Investors</td>
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</tbody>
</table>

STANDARD DEVIATION : 0
2.3A LETCHWORTH GARDEN CITY
APPLICATION: STANDARD DEVIATION

WELWYN GARDEN CITY Herts. 1920

EQUILIBRIUM

DEPENDECE ON CENTRE | 2 | COMPLETE COMMUNITY
QUANTITY OF OPEN SPACE | 0 | INTENSITY OF URBANIZATION
RANGE OF JOBS | 1 | RANGE OF HOUSING
SOCIAL HOUSING | 2 | MARKET HOUSING
PRIVATE TRANSPORTATION | 3 | PUBLIC TRANSPORTATION
FOOD PRODUCTION | 2 | FOOD CONSUMPTION
RECREATIONAL FACILITIES | 3 | CIVIC FACILITIES
FINANCIAL BENEFACORS | 2 | FOR-PROFIT INVESTORS

15

ENERGY GENERATION | 3 | ENERGY CONSUMPTION
WATER RECYCLING | 3 | WATER CONSUMPTION

STANDARD DEVIATION: 15

2.3B WELWYN GARDEN CITY
APPLICATION: STANDARD DEVIATION

HEMEL HEMPSTEAD NEW TOWN Herts. 1946

2.4A HEMEL HAMPSTEAD NEW TOWN

STANDARD DEVIATION: 21
APPLICATION: STANDARD DEVIATION

2.4B STEVENAGE NEW TOWN
APPLICATION: STANDARD DEVIATION

CITY OF ST. ALBANS
Herts. Roman Foundation

2.5A CITY OF ST. ALBAN'S

DEPENDENCE ON CENTRE 2  COMPLETE COMMUNITY
QUANTITY OF OPEN SPACE 0  INTENSITY OF URBANIZATION
RANGE OF JOBS 2  RANGE OF HOUSING
SOCIAL HOUSING 5  MARKET HOUSING
PRIVATE TRANSPORTATION 4  PUBLIC TRANSPORTATION
FOOD PRODUCTION 2  FOOD CONSUMPTION
RECREATIONAL FACILITIES 4  CIVIC FACILITIES
FINANCIAL BENEFACORS 4  FOR-PROFIT INVESTORS
ENERGY GENERATION 4  ENERGY CONSUMPTION
WATER RECYCLING 4  WATER CONSUMPTION

STANDARD DEVIATION : 23
### APPLICATION: STANDARD DEVIATION

**CITY OF HARPENDEN Herts. 1220**

| EQUILIBRIUM | \begin{tabular}{|c|c|c|c|} \hline & 12 & 3 & 4 & 5 \\ \hline DEPENDENCE ON CENTRE & 3 & \text{COMPLETE COMMUNITY} & \text{INTENSITY OF URBANIZATION} & \text{RANGE OF HOUSING} \\ \hline QUANTITY OF OPEN SPACE & 3 & \text{MARKET HOUSING} & \text{PUBLIC TRANSPORTATION} & \text{PRIVATE TRANSPORTATION} \\ \hline RANGE OF JOBS & 1 & \text{FOOD PRODUCTION} & \text{RECREATIONAL FACILITIES} & \text{FINANCIAL BENEFACTORS} \\ \hline SOCIAL HOUSING & 5 & \text{FOOD CONSUMPTION} & \text{CIVIC FACILITIES} & \text{FOR-PROFIT INVESTORS} \\ \hline PRIVATE TRANSPORTATION & 5 & \text{ENERGY GENERATION} & \text{ENERGY CONSUMPTION} & \text{WATER CONSUMPTION} \\ \hline FOOD PRODUCTION & 2 & \text{WATER RECYCLING} & \text{WATER CONSUMPTION} & \text{RECREATIONAL FACILITIES} \\ \hline RECREATIONAL FACILITIES & 2 & & & \\ \hline FINANCIAL BENEFACTORS & 4 & & & \\ \hline FOR-PROFIT INVESTORS & 5 & & & \\ \hline \end{tabular} |
The “When”—the Theory of Succession—is essential for the comparative assessment of urbanism.

Taking Welwyn as a case study would have been a useless exercise, say, 10 years after its inauguration when it consisted principally of housing. Assuming a successional increment of 30 years (approximately one human generation), by 1950—especially after the proliferation of wartime industry—one could fairly assess the jobs-housing balance, etc., and thus measure standard deviation (see 3.1A).

The next stage of succession 1950–1980 happened to coincide with the nationalization of Welwyn and the expansion of social housing, which caused a new deviation (see 3.1B). The subsequent Thatcherite policies are manifested in the next successional stage ca. 1980–2010, affecting the rebalancing in the ownership ratio of housing, and the completion of the retail and cultural uses (see 3.1C).

The future successional stage of 2010–2040 will presumably reflect the greening of Welwyn according to current concerns of resilience and self-sufficiency that happen to coincide with Howard’s paradigm of equilibrium, thus trending to a deviation of zero (see 3.1D).

Other settlements when subject to equal successional increments could then be fairly compared under the General Theory.
APPLICATION: SUCCESSION

WELWYN 1ST GENERATION 1920-1950

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STANDARD DEVIATION: 13

3.1A WELWYN 1ST GENERATION

WELWYN 2ND GENERATION 1950-1980

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STANDARD DEVIATION: 11

3.1B WELWYN 2ND GENERATION
### APPLICATION: SUCCESSION

#### WELWYN 3RD GENERATION 1980-2010

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**STANDARD DEVIATION : 15**

3.1C WELWYN 3RD GENERATION

#### WELWYN 4TH GENERATION 2010-2040

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**STANDARD DEVIATION : 0**

3.1D WELWYN 4TH GENERATION
The intersection of politics and environmentalism calls for the application to real estate development of a system similar to carbon offsets for industrial production. If the commons—natural land, clean air—must suffer degradation as a result of development, what might be a metric that warrants the proposed impact?

Should a Garden City ever be built again? This question may be approached through a theory of exchange value. What is worthy of being built, and at what loss? The political situation in Britain today refuses to condone the loss of open space to urban development which therefore defaults to small, incoherent tracts—the epitome of sprawl.

A theory of exchange value, so common in most endeavors, cannot today be presented in simple economic terms. Pragmatism has little standing in a society suffering from the overcrowding and overpricing of a market which is a result of opposition to urban development. Citizens will not readily exchange the promise of necessary housing even for a fallow open field.

There is need for objective assessment to determine if what is to be given away can be of equal value to what is to be gained. Is the loss of a field justified by the gain of a build-
er’s housing estate? The answer to that should be a clear NO! But is the loss of that field justified by the gain of a Garden City? That is yet to be tested.

Both biological and economic activities are based on transactions (of light and heat, of goods and services). Currencies are devised to efficiently evaluate what is exchanged. A transaction is considered physically, economically or politically sustainable if understood to be a fair trade. At one time development was generally considered to be worth it: a woodland or a farm might be lost, but the village or town that was gained was held to be of equal value. But today a suburban housing estate or a traffic-generating, paved-over shopping center, is usually considered a downward trade for the loss of that field or woodland. It is this fraud, this constant loss to society, that has led to the pervasive public opposition to development.

Urban theory could mediate this kind of transaction by developing a common currency. That could be the concept of diversity, which both the environmental sciences and the social sciences employ as an index of value.

Levels of natural and social diversity can be measured at points along the rural-to-urban transect. The Transect can enable environmentalists to assess the value of urban habitats and urbanists to assess the value of natural ones. It can analyze the human and natural interchange of complex place-types.

These can be assessed by means of the blended currency of natural and social diversity.

A. THE TRADITIONAL TOWN MODEL relies on the enhancement of land value by inducing a mix of jobs, housing, shops and entertainment in geographical proximity. This social diversity was assured organically until the 1950's when cars became ubiquitous and broke the discipline of the pedestrian shed. The positive environmental consequences of traditional urbanism are a result of its compactness, completeness, walkability and transit support, all of which result
APPLICATION: REGIONAL TRANSECT

in less transportation-based carbon emission. The major negative consequence is that land must be denatured into a commodity suitable for a continuous urban network. Natural features are effectively impediments to the optimized utilitarian condition of density. Analyzing along the Transect, Town Theory correctly rates the social diversity of T6 Urban Core to be at highest value. But there is an enormous flaw, as this model assigns a higher value to the T3 Sub-Urban than to T1 Natural.

B. THE COUNTRY MODEL when crudely applied—as it too often is—privileges natural diversity; assigning the worst performance to the T6 Urban Core with its pavements, perversely rating it worse even than T3 Sub-Urban which has more "green" space. This reveals a serious conceptual flaw. Conventional environmentalism, when based on humans being "other" than nature, has no metrics to assess the urban declension of the Transect. With only natural tools available, the social diversity of the T6 Urban Core does not register, except as denatured impervious pavement and "heat island". As a result, the most urban places are rated with the most negative "ecological footprints". Dense urban patterns are thereby considered part of the problem and not part of the solution—which is the irremediable problem of this country model.

C. HOWARD'S TOWN-COUNTRY MODEL, by measuring a blend of both social and natural diversity, assigns both T1 Natural and T6 Urban Core the highest value. This is as it should be. T3 Sub-Urban is also correctly shown to be the lowest value—as areas of suburban single-family housing have the worst diversity indices of both, usually being social and natural monocultures. This theory thus improves upon the prior two. Howard's theory is capable of assessing the loss of natural areas and compensating for them by the relative urbanity to be gained.

D. THE NEW TOWN-COUNTRY MODEL correctly retains Howard's characteristic equilibrium with its high rating of
natural diversity at T1 Natural and high social diversity of T6 Urban Core—but it also radically improves the performance of T3 Sub-Urban. This is done by technically integrating T3 into a "green" regime at the level of the building and the plot (the carbon-neutral house?). The low density dwelling is to be designed and equipped to compensate for the higher impacts of its land occupation and induced traffic. By enhancing requirements for energy efficiency and generation, water reuse, recycling/composting, and food production, T3 Sub-Urban can approach a fair trade for loss of open land. This theory thus equalizes performance all along the Transect, while retaining the lifestyle choice that is necessary in a market economy—and essential to human happiness as it is coming to be understood as virtuous living.

SUMMARY: A General Theory proposes that both natural and social diversity be combined and rated in various ratios along the rural-to-urban Transect. The high natural diversity of T1 Natural responds to the environmental ideal, while the high socio-economic diversity of T6 Urban Core is the traditional urban ideal. But each of these two monovalent and lopsided paradigms undervalues the other, while assigning unwarranted value to T3 Sub-Urban.

Town-Country Theory would perform better by valuing both the natural and social diversity at T1 and T6 respectively, while correctly devaluing the suburban point of T3, which has the lowest indices of both. A new Town-Country Theory would mitigate T3 Sub-Urban with technical overlays. These are the last two traits that are added to the Garden City assessment (see the additions at the bottom of 2.3-2.5) so that all Transect Zones are equalized.
APPLICATION: REGIONAL TRANSECT

A. TOWN THEORY - PRIVILEGES SOCIO-ECONOMIC DIVERSITY

B. COUNTRY THEORY - PRIVILEGES NATURAL DIVERSITY

C. HOWARD’S TOWN-COUNTRY THEORY - COMBINES NATURAL & SOCIO-ECONOMIC DIVERSITY

D. NEW TOWN-COUNTRY THEORY - COMBINES NATURAL & SOCIO-ECONOMIC DIVERSITY AND MITIGATION

4.1 ASSESSMENT OF EXCHANGE VALUE
5.1 A HYPOTHETICAL GARDEN CITY: Raymond Unwin was in fact Howard’s equal in polemic ability and was a great designer to boot. This drawing was perhaps intended to overcome the singular ineptitude of Howard’s urban diagram (see 1.8A). It manages to give a nod to Howard’s layout, while also integrating a credible presentation of the Transect—a concept destined to play a role in the proposed General Theory. This illustrated idea of a Garden City is supplemented in this paper by ideas for the Garden Town and the Garden Neighbourhood (see 5.2-5.5).

The two types of urbanism most likely to emerge today are what Unwin might have called a Garden Town and a Garden Neighbourhood, depending on the regional location (see 1.7A). In proximity of London, finding a site for a full Garden City is unlikely. In the century since Letchworth, suitable larger tracts of land along rail lines have been developed or permanently preserved as green-belts between settlements. It was difficult enough for Howard to find sites even a century ago! Note: There is a declension of possible urban types beyond the Garden Town and the Garden Neighbourhood—including the intensely agrarian Garden Village (see 1.7B).
5.2A THE GARDEN TOWN is similar to the free-standing full Garden City of Howard, but smaller. It must be large enough to accommodate the diversity of housing required today (see 1.11B)—tending to a high proportion of houses as corresponds with the lower land value of its country context.

At the centre of the town, associated with the rail station, are the shops and the workplaces of different types and sizes. This centre is within easy walking distance of most residents. The school is at the edge of the town so that it does not interrupt the pedestrian flow towards the centre. As a consequence of its lesser size, the Garden Town is superior to the Garden City in having only a single pedestrian shed. The full jobs/housing balance is achieved with the string of such towns connected by rail—as no single one is entirely self-sufficient. Although, in fact, the advent of telecommuting may lead to even better on-site capture rates of would-be commuters.

The Garden Town has a very high proportion of agricultural land at the greenbelt/edge, which in this case is not a hard edge but a gradual feathering-down of the density. This enables a declension of small holdings that mitigates the impact of the lower-density of this type through increased food production (see Duany, Garden Cities: Theory and Practice of Agrarian Urbanism).
5.2B THE GARDEN NEIGHBOURHOOD
The scale of the Garden Neighbourhood is that of a single pedestrian shed, with the centre within easy walking distance of the edges. An accretion of such neighbourhoods could expand an existing city by “bolting on” as a “garden suburb”. A city comprised of such neighbourhoods is implied in the pie-slice of Howard’s diagram (see 1.8A).

This Garden Neighbourhood would necessarily have less diversity of housing, tending to a high proportion of terraces and apartments—a consequence of the higher land value of its urban context.

The layout of the Garden Neighbourhood is the physical inversion of the Garden Town, with the highest density along the boulevards at the edges—which are shared by adjacent neighbourhoods. There are shops and workplaces of the larger scale along these, with public transport along them.

The fields and the school constitute the open space at the centre of the neighbourhood, distant from the traffic and city-scale activity at the edges. There is no greenbelt, but rather the allocation of agricultural land at the centre (reserved for allotment gardens and animal husbandry). But food production would be supplemented by high-intensity hydroponics on the rooftops of the workplaces and parking garages towards the edges.

The Garden Neighbourhood could be politically acceptable wherever sites are available for infill, although perhaps not as bolt-on urban extensions. Today, there seems to be a vested right to the “heritage view of the greenbelt”. In such cases sites of the separate Garden Town may be more politically acceptable.
PROPOSAL: NEW MODELS

5.3A GARDEN TOWN: AGRICULTURE & CIVIC

5.3B GARDEN NEIGHBOURHOOD: AGRICULTURE & CIVIC
PROPOSAL: NEW MODELS

5.4A GARDEN TOWN: WORKPLACES

5.4B GARDEN NEIGHBOURHOOD: WORKPLACES
5.5A GARDEN TOWN: HOUSING AREAS

5.5B GARDEN NEIGHBOURHOOD: HOUSING AREAS
It is not within the competence of the authors to select a feasible Garden City site. This study therefore re-designs the existing New Town of Stevenage as a critique: what it might have been had Unwin’s *Town Planning in Practice* been followed, or had today’s *Urban Design Compendium* been applied, rather than Germanic Modernist models.

Apart from the disarray of a profession lacking a paradigm, politically the single greatest impediment to the implementation of a Garden City today is its conflation in the minds of the people with the dismal post-war New Towns. The promise of the New Towns program and the subsequent disappointment ruined not only the confidence in the planning profession, but the reputation of the New Town as a category.

The car-dependent New Towns inadvertently became the model for suburban sprawl. They introduced what has become a syllabus of errors: (a) segregation by land use; (b) the absence of a building frontage discipline towards spatial definition; (c) the high-speed arterial streets, which are uncrossable from the pedestrian enclaves; (d) the cul-de-sac, which is the anti-social desiccation of Unwin’s “close”; (e) the separation of pedestrians from vehicles, which completed the
CASE STUDY: STEVENAGE CORRECTED

destruction of the street as a social locus; (f) the disconnected housing estate labelled as “neighbourhoods” dissipating the professional nomenclature; and (g) the remedial application of an extravagant amount of landscaping to compensate for the failure (including the aesthetic) of all else.

If the Garden City is to be salvaged, and the planning profession is to regain the popular standing that once permitted the building of Garden Cities (and, indeed, the New Towns), it will require a campaign of distancing from the New Towns. In order to demonstrate this, the New Town of Stevenage (so close to Letchworth and Welwyn) will serve as a chassis for the critique. The following are elements corrected to the urban design standards of Unwin’s *Town Planning in Practice* and the new *Urban Design Compendium*. 
It is obvious from his diagrams that Howard was not a designer. However it was the great fortune of the Garden City movement to be associated with Raymond Unwin. Without his design ability, the Garden City would not have achieved the polemical image that drove it worldwide. Garden Cities of To-Morrow must be assessed in collusion with Unwin’s Town Planning in Practice—or its success is unexplainable. This is clear when the deviation protocols of the Standard Model do not sufficiently expose the extent of the failure of New Towns compared to the Garden Cities (see 2.2-2.5). Stevenage fails primarily at the scale of urban design.

While Unwin’s book should never be permitted to fall out of print (but could do with an updating), this current document serves as an alternative. Urban Design Compendium by English Partnerships is as good a textbook as can be found worldwide. But this document is out of print, having been discarded by the Coalition Government in the process of dissipating its bloated bureaucracy—and in this instance with the approval of the architectural establishment, which prefers to impose a modernist aesthetic based on high-rises. The Urban Design Compendium is dedicated to diversity at the Garden City scale.
6.2A STEVENAGE NEW TOWN
CASE STUDY: STEVENAGE CORRECTED

6.2B STEVENAGE AS GARDEN CITY
CASE STUDY: STEVENAGE CORRECTED

6.3A STEVENAGE NEW TOWN

The sparse network of major thoroughfares at Stevenage become de facto motorways that separate neighbourhoods with high speed traffic, discouraging cross-town pedestrian activity. This is presumably compensated by separate pedestrian trails and underpasses. But these are unsupervised by building frontages, lack windows on the street and tend to be unsafe.

6.3B STEVENAGE AS GARDEN CITY

A small-scale network provides multiple routes, thus dispersing traffic, allowing pedestrian-friendly streets throughout. Pavements are integral to the streets, providing interesting and safe pedestrian experiences along the closely associated building frontages.
The Stevenage urban structure is hampered by the thoroughfare network, which by concentrating traffic on a few main thoroughfares must bypass the neighbourhood centres. The sense of community is consequently weak and the retail at the centres struggles. The open space (note the green) is randomly allocated—the result of wherever natural conditions survived.

Neighbourhoods are designed to function quasi-independently of the town centre, with basic retail and community assets located systematically within a pedestrian shed of most dwellings. Each neighbourhood centre is connected to others, along shared main streets. The density of network connectivity reduces the traffic on these so they can be allowed to penetrate the neighbourhoods. The neighbourhoods themselves are clearly delineated by stormwater management and recreational parkways.
CASE STUDY: STEVENAGE CORRECTED

6.5A STEVENAGE NEW TOWN

The Town Centre is based on the model of the suburban shopping centre. It is disconnected from the adjacent neighbourhoods by ring roads and parking lots. Large car parks are not the ‘best’ land use, given the intense demand for housing as close as possible to the shops and the regional rail station.

6.5B STEVENAGE AS GARDEN CITY

Housing, offices, shops and communal facilities form a very dense transport-oriented town centre around, and integrated with, the rail station. The town centre is essential. A High Street seamlessly connects to the rest of the closest neighbourhoods. There is no ring road so the street network enters at all points.
CASE STUDY: STEVENAGE CORRECTED

6.6A STEVENAGE NEW TOWN

Community amenities, such as schools, are allocated by criteria other than the pedestrian shed they serve. They are often away from the main thoroughfares, making efficient bus service impossible.

6.6B STEVENAGE AS GARDEN CITY

Community amenities, including schools, are placed at neighbourhood centres, reinforcing them socially and functionally, while sharing access to busses. Open space takes the form of sociable squares at the centroid of each neighbourhood as well as parks at the edges of the neighbourhoods.
CASE STUDY: STEVENAGE CORRECTED

6.7A STEVENAGE NEW TOWN

In this typical neighbourhood centre, buildings seldom enfront thoroughfares directly, more often facing parking lots, pathways or alleys. This structure subverts the pedestrian experience as fronts and service backs are randomly encountered.

6.7B STEVENAGE AS GARDEN CITY

Building frontages are disciplined along streets or squares, with clear fronts and backs throughout. Parking lots are behind buildings and open space is always spatially defined by building frontages.
6.8A STEVENAGE NEW TOWN

Most so-called neighbourhoods are residential monocultures, lacking variety in dwelling types. The preferred thoroughfare is the “cul-de-sac”, with vehicles at their centre. There is little care taken with building types that support privacy in the back yards, open space tending to be socialized. A great deal of it is unallocated: space left over after planning.

6.8B STEVENAGE AS GARDEN CITY

A multitude of building types integrate a variety of socioeconomic profiles: younger, older, poorer, wealthier, singles and families. Unlike the “cul-de-sac”, the “close” has a sociable greenspace at the centre. The housing is served by alleys such that the street frontage is not blighted by pavement and parked cars.
CONCLUSION

It is well to summarize for the reader some of the premises of this paper—now when the impact may be the strongest, but skepticism is likely at boiling point.

This paper is an attempt at an analysis in a profession that is much given to opinion. It provides a tool to analyze built examples such that the successes are understood to have higher standing than the failures—perhaps restoring the confidence of a profession, which at one time, between Haussmann and Leslie Martin, enjoyed the prestige of rock stars. After all, planners had done more for human health and happiness than even the doctors of medicine. Hence the trust that was then bestowed onto the planner who used it to demolish entire swaths of viable traditional urbanism for replacement by untested experiments. The subsequent failures took care of exterminating both that confidence and the prestige. The basis of this trust was not just the ability to assess but the mystique of technique—today more powerful than mere good intentions, however forcefully expressed verbally and beautifully illustrated.
CONCLUSION

But is it science? Do the formulas work? The comparative protocols are certainly not up to the standards of the hard sciences, but they are safely within the spread of the social sciences—where the formulas are expected to elucidate trends and not achieve mathematical precision. In any case, the purported metrics of traffic engineers or school board predictions have been, in the author’s experience, usually wrong. Even the hyperscientific methods of the American LEED system are proving overstated. It is understood that measures can only aspire to reveal relative virtue and to incentivize doing the right thing. So be it with the diagrams of this General Theory of Urbanism and all other such systems. (See 7.1.)

Regarding the credibility of the "What" and the criteria of their equilibrium, the two garden cities Letchworth and Welwyn seem to fall short: not enough jobs, too close to the cultural lure of London, the absurdity of a greenbelt intended to directly feed the town just as refrigerated transportation was introduced. This known criticism of the Garden Cities grew with the introduction of modernism in the 30’s.

But the attempt at happiness by means of a ribbon window failed to satisfy in most ways. It is precisely the Germanic contamination at the urban design scale that ruined the New Towns. Had they been built as Welwyn was or as Unwin taught, they would now be the glory of post-war Britain that they were meant to be.

But today, as the outlines of the twenty-first century are becoming clear (Century 21 began with the comprehensive crisis of 2008 just as Century 20 began with 1914) the looming ecological crisis has revalued Howard’s paradigms. Such
traits as food self-sufficiency, walkability and transit, the advent of teleported entertainment, and subsidiarity by the Coalition Government to the local community, are in utmost demand again.

Under these evolving circumstances, about a century after Garden Cities of Tomorrow, Howard and the Aristotelian virtue of equilibrium become, in the deepest sense, the ecological face of adaptation.
7.1 METRICS: An analytical method called the Greenprint has been developed by the Building Research Establishment. It suffers from the same taxonomic confusion of Howard’s magnets—not least because some categories are the result of others and some nested in others.