IDEONOMY:

THE SCIENCE OF IDEAS

Introduction, Foundations, and Applications

by

Patrick Michael Gunkel

TABLE OF CONTENTS

PREFACE: This is a contents table for a 5-volume (82%) sample of the est. 1,200 pages of the Ideonomy ms., as it existed at the start of 1994. The symbol ☞ indicates possible logical 'parts' of the book for insertion or use of the item.

• *LENGTHS OF THE FIVE VOLUMES* •

214 (177+37) — (A) ***ORANGE*** VOLUME (19 pieces);
216 (214+2) — (B) ***BRIGHT*** GREEN VOLUME: ***What Ideonomy Can Do*** (132 sections);
215 (141+74) — (C) ***BLUE*** VOLUME (13 pieces);
242 (185+57) — (D) ***PASTEL GREEN*** VOLUME (41 pieces)
101 — (E) ***YELLOW*** VOLUME: ***Ideonomy Glossary***.

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988 **pages TOTAL** (818pp ***text*** <83%> + 170pp ***nontext*** <17%>)
206 **'pieces' TOTAL** (19+132+13+41+1)

(A) *ORANGE* VOLUME (19 pieces; 177pp. text + 37 other = 214 pp.):

17. *Some Words Produced By "WordSpring" Examined.* • 12+2pp. ☞ *DIVISIONS* — div. **Linguistic Things.**
18. *Coining Names For Anonyms.* • Chapter. 8pp. ☞ *DIVISIONS* — div. **Linguistic Things.**
19. *Universal Scales of Fundamental Quantities.* • Chapter. 4pp. ☞ *DIVISIONS* — div. **Quantities.**

(B) *BRIGHT GREEN* VOLUME: *What Ideonomy Can Do.* • A massive but specialized part of the book. 132 sections (only 71% of the planned 186). 214pp text+ 2 other = 216pp. ☞ *INTRODUCTION* I or ☞ I *DIVISIONS.*

(C) *BLUE* VOLUME (13 pieces; 141pp text + 74 other = 215pp.):

1. *The Ideonomy Book: Very Partial Alphabetical Table of Contents.* • Table. 5pp.
2. *The Ideonomic Division "Paths".* • Chapter. 23+29pp. ☞ *DIVISIONS* — div. **Paths.**
3. *Dendrograms.* • Chapter. 6pp. ☞ *METHODS.*
4. *Definitions of and Metaphors For Ideonomy.* • Chapter. 23pp. ☞ *INTRODUCTION.*
5. *How Do Life's "92 Fundamental Properties" Affect One Another?* • Chapter. 2pp. ☞ *APPLICATIONS* — biology.
6. *Playful Seas (Examples of the Metaphenomenal Genus).* • Table. 2pp. ☞ *DIVISIONS* — div. **Phenomenons.**
7. *The Ideonomic Division "Illusions and Apatology".* • Chapter. 19+22pp. ☞ *DIVISIONS* — div. **Illusions.**
8. *The Ideonomic Division "Stories and Enology".* • Chapter. 9+5pp. ☞ *DIVISIONS* — div. **Stories.**
9. *The "Best Ideas" Generated By the Ideonomy Project.* • Table. 10pp. ☞ *APPLICATIONS* — universal.
10. *The "Best Ideas".* • Chapter. 12pp. ☞ *APPLICATIONS* — universal.
11. *The Ideonomic Division "Forms and Morphology"* {+ § *Ideas For Sinusoidal and Cyclic Structures Suggested By Ring Variants*}. • Chapter. 12+11pp. ☞ *DIVISIONS* — div. **Forms.**
12. *Personal Origins of Ideonomy.* • Chapter. 6+1pp. ☞ *INTRODUCTION.*
13. *The Archanalogon "Volcano" and Its Analogs; Analysis and Synthesis of Their Analogical Interrelationships.* • Chapter. 12+6pp. ☞ *DIVISIONS* — div. **Analogies.**

(D) *PASTEL GREEN* VOLUME (41 pieces; 185pp text + 185 other = 242pp.):

1. *The Ideonomic Division "Roles and Functions".* • Chapter. 3+7pp. ☞ *DIVISIONS* — div.s **Functions; & Roles.**
2. *The Ideonomic Division "Conflicts and Syrrhagmology".* • Chapter. 7+9pp. ☞ *DIVISIONS* — div. **Conflicts.**
3. *Similarities and Differences Between Two Scenes.* • Chapter. 3+5pp. ☞ *APPLICATIONS* — visual sciences.
4. *Ideogenetic Formulas.* • Chapter. 4+1pp. ☞ *METHODS.*
5. *Multidimensional Maps of "Radiation" Form-Species.* • Chapter. 5+6pp. ☞ *METHODS.*
6. *Possible Anomalous Dimensions of Astronomical Phenomena.* • Chapter. 5+3pp. ☞ *APPLICATIONS* — astronomy I or ☞ I *DIVISIONS* — div. **Anomalies.**

7. *Ideonomic Methods.* • Chapter. 4pp. ☞ METHODS.
8. *Transformation of Ideonomy Into A Predictive Science.* • Chapter. 3pp. ☞ INTRODUCTION.
9. *Symmetry and Ideonomy.* • Chapter. 3+1pp. ☞ METHODS.
10. *Ideonomy's Future Use In—and Transformation of—Education.* • Chapter. 4+1pp. ☞ APPLICATIONS — education | or ☞ | INTRODUCTION.
11. *Ideonomic Computer Software.* • Chapter. 3+1pp. ☞ METHODS.
12. *Ways In Which I Seem To Have Benefited From My Use of Ideonomy.* • Table. 1p. ☞ INTRODUCTION.
13. *"Form-Templates" For Mapping Ideas.* • Chapter. 5+2pp. ☞ METHODS.
14. *Future Uses and Users of Ideonomy.* • Chapter. 8pp. ☞ INTRODUCTION.
15. *The Ideonomic Division "Motions and Kinology".* • Chapter. 6+9pp. ☞ DIVISIONS — div. **Motions.**
16. *Science Before and After Ideonomy: An Instructive Comparison.* • Chapter. 7+1pp. ☞ INTRODUCTION.
17. *Test of the Universality and Fertility of the Organon "Generic Things Events May Have In Common".* • Chapter. 2pp. ☞ DIVISIONS — div. **Events.**
18. *New Ways of Cognizing Knowledge.* • Chapter. 2pp. ☞ INTRODUCTION.
19. *Prophetic Dream: Description of A Future Ideonomic Laboratory.* • Chapter. 1p. ☞ INTRODUCTION.
20. *Fanciful Micro-Portrait of Ideonomy's Future.* • Chapter. 1p. ☞ INTRODUCTION.
21. *The Study of Knowledge Is Self-Infinite.* • Chapter. 1p. ☞ INTRODUCTION.
22. *The Ideonomic Division "Images and Idology".* • Chapter. 2pp. ☞ DIVISIONS — div. **Images.**
23. *Introduction To Ideonomy.* • Chapter. 24pp. ☞ INTRODUCTION.
24. *A Multidimensional Scaling Version of "WordSpring".* • Chapter. 4pp. ☞ DIVISIONS — div. **Linguistic Things** | or ☞ | METHODS.
25. *Examples of Idea Maps Produced By Multidimensional Scaling.* • Chapter. 10pp. ☞ METHODS.
26. *Multidimensional Scaling Based On Dyadic Choices.* • Chapter. 3pp. ☞ METHODS.
27. *A Curious Case, and Possible Implications of the Curious Case.* • Chapter. 3pp. ☞ METHODS.
28. *Ideas In Psychology Produced By the Ideonomy Project.* • Chapter. 1p. ☞ APPLICATIONS — psychology | or ☞ | DIVISIONS — div. **Psychic Things.**
29. *Conversational Topics.* • Chapter. 4pp. ☞ APPLICATIONS — food technology.
30. *An Experiment In the Creation of Organons By Nonideonomists.* • Chapter. 11+4pp. ☞ DIVISIONS — div. **Capacities.**
31. *The Significancy of Combinations.* • Chapter. 2pp. ☞ INTRODUCTION | or ☞ | METHODS — combinatorial | or ☞ | DIVISIONS — div. **Combinations.**
32. *Excerpt From 1/17/91 Letter From Patrick Gunkel To Edward Fredkin.* • Letter. 1p. ☞ INTRODUCTION.
33. *Notes On Wonderful Group of Interrelated Ideas Developed In Discussion With Betsey Dyer On 1985 May 4, Dealing Generally With "Possibilities For Quasi-Biological Evolution and Sophistication In the Purely Chemical Realm".* • Table. 3pp. ☞ APPLICATIONS — chemistry.
34. *Simple Combinations of Divisions.* • Chapter. 3pp. ☞ METHODS — combinatorial.
35. *The nMDS Ideomap "Generic Relations".* • Chapter. 2pp. ☞ DIVISIONS — div. **Relations.**

36. *The Future of Ideonomy and Its Impact (Anticipatory Calendar).* • Table. 2pp. ☞ INTRODUCTION.
37. *Transdivisional Organons.* • Chapter. 15pp. ☞ METHODS | or ☞ | INTRODUCTION.
38. *"Idea Chemistry".* • Chapter. 4pp. ☞ METHODS.
39. *Idea Banks.* • Chapter. 3pp. ☞ INTRODUCTION | or ☞ | METHODS.
40. *Nature's Unconscious.* • Chapter. 2pp. ☞ INTRODUCTION.
41. *The Ideonomic Division "Taxons and Taxology".* • Chapter. 9+7pp. ☞ DIVISIONS — div. **Taxons**.

(E) *YELLOW* VOLUME: *Ideonomy Glossary.* • Glossary for ideonomy and book. 101pp.

FUNCTIONS
+ ROLES

The Ideonomic Division
ROLES AND FUNCTIONS

The pair of words naming this division do not have unique, precise, final, and disparate definitions. They are merely suggestive of what the division is, concerns, and would do. Associations, ideas, and possibilities cluster about them; they provide a useful verbal nucleus for the later development of their part of ideonomy.

Role tends to suggest that a thing has a specific part to play in some other thing, alongside still other things that play correlative parts, in a definitive sum of complementary parts; but it may also simply refer to a single thing's single function in a single thing, served by one function or many.

Function may perhaps be what a thing does, does to, or does for a thing; its planned or at least fairly regular contribution to the operation, behavior, performance, nature, or existence of another thing.

The Functions of A Single Thing

Let us consider all the definite and speculative functions that we can imagine as normally being played by one random thing (please consult the list "The Functions of Sidewalks").

Some readers may first want to draw up their own sidewalk list, so that they can then compare it with my own. Do—or to what extent do—such independently constructed lists converge, share item ordering, clustering, and subitemization, explore the same territories, take kindred things into consideration, make like distinctions, employ analogous qualifiers, etc; or per contra, or to what extent do they differ, supplement or complement one another, etc? To what degree could one list be described as a transformation of another? What variations of style do lists exhibit?

It is surprising just how many and diverse the functions of something as pedestrian as a sidewalk are. One is taken aback!

The possible lessons are many and include at least the following: [1]Civilization may be far more rational than is ordinarily assumed. [2]Progress perhaps represents the synergistic weaving together of myriad functions, purposes, and considerations. [3]The present world is evidently stupendously synthetic. [4]The functions of things are mostly hidden and unremarked. [5]And multiplicity of function, cause, and effect may not be peculiar to artifacts but instead extend to the totality of things in Nature and of the world of ideas. A reexamination of reality may be indicated.

As I made the list, one item led to another. Accumulating items provided a context that refined and altered their meanings, and an analytical and synthetic laboratory from which new items sprang in a way at once more spontaneous and systematic. Themes emerged that underwent sequential and parallel development in successive items; the permutation, interplay, combination, and transformation of items and themes gave rise to more and to increasingly subtle and sophisticated items and themes. The list not only tended to extend but to complete itself, or to specify the boundaries of the topic and its natural closure.

An attempt to enumerate all functions of a sidewalk had the effect of creating a vast and incredibly specific definition of a sidewalk, a definition that went way beyond anything that one might earlier have imagined, thought possible, or certainly encountered; somehow it left the sidewalk a greater and more imposing thing, and a thing pregnant with unrealized future possibilities.

After perusal of the list, one no longer feels certain what the major function, or the basic definition, of a sidewalk is; apparently one's conventional assumptions and expectations are premature. The implication may be that the concepts we have of things in general are severely defective and lacking in imagination.

Before we undertake to improve things, it may be desirable to make the totality of their functions explicit; and if we are to improve the world itself, perhaps we should first try to do something similar for the totality of things, and their—actual and possible—complementary functions, or "interfunctions".

One function of sidewalks my list identifies is to "furnish a nocturnally visible white surface". Exhumed or stated baldly thus, the idea, desirability, and feasibility of variously enhancing this largely neglected function is suggested. Would it help if the analog of a micaceous material, or if brilliantly reflective flecks, were incorporated in sidewalks? What is the whitest they could be made, or the most mirrory, or the most appropriate for starlight or night (scotopic) vision? Would psychophysics ask them to be made of—random or ordered—points, lines, or complex textures or designs (of homogeneous or heterogeneous scales)? Could countless conductive light fibers be embedded vertically within them? Could they be made phosphorescent, or fluoresced by groundward or oblique ultraviolet light? Could they be made of a piezoluminescent material that would glow in response to, or after, foot pressure?

Notice how a purely functional analysis may also suggest new aesthetic possibilities. Indeed, latent in sidewalk technology is a sidewalk art that history has never touched.

One value of a comprehensive list of the functions of a thing is that it may prevent the accidental future omission of important tertiary, secondary, or even primary functions and features, by ignorant and simplistic modernizations of technology and design. This unfortunate process of unthinking and often destructive omission and mutilation of the goods, services, and amenities of civilization is a cardinal feature of our age.

The list of sidewalk functions could be consulted whenever the building of a sidewalk was planned so as to specialize the form, size, appearance, and materials of the sidewalk with respect to the needs and possibilities of the instance, and by way of making any engineering project of which it was a part more rational, imaginative, unitary, and prescient.

To develop Roles and Functions as an efficient and powerful division of ideonomy, similar lists should be constructed for an immense range of lists. Recurring rules and considerations for constructing such lists for arbitrary things will come to light in the course of this endeavor that will speed and ease its completion and greatly add to the profundity and utility of the result; even the raison d'etre of the enterprise will be clarified.

Study of these lists and explication of these recurring rules and considerations will foster the discovery of genera and other taxa of the roles and functions—including ones of broadening generality, universality, and fundamentality—and these may be developed further by their semiempirical application to the world of things, ideas, and tasks.

Eventually the different lists of roles and functions will begin to grow together in an integral, organic, and necessary structure of tremendous predictive, deductive, and creative power.

1984 S 13
pure ideonomy
ROLES,FUNCTIONS
things → examples

WHAT ARE THE 'FUNCTIONS' OF THESE THINGS?

1 Maps
Insurance
Houses
Refrigerators
5 Toilets
Perfumes
Chairs
Timepieces
Church organs
10 Sidewalks
Toys
Rugs
Museums
Parks
15 Standardization
Manners/Etiquette
Paints
Governments
Lying (not telling the truth)
20 Schooling
Glass windows
Tableware
Aphorisms
Money
25 Business contracts
Prostitution
Dictionaries
Tunnels
Periods (ending sentences)
30 Hats
Rulers (12-inch)
Movie reviews
Presidents (of the U.S.)
Marriage
35 Parades
Cars
Nursery rhymes
The Law
Wakes/Funerals
40 Religion
Psychiatrists
Newspapers
Stock exchanges
Divorce
45 Advertisements
Cosmetics
Friends
Science
Anger
50 Expletives
Grammar
Crying
Instincts
Intestinal bacteria
55 Teaching

THE FUNCTIONS OF SIDEWALKS

NOTE: It is surprising just how many and diverse the functions of something as pedestrian as a sidewalk are. One is taken aback! The possible lessons are many and include at least the following: [1]Civilization is far more rational than is ordinarily assumed; [2]Progress consists of the synergistic weaving together of myriad functions, purposes, and considerations; [3]The present world is stupendously synthetic; [4]The functions of things are mostly hidden and unremarked; and [5]Multiplicity of function, cause, and effect may not be peculiar to artifacts but instead extend to the totality of things in Nature and of the world of ideas. A reexamination of reality may be indicated.

Omit from chapter, since already quoted on p. 2!

[1]Keep feet dry
Keep feet clean
Provide an all-weather footpath
Keep houses, vehicles, and clothes clean
[5]Prevent erosion, cross-gullying, and non-distributed (stream-like) cross-flows
Keep pedestrians—kids especially—off the street and out of harm's way
Make the proper path manifest, definite, and stable
Enable greater and maximal foot traffic
Minimize path maintenance (rate, difficulty, and cost)
[10]Narrow the path (minimize its necessary area)
Make the path straight, rectangular, and modular, and its complications elegant, direct, and purposeful
Keep pedestrians off lawns
Allow in addition a distinct siding (say between sidewalk and street) for dogs, plants, trees, utility poles, etc
Insure a path of sufficient width
[15]Provide a smooth surface that 'rolls' over uneven terrain
Supply a flat surface
Prevent progressive concave downwearing (rutting) by feet
Provide a surface capable of supporting very small wheeled vehicles and loads
Furnish a nocturnally visible white surface
[20]Provide a rigid textured surface for maximal grip of footwear (allowing e.g. faster walking)
Enable easy and safe ascent and descent of hills
Provide a surface for easy and nondestructive winter snow and ice removal
Standardize sidewalks and enable a science, technology, and art thereof
Minimize the risk of slipping and falling on mud, tripping on stones or roots, etc
[25]Prevent standing puddles and treacherous holes, slopes, and multiply-curved surfaces
Avoid and prevent vegetation
Enable quickened road traffic (owing to #6)
Make property boundaries more explicit
Supply a publicly owned right-of-way, receiving regular municipal maintenance
[30]Guarantee an omnipresent and uninterrupted off-street footpath
Provide a distinct and safe mini-street for bicycles
[32]Provide, generally, a safe street-substitute for youngsters—equipping kids with their own 'linear kingdom'

(2) "The Functions of Sidewalks"

[33]Maximize (when properly designed) water runoff velocity, removal, and 'capacity'

Give a psychologically and aesthetically desirable sense of terra firma, self-location and ubiety, propriety, direction, simplicity, reliability, etc

[35]Preclude all soft ground and insure that the path has a solid, deep, and permanent foundation

Enable the playing of various games and other recreations (e.g. hopscotch, roller-skating, marbles, and lemonade stands)

Provide a place for meeting and conversing with neighbors

[38]Serve bazaars, sidewalk sales, etc.

THE REASONS FOR MARRIAGE

1 Reproduction of self and propagation of species
Erotic life (pleasure); controlled and stablest sex life
Privacy
Mutual (husband-wife) service and slavery
5 Co-memory and interweaving co-meaning (convergent and vergent being); mutual knowledge leading to maximal psychic and existential depth
Mutual observation, supervision, criticism, and development
'Mechanical' biological instinct
Biological need
Pleasures of household and kids
10 Tradition (cultural habit)
Imitation
Sociocultural compulsion
Role specialization, complementation, and synergism
Maximization of genetic diversity
15 Eugenic assortative mating
Mutual protection
Maximally intimate friendship
Noncompetitive and jealousy-free sex
Reciprocal bonding and mutual control (intercontrol)
20 Mutual motivation
Bi-mental culture, interaction, thought, and conversation
Social stability (greater social reliability, sobriety, and coherence; contractually stabilized society)
Stable parentage (kid protection)
Home-building
25 Double—because shared—wealth
Localization of aggression and tension (made marital instead of communal, thereby contributing to social peace)
27 For the individual: maximally predictable, self-controlled, determinate, planned, organized, known, and selfish (idiosyncratically personal) existence.

THE FUNCTIONS OF MAPS

1 Overview
Random ocular access to information
'Parallel cognition' of information
Compression of information
5 Presentation of information in analogue form
Diagrammatization of photography
Information storage
Information retrieval
Collation of homogeneous information
10 Collation of heterogeneous information
Publication and communication of information
Mixture of analogue, digital, and symbolic information
Varied or arbitrary uses of an invariant analogue or template
Geometric verification of intuitive, topological, verbal, and sensory information
15 Uniform diachronic accumulation of information in one absolute 'place of convergence'
Convenient, instantaneous, and efficient checking and cross-checking of data
Triangulation
Interpolation
Extrapolation
20 Historical 'snapshotting' or memory
Size-transformation (enlargement or reduction; ocular, optical, or computational)
Group or mass viewing
Geometric transformations (re-projections; affine, spherical, homomorphic, etc)
Comparison and collation of different maps
25 Reduction of 3-dimensional topography to a '2-dimensional representation'
Teaching
Analysis, synthesis, planning, and imagination
Mnemonic functions
Other mathematical operations (enabling of; e.g. commercial land division, merger, and conformation)
30 Maximization of information by informational addition
Correlation of spatial and other information
Discrimination and comparison of features
Updating and correction of geographic information
Standardization or regularization of features
35 Simplification of geographic information
Selection or specialization of geographic information
Maximization of information-theoretic content, density, or efficiency of geographic or significant information
Portability and manual manipulability of geographic information
'Visualization', pictorialization, and 'holistic iconicization' (gestaltization) of geographic information
40 'Hierarchic universalization and encyclopedic concorporation' of all geographic or cosmographic information
'Anthropomorphization (humanization)' of geographic information
Agnosiography (revelation of loci and types of geographic ignorance)
43 'Multidimensionalization' of cartographic data (sensu both the building of n-dimensional manifolds and the multiplication of qualitative dimensions —or the synergism of both).

total items: 29

1986 Oct 23
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ROLES,FUNCTIONS
examples

THE FUNCTIONS OF RUGS

1 Cleaning of feet and shoes
Absorption of room sound (creation of quiet)
Sound insulation for room below
Foot massage
5 Stoppage of sound from room below {should we have rugs on the ceiling??}
Prevention of clatter and scraping sounds from shoes on hard floor
Foot comfort (from soft, yielding, fuzzy, tactile, enfolding, warm, etc carpet)
Prevention of foot slippage; greater friction
Easy changeability of floor and room appearance or aspect
10 Floor protection
Foot thermal insulation from cold hard floor
Preservation of room heat
Aestheticization of floor (e.g. greater visual and tactile diversity and complexity; possible simulation or [paleopsychic?] symbolization of grass, soil or sand, forest or cave litter, clothing, or hair)
Movability (slidability) of furniture without damage or risk to floor
15 Permitting of naked (shoeless or sockless) feet
Safer and pleasanter floor for young children
Enhancement of privacy and sense of intimacy and enclosure
Comfort to guests
Display or conspicuous consumption
20 Enablement of sitting, lying, or even sleeping on floor
Hiding of blemished or scarred underfloor
Covering (blockage) of any floor holes or board interspaces, or masking of floor irregularities (originally or sometimes)
Enablement and display of floor art
Prevention of shattering of or injury to dropped objects
25 Ready and variable adaptation (quasi-painting) of floor to complement design or look of rest of room
Individualization of the separate rooms of a house
Regionalization of a floor
Extension of the comfort, sensa, or percept of a chair or sofa to the fore-floor
29 Cultural elitism and sophistication—and greater existential regulation—by making the dirtying and abuse of a floor manifestly less tolerable and more boorish, and by making the floor a thing more demanding of care and respect.

total items: 36

1986 Oct 13
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ROLES,FUNCTIONS
examples

THE FUNCTIONS OF COSMETICS

1. Youth maintenance or illusory rejuvenescence
2. Improvement of self-image
3. Assured and controllable appearance
4. Acquisition of psychic security
5. Competition (re appearance, power, and skills) with other females (cosmeticized or not)
6. Competition (equality) with prettier women
7. Acting aid
8. Transformation of appearance or self-image (e.g. eroticization, greater age or dignity, self-variation, self-transcendence, etc)
9. Disguising or hiding of oneself
10. Mimicry of another person (celebrity, friend, mother, enemy, etc)
11. Enhancement, maximization, or epitomization of some trait or type of appearance (e.g. "femininity")
12. Hiding of (real or imagined) blemishes, scars, wrinkles, or ugliness
13. Conformity to cultural habits
14. Seduction, charming, or impressing of one or all males
15. Husband acquisition
16. Maintenance of husband's or boyfriend's satisfaction with, enthusiasm over, or devotion to oneself
17. Heightening of one's husband's or lover's personal happiness or possessive pride
18. Self-exploration, character growth, and role-experimentation
19. Provision of opportunity and 'justification' for prolonged (visual and tactile) self-examination, self-study, facial play and exercise, catalyzed fantasies, self-criticism, and physiognomic microkinesic practice, experimentation, development, and repertoire-building
20. 'Shining' in special situations requiring such incandescence
21. Coquetry or obedience to biological mating-ritual instincts
22. Narcissism and provision of excuse for self-admiration
23. Facial health (cure and prevention)
24. Improvement of complexion and facial tone
25. Improvement of facial feeling and facilitation of facial awareness
26. Exhibition, dramatization, or misrepresentation of one's social status, situation, or wealth
27. Exhibition of one's tastes, judgment, personality, and style
28. Cultural consolidation, and the adoption of and communication via the standard cosmetic 'language' of one's culture
29. Accentuation and affirmation of the difference between the sexes
30. Narrowing of any gap between one's bodily glamour and the beauty of one's dress, environment, or husband
31. Either acute or continuous compensation for or hiding of diurnal, menstrual, mood, health-related, or accident-related diminutions of one's appearance
32. Idle and solitary entertainment and art-form
33. Provision of a major and ideal topic for womanly chitchat, mutual comparison, and instruction
34. Aid in prostitution and transvestism
35. Making of industrial profit
36. Spiting of husbands who do not like cosmetics.

NOTE: Item #36 was added afterwards, after a cosmeticist friend who had shown the list to her customers reported back that this seemed to be the sole omission (a testament to the importance of empirical research!).

"MULTIDIMENSIONAL MAPS OF FUNCTIONS"

Patrick Gunkel

Three nMDS maps will be discussed here: 1) The primary map shown in Fig. 6114, and entitled "nMDS Map of the Mutual Analogousness of 30 (of 54) *Things' Function-Sets*". 2) Its companion "Analytic-Regions Countermap For Fig. 6114" (see Fig. 6746). 3) The primary map titled "nMDS Map of the Mutual Analogousness of 42 (of 48) *Generic Functions*" (Fig. 6062).

What is meant by the "function-set of a thing", in the first figure, is the set of all of the functions that tend to characterize the thing, or some sort of intuitive integral or gestalt corresponding to same (as distinguished from the function-sets, integrals, and gestalts of other things or the other things treated).

The last of these was produced, not in the usual way by using *intra-set scaling dyads* [*i.e.,* scaling dyads that belong to the same set from which the scaling poles, or actually scaled ideas, are drawn], but rather by making use of *extra-set scaling dyads*. In other words, the mutual analogousness of the forty-two Generic Functions was determined **indirectly**, by 'weighting' them for perceived analogousness, not to Generic Functions, but to 27 (of 54) Things' Function Sets. The latter were of the same set as formed the subject of Fig. 6114.

To begin with Fig. 6114, then.

Nearest to the plot's origin are to be found **Religion**, **Divorce**, and **Timepieces**. The Analytic-Regions Countermap (Fig. 6746) suggests that the explanation for their centrality may lie in the fact that each has equally to do with both functions of starting and functions of ending. **Religion** involves both archological and eschatological doctrines; **Divorce** ends a marriage but represents a new beginning in life, and often leads to a new marriage; and **Timepieces** serve to indicate—and effect—the initial and terminal moments of things.

The concern of **Religion** with both secular and eternal time probably accounts for its mapped proximity to **Timepieces**.

The Ideonomic Division
CONFLICTS AND SYRRHAGMATOLOGY

[1]con·flict \'kän,flikt\ n -s [ME, fr. L conflictus act of striking together, fr. conflictus, past part. of confligere to strike together, fight, fr. com- + fligere to strike — more at PROFLIGATE] 1 a : [clash, competition, or mutual interference] of [opposing or incompatible] [forces or qualities] (as [ideas, interests, wills]) : ANTAGONISM ⟨the convulsions of a soul storm-driven amid unreconcilable spiritual ~s—H.O.Taylor⟩ b : an emotional state characterized by [indecision, restlessness, uncertainty, and tension] resulting from incompatible inner [needs or drives] of comparable intensity 2 a : an engagement between men under arms : STRUGGLE, CONTEST, FIGHT b prolonged fighting esp. with weapons : WARFARE, STRIFE c the opposition of [persons or forces] upon which the dramatic action depends in [drama or fiction] d : CONFLICT OF LAWS 3 : a [striking or clashing] together of [material bodies or substances] (as [air currents, parts of a mechanism]) : COLLISION syn see CONTEST, DISCORD

[2]con·flict \kən'flikt, 'kän,f-\ vi -ED/-ING/-S [ME conflicten, fr. L conflictus, past part. of confligere to fight] 1 : to contend [with or against] another in [strife or warfare] ⟨France ~ed with England⟩ ⟨the ~ing nations of Greece and Turkey⟩ 2 : to show [variance, incompatibility, irreconcilability, or opposition] : evidence [variance or disharmony] calling for [adjustment, harmonizing, bringing into accord] ⟨the two versions of the story ~⟩ ⟨nor does the French revolutionary spirit ~with what we ordinarily mean by respect for law—W.C.Brownell⟩ syn see BUMP, CONTEST

— Webster's Third

INTRODUCTION

Conflicts are not necessarily bad things, and often they serve to illuminate the nature of reality. They can throw things into contrasting light, reveal their active and dynamic essence, bases, or possibilities, and hint at what they strive for, aim for, or ultimately promise or may allow. They can indicate the mutual and absolute limits, and the complementarities, of things.

Conflicts are often the antecedents, and even the beginnings, of harmonies. They are powerful catalytic, creative, and evolutionary agents.

Confliction is itself relative: being unity, harmony, or cooperation on other levels, from other perspectives, in other dimensions, ways, or senses (and to such duality there is no exception, so that absolute conflict is but a costly and persistent myth).

The concern of syrrhagmatology, or of the present division, might be taken to include not merely conflicts, in the narrow sense, but struggles in general.

Syrrhagmatology is formed from the Ancient Greek word syrrhagmatos, meaning conflict.

SUBDIVISIONS RELATED TO CONFLICTS

KEY: Uppercase = especially related.

1. Alternative histories.
2. Alternatives.
3. Ambiguities and amphibology.
4. Antisyzygies.
5. Bads and cacology.
6. Controversies and erismology.
7. Convergences.
8. Criticisms and crinology.
9. Cycles, periodicities, and encliology.
10. DEBATES, ARGUMENTS, AND AGONOLOGY.
11. DIALECTICS.
12. Differences.
13. Disequilibria and astatology.
14. Disjunctions.
15. Disproofs.
16. Divergences.
17. Games and condacology.
18. Heterodoxies and heterodoxology.
19. Interactions.
20. INTERFERENCES.
21. Negations.
22. Negatives.
23. OPPOSITES AND ENANTIOLOGY.
24. Pan-paradoxy.
25. "Pan-Truth" and contradictions.
26. Paradoxes and paradoxology.
27. Pathologies.
28. Perspectives.
29. Problems and aporology.
30. Reactions.
31. RECIPROCITIES.
32. Surprises and adocetology.
33. Vergences.

"REASONS FOR STUDYING CONFLICTS"

1. To understand the [BEHAVIOR, DYNAMICS, CHANGES, OR TRANSFORMATIONS] of conflict(s).
2. To understand the [CAUSES, ORIGINS, SOURCES, BASES, OR MECHANISMS] of conflict(s).
3. To CLASSIFY CONFLICTS in terms of other conflicts, discover how to do so, or develop a universal taxonomy of conflicts or of things pertaining to conflicts.
4. To know the [CONSEQUENCES, EFFECTS, OR SEQUELS] of [conflict, types of conflict, or particular conflicts].
5. To DISCOVER [CONCEPTS OR METHODS] pertinent to the [investigation, treatment, or discussion] of conflict, or to CONSTRUCT a universal ideonomic science of conflicts (SYRRHAGMATOLOGY).
6. To understand the [DEVELOPMENT, PROGRESS, EVOLUTION, CULMINATIONS, OR TERMINATIONS] of conflict(s), or the contribution of conflict to such things (e.g. to [biological, social, or intellectual] evolution).
7. To understand the [EXTENT, RANGES, DEGREES, LIMITS, EXTREMA, OR BOUNDARIES] of conflict(s).
8. To find out HOW TO MAKE THINGS [more, fully, in a sense, for a purpose, vc] [COMPATIBLE, HARMONIOUS, coordinated, UNIFIED, AT PEACE with one another, combinable, equivalent, vc]; or how to [MINIMIZE, ELIMINATE, PREVENT, TRANSCEND, OR REDIRECT] conflicts.
9. To learn HOW TO STUDY [given or arbitrary] conflicts BY ANALOGY TO, or through comparison with, [OTHER CONFLICTS or things] (especially those about which the most is known).
10. To unravel the total INTERRELATIONS (incl. the [interactions, interdependences, or reciprocities]) of conflicts INTER SE.
11. To discover "META-PATTERNS" (e.g. [hierarchies, networks, or series]) [of, relating to, or involving] conflicts.
12. To understand the [NATURE, MEANING, OR ABSTRACT IMPLICATIONS] of conflict(s), or WHAT conflict is, IS NOT, or consists of.
13. To understand the [POSSIBILITIES, USES, or VALUES (incl. the costs and benefits)] of conflict(s), OR what the IMPORTANCE of conflict is.
14. To learn how to [PRODUCE OR MANAGE] conflicts.
15. To understand the [PROPERTIES, DIMENSIONS, APPEARANCES, STRUCTURES, OR MANIFESTATIONS] of conflict(s).
16. To [discover, characterize, or exploit] the systematic RELATIONSHIPS of "Conflicts" TO IDEONOMY'S OTHER [DIVISIONS or concerns].
17. To better UNDERSTAND what THINGS are (that [do or could] relate in any way to conflicts).
18. To learn WHY [general or particular] THINGS [are or may be] [partly or wholly] INCOMPATIBLE.

WHY STUDY CONFLICT

Please see the table "Reasons For Studying Conflicts".

A FIRST REASON for such inquiry is to understand the [BEHAVIOR, DYNAMICS, CHANGES, OR TRANSFORMATIONS] of conflict(s).

Thus the convergence of two ocean currents at some geographic locus may generate a conflict as to the subsequent course of the two currents, and as to their combined course, to the extent that they merge. There may be no fixed resolution of this conflict, and the issuant flows may vary over time as the effect of diachronic conflict. Reflexive force and momentum components of the efflux may themselves add to the temporal and spatial complexity of the original conflict; the effects of these may in turn contribute to that complexity, and so on ad infinitum.

Such conflict of marine currents might exhibit meandering BEHAVIOR (as to the center of the conflict over time), periodic DYNAMICS, CHANGES to left or right, down or up, or backwards and forwards, and TRANSFORMATIONS sensu catastrophe theory or topological dynamics. Gaining an understanding of these things could lead eventually to improved understanding of conspecific and congeneric conflicts: say, respectively, of atmospheric winds and internally struggling mobs.

A SECOND REASON to investigate conflict is to comprehend its [CAUSES, ORIGINS, SOURCES, BASES, OR MECHANISMS].

Moral values are in ceaseless conflict over the earth: but because of what causes and mechanisms? Ignorance of the latter may variously mask benefits to be derived from such conflicts, solutions to the conflict, the noise-like inextinguishability and unimportance of moral conflicts, an unrecognized need for consummated, more diverse, or directed conflict, etc.

The CAUSE of war might be neurological, its ORIGIN a territorial instinct in the totality of species, its SOURCE the amygdalar nucleus of the human brain, its BASIS contradictory behavioral effects of different subnuclei of the amygdala, and its MECHANISM a struggle for dominance among these subnuclei.

The importance of knowing such a cause could be that it implies the need for a panhuman psychopharmaceutical; such an origin, that it suggests that wars may exist among the lowly bacteria; such a source, that it circumscribes the part of the brain that needs to be studied or modified irenically; such a basis, that it hints the value of a drug that could blunt the behavioral expression of the subnuclei; and of such a mechanism, the value of a drug able to moderate the antagonism of the amygdalar subnuclei.

A THIRD REASON why it is important to study conflicts is to CLASSIFY them in terms of other conflicts, to discover how to do so, and to develop a universal taxonomy of conflicts or of things that pertain to conflicts.

The genes within the genome of a biont or species are in mutual conflict: both directly and, through the phenes they give rise to or regulate, indirectly. These numerous intra-genomic conflicts need to be classified so that those of like and unlike type can be distinguished, by way of minimizing the redundancy and maximizing the efficiency and directness of genetic research; moreover, minor distinctions will lead to the making of major distinctions, and vice versa. Only once certain types of conflicts have been identified will it become possible to imagine canonical variations upon these types, and subtler processes of interaction of the types.

Bases and methods of classification discovered to be applicable to a portion of such conflicts will be applicable beyond them, or suggest how it is possible to devise things that are.

A universal system of classification of conflicts—spanning all fields and phenomena—will enable what is known about the causes, qualities, and effects of specific conflicts to be reused and modified elsewhere, everywhere, and all the time. A universal taxonomy of the things that pertain to conflict will enlarge the number of things that are known to contribute, or to potentially contribute, to any given conflict; or that are known to otherwise bear upon the conflict.

A FOURTH REASON to study conflict is to know the [CONSEQUENCES, EFFECTS, OR SEQUELS] of [conflict, types of conflict, or particular conflicts].

These may be more diverse than imagined. Then again, they may be linked or have a tendency to co-occur or to exclude, modify, mask, cooperate with, or enhance one another.

Different effects or types of effects may be diagnostic of different conflicts or types of conflict, or indicate the illusory identity of two or more conflicts.

The uncovery of the consequences of conflicts may continue endlessly, but depend upon the prior revelation of prior, independent, or more primary consequences; the total consequences of conflicts may be infinite.

Different types of odors may conflict with one another, receptorally or in the brain: is the effect then purely negative (e.g. cancellation), neutral (e.g. transformation), or positive (productive of more general information, or intrinsically significant)? The question could first be asked about particular cases and then generalized to increasingly arbitrary cases.

A FIFTH REASON for examining conflict is to DISCOVER [CONCEPTS OR METHODS] pertinent to the [investigation, treatment, or discussion] of conflict, or to CONSTRUCT a universal ideonomic science of conflicts (SYRRHAGMATOLOGY).

Please see the tables "38 Concepts Pertinent To Conflict" and "35 Methods Pertinent To Conflict: Its Investigation, Treatment, Or Discussion".

"109 'GENERA OF CONFLICTABLE THINGS'"

1. Accompaniments (cf. #3).
2. Accomplishments.
3. Associations (cf. #1).
4. Attributions or assignments.
5. Behavior, acts, actions, activities, customs, or practices.
6. Benefits, advantages, or goods.
7. Boundaries, interfaces, or margins.
8. Causes or stimuli (cf. #14, #48).
9. Centers or axes.
10. Changes, transformations, or dynamics.
11. Circumstances, conditions, or preconditions.
12. Concerns or interests.
13. Consequences, effects, or side effects (cf. #60).
14. Controls, constraints, governments, managements, coordinations, influences, factors, or cofactors (sic) (cf. #24, #28, #99).
15. Convergences, divergences, or vergences.
16. Cooperative phenomena or interdependences.
17. Corollaries, implications, meanings, deductions, conclusions, hypotheses, theories, predictions, inductions, expansions, or extensions.
18. Criteria.
19. Data, signs, or indications.
20. Decisions or choices.
21. Degrees of freedom or variables.
22. Descriptions, representations, imagery, models, correlations, valuations, interpretations, analogies, perspectives, or paradigms (cf. #3, #67).
23. Dimensions, dimensionalities, or meta-dimensions.
24. Disequilibria or instabilities (vs. #28, cf. #25).
25. Dissipations or degenerations (cf. #24, #28, #99).
26. Domains, phases, or points.
27. Elements, components, contents, inclusions (e.g. would-be), parts, or details.
28. Equilibria, stabilities, metastabilities, relaxations, adaptations, or adjustments (vs. #24; cf. #25, #86).
29. Events.
30. Examples or instances.
31. Experiences.
32. Extrema [minima, maxima, etc].
33. Features, phenes, appearances, sensa, percepts, or perceptions (cf. #22, #74).
34. Forces, energies, or fields.
35. Frameworks or matrixes.
36. Functions, roles, or reasons (cf. #8).
37. Fundamentals.
38. Goals, objectives, purposes, or endings.
39. Groupings, configurations, or arrangements.
40. Hierarchies.
41. Ideas, concepts, conceptions, or doctrines.
42. Individuals.
43. Inputs (cf. #60).
44. Languages.
45. Laws, principles, or rules.
46. Levels.
47. Measurements, measures, coordinates, or coordinate systems.
48. Mechanisms (cf. #8, #14).
49. Methods, procedures, or operations (cf. #92).
50. Modalities.
51. Modes.
52. Motions or flows.
53. Motivations, feelings, or drives.
54. Needs or challenges.
55. Networks or plexures.
56. Niches.
57. Opinions, beliefs, or attitudes.
58. Opposites.
59. Optima or norms.
60. Outputs, products, or expressions (vs. #43; cf #13).
61. Partitionings, divisionings, or compartments.
62. Patterns or meta-patterns.
63. Perturbations, disturbances, sensitivities, stresses, strains, or thresholds.
64. Phases, stages, or cycles.
65. Phenomena.
66. Philosophies or world views.
67. Polarities, orientations, dependences, or couplings.
68. Polymorphisms.
69. Potentials, possibilities, abilities, capacities, or powers.
70. Priorities, serial orderings, or permutations.
71. Probabilities.
72. Processes.
73. Proofs or arguments.
74. Properties or qualities (cf. #22, #33).
75. Propositions.
76. Quantities or proportions.
77. Randomnesses [chance events, contingencies, stochastic processes, etc].
78. Ranges or distributions.
79. Realms.
80. Relationships.
81. Responses or reactions.
82. Rhythms.
83. Routes or paths.
84. Self-effects.
85. Sets or combinations.
86. Simplicities, homogeneities, regularities, linearities, isotropies, or continuities (cf. #28).
87. Solutions or answers.
88. Standards.
89. Statements.
90. States.
91. "Stories", "melodies", sequences, series, or chains.
92. Strategies or tactics (cf. #49).
93. Structures, forms, or textures.
94. Styles.
95. Substances.
96. Symmetries or equivalences.
97. Systems.
98. Tasks, programs, or undertakings.
99. Tendencies, trends, directions, gradients, vectors, or evolutions (cf. #25).
100. Themes.
101. Thoughts or logics.
102. Times, moments, or epochs.
103. Tolerances or strengths.
104. Truths, axioms, assumptions, or postulates.
105. Types, genera, or species.
106. Unities, syntheses, integrations, harmonies, consiliences, or concinnities.
107. Uses or applications.
108. Values or importances.
109. Wants.

'68 'CAUSES OF CONFLICTS'

1. [Absence, decay, or extinction] of other conflicts (sic).
2. Abuse.
3. Aggressions.
4. Alienation.
5. [Alignments, associations, requirements, or corollaries] that are [dissimilar, incorrespondent, contrary, competitive, contradictory, irreconcilable, or inter-inimical].
6. Anarchy, chaos, turbulence, or deficient organization or coordination.
7. Ambiguities.
8. Anamorphoses, complexities, or myriontology.
9. Antagonisms or incompatibilities [mutual or unilateral].
10. Antisynergisms.
11. Asymmetries, inequalities, imbalances, disequilibria, or nonequivalences.
12. Autonomy, independence, neutrality, uncooperativeness, or insubmissiveness.
13. Carelessness, neglect, irresponsibility, lack of foresight, planning, or preparation.
14. Chance, indeterminacies, fluctuations, field-fluctuations, coincidences, synchronies, anomalies, irregularities, minutiae, dynamics, statistics, or probabilities.
15. Circularities, reverses, or cycles.
16. COMPETITION [for control, dominance, inferiority <sic>, supremacy, rewards, possession, resources, wealth, evolutionary edge, priority, attention, power, influence, access, right, security, continuity, freedom, knowledge, benefits, advantages, opportunities, office, locus, means, etc].
17. Configurations.
18. Congruences, symmetries, identities, or convergences.
19. Covariations.
20. Criticisms.
21. Differences, contrasts, or opposites (e.g. in man different [values, beliefs, attitudes, perceptions, philosophies, practices, institutions, or languages]).
22. Directions, tendencies, patterns, forces, purposes, or goals] that are [dissimilar, contrary, competitive, contradictory, irreconcilable, or inter-inimical].
23. Disturbing or unfavorable [situations, conditions, environments, events, actors, or factors]; or catalysts, triggers, or disasters.
24. [Elements, phenomena, structures, qualities, or capacities] that are [dissimilar, contrary, competitive, contradictory, irreconcilable, or inter-inimical].
25. Errors.
26. Excessive, uncontrolled, or exponential growth or change.
27. Exclusional processes.
28. Expressions.
29. Extremism.
30. Factors [exploiting, creating, or actively maintaining] conflicts; or self-perpetuating (aspects of) conflicts.
31. Fights, wars, arguments, machinations, contests, or games.
32. GENERA OF 'BADS' (vide).
33. Haste or overrapidity.
34. Hatreds, intolerances, or strife.
35. Idleness or stagnation.
36. Imperfections.
37. Injustices or unfairnesses.
38. Instabilities, weaknesses, fragilities, delicacies, sensitivities, or margins.
39. Interdependences, exchanges, intercontrols, interactions, reciprocities, feedbacks, reactions, amplifications, or resonances.
40. Interdifferentiation, divergence, disjunctions, dissociation, separation, 'mutual' transcendence, or new associations.
41. Interfaces, borders, or boundaries (or phenomena thereof).
42. Interferences, side effects, collisions, contact, contiguity, displacements.
43. Intersections, entanglements, combinations, or excessive overlap, interpenetration, or mutual involvement.
44. Logical relationships (e.g. [nil, defective, or peculiar] [reflexivity, commutativity, distributivity, associativity, transitivity, or seriality, or hierarchy]).
45. Maladjustments or being out of step or rhythm.
46. Misbehavior, defects, or pathologies [e.g. loss of self-control, or human neurosis, insanity, stupidity, or irrationality].
47. Misgovernment or management.
48. Misunderstandings, confusions, 'language difficulties', misperceptions, misconceptions, misinformation, ignorance, prejudices, uncertainties, illusions, or delusions.
49. Movements, migrations, or actions.
50. Niches.
51. Nonlinearities.
52. [No, poor, or defective] [oversight, laws, guidelines, or standards].
53. Other conflicts (sic).
54. Partitions or barriers.
55. Problems or difficulties.
56. Progress, evolution, change, variables, innovation, emergence, or novelty.
57. Propagations.
58. Redundancy.
59. Revolutions, discontinuities, transformations, negations, or subversions.
60. Rigidities, immutabilities, or inadaptabilities.
61. Scarcities, stoichiometries, needs, or zero-sum competition.
62. Strains, failures, disintegrations, or degenerations.
63. Stresses, tensions, pressures, or excesses.
64. Suppression or 'excessive' restriction or inhibition.
65. Traditions, habits, norms, inertias, or momenta.
66. Vergences.
67. Wants, desires, greed, ambitions, or misery.
68. [Wrong, misordered, graceless, crude, or immethodical] actions or courses.

DOG FIGHTS

Three lists under the division CONFLICTS will be used in conjunction with one another in this exercise: "69 Causes of Conflicts", "109 Genera of Conflictable Things", and "51 [Consequences, Effects, Or Products] of Conflicts". Items will be drawn from these lists at random to produce recurring triplets of sentences.

The first sentence of each of these triplets will ask whether some random cause of conflicts ever causes whatever particular conflict is at issue—"dog fights" in the present instance.

The second sentence of the triplets asks whether the particular conflict—again, dog fights—could be said to represent some random genus of conflicts.

Finally, the third sentence of each triplet asks whether the given conflict at issue can have the type of effect, product, or consequence that has been randomly chosen by the computer program.

These three sentences in each triplet, or the answers thereto, may or may not appear to bear upon one another in some way or to be mutually complementary.

The stochastic character of this exercise should not be mistaken for the way in which ideonomy will normally be done once it has developed as a genuine science. At that point intricate weightings, complicated statistical programs, and massive past ideonomic experience will dictate in an enlightened and logical way not only the internal structure of triplets (which sentences should accompany and follow one another in all possible or all proper triplets) but which triplets should accompany and follow other triplets and even which triplets are apt to be appropriate for particular (arbitrary) conflicts.

After this first triplet another triplet randomly constructed by the computer appears. Ideas derived by analysis of the preceding triplet may or may not relate to ideas apt to arise from this second triplet.

A chain of up to 383,571 more or less irredundant triplets could be explored in this way to illuminate the nature and possibilities of dog fights, or of any other given conflict.

The following treatment of dog fights is of interest for the relevance it might have to the large-scale effort that is currently underway to advance ethology (the science of animal behavior).

(1) Are dog fights ever caused by ANTAGONISMS OR INCOMPATIBILITIES [MUTUAL OR UNILATERAL]?

REMARK: The answer of course is yes. Yet the sentence calls attention to the fact that conflicts may arise from PREEXISTING, PECULIAR, or PROBLEMATIC antagonisms or incompatibilities, including ones that might reflect inborn character traits of dogs, possibly in ways singularly limited to certain pairs or pairings of canine traits, or of such traits in given pairs of dogs.

Do they generically represent conflicts between or among HIERARCHIES?

REMARK: Dogs have hierarchic pecking orders, but the question refers to conflicts between hierarchies. Perhaps the hierarchy represented by a pecking order can fold over upon itself, and display internal conflict that is analogous? Then again, might a given set

(say pack or litter) of dogs possess more than one pecking order, or 'pecking sub-orders' (say expressing themselves with fractional probabilities, in given situations, at given times, in given orders or clusters, e/vc), or different types, qualities, or functions of pecking orders? In the course of time a canine pecking order may compete with, be superseded by, or alternate cyclically with other pecking orders. Hierarchies other than pecking orders exist in dogs and may, in fact must, trigger canine quarrels (hierarchies of different drives within the brains of dogs, for example).

Can their effect, product, or consequence be GAMES?

REMARK: Simple conflicts among dogs—over who gets to be fed first, who gets what bits or types of food, or who gets how much, who gets to lead the pack, who gets a bitch in heat, who gets to be best friend of the master, etc—will inevitably generate games.

REMARK ON THE TRIPLET AS A WHOLE: Dog fights could indeed arise from antagonisms or incompatibilities, represent conflicts between hierarchies, and inspire games; the first could indeed be hierarchic, and the games might derive from this very hierarchic property. Hence the triplet may be completely coherent.

(2) Are dog fights ever caused by CONGRUENCES, SYMMETRIES, IDENTITIES, OR CONVERGENCES?

Do they generically represent conflicts between or among NICHES?

Can their effect, product, or consequence be RACES?

(3) Are dog fights ever caused by [NO, POOR, OR DEFECTIVE] [OVERSIGHT, LAWS, GUIDELINES, OR STANDARDS]?

Do they generically represent conflicts between or among PHENOMENA?

Can their effect, product, or consequence be EXTREME BEHAVIORS?

(4) Are dog fights ever caused by WANTS, DESIRES, GREED, AMBITIONS, OR MISERY?

Do they generically represent conflicts between or among IDEAS, CONCEPTS, CONCEPTIONS, OR DOCTRINES?

Can their effect, product, or consequence be REVERSIONS, RETROGRESSIONS, OR CRUDIFICATIONS?

(5) Are dog fights ever caused by ASYMMETRIES, INEQUALITIES, IMBALANCES, DISEQUILIBRIA, OR NONEQUIVALENCES?

Do they generically represent conflicts between or among TIMES, MOMENTS, OR EPOCHS?

Can their effect, product, or consequence be JUMPS OR DISCONTINUITIES?

(6) Are dog fights ever caused by GENERA OF 'BADS' (VIDE)?

Do they generically represent conflicts between or among PRIORITIES, SERIAL ORDERINGS, OR PERMUTATIONS?

Can their effect, product, or consequence be HARMONIES, UNITIES, OR SYNTHESES [GREATER OR CHANGED]?

(7) Are dog fights ever caused by REDUNDANCY?

Do they generically represent conflicts between or among STATEMENTS?

Can their effect, product, or consequence be PERTURBATIONS, DISTURBANCES, STRESSES, STRAINS, OR INTERFERENCES?

51 [CONSEQUENCES, EFFECTS, AND PRODUCTS] OF CONFLICTS

1. Accelerations or amplifications.
2. Adjustments or adaptations.
3. Alignments or realignments.
4. Autocorrelation or improved self-coordination or fitness.
5. Chains of consequences.
6. Changes, transformations, restructurings, or reconfigurations.
7. Chaos, disunity, disharmony, irregularity, or random behavior.
8. Competition for [resources, advantages, niches, dominance, mutual independence, loci, priorities, associations, etc].
9. Compromise, convergence, tradeoffs, averaging, equalization, identity, uniformity, symmetry, or negotiation.
10. Conflict curtailment or avoidance, or extinction of conflict source (vs. #35).
11. Damages, harm, defects, errors, or pathology.
12. Deflections.
13. Disintegration, fission, death, failure, terminations, or mutual annihilation (vs. #41).
14. Displacements, relocations, or transportations.
15. Distractions.
16. Emergence [novelty], evolution [niveaux or higher things or aspects of things], or transcendence [transcendents or transcendent states].
17. Entanglement, co-involvement, or plexure (cf. #26, #27).
18. Exchanges or mutual concessions or accessions.
19. Extreme behaviors.
20. Fights, arguments, debates, wars, contests, or struggles.
21. Frictions.
22. Games.
23. Generated [methods, strategies, tactics, tools, resources, etc].
24. Harmonies, unities, or syntheses [greater or changed].
25. Intercommunications or mediations.
26. Intercorrelations, linkages, coupled behavior, interdependence, reciprocities, or intercontrol (cf. #17).
27. Interpenetration, overlapping, contact, or superposition (cf. #17, #34).
28. Inversions, reversals, transpositions, or substitutions.
29. Isolation of the [conflict or conflictual system] from the larger environment.
30. Jumps or discontinuities.
31. Limitations.
32. Losses, costs, risks, insecurities, special needs, greater energy expenditures, or use of stores and surpluses (cf. #51).
33. Maneuvering or movements.
34. Merger, coalescence, or combination (cf. #17, #27).
35. More and different conflicts, sub-conflicts, conflict specialization and segregation (vs. #10).
36. Mutual [imbalances, asymmetries, or differences].
37. New equilibria.
38. Oscillation, vibrations, 'coorbiting', chasing behavior, or rotation.
39. Perturbations, disturbances, stresses, strains, or interferences.
40. Races.
41. Reinvigoration or renewal (vs. #13).
42. Reversions, retrogressions, or crudifications.
43. Revolutions, subversions, overthrows, destabilizations, or disequilibria.
44. Searches, hunting behavior, or (virtual) experimentation.
45. Separations, expulsions, or outputs.
46. Stoppages or retardations.
47. Stratifications, hierarchizations, compartmentalization, or assortations.
48. Surprises or [more complex, less predictable, or anomalous] behavior.
49. Tests or data.
50. Violence or brutality.
51. Wastes, inefficiencies, added costs, or greater entropy (cf. #32).

EFFECTS

Turning now to the diapasonal effects that conflicts may have, and the organon "51 Consequences, Effects, and Products of Conflicts" (vide).

First, conflicts can cause ACCELERATIONS OR AMPLIFICATIONS.

One way to recognize the effects that conflicts may have is to consider possible and necessary relationships between and among the diverse effects of conflicts in general or of the particular conflict that may occupy one's mind at a given moment. What or which effects are apt to cause—and/or be caused—by what or which other effects? Which are apt to be contingent and which should be thought of as necessary? What possible and necessary clusterings of these effects are there? What sequences of events and combinations of circumstances may produce and modify the play of effects imagined?

Thus mismanagement within one company can create a marketing opportunity for a competitor and bring the two companies into conflict, precipitating a race to claim or reclaim the allegiance of a group of consumers—as a primary effect of the conflict—and amplifying and accelerating market research and sales efforts—as a secondary or accessory effect.

Where conflict between good and evil is made explicit, polarization may result and both virtue and vice may be amplified momentarily.

Conflicts, of course, can also amplify and accelerate themselves.

Secondly, the effect of conflicts may be to produce ADJUSTMENTS OR ADAPTATIONS.

Two friends who discover that they happen to be suitors of the same woman may have to adapt to the reality that they cannot both be successful or else adjust the terms of their friendship.

When two species come into conflict because of their reliance upon the same food source, one may adapt to the situation by changing its diet.

Thirdly, the effect of conflicts can be ALIGNMENTS OR REALIGNMENTS.

When a new issue arises in political life, new and transformed alignments occur among various and sundry political groups, including ones that have no natural interest in the matter, but do have an interest in the long-term balance sheet of favors done and gotten.

Similar alignments and realignments can be expected to occur among the brain's many neurons in the course of sensory experience or whenever thinking occurs.

An interesting speculation by analogy is that such shifting alignments and realignments may occur in the physical particles of a gas or solid.

Fourthly, an effect of conflicts can be AUTOCORRELATION OR IMPROVED SELF-COORDINATION OR FITNESS.

Perhaps the conflict is that existing between a farmer and the elements as the farmer attempts to raise a crop. The man plows the soil but finds that the soil puts up resistance to being broken up and overturned by the plow. With a patch of soil that is especially hard the man may have to advance his plow repeatedly or apply greater muscular effort.

The instantaneous effect of this conflict will be to increase the coordination of the man's many muscles and synergism of his nervous, sensory, and endocrine systems. Such integration triggered by the exertion may persist the next day or have become even more marked at that point because of hysteresis.

Will there be any similar effect upon the soil itself? Yes there will be. The soil's clumps, molecules, and topographic points, for example,

will have gotten mixed and diffused, and—by analogy to fluid dynamics—the soil will in effect have become more 'autocorrelated'. Some information representing the pattern and history of the plowing or mixing process itself will be added to the soil via the induced autocorrelation thereof.

Fifthly, conflict may give rise to CHAINS OF CONSEQUENCES.

Since all physical events inevitably release chains of consequences, this is not surprising. Nevertheless, the kinds of chains of effects that may be associated with various conflicts are things that it is important to study and know—partly owing to their predictive value.

Thus fights between children may spawn chains of consequences that ultimately shape adult character in peculiar ways. By carefully studying such chains for their possible generic characteristics, it might be possible to identify the standard origins of standard virtues and vices of adults who are the end products of the recurring chains—and to know, as a result, which juvenile conflicts it is desirable either to eradicate or preserve.

Sixthly, CHANGES, TRANSFORMATIONS, RESTRUCTURINGS, OR RECONFIGURATIONS may occur as effects of conflicts.

Metastable dynamical equilibria must obtain at all length and temporal scales in nature, and certain configurations of ocean currents may be of this metastable sort, even though the average frequency of change is, say, anywhere from years to millennia. Conflicts arising from slow or rare events may often cause changes, restructurings, or reconfigurations of the large-scale patterns of flow of the ocean's waters.

In phytogeography, different communities of plants must be in perpetual motion, tension, and collision. Conflicts at the contiguous peripheries of such communities must generate diverse cyclic and aperiodic transformations: including radially or even circumferentially moving undulations, alternations, exchanges, or multistage successions of different plant species. There may even be analogs of linear and angular momentum in the translations and rotations of plant populations at every spatial scale, in which case the various types of momental conflicts found in the physical sciences would be expected as well.

Seventhly, the product of conflicts may be CHAOS, DISUNITY, DISHARMONY, IRREGULARITY, OR RANDOM BEHAVIOR.

The mathematical theory of chaos has shown how conditions or states of great order, simplicity, unity, regularity, or determinism may abruptly give way to their opposites on occasion. Even simple conflicts may therefore lead to chaos in a straightforward way.

Where entities that are normally constrained by global forces become enmeshed in conflicts with one another locally, utter chaos may emerge.

Eighthly, conflicts may not only be caused by but may themselves cause COMPETITION—FOR THINGS SUCH AS: RESOURCES, ADVANTAGES, NICHES, DOMINANCE, MUTUAL INDEPENDENCE, LOCI, PRIORITIES, OR ASSOCIATIONS.

Program, memory, or operational errors could cause a conflict to develop among the parts of a computer program, and this in turn could cause those parts to compete in the computer for resources, advantages, dominance, or priorities.

Different possible interpretations of a painting's meaning may give rise to a conflict within the mind, and this conflict may in turn cause those interpretations to compete for various mental niches.

A fundamental doctrinal conflict between two religions may cause them to compete for converts, in a way or to a degree that would not be the case in the absence of such conflict or were the religions reconcilable.

"39 'SPECIES OF CONFLICTABLE THINGS'"

1. Aesthetic or moral values.
2. Age groups.
3. Alternative biochemical equilibria.
4. Animals.
5. Bodily systems.
6. Brain states.
7. Branches of a family.
8. Branches of government.
9. Cerebral hemispheres.
10. Chemical reactants.
11. Children.
12. Computer instructions.
13. Corporations.
14. Cultural customs.
15. Developmental tendencies.
16. Divisible facial expressions.
17. Heirs to the throne.
18. Industries.
19. Interpretations of literary texts.
20. Intra-individual emotions.
21. Life goals.
22. Managerial levels.
23. Microorganisms.
24. Military tactics or strategies.
25. Molecules competing for a cell receptor.
26. Nations.
27. Ocean currents.
28. Opinions of different individuals.
29. Perceptual gestalts.
30. Plants.
31. Races of men.
32. Religions.
33. Scholars.
34. Schools of art.
35. Scientific theories or beliefs.
36. Social classes.
37. Subspecies.
38. Visual sensa or percepts.
39. Wise men.

15. EXAMPLES OF CONFLICTS

1. Among brain neurons competing for [neural, psychic, or metabolic] [precedence or dominance].
2. Among characters in a novel.
3. Among different business interests.
4. Among genes within the genome.
5. Among phenes within the biont (or phenotype).
6. Among political [ideas or ideologies].
7. Among rival organisms [bionts or species] competing for finite ecological niches.
8. Between alternative [different or opposite] interpretations of a painting's [meaning or content].
9. Between (forces of) social progress and reaction.
10. Between good and evil.
11. Between integrative and disintegrative forces within the body.
12. Between or among different social [classes or groups].
13. Between small things and large.
14. Of armies upon the battlefield.
15. Psychomachies (or conflicts of the soul).

"38 CONCEPTS PERTINENT TO CONFLICT"
Its Investigation, Treatment, Or Discussion

1. Aggression, transgression, dispossession, or usurpation.
2. Alternation, oscillation, or vibration.
3. Bad, destruction, harm, cost, risk, danger, or insecurity.
4. Collision.
5. Competition.
6. Contradiction.
7. Dialectics.
8. Difference or dissimilarity.
9. Disalignment.
10. Disequilibrium or instability.
11. Disharmony.
12. Disorder, chaos, anarchy, or irregularity.
13. Disturbance, perturbation, or displacement.
14. Divergence.
15. Drama.
16. Entanglement.
17. Force.
18. Frustration.
19. Game.
20. Incompatibility.
21. Indeterminacy.
22. Interaction.
23. Interference, friction, or subversion.
24. Limitation.
25. Maladjustment, incongruity, or asymmetry.
26. Motion.
27. Mutual constraint.
28. Nonlinearity or complexity.
29. Opposition.
30. Pathology.
31. Polarities.
32. Reciprocity.
33. Separateness.
34. Struggle.
35. Success or victory (or failure or defeat).
36. Tendencies.
37. Tension, strain, or stress.
38. Violence.

"35 METHODS PERTINENT TO CONFLICT"
Its Investigation, Treatment, Or Discussion

1. Acceleration.
2. Cause-effect inversion.
3. Classification.
4. Combination.
5. Complication.
6. Construction.
7. Decomposition.
8. Description.
9. Experimentation.
10. Explanation.
11. Extension.
12. Extinction.
13. Forcing.
14. Generalization.
15. Interruption.
16. Isolation.
17. Limitation.
18. Maximization.
19. Measurement.
20. Minimization.
21. Modeling.
22. Modulation.
23. Phasing.
24. Prevention.
25. Redirection.
26. Reproduction.
27. Sequencing.
28. Simplification.
29. Simulation.
30. Specialization.
31. Steering.
32. Strategic planning.
33. Stratification.
34. Transformation.
35. Triggering.

SIMILARITIES AND DIFFERENCES BETWEEN TWO SCENES

The systematic comparison of two scenes to identify their diverse analogies and contrasts can afford a wonderful illustration of the way in which ideonomy can be developed.

The overall method is simple and direct, and readers can easily experiment with it themselves. Also its ways of being modified and extended, and its reapplicability to other matters (such as comparisons of pieces of music or life events), are rather obvious.

The scenes that are compared may be arbitrary or random, or ones that have been pre-selected for their relatedness or unrelatedness, or for their oppositeness, in overall appearance, structure, general content, subject, or special interest.

The process of comparison may be either spontaneous and unprepared, or based on careful consultation with a set of a priori or universal criteria or other guides.

The comparisonal exercise may be superficial or truncated, or instead extensive, deep, or exhaustive to an arbitrarily great degree. It may be either thematic or general; it may pursue a specific goal or move in some chance or predetermined direction.

Where analogies are found, they may themselves be heuristic, by suggesting ad hoc other analogies and in fact by suggesting actual differences. Likewise, where differences between the scenes are noted they in turn will suggest other differences, as well as actual similarities.

The relevant ideonomic principles are: (1) Analogies are a function of other analogies; (2) Differences are a function of other differences; (3) Analogies are a function of differences; (4) Differences are a function of analogies; (5) Functions are a function of other functions; and (6) Comparisons (always) imply infinite meta-structures.

When two scenes have been compared—and their set of similarities and dissimilarities enumerated, distinguished, and defined—the results of the exercise can be studied to identify and extract a set of relatively fundamental and general elements, dimensions, and concepts. These will presumably have been the key terms in one's analysis and comparison of the scenes.

This set of empirically derived terms can thereafter be used and endlessly reused as generalized ("generic") absolute or relative bases for either comparing or simply describing other scenes, of a related or unrelated character.

Also, and more importantly, it can be added to and integrated with other such sets of terms that were, or that will later be, produced elsewhere: say through all possible comparisons of all possible pairs or sets of scenes, or as a result of a general program of investigations. Powerful organons of both general and specialized nature can be developed in this way.

I will now conduct such a comparison of one particular pair of scenes, both taken from the colorful pages of National Geographic, the world's most subscribed magazine. Please see the accompanying chart "Positive and Negative Analogies Between Two Scenes".

The pair of small photographs has been reproduced at the top, although unfortunately not in the original color (which renders many of the items on the chart obscure, meaningless, or ambiguous to the reader). The photographs are labled Scene-I and Scene-II.

Juxtaposed beneath these scenes are two columnar lists. That on the left is titled and captioned "ANALOGIES (Identities, Commonalities, Similarities, and Positive Analogies)". The antipolar counter-list on the right is headed "NEGATIVE ANALOGIES (Nonidentities, Noncommonalities, Differences, and Catalogies)".

The parenthesized terms are meant to explicate some of the different and even disparate things that are unavoidably but misleadingly subsumed in the holophrases "analogies" and "negative analogies" (syn. catalogies). These appended terms are actually themselves elliptical, as can be seen from the organon "Subsenses, Homosenses, Merosenses, Parasenses, Cognates, Congeners, Etc of: (Positive Analogies and Negative Analogies)", which offers a larger breakdown of the possibilities. And in all likelihood there 'are' infinitely many different-but-related concepts that properly belong or relate to the expedient holophrases.

All the concepts listed in the second organon were compared and judged to be essentially, or definably, irredundant. This organon, incidentally, introduces the reader to some of the technical terms that will have to be developed and employed concertedly in the new science of ideas. Existing words and concepts cannot possibly meet the need that exists for additional, more precise, more essential, and more encyclopedic terminological and cognitive distinctions, and for the curtailment of ambiguity.

In the dicolumnar lists of the first organon I tried to enumerate all of the nontrivial similarities and differences of the two scenes I could think of (although those I have itemized are admittedly of varying generality and importance). Some of the things that I list are more conjectural than certain (most of these items are flagged by a question mark); even the magazine plates left the exact nuances of many features open to different interpretations. Whenever one attempts to describe precisely the complex interrelations of the detailed features of something, one is apt to find, to one's horror, that an overwhelming number of ambiguities obtain, and that these preclude any unique, complete, or categorical characterization of what is there or of what it means.

The reader should also be warned that some of the items that seem to be more or less identical to other items on the same list, really are not. These quasi-identical items result from the inadequacies of words (as well as the brachylogy of the organon).

Notice that the number of positive and negative analogies that are identified is the same, or 53. The coincidence, however, is an artifact. I wanted the degree of analogization to be or appear proportionate to the degree of differentiation, so I stopped the growth of the two lists at the same point. This fact can also dramatize in the mind of my reader that, although the lists are substantial, they are by no means exhaustive. Indeed, you might find it an instructive exercise to try to extend them; at the very least, this would give you a much better understanding of what the lists do contain and mean, and of my own cognitive processes as an ideonomist when I compared the scenes and wrote the organon.

Let me now discuss a representative set of the 106 (53 + 53) inter-scenic similarities and differences. I will begin with the similarities.

Analogy #1: Dark objects in the foreground (of the two pictures) stand silhouetted against the luminous, larger and more open, background.

That the two scenes are in fact identical in this respect requires for its perception the supervention of higher mental logic over elementary sensory awareness: since in Scene-II the outdoors (in its intrinsic immensity) is only hinted by the series of openings in the walls of the shed (whose interior is the subject of the photograph). But the opaque outlines of the crowns of the trees and the frame of the building against the bright backdrop do unquestionably represent a profound and conspicuous analogy between the scenes: and a 'central or axial theme' of the intellect as it schematizes the total interrelations of the scenes by synthesizing an elegantly unitary (maximally symmetric or supersymmetric) complexus of informational meta-structures (including hierarchies, series, cycles, trees, networks, fractals, attractors, vergences, etc).

A CATALOG OF GENERIC BASES FOR COMPARING AND EVALUATING SCENES

1. View inclination.
2. Natural vs. artificial subject matter.
3. Distance.
4. Scene fullness (object density).
5. Main orientation of scene lines (transverse vs. vertical vs. longitudinal).
6. Predominant color (or part of spectrum; e.g. blue vs. red end of spectrum).
7. Scene diversity (object richness).
8. Number of distinct regions in scene or overall regionality (relative).
9. Average simplicity vs. complexity of average scene objects.
10. Overall obliquity of scene or its elements (relative).
11. Shadowing amount.
12. Illumination degree (or light level).
13. Curvilinearity vs. rectilinearity (general ratio of).
14. Curvilinearity vs rectangularity (general ratio of).
15. Textural similarities vs. dissimilarities: (1) overall; (2) specific elements.
16. Image resolution (focus).
17. Convergences vs. divergences: (1) various specific; (2) overall.
18. Paralinearities vs. nonparalinearities: (1) overall; (2) specific.
19. Planarities: (1) overall; (2) specific planes.
20. Paraplanarities: (1) overall; (2) specific.
21. Coplanarity (overall).
22. Symmetries: (1) specific; (2) total symmetry (overall order vs. amorphy).
23. Reflectional symmetries (e.g. bilateral symmetries).
24. Clusteral symmetries.
25. Spatial homogeneity vs. inhomogeneity (regularity vs. irregularity of overall spacing as a function of distance from viewer).
26. Spatial isotropy vs. anisotropy (regularity vs. irregularity of overall spacing as a function of distance from scene's edge or center).
27. Axosymmetry (overall).
28. Overall tridimensional texture ('relief').
29. Tridimensional 'fog' ('apparent quasi-solid or fractal filling, disturbance, heterogeneity, or texture of the total scene volume': either Euclidean or as biased by the observer and/or the representational projection).
30. Overall scenic scale-invariance vs. scale-dependence.
31. Total bidimensional spatial texture (total apparent or implied surface or surficial relief, roughness, or curvature, or topography).
32. Total 'flat' texture ('geographic intensity, heterogeneity, or information', 'domainal complexity, micro-compartmentation, or multiplexing', e/vc).
33. 'Compound ratio of total investment of scene information in different taxons of order (e.g. sequential, cyclic, fractal, clusteral, tesellational, rational-numeric, real-numeric, complex-numeric, chaotic, attractoral, hierarchic, holonomic, meromorphic, Peano-curve or inflectional or enfolded or flexural, infinite-derivative, point-set, self-dissimilar, contradictory, illusional, boundary or self-bounded, idiomorphic, circuital, divergent, convergent, vergent, rotational, radiational or arboreal, anastomotic or reticular, matrixal, mereologic, crystallomorphic, antisyzygial, eversional or egagropilar, plexural, wound or twisted, cellular-automaton, spectral, meta-dispersional, e/vc; also chromatic (Munsell 3-dimensional), morphic, fuzzy-logic, e/vc)'.
34. 'Total omnigenous entropy vs. order vs. information'.

(cont.)

35. Centrosymmetries (e.g. centers, poles, foci, radial symmetries, 'onion symmetries', annular symmetries, spherical symmetries, ovoidal symmetries, vertices, conoidal symmetries, cylindroid symmetries, e/vc): (1) overall; (2) specific.
36. Gradients, chains, sequences, series, paths, e/vc.
37. Breadth vs. narrowness: (1) of scene; (2) of picture; (3) of scenic elements (overall or individually).
38. Height vs. squatness: (1) of scene; (2) of picture; (3) of scenic elements (overall or individually).
39. Depth vs. 'flatness': (1) of scene objectively; (2) of scene subjectively; (3) of scenic elements (overall or individually).
40. Stratification.
41. Concavity vs. convexity vs. zero-concavity-and-convexity (of scene).
42. 'Undularity' or 'plication': (1) total; (2) general; (3) local.
43. Scenic 'brokenness' (holedness or interruptedness).
44. Organizational unity vs. pluralism.
45. Familiarity vs. unfamiliarity.
46. Simplicity vs. complexity.
47. Domination vs. nondomination.
48. Closure vs. openness of the scene.
49. Details vs. medium-size vs. large elements as dominant (most important).
50. Apparent time (e.g. of day, seasonal, historical, or event-specific).
51. Viewer angle to scene.
52. Apparent place.
53. Time-specificity vs. time-indefiniteness.
54. Ubiety vs. unlocalizability.
55. Scenic length scale (size scale).
56. Active vs. inactive scene.
57. Mood.
58. Apparent antecedence vs. contemporaneity vs. postcedence of scene (actional stage).
59. Degree of interest of scene.
60. Beauty vs. ugliness vs. aesthetic neutrality: (1) overall; (2) aspectual; (3) local.
61. Balance vs. imbalance (asymmetry; overall).
62. Archetypal vs. specialized nature of scene.
63. Vagueness vs. clarity of scene's nature, subject, or theme.
64. Apparent completeness or incompleteness of scene.
65. Overall similarity vs. dissimilarity (of one scene to another).
66. Population (total number of scene objects or things).
67. Differentiability or individuality of the elements (parts) of the scene.
68. Discreteness vs. continuity of the scene's objects, features, qualities, or aspects (their measure of disconnectedness, unconnectedness, or connectedness).
69. 'Compound angle of scenic top, midplane, and bottom elements' (e.g. of sky to people to ground).
70. Consistency vs. inconsistency: (1) overall; (2) specific; (3) local.
71. Resolutional isotropy vs. anisotropy (i.e., e.g., general or aspectual : 'focus' can be spatially invariant, variable, or even nonmonotonically variable : over or between : the three dimensions, or six or more directions, of space).
72. Degree of self-explanability of scene (its 'self-meaning'; the power of a scene's structure and content to progressively assist with its own decipherment, or with the extraction of more and more meaning from the scene).

COLOR KEY :

☐ : How Scenes Alike;

☒ : How Scene-I Differs;

☐ : How Scene-II Differs.

POSITIVE AND NEGATIVE ANALOGIES BETWEEN TWO SCENES

1984 June 29
applied ideonomy
ANALOGIES
vision

Scene-I:

Scene-II:

ANALOGIES

and Kins

1. Dark objects in foreground stand silhouetted against luminous larger and more open background.
2. The solid objects are mainly wooden or arboreal.
3. The main figure in the foreground is a living organism.
4. Both scenes appear to speak of bad weather.
5. Tops of the heads of clouds and man are shown from the side.
6. The intermediate space is open.
7. The branches and derived twigs of the trees are like the arms and hands of the man.
8. There are stratified horizontal lines (cf.#23).
9. The main foreground objects are upright.
10. Pieces of the external 'light' are seen through opaque frameworks (cf.#1).
11. Bottoms of the scenes are darker, tops brighter.
12. The brightest light is natural.
13. The brightest light is white.
14. Tops of the heads of clouds and man appear fluffy.
15. Tops of the heads of clouds and man are rounded.
16. Natural light is transmitted through liquids (glass windows and cloud water droplets).
17. Main foreground objects (man and trees) are supported by skeletons.
18. Both scenes are oriented rather to the left.
19. The major foreground figures are slanted leftward.
20. No or few green objects.
21. Tree-tree interspace in Scene-I and standing human figure in Scene-II both suggest a median vertical axis.
22. They also suggest (v.#21) an upright rectangle of similar area and configuration.
23. Decoys and clouds alike seem carved with innumerable longitudinal (horizontal) lines (cf.#8).
24. The major scenic lines appear slanted upward.
25. Yet (v.#24) in both cases the effect is presumably an illusion and the slope of the lines with respect to the surface of the earth is zero.
26. Large foreground objects block the view (cf.#1).
27. Brightest toward upper left
28. Resolution comparable.
29. Clouds of Scene-I look jumbled like the pieces of decoys in Scene-II.
30. Processes of creation and transformation are underway.
31. Large patches of shade or shadow are widely dispersed through both scenes.
32. Both scenes suggest an aesthetic contrast and 'conversation' between foreground figures and the evocative backdrops.
33. Sense of movement in the foreground is greater.
34. Silential.

NEGATIVE ANALOGIES

(Nonidentities, Noncommonalities, Differences, and Catalogies)

1. 'View' is tilted slightly downward in Scene-II but the opposite (slightly upward) in Scene-I.
2. The subject matter of Scene-I is natural, that of Scene-II artificial.
3. The hour of Scene-II is diurnal, but that of Scene-I is nocturnal. (?)
4. The colors of Scene-I favor the blue end of the spectrum, those of Scene-II the red end.
5. Scene-II shows what is near, Scene-I what is far.
6. But (v.#7opp.) whereas the arms of Scene-II are lowered, the arm-like boughs of Scene-I are raised skyward.
7. Scene-I is open at the sides, Scene-II closed.
8. The main lines in Scene-I are transverse, those of Scene-II longitudinal.
9. Scene-II is crowded, Scene-I rather 'empty'.
10. Whereas the air in Scene-I is evidently in motion, in Scene-II it is stagnant.
11. Whereas the illumination in Scene-I is wholly natural, that of Scene-II is partly artificial.
12. Only the sky is visible in Scene-I , only the ground level in Scene-II.
13. Scene-II displays only solid objects, Scene-I mainly 'liquid' ones.
14. Diversity of objects in Scene-II vastly greater than in Scene-I (at least by normal human criteria).
15. Number of discrete 'relatively' large objects greater in Scene-II (at least by normal human criteria) (cf.#14).
16. Fewer distinct regions are found in Scene-I (at least by normal human criteria).
17. Objects in Scene-II are more clearly three-dimensional.
18. Scene-II abounds in simple geometric objects, whereas the objects of Scene-I are amorphous.
19. Most people could say more about the content of Scene-II.
20. Most people could say more about the meaning or implications of Scene-II (cf.#19).
21. Scene-I is basically monochromatic, Scene-II panchromatic.
22. Scene-I seems broad, Scene-II narrow.
23. Scene-II appears to converge, Scene-I to diverge.
24. Scene-I seems flat, Scene-II deep.
25. Scene-I outdoors, Scene-II indoors.
26. Scene-I lacks the obvious center or focus of Scene-II (pace ##21-22opp.).
27. The implicit vertical median elements (v. ##21-22opp.) are positive in Scene-II, negative in Scene-I.
28. The 'main textural direction' of Scene-I sweeps 75°E, whereas Scene-II merely plunges backward, away from the viewer.
29. Whereas the foregound figure in Scene-II is solid, the corresponding figures in Scene-I are perforated and mainly empty.
30. Most of Scene-I is lit by transmitted

INTRODUCTION
Methodology
\METHODS

IDEOGENETIC FORMULAS

A paramount device in pure and applied ideonomy is known as the ideogenetic formula. What is it and what does it do?

The name does not refer to a single formula, but rather to a generic device. There can be an infinity of individual formulas and of types and subtypes of formulas.

It should be stressed that what is meant by such a formula at the present time, when ideonomy has hardly gotten its first breath or is still in the process of being imagined and conceived, may have little to do with the basic and more embracive and sophisticated nature of ideogenetic formulas at a more mature stage of the science. There is always a limit to what can be foreseen, especially in the case of something as fundamental and novel as the ideogenetic formula.

The formula will develop in part in response to the needs and possibilities that will be discovered on the basis of broad use and experimentation. Appropriate theory will also have to emerge, as well as insights derived from analogies to conventional mathematical formulas in other areas of science. Experience and training, and the existence of a professional community, will lead to the growth of formulary skills.

The adjective ideogenetic is defined in Webster's Third to mean "originating ideas". Formula, on the other hand, is assigned several senses that are of some relevance here: (1) "a conventionalized statement intended to express some fundamental (truth or principle), esp. as a basis for (negotiation, discussion, or action)"; (2) "a (recipe or prescription) giving (method and proportions of ingredients) for the preparation of some material"; (3) "a general (fact, rule, or principle) expressed in symbols"; (4) "a symbolic expression showing the (composition or constitution) of a chemical substance and consisting of (symbols for the elements present and subscripts to indicate the ⟨relative or total⟩ number of atoms present in a molecule)"; (5) "a group of symbols (as numbers, letters, or arbitrary signs) associated to express briefly a single concept - also, in logic - any combination of signs in an uninterpreted calculus"; (6) "in logic - an expression (as a statement or matrix) stipulated to be meaningful by the rules of the calculus to which it belongs - esp. such an expression containing only variables"; and (7) "a (prescribed or set) form - a (fixed or conventional) method (as of acting, arranging, or speaking) - an established (rule or custom)" [I have made slight alterations in the definitions].

Ideogenetic formulas, then, are: devices for operating upon given sets of ideas to generate new ideas; to rigorously define or explore systematic relationships among sets, subsets, and supersets of ideas; to control the use of ideas; to define, characterize, and create spaces and structures of ideas; to combine, permute, transform, or evolve ideas; to structure, direct, methodize, and mechanize thought; etc.

They work by making use of or operating upon other organons (e.g. lists, charts, ideograms, data tables, computer software, and books).

Ideogenetic formulas resemble ordinary mathematical formulas in possessing various constant and variable terms, and in making use of abstract symbols and other notational devices (such as brackets, arrows, superscripts, union and intersection signs, equality and inequality signs, etc).

Countless other symbols, notational forms, and relationships from other fields - notably logic, linguistics, computer science, chemistry, physics, and music - may also be used in ideogenetic formulas (with identical, analogous, or different forms and meanings).

Moreover, symbols—and other forms of notation and representation—that are unique to ideonomy will be created in the future and exploited in these formulas.

As for mathematics, it should be mentioned that virtually the totality of that science—or of its concepts, operations, structures, subfields, etc—can apparently be mapped, with or without alteration, upon ideonomy, or can be reused in ideonomy or be shown to have echoes in ideonomy. The isomorphism obtains in two senses: (1) in the more obvious sense that in numerical or other conventional ways the general methods, means, and structures of mathematics can be shown to be applicable to the quantitative treatment of particular and universal ideas; and (2) in the more radical sense - which is somewhat more difficult to explain - that the things of mathematics are applicable to the qualitative treatment of ideas or have analogs in the 'pure' relationships and phenomena of ideas or represent specializations of more fundamental pre-mathematical equivalents.

(Of course it will always be possible to define mathematics in a more and more generalized way.)

Typically the effect of an ideogenetic formula is to create sundry and various **sentences** that may or may not be possessed of some obvious or deep intrinsic or extrinsic meaning. These could be referred to as **ideonomic propositions**.

The propositions may be meaningful alone, in combination with or the environment of one another, or in connection with some larger - physical or mental - context, concept, program, function, or perspective.

The work of a formula can alternatively be done mentally, manually, or with or by a computer.

What is meant by the **constant and variable terms of ideogenetic formulas**?

Again it is almost necessary to speak restrictedly: or to define, explain, and illustrate the elements of ideonomy by means of the simplest and earliest forms possessed by those elements in the extreme infancy of the science.

In this way, the **constant terms** of an ideogenetic formula may be thought of as those elements of the formula that do not vary in the course of the formula's use, or that define its static structure.

The formula about which we are speaking may be assumed to be a wholly or largely verbal formula, although many other types of largely or wholly nonverbal formulas are possible.

The constant terms may be or include nouns, verbs, adjectives, adverbs, prepositions, articles, or any other recognized - or devisable - part of speech. They may also include punctuational elements: commas, colons, full stops, brackets (round, square, angle, etc), forward and backward slants, single and double quotation marks, etc; as well as other kinds of symbols. Characters used may have many different font styles and sizes; e.g. they may be italicized, bold, and uppercase.

The variable terms of an ideogenetic formula, by contrast, may be considered to be those elements of the formula that in the course of the formula's use do or may vary, or that define its dynamic structure. Without its variable terms, the propositions produced by a formula would all be identical; or put another way, the formula would yield only one proposition.

The variable terms may be or include any of the parts of speech, elements of punctuation, symbols, or other features that the constant terms of ideogenetic formulas may. In this respect the constant and variable terms do not differ, save in special cases.

Given **canonical formulas** have **canonical variants.** That is, they have sets of minor and major homologs and analogs. What this often means is that their constant structure exhibits or permits a range of natural morphological or semantic variations (or even covariations).

Such a **set or group of variations - or subformulas** - may be more or less peculiar to a given ideogenetic formula. But then again, it may be canonical in a higher sense: for there are general and universal types and taxons of formulas and of variations of formulas. In fact all possible formulas can more properly be visualized as being taxons within and manifestations of a single infinite taxological scheme or system of such schemes.

Canonical ideogenetic formulas relate to finite and infinite ideonomic meta-structures - to series, hierarchies, cycles, networks, trees, matrixes, etc - that can be explored and exploited.

The variable structure, or the **dynamics, of ideogenetic** formulas can also have canonical variants.

Formulas can also be varied in less canonical ways. That is, their constant or variable terms may be altered for narrow or unique (nonrecurrent) ends: e.g. to introduce nuances in certain situations, nuances with little or no application elsewhere.

Collections of canonical or noncanonical formulas—that have been assembled a priori or a posteriori for the treatment of some topic, problem, phenomenon, or ideonomic division—are called **libraries of ideogenetic formulas** (or simply **formula libraries** or **formularies**).

In the future of ideonomy, ideogenetic formulas and formula libraries will proliferate and accumulate until there are literally thousands, millions, and even trillions of them stored, cataloged, and available to ideonomists or to those who would use ideonomy.

In fact, there will be **grand ideogenetic formulas** for the consolidation, classification, modification, combination, application, and creation of ideogenetic formulas; and progressively, there will be an **infinite hierarchy and network of formulas of formulas of formulas...** that will come into existence through human effort and through subintelligent and intelligent automation.

These formulas will be progressively interlinked and interwoven so that vast numbers of them will operate more or less simultaneously in the pursuit of any given ideonomic task, whether finite or infinite. A complexus will emerge of computations so interconnected, comprehensive, and endless that they will partake of the character of organic or sentient life and will never be turned off; it will resemble the "society of the mind" that Marvin Minsky sees as the basis of human, and ultimately of mechanical, intelligence.

But let us return to the essential nature of ideogenetic formulas.

The variable terms of these formulas may be thought of as slots into which lists of similar, related, or functionally related items are inserted—usually substitutionally—when the formula is operating or in use. Each insertion generates a new proposition. (Formulas bear some analogy to what in artificial intelligence are called "frames". Certain formulas are frames.)

For the moment think of the insertible elements as words.

The changes of the variable terms—say by replacing one word in a slot by another drawn from the same list—may or may not be synchronous with changes of the other variable terms. Here we assume that the ideogenetic formula has more than one variable term, which need not always be the case (since the number of variables may range from one to infinity, at minimum).

Again we can assume for simplicity in our introductory discussion of ideogenetic formulas that all variables always change at once, that they do so irrepetitively and by simple substitution of other items from the same list (corresponding to each variable), and that the different lists of the different variables are wholly disjoint (itemically irredundant).

But what is it that decides which items are to replace other items during each operational cycle of a formula; that is, whenever a formula gives rise to a new proposition or increases the set of previously created propositions by one?

The answer is that the process that governs replacement may be of various alternative types.

In the simplest case it may be some sort of stochastic process: a matter of chance, in other words. Types of order and structure in the sampled list, or their absence, will be all-important here (assuming that no other process is operating, that there is no interpretive mechanism, and that the different variables are operating completely independently at all stages of the entire ideogenetic process).

Another type of process that may be operating, alternatively, is that of human choice. A single individual or a set of individuals may be examining all or part of the set of lists and their contents, and then deciding during each operational cycle how to 'set' the variables of the ideogenetic formula (which word to put into each slot, for example). Generally speaking, this decision may be made in either of two ways: by direct human judgment unaided by any device, or else by human judgment guided by helpful principles or clues, constrained by decision trees or other structures, aided by definitions, or the like. In the latter of these two cases, interactive mechanisms may operate, both within and between cycles.

The third general process that can govern the replacement of items in the variables of ideogenetic formulas embraces an immense variety of statistical techniques depending upon, and giving, prior weightings of the listed items and lists. Here one should think of such things as matrixes, multivariate analysis, cluster analysis, and multidimensional scaling.

→ NOTES FOR FURTHER WRITING OF THE "IDEOGENETIC FORMULAS" CHAPTER:

1. OTHER PROCESSES:
    1. [redacted] techniques;
    2. Neural nets.

2. Formulas with different numbers of variables: monads, dyads, etc.
   Empirical observation that formulas with more and more variables are more and more interesting.
3. Variable drawing from the same list.
4. [redacted]al formulas.
5. Tr[redacted]mational formulas.
6. Ideogenetic formulas used in ideonomic [redacted].
7. Recursive ideogenetic formulas.
8. [redacted] of formulas.
9. Combinations of different formulas.
10. [redacted]ative formulas.
11. Nonverbal formulas: e.g. forms, images, musical things, etc.
12. Formulas used to create great idea-spaces.
13. Examples of formulas at work in diverse areas.

ORIGINAL

"MULTIDIMENSIONAL MAPS OF 'RADIATION' FORM-SPECIES"

Patrick Gunkel

Two nMDS maps are to be discussed: [1]The primary map shown in **Fig. 4245**, and entitled "*nMDS Map of the Mutual Analogousness of 20 (of 152) Species of the Form-Genus 'Radiation'*", and [2]"*Analytic-Regions Countermap For Fig. 4245*" (see **Fig. 5257**). Both are from the ideonomic division **FORMS AND MORPHOLOGY**.

Among the over-two-hundred quasi-finite, quasi-canonical genera of form distinguished by the organon "*Form Genera*" (**Fig. 6688**, elsewhere) is the present generic form, **Radiation**. Actually a radiational shape is surely one of the most basic, and therefore *truly* canonical, of all the 'types' of forms which have been named or that are identifiable.

A set of one-hundred-fifty-two quasi-finite, quasi-canonical species of this genus were polychromatically sketched in the pictorial organon "*Species of the Form-Genus 'Radiation'*" (**Fig. 3688**). Keep in mind that the original coloration was essential to understanding the major or minor structure of some of the forms in **Fig.s 3688 *et* 4245**.

A subset of twenty **Radiation** species (hereafter simply referred to as **Radiations**, or **R**) were *essentially* selected at random from the full, 152-item set, of which they therefore represent a ~13% sample. The author then nMDS scaled and mapped these on the basis of a complete rank-ordering of their estimated overall (or holistically intuited) inter-analogousness; which required him to make $20^2 = 400$ (*explicit or recordative*) ordinal decisions.

In the **Fig. 4245** primary map, the twenty are shown pictorially in their computationally predicted positions in the lowest-dimensional 2-dimensional nMDS space. Each bears the number it had originally in **Fig. 3688**.

The **Radiations** are distributed about the plot origin over a roughly circular disc. Three inhabit the central field; these are circumvallated by the rest, which form a fairly linear, albeit jagged, annulus.

The [extant and tendential] [structure and dynamics] of this primary map have been interpreted in the geographic color-coded annotation of the accompanying analytic-regions countermap (**Fig. 5257**).

Readers are cautioned that it was not always possible to inscribe these notes in their precisely appropriate bicoordinate loci, or to indicate, conversely, the corresponding thematic loci by the use of such rigid lettering. Overmeticulousness would have caused [intersection, superposition, and warping] of inscriptions. In principle, such thematic fields or ideic structures may even be [uneven, multipolar, textured, discontinuous, cyclic, perforated, etc]. The azimuthal placement of the notes was generally better than their radial placement (which in a few instances was arbitrary!).

This particular analytic-regions countermap actually has an historical significance: it was the first diagram of this sort constructed in the ideonomy project. After creating it I was astonished to notice how the previously rather confusing and seemingly chaotic spatial patterns of the primary map had suddenly become so utterly simple, symmetric, rich with meaning, and *necessary*.

This revelatory demonstration of the *logical* [interpretability, explicability, and rigor] of a plot produced by nMDS of course implied that the results of nMDS might well have this character, not just in special cases, but *universally*, and that is in fact what all of my subsequent experimentation with nMDS has suggested.

It is remarkable that all of the experts on nMDS appear to have overlooked the *basically cognitive* nature of their method, although the reason for the oversight has almost certainly been the purely statistical and quantitative training of these overspecialized specialists.

The most striking pattern that I observed in the 2-D **Radiations** plot was the following *rotational group* (*sensu* mathematics).

I noticed while pondering the primary map that the **Radiations** found in the west of the diagram (or at $\phi \approx 270°$) tend to have straight arms [*vide* **R**85, **R**87, **R**108, ~ **R**97] whose two sides are either parallel [**R**85, **R**87, **R**108, ~ **R**97] or along (ipsilaterally parallel to) radii of the whole form [**R**85; ~ **R**97 *et* **R**108].

Toward the north (or at $\phi \approx 0°$), *per contra*, the two sides of the arms of the **Radiations** invariably, or all but invariably, converge outwardly, even to terminal points (so that the arms are acuate).

This azimuthal shift of morphological habit naturally made me curious concerning the kinds of **Radiations** I would find if I moved in the opposite direction—or to the diametrically, or 180°, opposite region of the ideospace; and I was especially interested in learning whether contrary and antipolar, but therefore symmetric, changes would occur in the characteristic forms. My intuitive "prediction" was that austral **Radiations** would behave oppositely to boreal **Radiations**, and hence the two sides of their arms would actually diverge outwards (or, if you will, each arm would self-diverge).

If you will examine the southern triangle of the map you will see what I found.

The 'staggered flower petals' of **R**92 do indeed represent self-divergent arms (rounded peripherad), as do the 'internal arms' of **R**138 (though this is a Janus-faced sample).

If you extrapolate this process of the two sides of an arm diverging, the angle subtended widens from acute, to right, to obtuse, to straight; and the sides of *neighboring* arms eventually overlap and intersect one another. This is exactly the pattern seen counterclockwise of **R**92: in **R**86, **R**80, and **R**124. In the course of self-divergence, length and width can interconvert, unipartite (uniradiate) length can become bipartite (biramous and antidirected) length, and radiation can paradoxically become tangential: witness **R**86. The anticipated straight angles are displayed by **R**124.

The southern, western, and northern phases of this *dia-generic transformation* of **Radiation** form-species having been brought to light, the question then arises as to what the enigmatic eastern continuation could possibly be, that would interlink the northern and southern limits of our cognitive adventure, and complete a *circular group*?

If one apposes the palms of one's hands, to represent the parallel condition of the two sides of the arms of the western **Radiations** (or their self-parallel arms), gradual distal opening can simulate the effect of gradually moving counterclockwise into the southern diagrammatic region of self-divergent arms, until a straight angle is reached; and conversely,

gradual proximal opening can simulate the effect of slowly moving from self-parallel to self-convergent arms.

If the latter process of increasing self-convergence is continued, the external reflex angle of the two hands, or of the two sides of the individual arms of **Radiations**, gradually closes. As the external angle approaches being, and becomes, a straight angle, the ends of the arms may become rounded, obtuse, or flat; these radiational transformations are in fact what one sees as one revolves clockwise from 0°, or moves from the northern to the eastern region, in the nMDS map [**R**152, **R**150, **R**120] .

What happens as the external angle becomes less than a straight angle? Several things can happen and do. The ends of the arms can become dimpled, concave, or inturned [**R**89]. The two sides of the arms may recurve, even to the center of the form—or even 'beyond' that!

The effects of these extreme curvatures may be various and bizarre. As the countermap suggests, for example, there can be [cyclical, spiral, helical, catenulate, segmented, jointed, or pluricentric] arms; although perforce not all of these are actually exemplified by the small subset of twenty (of 152) **Radiation** form-species. If the concave incurvature of an arm is severe enough, it may paradoxically (or really *noumenally*) curve back outwards again and cut itself off, orbit endlessly, or generate in this way things resembling chains of bubbles [**R**120].

Logically these possibilities suggest **Radiations** with concentric or layered arms [**R**89], recurrent arms, and arms that diverge from themselves *many times at once* [**R**130].

The egagropilar **Radiation** [**R**142] in the southeast of the map illustrates the weirdly complex possibilities that can be associated with enwrapped arms. With the themes of [self-intersective arms, mutually intersective arms, and mutually perpendicular arms] identified in this area by the countermap, the possibilities that I have been analyzing and synthesizing finally come full circle, and the *rotation group* spoken of is completed.

It is, for various reasons, of considerable interest that a [rotation group, cycle, or ring] exists in the structure of this nMDS map depicting the space of basic radiational shapes:

'GROUPS' AND STELLOLOGY and CYCLES AND NOSTOLOGY are ideonomic divisions.

Like **Radiation**, **Ring** is a major genus of form, and there is a chart with sketches of two-hundred-ninety-one **Ring** species. Consulting this chart, and ideonomic discussions of **Rings**, might throw light on the [structure, properties, systematics, causes, effects, and possibilities] of the annular map.

The invention of the analytic-regions countermap led to the preparation of many other such maps treating themes not related to **Radiations** or even forms, which almost serendipitously occasioned one of the supreme and most eery discoveries of the ideonomy project.

One day, after I had finished creating an nMDS map and countermap on the mutual analogousness of examples and sources of beauty, I decided it would be of interest to juxtapose the former analytic countermap to that treating **Radiations**, to see if by any remote chance they shared any

similarities or would in any sense, way, or degree imply something about one another. A trivial motive must also have been to check and guide the generic development of the new device of such countermaps, and to compare the merits and special features of the two specimens.

When comparison of the countermaps apparently revealed them to share the above rotation group, I whispered an oath, I was so amazed!

Of course, I was skeptical at first about the reality, meaning, or profundity of the homomorphy. I wondered if the evident similarity might be accidental, only superficial, based on some manner of illusion, the product of a wish or abstract projection, of secondary nature, an artifact of the statistical methods I was using, a circumscribed and idiosyncratic connectedness of beauty and radiational form (or of esthetics and morphology), or possibly a prosaic result of the [complexity, ambiguity, all-meaningfulness, and superabundance] of metaphor.

But after further reflection and analysis I came to realize that the presence of something like rotation, or of rotational symmetry, in the transcendental, encephalic, or experiential foundations of esthetics simply made sense and was both inevitable and important; and that this would also be true for cycle, circle, disc, curvature, and closure, as well as for those patterns associated with the supposed rotation group in the **Radiation** countermap, such as divergence, parallel lines, convergence, recurrence, and vergence.

Imagine superimposing the set of four primary and analytic maps on **Radiations** and **Beauties**:

In the west, where **Radiations** with straight, radial, and parallel-sided arms occur, the **Beauties** of justice, telescope, probity and zeal for truth, and infinity are celebrated.

As one begins to rotate clockwise toward the northern region of **Radiations** with convergent arms, the **Beauties** of athletic competition, and cooperative endeavor appear; followed by the somewhat triangular **Beauties** of tree, battleship, and 'mountain'.

At the north pole itself reside the eminently convergent **Beauties** of evolution, ontogeny, the mind's machinery, and precise clockwork. Is a forest fire convergent? Certainly it engulfs and consumes and issues angular flames (not unlike **R**113 *et* **R**98). Clockwork is a tad centrad, toward the circlets-encircled-circle **R**79 and horologic **R**138; and it borders the chained-circles-**Radiations** that materialize a few degrees to the east.

In this latter or northeast region, which is also where **Radiations** possessed of "cyclical, helical, catenulate, segmented, jointed, or pluricentric arms" are contemplated by the **Radiational** countermap, and where its esthetic analog sings of **Beauties** "charming, active, busy, small, numerous", are collocated the **Beauties** of the starry night sky, bees pollinating flowers, migrating geese, music, enchanting centurial dollhouse, a child's toys, dew, banquet, and (almost due east) bubble bath.

In the east proper, where the **Radiation** countermap speaks of concentric, layered, flat-ended, and recurrent arms, are superimposed **Beauties** of kaleidoscope, butterfly wing color patterns, lush rain forest, frost patterns, marine isle or archipelago, ocean swim, charmed banter, dalliance, or dazzling laughter, and mountain meadow. Recall also that

here is where the rotation group would have the ends of the arms of the **Radiations** start to invaginate.

Revolving now to the southeast, a land of fabulous **Radiations** with arms that may variously be [coreless (?), enwrapped, self-intersective, and mutually intersective or perpendicular]; and where the **Beauties** are generally described as quiet, still, negative, soft, or beloved. The repeated self-enclosure of the tunicate **R**130 and egagropilar **R**142 could easily be thought evocative of or complementary to the corotationally appropriate silence, stillness, and love.

The arms of the southern **Radiations** are countermapped as flared, self-divergent, or hyperbolic; the southern **Beauties**, as "liberational, one-act, final". The south is inhabited by the **Beauties** of childbirth, rescue from misery or horror, catharsis. Directly south of the plot origin is the **Beauty** of a cancer patient's indomitable will to live, and to its southeast, of jewel (*a la* **R**138, crystalline **R**124, **R**80, and **R**86). The centers of the maps are conceptualized as a region of "crypto and quasi" **Radiations** and of perfect **Beauties**.

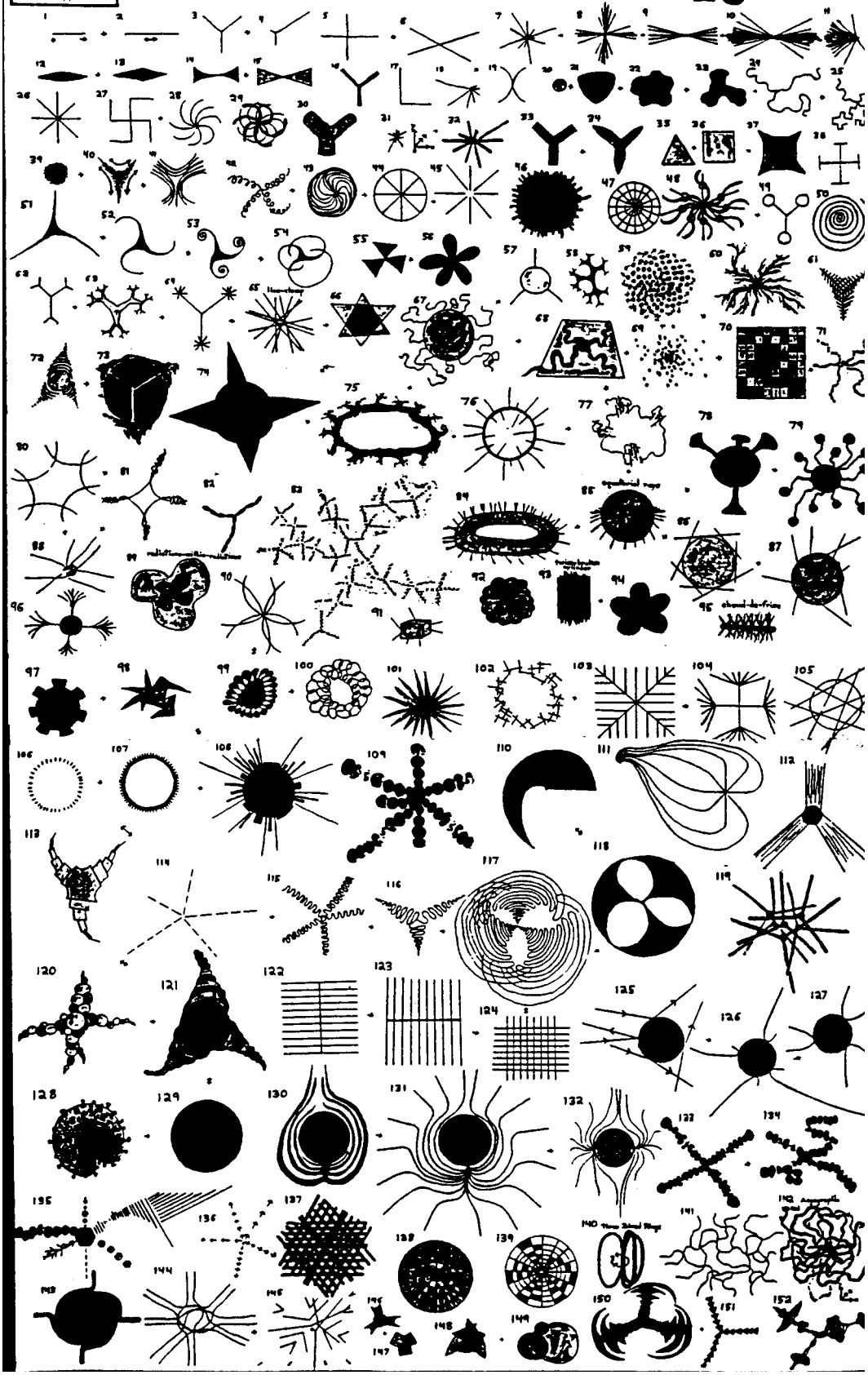
Finally the circular and rotational structure of the four maps ends or closes in the southwest. Here the theme of divergence should begin giving way to convergence or intergrade with parallelism. The esthetic themes are to be giving or receiving, and then right, moral, or singular. The concrete **Beauties** are those of charitable act or self-giving, academic graduation ceremony, and a mother's or son's devotion.

The rotational symmetry or group, as well as other themes and features of the Radiation Species Space analytic-regions countermap, later turned out to be common—and might even be universal—properties of ideonomic nMDS [maps, spaces, and structures], or as revealed by their interpretive countermaps. For example, I could see or imagine their [identities, analogs, variants, surrogates, homologs, children, tendencies, elements, and parental noumena] in my nMDS maps and countermaps devoted to: Generic Forms, Emotions, Order Taxons, Typical Motion of Diverse Things, Things Paths Do, Random Things, and Diverse Geological Phenomena. These seven things, added to Examples and Sources of Beauty and Radiation Form-Species, together represent a substantial fraction (or perhaps 25%) of all of the things I have treated via nMDS to date.

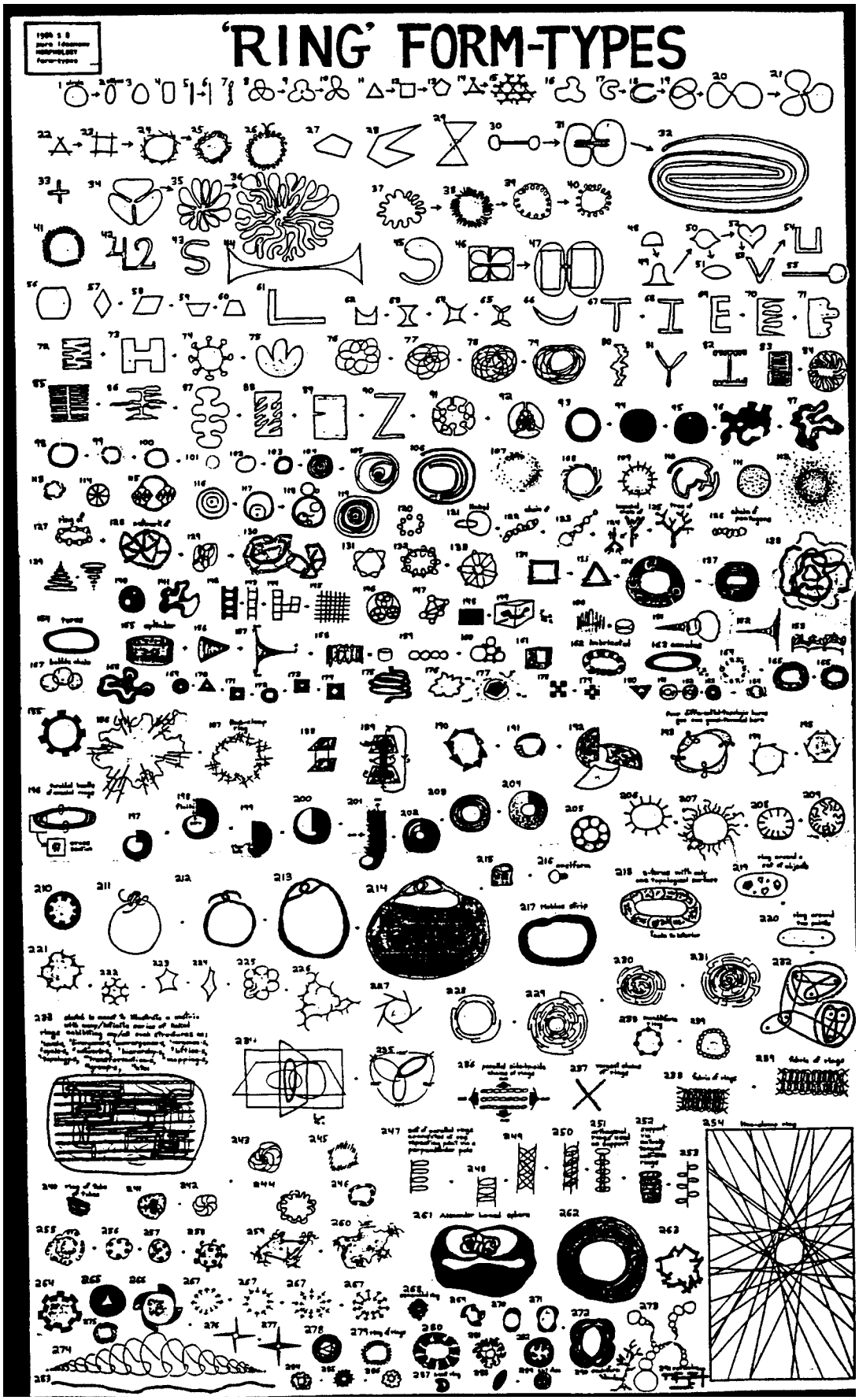
The existence of mathematical groups in ideonomic nMDS maps, and of inter-countermap pattterns, would be of great importance to ideonomy, in part because they could lead to the development of a universal language for interpreting such maps. Group theory is a well-developed part of mathematics, and numerous types of groups are known; ideonomy might be able to exploit much of this preexisting knowledge.

pure ideonomy
MORPHOLOGY
form-types

'RADIATION' FORM-TYPES



'RING' FORM-TYPES



P	P	1.33	-.50
Q	Q	-.02	-.30
R	R	.84	-.85
S	S	.39	.11
T	T	.68	1.15

D=2

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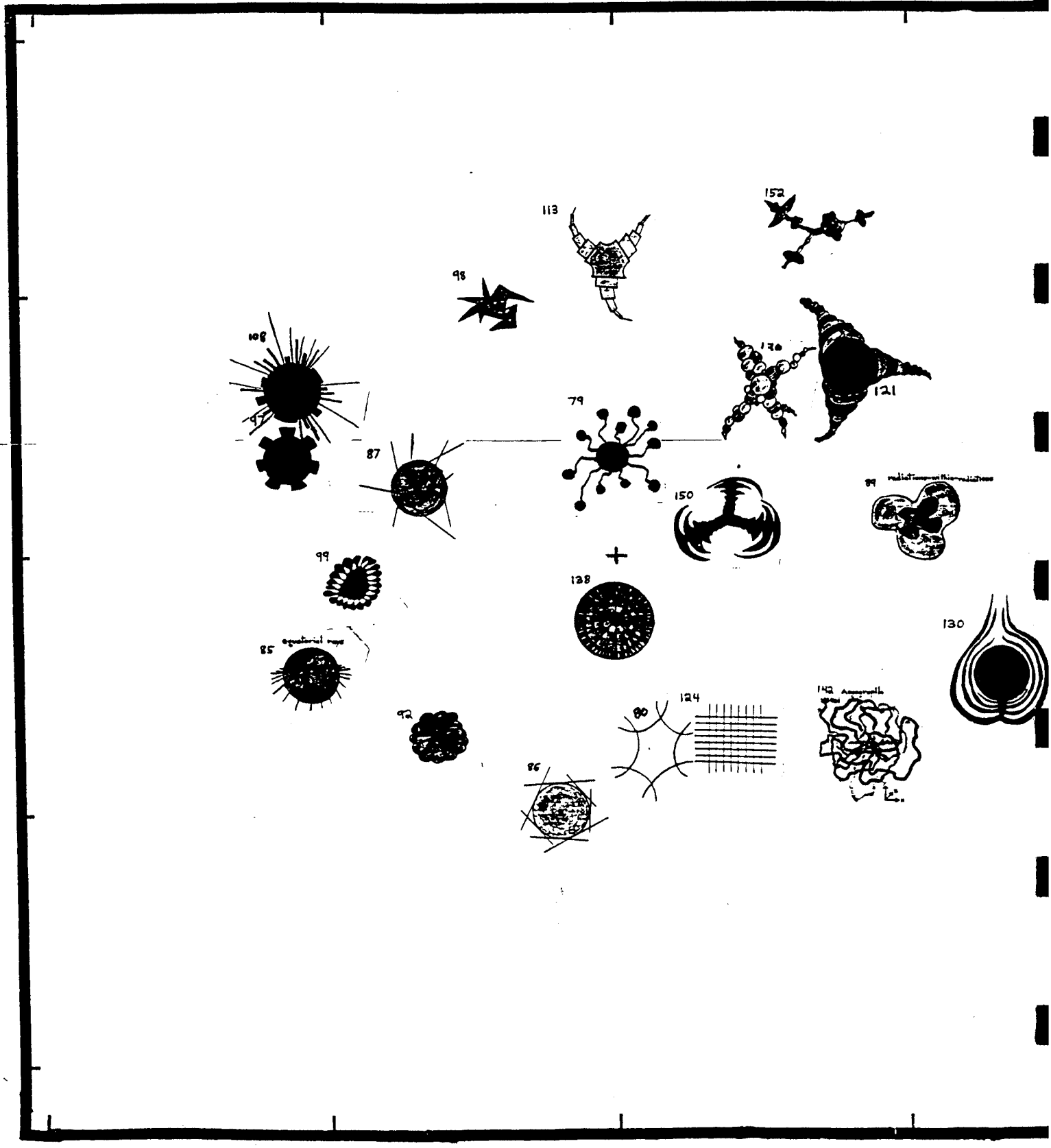

Species of the Form-Genus
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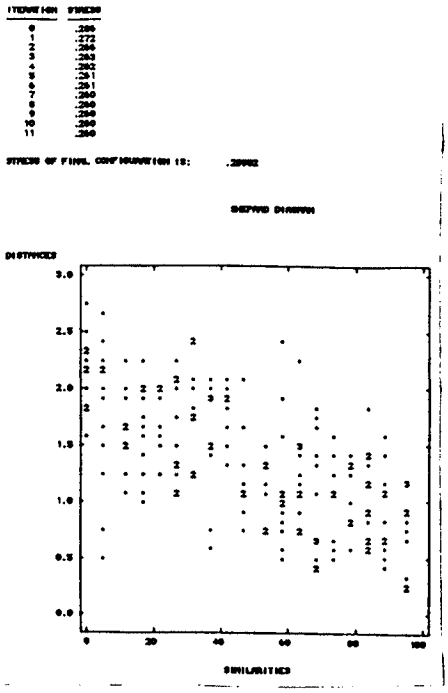
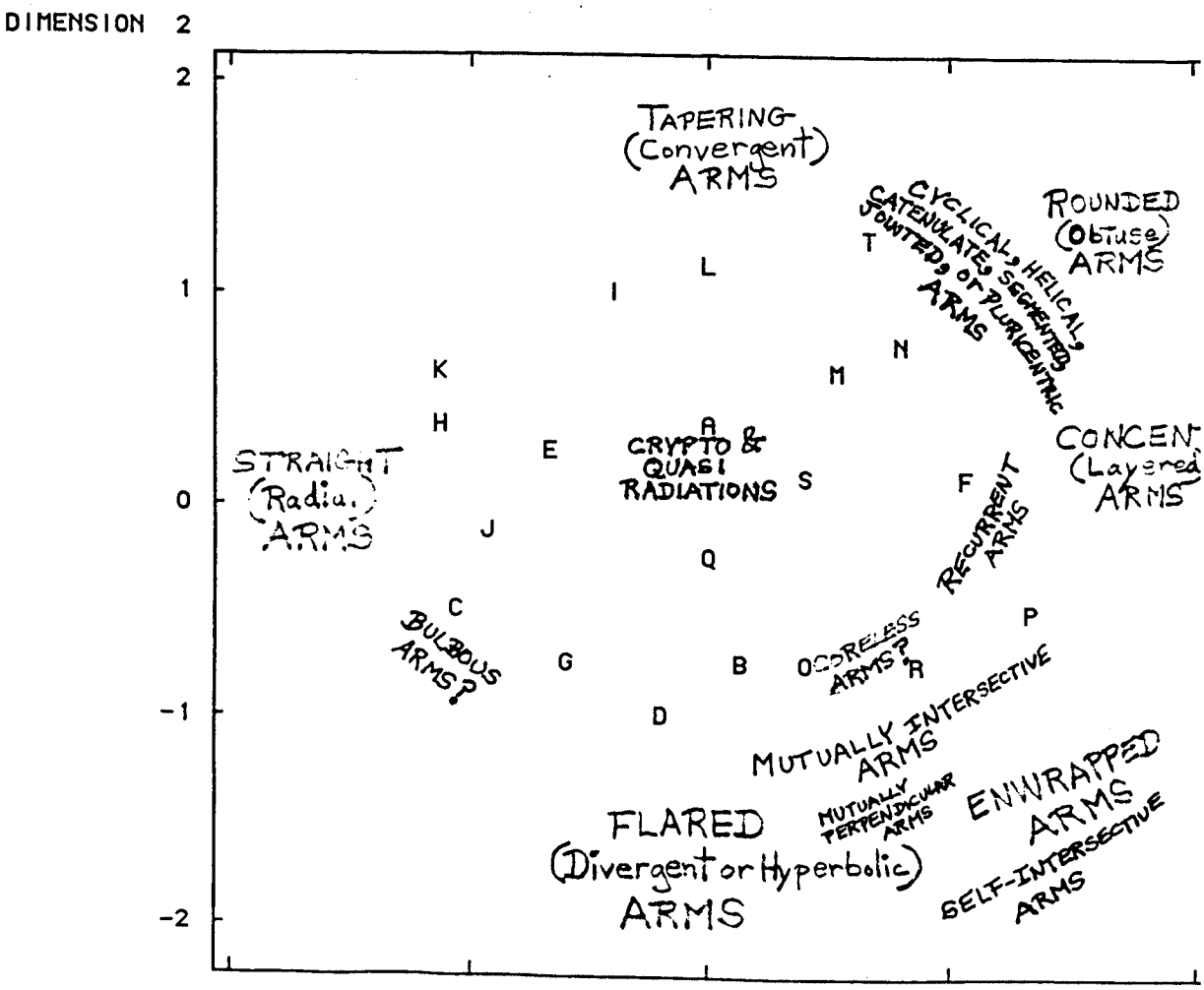


Figure 5257.

ANALYTIC-REGIONS COUNTERMA

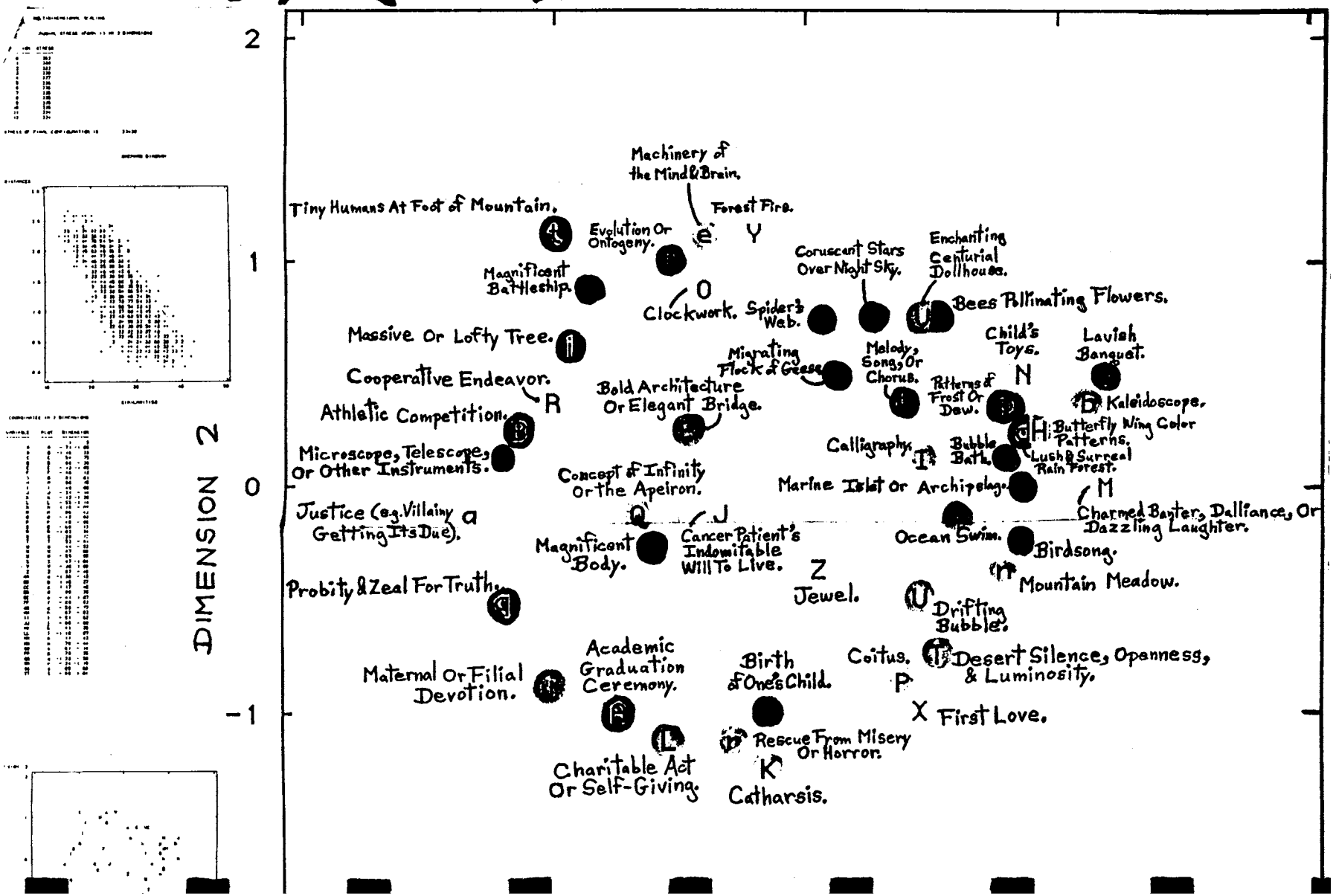


→46 (of 141) Examples and Sources of BEAUTY.

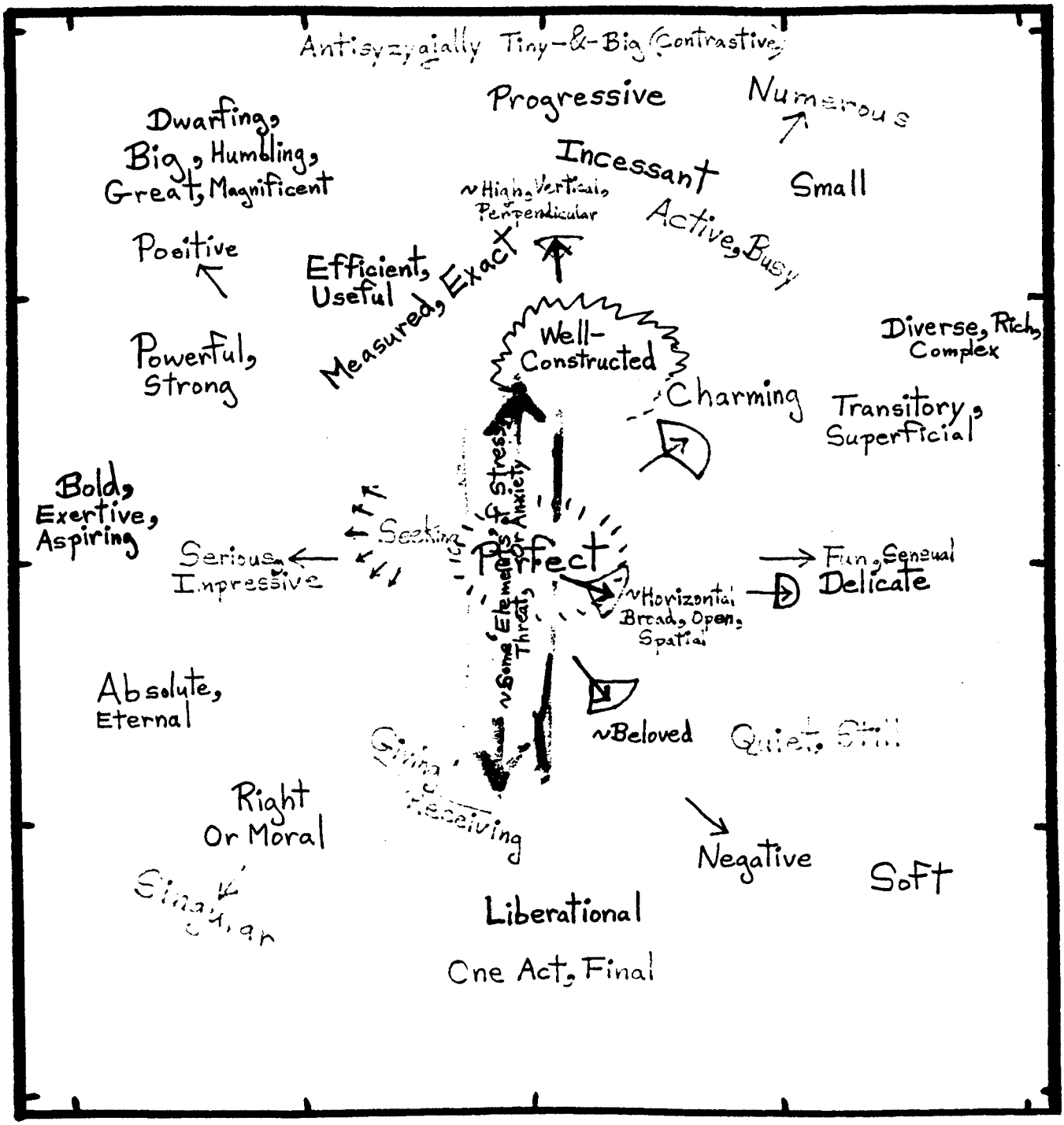
Analogousness.

Triadic Method: 50 virtually intra-set scaling dyads (2,300 dec).

D = 2

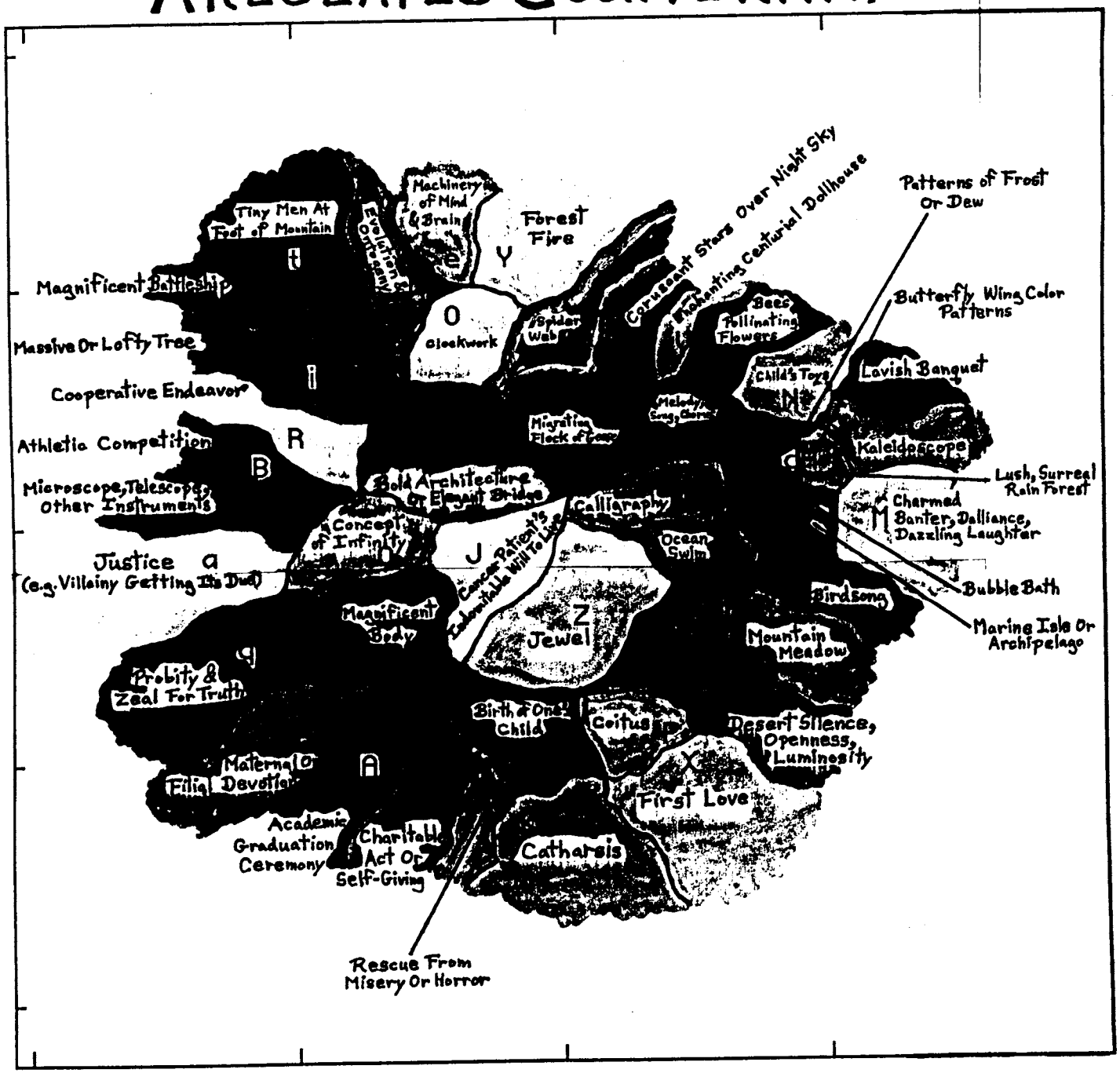


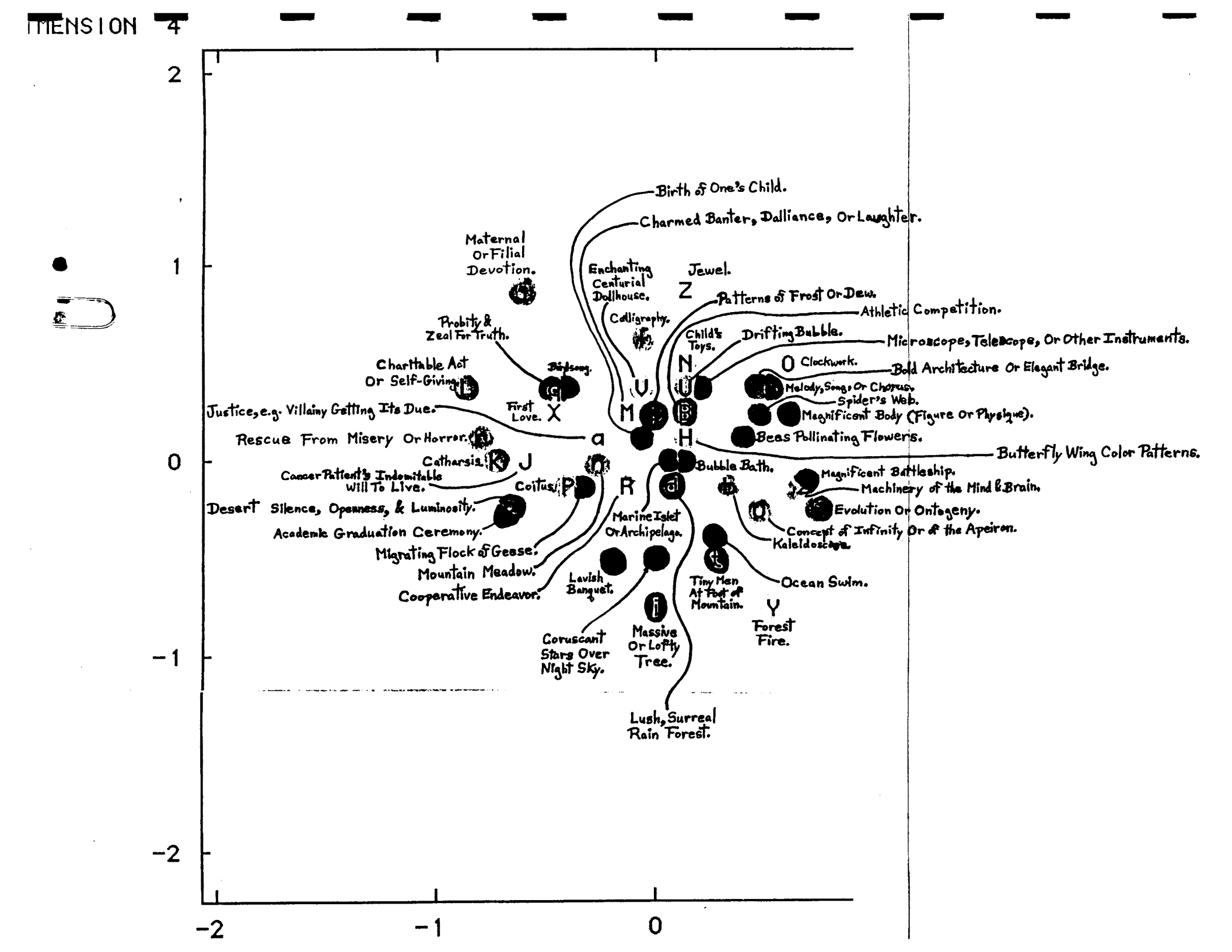
Various Regions, Directions, Poles Visibly Or Conjecturably Present, Emergent Or Confused In Primary Plot:



Analytic Regions Countermap

AREOLATED COUNTERMAP

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Birth of One's Child.
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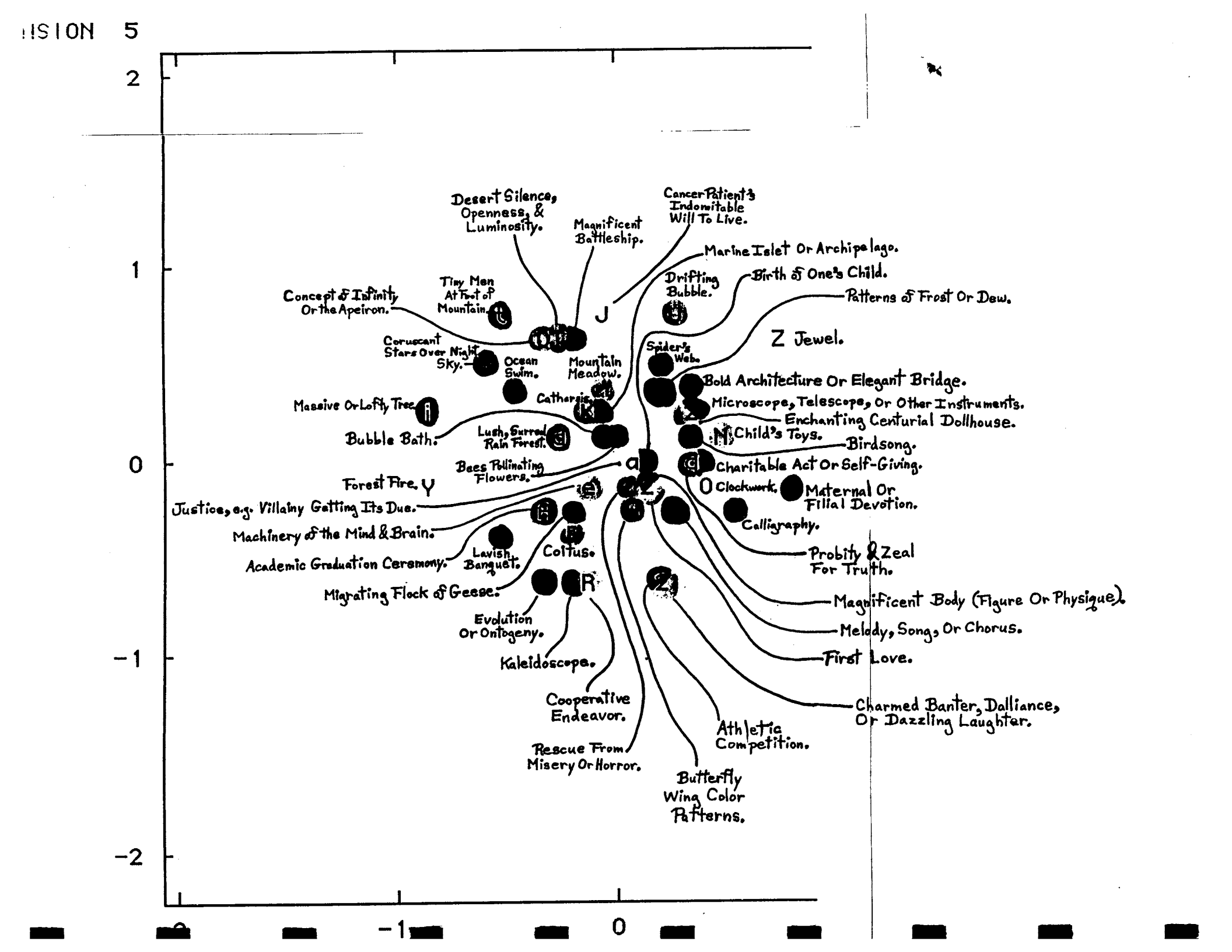
Maternal Or Filial Devotion.
Enchanting Centurial Dollhouse.
Jewel.
Z
Patterns of Frost Or Dew.
Athletic Competition.
Calligraphy.
Probity & Zeal For Truth.
Child's Toys.
Drifting Bubble.
Microscope, Telescope, Or Other Instruments.
Charitable Act Or Self-Giving.
Birdsong.
N
O Clockwork.
Bold Architecture Or Elegant Bridge.
Melody, Song, Or Chorus.
Spider's Web.
First Love.
X
Justice, e.g. Villainy Getting Its Due.
Magnificent Body (Figure Or Physique).
Rescue From Misery Or Horror.
Bees Pollinating Flowers.
Butterfly Wing Color Patterns.
Catharsis
J
Bubble Bath.
Magnificent Battleship.
Cancer Patient's Indomitable Will To Live.
Coitus
Machinery of the Mind & Brain.
Desert Silence, Openness, & Luminosity.
Evolution Or Ontogeny.
Marine Islet Or Archipelago.
Concept of Infinity Or of the Apeiron.
Academic Graduation Ceremony.
Kaleidoscope.
Migrating Flock of Geese.
Mountain Meadow.
Lavish Banquet.
Ocean Swim.
Cooperative Endeavor.
Tiny Man At Foot of Mountain.
Y
Forest Fire.
Coruscant Stars Over Night Sky.
Massive Or Lofty Tree.
Lush, Surreal Rain Forest.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First Love.
Kaleidoscope.
Charmed Banter, Dalliance, Or Dazzling Laughter.
Cooperative Endeavor.
Athletic Competition.
Rescue From Misery Or Horror.
Butterfly Wing Color Patterns.

POSSIBLE ANOMALOUS DIMENSIONS OF ASTRONOMICAL PHENOMENA

There are in general two different ways in which to prepare ideonomic organons. Organons can be constructed that are or approach being of a pandisciplinary or interdisciplinary character, and interested specialists can then make use of them in the context of their own disciplines, or perhaps when interested in connections of the latter with other disciplines or in the import of such disciplines for their own.

Alternatively, ideonomic organons of a given type or title can be created more or less de novo within a given discipline, either by the workers in that discipline themselves or by hired or independently motivated ideonomists. Such intradisciplinary organons may either superficially or fundamentally, and by either accident or design, have a form or content that limits or conditions them—to some extent, largely, or entirely—to use and reuse within the narrow discipline, or within some still more specialized subfield or topic thereof; or on the contrary, they may directly or upon adaptation find use or have utility beyond the discipline or in some closed or open subset of all possible disciplines.

These alternative origins of organons mimic the two different ways in which ideonomy as a whole may develop: either from above, beyond, or a more fundamental level than individual disciplines, or else repeatedly, from within—and in response and conformity to the needs, interests, methods, concepts, phenomena, priorities, and idiosyncrasies of—many or all of the individual disciplines.

What will happen in reality of course, at least to some extent, is that both modes of development will occur, and they will be partly complementary, mutually confirmatory or corrective, and irredundant.

In this chapter we will treat of an organon that was fashioned from within and for the sake of a particular discipline, namely astronomy. It was also produced through study of a single book in that field, Mysterious Universe: A Handbook of Astronomical Anomalies, a work of 710 pages compiled by the physicist and xenologist William R. Corliss and published in 1979. Corliss's book represents a survey of the anomalous astronomical phenomena and data that have been described or recorded over the centuries in astronomical or other scientific periodicals. The astronomical entities he deals with range from the Sun and its planets, satellites, meteors, and comets, to other stars and galaxies and the universe as a whole. The compiler's concern is not speculative but merely descriptive; the anomalies reported were usually considered to be anomalies by the original observers themselves, or else they have come to be so regarded by the astronomical community.

I prepared my organon by perusing Mysterious Universe and building a typology of the many diverse kinds and properties of anomalousness of astronomical phenomena that were either reported or strongly implied by the hundreds of accounts it quotes passages from. The organon, which is reproduced here as "Table of 205 'Anomalous Dimensions of Astronomical Phenomena'", represents a set of traits that have not been structured, ordered, or defined, apart from being presented in alphabetical order. The quantitative and qualitative dimensions it enumerates were meant to be as diverse, comprehensive, and free of overlap, and as elementary, as possible. The specificity or generality of these traits, it should be noted, varies greatly; and the list has other idiosyncrasies and imperfections.

THE TWO LISTS OF PRIMARY IDEOMOTICAL TECHNIQUES TO PRODUCE THIS ARTICLE

(A.) "205 Anomalous Dimensions of Astronomical Phenomena"

1. Aborted development or course.
2. Abruptness of ending.
3. Abruptness of occurrence.
4. Absences (of major, key, central, or quasi-necessary parts or aspects).
5. Alignments.
6. Appearance (in a non-structural sense).
7. Arms.
8. Asymmetries.
9. Bands, streaks, or alternations.
10. Beauty.
11. Behavior.
12. Behavior seemingly in reverse.
13. Bigness.
14. Births, appearances, or geneses.
15. Bodies.
16. Borders.
17. Braids or plexures.
18. Brevity of existence.
19. Bridges or yokes.
20. Brightenings or intensifications.
21. Bunchings.
22. Bursts or clusters of many diverse anomalies.
23. Cause-effect reversal (either real or illusory).
24. Causes.
25. Chains or necklaces.
26. Changes or variations.
27. Charged emissions.
28. Circles.
29. Clearings, visibilities, clarities, detail, glimpses, or perceptibilities.
30. Clouds.
31. Clumps, clusters, or clumping.
32. Coherent emissions.
33. Colors.
34. Complexities or subtleties.
35. Complexity.
36. Compresences.
37. Concentric annuli.
38. Concomitants.
39. Condensations or concentrations.
40. Cones.
41. Corpuscular emissions.
42. Correlations or couplings.
43. Crosses.
44. Crudity.
45. Currents, flows, 'winds', 'rivers', fluxes, countercurrents, or 'streams'.
46. Cusps.
47. Cycles or rhythms.
48. Cylinders.
49. Decelerating or accelerating velocities.
50. Decelerating rates.
51. Decouplings or independences.
52. Defective form.
53. Deflections or refractions.
54. Delays.
55. Dependences (seemingly).
56. Depressions or cavities.
57. Developments or evolutions.
58. Deviations or 'monsters'.
59. Diaper patterns.
60. Diffuse, specular, or radio reflections.
61. Directions.
62. Discrepancies.
63. Disintegrations.
64. Dispersions.
65. Displacements.
66. Distorted shapes.
67. Disturbances.
68. Divisions or regionalization.
69. Doubles, multiple copies, analogues (e.g., image, shadow, material object).
70. 'Dumbbell', 'paired', or 'bipolar' phenomena.
71. Eclipses or transits.
72. Effects or consequences.
73. Electrically neutral emissions.
74. Energies or powers.
75. Energy emissions.
76. Engulfments.
77. Entourages.
78. 'Eruptions', 'fountains', 'volcanoes', ejections, 'bursts'.
79. Events.
80. Expansions, enlargements, broadenings, growths, or swellings.
81. Explosions or outbursts.
82. Exponential or accelerating rates.
83. Fadings, disappearances, decreases, dimmings, or deaths.
84. Fast rates.
85. Fast, 'excessive', or (seemingly) transluminary velocities.
86. Flashes.
87. Flickerings.
88. Geometric parallelisms.
89. Giant or tiny sizes.
90. 'Glows' or patches.
91. Grids.
92. Grooves.
93. Grouped clusters.
94. 'Hair'.
95. Handles.
96. Heterogeneities.
97. Hierarchies.
98. High velocity.
99. Holes, gaps, interruptions, or rifts.
100. Honeycombs.
101. Implosions or collapses.
102. Incoherent emissions.
103. Indentations.
104. Interactions.
105. Interdimensional ratio.
106. Interferences.
107. Iridescences or diffractions.
108. Irregular polygons.
109. Irregularity.
110. Isolates.
111. Jets.
112. Jumping, skipping, or discontinuous movement.
113. Knots.
114. Layers.
115. Limb distortions, bulges, or asymmetries.
116. Lines.
117. Location or locations.
118. Low velocity.
119. Luminosities, glows, or afterglows.
120. Meanders or wanderings.
121. Moderate rates.
122. Moderate, slow, 'inadequate', or zero velocities.
123. Multitudes.
124. Negative rates.
125. Nonmonoconicities or reversals.
126. Nonoccurrences.
127. Nonpolarized emissions.
128. Nuances.
129. Obscurations or hazes.
130. Orbital changes or characteristics.
131. Order, form, or coherences.
132. Orientations.
133. Oscillation.
134. Paths.
135. Perfection.
136. Persistence or durability.
137. Perturbations.
138. Planes or sheets.
139. Polarized emissions.
140. Precursors or prematurenesses.
141. Presences.
142. Protuberances.
143. Pulsations.
144. Quantity.
145. 'Quakes'.
146. Rates of occurrence.
147. Rectangles.
148. Regular or irregular polyhedra.
149. Regular polygons.
150. Regularity.
151. Relocations.
152. Rings, tori, or halos.
153. Rotations.
154. Roughnesses.
155. Rows or columns.
156. Scintillations.
157. Seemingly-in-reverse behavior.
158. Sensory dimensions (sensu abnormal).
159. Sequelae or aftereffects.
160. Sequences or series.
161. Shadows or shades.
162. Shrinkages, contractions, constrictions, or narrowings.
163. Side-effects.
164. Simplicities.
165. Slow rates.
166. Smallness.
167. Sources or sinks.
168. Spectra.
169. Spheres.
170. Spokes or rays.
171. Spots, points, or beads.
172. Squares.
173. Stabilities, instabilities, or metastabilities.
174. 'Star shapes'.
175. 'Storms'.
176. Structure.
177. Swarms, progressions, or processions.
178. Swirls, spirals, helices, eddies, or vortices.
179. Symmetries.
180. Synchronicity (seemingly).
181. Synchronies or timings.
182. Synergisms or resonances.
183. Tails.
184. Tendencies or trends.
185. Tetrahedra.
186. Textures.
187. Tides, seiches, surges, or waves of matter.
188. Tilts.
189. Timing or untimeliness.
190. Transformations.
191. Transportations.
192. Transpositions.
193. Triangles.
194. Triggers or sensitivities.
195. 'Turbulences'.
196. Undulations.
197. Variability.
198. Variable or protean velocities.
199. Variable, rhythmic, nonlinear, complex, or discretely varying rates.
200. Vibrations.
201. Violences or calms.
202. Voids or tenuities.
203. Webs.
204. Wobbles.
205. Zero rates.

(B.) "45 Major Astronomical Phenomena"

1. Asteroids.
2. Clusters or hyperclusters of galaxies.
3. Comets.
4. Cosmic gravity waves.
5. Cosmic microwave blackbody radiation.
6. Dust clouds.
7. Elliptical galaxies.
8. Galactic arms.
9. Galactic cores.
10. Galactic halos.
11. Galactic jets.
12. Gas clouds.
13. Giant cosmic voids.
14. Gravitational lenses.
15. Heliosphere.
16. Hypothetical cosmic 'dark matter'.
17. Hypothetical superstars.
18. Intergalactic matter.
19. Jupiter's Great Red Spot.
20. Magnetospheres.
21. Meteors.
22. Milky Way Galaxy.
23. Moons.
24. Nebulae.
25. Oort cloud.
26. Other star-planet systems.
27. Planetary atmospheres.
28. Planetary rings.
29. Planets.
30. Primordial universe or 'Big Bang'.
31. Quasars.
32. Radiation belts.
33. Seyfert galaxies.
34. Solar flares.
35. Solar prominences.
36. Solar system.
37. Solar wind.
38. Spiral galaxies.
39. Stars.
40. Stellar interiors.
41. Subaerial surfaces of planets.
42. Sunspots.
43. Sun.
44. Universe.
45. Zodiacal light.

For certain tasks the organon would be more powerful and useful if its items were defined, illustrated, critiqued, sequenced, clustered, distinguished, mutually derived, hierarchized, weighted, mapped onto multidimensional spaces and manifolds, networked, and otherwise improved upon in the usual ideonomic ways. In its present form it represents merely a suggestive beginning.

The largely empirical organon should also be supplemented by many purely speculative categories of anomalousness that astronomical phenomena may have a natural tendency to display, or might display as a function of some worthy theory.

ATLAS OF POSSIBLE ASTRONOMICAL ANOMALIES

The "Table of 205 'Anomalous Dimensions of Astronomical Phenomena'" was created for two purposes: to see for the first time what the sort of de novo organon we have already discussed would be like, and to empower a computer to generate an entire atlas that might find professional use by astronomers, or at least that might enable astronomers to evaluate ideonomy as a potential new science and technology.

To create the atlas I inserted into my computer both the first organon and another list titled "45 Major Astronomical Phenomena" (see). I wrote a computer program incorporating a simple ideogenic formula, and the computer proceeded to manufacture, and to print as the atlas, 9,225 dyadic sentences of the form:

> "{ITEM #} Could there be anomalous {ANOMALOUS DIMENSION OF ASTRONOMICAL PHENOMENA, nounal form} of {MAJOR ASTRONOMICAL PHENOMENON, nounal form}?"

Entitled Possible Anomalous Dimensions of Astronomical Phenomena, this atlas comprises ninety-two huge pages measuring .56-meter high by .38-meter wide. Two facing pages are devoted to each of the forty-five phenomena. All of the two-hundred-and-five dimensions are reapplied to each phenomenon, but to minimize the destructive effect of mental monotony the order of the dimensions is changed completely on successive double-pages.

It should not be thought that, because the dimensions used in the atlas were extracted from Mysterious Universe and its account of known anomalies of astronomical phenomena, and reapplied to basically the same set of astronomical entities, the atlas must be nothing more than a réchauffé or a fatuous tautological exercise.

What the atlas does is suggest that such dimensions of anomalousness as were found to apply to, or to be displayed by, at least one type of astronomical entity, might also be expected to apply very broadly to many other types of astronomical entities. In other words, it postulates that to some extent the specific should be elevated to generic status.

Now of course there are various tests of this postulate.

It was inevitably noted in the study that was made of Corliss's material that the dimensions being identified did indeed have a tendency to be exemplified by a multitude of different entities, and often in diverse ways, senses, and forms. Clearly the anomalous dimensions were not the private property of the specific entities.

"WHAT ANOMALIES OF THE ASTRONOMICAL PHENOMENON 'ASTEROIDS' ARE CONCEIVABLE?"
A List of 205 A Priori Possibilities

Foreword:
The purpose of this exercise within the ideonomical division "Anomalies" is to check the validity, efficiency, sufficiency, and power of the divisional list "205+ Anomalous Dimensions of Astronomical Phenomena" in the case of the specific astronomical phenomenon asteroids. How good is the list as a whole and, also, how do its individual items fare?

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1. Could there be anomalous DIRECTIONS of ASTEROIDS?
2. Could there be anomalous INTERFERENCES of ASTEROIDS?
3. Could there be anomalous CAUSE-EFFECT REVERSAL (EITHER REAL or ILLUSORY) of ASTEROIDS?
4. Could there be anomalous DIAPER PATTERNS of ASTEROIDS?
5. Could there be anomalous GROOVES of ASTEROIDS?
6. Could there be anomalous FLASHES of ASTEROIDS?
7. Could there be anomalous 'DUMBBELL', 'PAIRED', or 'BIPOLAR' PHENOMENA of ASTEROIDS?
8. Could there be anomalous SYMMETRIES of ASTEROIDS?
9. Could there be anomalous INTERACTIONS of ASTEROIDS?
10. Could there be anomalous TIDES, SEICHES, SURGES, or WAVES OF MATTER of ASTEROIDS?
11. Could there be anomalous BEAUTY of ASTEROIDS?
12. Could there be anomalous PLANES or SHEETS of ASTEROIDS?
13. Could there be anomalous SLOW RATES of ASTEROIDS?
14. Could there be anomalous ABRUPTNESS OF OCCURRENCE of ASTEROIDS?
15. Could there be anomalous PULSATIONS of ASTEROIDS?
16. Could there be anomalous CRUDITY of ASTEROIDS?
17. Could there be anomalous VARIABLE or PROTEAN VELOCITIES of ASTEROIDS?
18. Could there be anomalous CIRCLES of ASTEROIDS?
19. Could there be anomalous ARMS of ASTEROIDS?
20. Could there be anomalous ECLIPSES or TRANSITS of ASTEROIDS?
21. Could there be anomalous DISINTEGRATIONS of ASTEROIDS?
22. Could there be anomalous CONCOMITANTS of ASTEROIDS?
23. Could there be anomalous ISOLATES of ASTEROIDS?
24. Could there be anomalous PRECURSORS or PREMATURENESSES of ASTEROIDS?
25. Could there be anomalous CURRENTS, FLOWS, 'WINDS', 'RIVERS', FLUXES, COUNTERCURRENTS, 'STREAMS' of ASTEROIDS?
26. Could there be anomalous EFFECTS or CONSEQUENCES of ASTEROIDS?
27. Could there be anomalous 'ERUPTIONS', 'FOUNTAINS', 'VOLCANOES', EJECTIONS, or 'BURSTS' of ASTEROIDS?
28. Could there be anomalous CHANGES or VARIATIONS of ASTEROIDS?
29. Could there be anomalous BRAIDS or PLEXURES of ASTEROIDS?
30. Could there be anomalous MODERATE, SLOW, 'INADEQUATE', or ZERO VELOCITIES of ASTEROIDS?
31. Could there be anomalous IRIDESCENCES or DIFFRACTIONS of ASTEROIDS?
32. Could there be anomalous TRANSPORTATIONS of ASTEROIDS?
33. Could there be anomalous HANDLES of ASTEROIDS?
34. Could there be anomalous EXPLOSIONS or OUTBURSTS of ASTEROIDS?
35. Could there be anomalous WEBS of ASTEROIDS?
36. Could there be anomalous ORDER, FORM, or COHERENCES of ASTEROIDS?
37. Could there be anomalous REGULARITY of ASTEROIDS?
38. Could there be anomalous TETRAHEDRA of ASTEROIDS?
39. Could there be anomalous 'STAR SHAPES' of ASTEROIDS?
40. Could there be anomalous LINES of ASTEROIDS?
41. Could there be anomalous DEVIATIONS or 'MONSTERS' of ASTEROIDS?
42. Could there be anomalous DEVELOPMENTS or EVOLUTIONS of ASTEROIDS?
43. Could there be anomalous NEGATIVE RATES of ASTEROIDS?
44. Could there be anomalous MULTITUDES of ASTEROIDS?
45. Could there be anomalous COLORS of ASTEROIDS?
46. Could there be anomalous INDENTATIONS of ASTEROIDS?
47. Could there be anomalous DISPERSIONS of ASTEROIDS?
48. Could there be anomalous JUMPING, SKIPPING, or DISCONTINUOUS MOVEMENT of ASTEROIDS?
49. Could there be anomalous VARIABLE, RHYTHMIC, NONLINEAR, COMPLEX, or DISCRETELY VARYING RATES of ASTEROIDS?
50. Could there be anomalous ROUGHNESSES of ASTEROIDS?
51. Could there be anomalous 'HAIR' of ASTEROIDS?
52. Could there be anomalous CLEARINGS, VISIBILITIES, CLARITIES, DETAIL, GLIMPSES, PERCEPTIBILITIES of ASTEROIDS?
53. Could there be anomalous DECELERATING RATES of ASTEROIDS?
54. Could there be anomalous DISPLACEMENTS of ASTEROIDS?
55. Could there be anomalous SOURCES or SINKS of ASTEROIDS?
56. Could there be anomalous RATES OF OCCURRENCE of ASTEROIDS?
57. Could there be anomalous BODIES of ASTEROIDS?
58. Could there be anomalous LAYERS of ASTEROIDS?
59. Could there be anomalous TAILS of ASTEROIDS?
60. Could there be anomalous SYNCHRONICITY (SEEMINGLY) of ASTEROIDS?
61. Could there be anomalous HIGH VELOCITY of ASTEROIDS?
62. Could there be anomalous GRIDS of ASTEROIDS?
63. Could there be anomalous APPEARANCE (IN A NON-STRUCTURAL SENSE) of ASTEROIDS?
64. Could there be anomalous ORIENTATIONS of ASTEROIDS?
65. Could there be anomalous LOW VELOCITY of ASTEROIDS?
66. Could there be anomalous SMALLNESS of ASTEROIDS?
67. Could there be anomalous SPOKES or RAYS of ASTEROIDS?
68. Could there be anomalous ENGULFMENTS of ASTEROIDS?
69. Could there be anomalous CLUMPS, CLUSTERS, or CLUMPING of ASTEROIDS?
70. Could there be anomalous ABSENCES (OF MAJOR, KEY, CENTRAL, or QUASI-NECESSARY PARTS/ASPECTS) of ASTEROIDS?
71. Could there be anomalous GROUPED CLUSTERS of ASTEROIDS?
72. Could there be anomalous SWIRLS, SPIRALS, HELICES, EDDIES, or VORTICES of ASTEROIDS?
73. Could there be anomalous EVENTS of ASTEROIDS?
74. Could there be anomalous IMPLOSIONS or COLLAPSES of ASTEROIDS?
75. Could there be anomalous VIBRATIONS of ASTEROIDS?
76. Could there be anomalous SEQUENCES or SERIES of ASTEROIDS?
77. Could there be anomalous SYNERGISMS or RESONANCES of ASTEROIDS?
78. Could there be anomalous COMPRESENCES of ASTEROIDS?
79. Could there be anomalous TRIGGERS or SENSITIVITIES of ASTEROIDS?
80. Could there be anomalous ENTOURAGES of ASTEROIDS?
81. Could there be anomalous CROSSES of ASTEROIDS?
82. Could there be anomalous SPOTS, POINTS, or BEADS of ASTEROIDS?
83. Could there be anomalous CLOUDS of ASTEROIDS?
84. Could there be anomalous BEHAVIOR of ASTEROIDS?
85. Could there be anomalous VOIDS or TENUITIES of ASTEROIDS?
86. Could there be anomalous CONES of ASTEROIDS?
87. Could there be anomalous RECTANGLES of ASTEROIDS?
88. Could there be anomalous ALIGNMENTS of ASTEROIDS?
89. Could there be anomalous SPECTRA of ASTEROIDS?
90. Could there be anomalous PRESENCES of ASTEROIDS?
91. Could there be anomalous VARIABILITY of ASTEROIDS?
92. Could there be anomalous SIMPLICITIES of ASTEROIDS?
93. Could there be anomalous TRANSPOSITIONS of ASTEROIDS?
94. Could there be anomalous ABORTED DEVELOPMENT or COURSE of ASTEROIDS?
95. Could there be anomalous OBSCURATIONS or HAZES of ASTEROIDS?
96. Could there be anomalous ORBITAL CHANGES or CHARACTERISTICS of ASTEROIDS?
97. Could there be anomalous CHAINS or NECKLACES of ASTEROIDS?
98. Could there be anomalous SIDE-EFFECTS of ASTEROIDS?
99. Could there be anomalous FADINGS, DISAPPEARANCES, DECREASES, DIMMINGS, or DEATHS of ASTEROIDS?
100. Could there be anomalous SCINTILLATIONS of ASTEROIDS?
101. Could there be anomalous COMPLEXITY of ASTEROIDS?
102. Could there be anomalous KNOTS of ASTEROIDS?
103. Could there be anomalous BRIGHTENINGS or INTENSIFICATIONS of ASTEROIDS?
104. Could there be anomalous BORDERS of ASTEROIDS?
105. Could there be anomalous BREVITY OF EXISTENCE of ASTEROIDS?
106. Could there be anomalous SYNCHRONIES or TIMINGS of ASTEROIDS?

107. Could there be anomalous SHRINKAGES, CONTRACTIONS, CONSTRICTIONS, or NARROWINGS of ASTEROIDS?
108. Could there be anomalous EXPONENTIAL or ACCELERATING RATES of ASTEROIDS?
109. Could there be anomalous REGULAR POLYGONS of ASTEROIDS?
110. Could there be anomalous PROTUBERANCES of ASTEROIDS?
111. Could there be anomalous FLICKERINGS of ASTEROIDS?
112. Could there be anomalous SEEMINGLY-IN-REVERSE BEHAVIOR of ASTEROIDS?
113. Could there be anomalous GEOMETRIC PARALLELISMS of ASTEROIDS?
114. Could there be anomalous WOBBLES of ASTEROIDS?
115. Could there be anomalous DIVISIONS or REGIONALIZATION of ASTEROIDS?
116. Could there be anomalous NUANCES of ASTEROIDS?
117. Could there be anomalous CONDENSATIONS or CONCENTRATIONS of ASTEROIDS?
118. Could there be anomalous CYLINDERS of ASTEROIDS?
119. Could there be anomalous PERTURBATIONS of ASTEROIDS?
120. Could there be anomalous ABRUPTNESS OF ENDING of ASTEROIDS?
121. Could there be anomalous ELECTRICALLY NEUTRAL EMISSIONS of ASTEROIDS?
122. Could there be anomalous DISTORTED SHAPES of ASTEROIDS?
123. Could there be anomalous DEPRESSIONS or CAVITIES of ASTEROIDS?
124. Could there be anomalous ASYMMETRIES of ASTEROIDS?
125. Could there be anomalous BEHAVIOR SEEMINGLY IN REVERSE of ASTEROIDS?
126. Could there be anomalous IRREGULARITY of ASTEROIDS?
127. Could there be anomalous INTERDIMENSIONAL RATIO of ASTEROIDS?
128. Could there be anomalous DEFLECTIONS or REFRACTIONS of ASTEROIDS?
129. Could there be anomalous NONPOLARIZED EMISSIONS of ASTEROIDS?
130. Could there be anomalous TIMING or UNTIMELINESS of ASTEROIDS?
131. Could there be anomalous ENERGY EMISSIONS of ASTEROIDS?
132. Could there be anomalous STABILITIES, INSTABILITIES, or METASTABILITIES of ASTEROIDS?
133. Could there be anomalous CYCLES or RHYTHMS of ASTEROIDS?
134. Could there be anomalous 'GLOWS' or PATCHES of ASTEROIDS?
135. Could there be anomalous DEFECTIVE FORM of ASTEROIDS?
136. Could there be anomalous MODERATE RATES of ASTEROIDS?
137. Could there be anomalous TILTS of ASTEROIDS?
138. Could there be anomalous BRIDGES or YOKES of ASTEROIDS?
139. Could there be anomalous STRUCTURE of ASTEROIDS?
140. Could there be anomalous DELAYS of ASTEROIDS?
141. Could there be anomalous GIANT or TINY SIZES of ASTEROIDS?
142. Could there be anomalous BIRTHS, APPEARANCES, or GENESES of ASTEROIDS?
143. Could there be anomalous SQUARES of ASTEROIDS?
144. Could there be anomalous 'TURBULENCES' of ASTEROIDS?
145. Could there be anomalous UNDULATIONS of ASTEROIDS?
146. Could there be anomalous NONMONOTONICITIES or REVERSALS of ASTEROIDS?
147. Could there be anomalous HONEYCOMBS of ASTEROIDS?
148. Could there be anomalous PERFECTION of ASTEROIDS?
149. Could there be anomalous CUSPS of ASTEROIDS?
150. Could there be anomalous DISTURBANCES of ASTEROIDS?
151. Could there be anomalous PERSISTENCE or DURABILITY of ASTEROIDS?
152. Could there be anomalous NONOCCURRENCES of ASTEROIDS?
153. Could there be anomalous HETEROGENEITIES of ASTEROIDS?
154. Could there be anomalous LOCATION or LOCATIONS of ASTEROIDS?
155. Could there be anomalous DEPENDENCES (SEEMINGLY) of ASTEROIDS?
156. Could there be anomalous RELOCATIONS of ASTEROIDS?
157. Could there be anomalous BUNCHINGS of ASTEROIDS?
158. Could there be anomalous ROWS or COLUMNS of ASTEROIDS?
159. Could there be anomalous CONCENTRIC ANNULI of ASTEROIDS?
160. Could there be anomalous HIERARCHIES of ASTEROIDS?
161. Could there be anomalous PATHS of ASTEROIDS?
162. Could there be anomalous DECOUPLINGS or INDEPENDENCES of ASTEROIDS?
163. Could there be anomalous MEANDERS or WANDERINGS of ASTEROIDS?
164. Could there be anomalous 'STORMS' of ASTEROIDS?
165. Could there be anomalous ROTATIONS of ASTEROIDS?
166. Could there be anomalous RINGS, TORI, or HALOS of ASTEROIDS?
167. Could there be anomalous DOUBLES, MULTIPLE COPIES, ANALOGUES (e.g., IMAGE, SHADOW, MATERIAL OBJECT) of ASTEROIDS?
168. Could there be anomalous SWARMS, PROGRESSIONS, or PROCESSIONS of ASTEROIDS?
169. Could there be anomalous ZERO RATES of ASTEROIDS?
170. Could there be anomalous JETS of ASTEROIDS?
171. Could there be anomalous LIMB DISTORTIONS, BULGES, or ASYMMETRIES of ASTEROIDS?
172. Could there be anomalous DISCREPANCIES of ASTEROIDS?
173. Could there be anomalous CHARGED EMISSIONS of ASTEROIDS?
174. Could there be anomalous EXPANSIONS, ENLARGEMENTS, BROADENINGS, GROWTHS, or SWELLINGS of ASTEROIDS?
175. Could there be anomalous TRIANGLES of ASTEROIDS?
176. Could there be anomalous CORPUSCULAR EMISSIONS of ASTEROIDS?
177. Could there be anomalous REGULAR or IRREGULAR POLYHEDRA of ASTEROIDS?
178. Could there be anomalous HOLES, GAPS, INTERRUPTIONS, or RIFTS of ASTEROIDS?
179. Could there be anomalous FAST, 'EXCESSIVE', or (SEEMINGLY) TRANSLUMINARY VELOCITIES of ASTEROIDS?
180. Could there be anomalous OSCILLATION of ASTEROIDS?
181. Could there be anomalous IRREGULAR POLYGONS of ASTEROIDS?
182. Could there be anomalous POLARIZED EMISSIONS of ASTEROIDS?
183. Could there be anomalous QUANTITY of ASTEROIDS?
184. Could there be anomalous BANDS, STREAKS, or ALTERNATIONS of ASTEROIDS?
185. Could there be anomalous COMPLEXITIES or SUBTLETIES of ASTEROIDS?
186. Could there be anomalous ENERGIES or POWERS of ASTEROIDS?
187. Could there be anomalous TENDENCIES or TRENDS of ASTEROIDS?
188. Could there be anomalous VIOLENCES or CALMS of ASTEROIDS?
189. Could there be anomalous SEQUELAE or AFTEREFFECTS of ASTEROIDS?
190. Could there be anomalous SPHERES of ASTEROIDS?
191. Could there be anomalous DIFFUSE, SPECULAR, or RADIO REFLECTIONS of ASTEROIDS?
192. Could there be anomalous TEXTURES of ASTEROIDS?
193. Could there be anomalous COHERENT EMISSIONS of ASTEROIDS?
194. Could there be anomalous INCOHERENT EMISSIONS of ASTEROIDS?
195. Could there be anomalous 'QUAKES' of ASTEROIDS?
196. Could there be anomalous SHADOWS or SHADES of ASTEROIDS?
197. Could there be anomalous DECELERATING or ACCELERATING VELOCITIES of ASTEROIDS?
198. Could there be anomalous CAUSES of ASTEROIDS?
199. Could there be anomalous CORRELATIONS or COUPLINGS of ASTEROIDS?
200. Could there be anomalous BIGNESS of ASTEROIDS?
201. Could there be anomalous BURSTS or CLUSTERS OF MANY DIVERSE ANOMALIES of ASTEROIDS?
202. Could there be anomalous TRANSFORMATIONS of ASTEROIDS?
203. Could there be anomalous FAST RATES of ASTEROIDS?
204. Could there be anomalous (SENSU ABNORMAL) SENSORY DIMENSIONS of ASTEROIDS?
205. Could there be anomalous LUMINOSITIES, GLOWS, or AFTERGLOWS of ASTEROIDS?

Then again, one need only look at the named dimensions to realize that most should find general, and many should find universal, exemplification in the celestial menagerie; the surprise would be if the facts were to prove otherwise. Many of the dimensions are even sure to be discovered in the phenomena of other sciences.

If the dimensions have generic status, then it should be possible to justify this through logical analysis and argumentation.

Inductively, a single dimension of anomalousness could be chosen as apposite for an intense and long-term series of astronomical experiments, observations, simulations, and theoretical exercises designed to provide a measure of the actual breadth of exemplification of the dimension in the gamut of astronomical entities, systems, realms, and processes—or contrary evidence for a lack of breadth.

The atlas was made 1985 July 6, and as it happened the industrious William Corliss himself thereafter went on to produce three other books of anomalies in astronomy, all subtitled A Catalog of Astronomical Anomalies: The Moon and the Planets, The Sun and Solar System Debris, and Stars, Galaxies, Cosmos. The net thrown by Corliss in his new books was much greater, and hence they provide a convenient means for checking the atlas's mechanical extensions and generalizations. We will make use of them for this purpose at the end of the chapter.

First, in the section that follows, we are going to take a look at a tiny bit of the atlas to see whether the items it generates for particular types of astronomical entities tend to be plausible, make intuitive sense, correspond with known phenomena, are not in conflict with existing data, are of interest, and have heuristic value.

POSSIBLE ANOMALIES OF ASTEROIDS

(1) COULD THERE BE ANOMALOUS DIRECTIONS OF ASTEROIDS?

Yes—and there are!

Asteroids occur outside the dense belt of asteroids that lies between the orbits of Mars and Jupiter. The Apollo asteroids, for example, approach the Earth and even cross its orbit, and their directions, to this extent, are anomalous. In the asteroid belt itself the orbits of certain planetesimals may be atypical and even 'anomalous' (sensu being a problem for the theorist or historian).

Asteroids whose orbits are anomalously elliptic, inclined to the ecliptic plane, hyperbolic, concentrated in one direction, perturbed, or perihelial could all be spoken of as having anomalous directions. The description could also apply to asteroids with orbits tangent, or orbital directions opposite, to Earth's.

(2) COULD THERE BE ANOMALOUS INTERFERENCES OF ASTEROIDS?

Yes—especially such as may only show up in the future when the powers of our instruments, computers, and mathematics to measure and detect anomalies in, or anomalous couplings and dependences of, the motions of celestial bodies is many orders of magnitude greater. Anomalies of this sort are in fact inevitable. Ultimately the study of such anomalies could be that place in nature where the need for or form of some revolution in general physical theory was first realized.

Perhaps there are anomalous interferences in the motions of certain belt asteroids that are telltales of anomalous densities, internal density distributions, magnetic fields, or gravitationally bound systems of those asteroids.

Solar activity might be shown to interfere, in a way minute and yet anomalous, with the orbital motion or bodily alignment of asteroids.

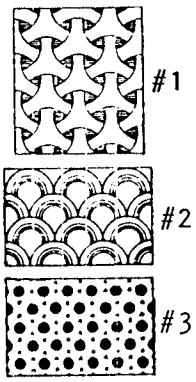
(3) COULD THERE BE ANOMALOUS CAUSE-EFFECT REVERSAL (EITHER REAL OR ILLUSORY) OF ASTEROIDS?

The motions of the planets are known to affect the motions of asteroids, but what if it were shown or implied that the collective motions of the belt asteroids affect the fine motions of Jupiter, say?

(4) COULD THERE BE ANOMALOUS DIAPER PATTERNS OF ASTEROIDS?

Diagram #2 on the right suggests a pattern that some asteroid might be found to have over a portion of its surface. Perhaps the cratering would be imbricated in this way, and the no-less-anomalous explanation be that the asteroid rotated once slowly in the course of some very brief bombardment by a swarm of meteoroids.

an allover pattern consisting of one or more small repeated units of design (as geometric figures) connecting with one another or growing out of one another with continuously flowing or straight lines



examples of diaper pattern

An anomalous pattern such as that of diagram #3 could be due to a topographic analog of Earth's (also anomalous) pimpled plains; and an especially anomalous cause could be some cosmic pingo mechanism.

(5) COULD THERE BE ANOMALOUS GROOVES OF ASTEROIDS?

Anomalous sets of grooves have been found on the exterior of some moons of other planets (Phobos of Mars, for example), and many moons may be homologous with, or even captures of, asteroids. Space probes have flown by and photographed moons, but never as yet asteroids.

The cause of the known groove systems is not known; they may even be polymorphic and polygenetic.

An anomalous twist would be the revelation that asteroids indeed do have such grooves, but of a type, form, or cause dichotomic and irreconcilable with those of satellites.

(6) COULD THERE BE ANOMALOUS FLASHES OF ASTEROIDS?

Such flashes have been noted in the case of the Moon and Mars, for which certain explanations have been advanced that would imply the need for there to be asteroidal equivalents (although the discovery of such equivalents could then have the paradoxical effect of extinguishing the phenomenon's anomalousness, by tending to validate the proposed explanation).

The discovery of specular or quasi-specular surfaces on asteroids would be less surprising than the discovery that there are luminous or gaseous surface emissions, or clouds of dust or other particles raised by electrical charges, possibly à la phenomena on or near comets—from which in fact asteroids may be descended. Bursts of light may also result from occasional meteoroidal collisions.

(7) COULD THERE BE ANOMALOUS 'DUMBBELL', 'PAIRED', OR 'BIPOLAR' PHENOMENA OF ASTEROIDS?

All three are conceivable: a high-spin asteroid pulled apart or formed as a figure eight, two asteroids orbiting or osculating one another, or an asteroid with radically different or antithetic halves (morphologically, topographically, compositionally, or genetically).

(8) COULD THERE BE ANOMALOUS SYMMETRIES OF ASTEROIDS?

Some asteroids might approximate simple geometrical shapes—cuboids, spheroids, solenoids, conoids, discoids, helicoids, etc—in ways and degrees not easily attributed to 'chance'. Statistical analysis of the asteroid population might also reveal such tendencies.

Such anomalous morphology could say much about the primordial origin of asteroids and the cosmogony of the Solar System in general. Favored shapes would be particularly revealing, or discriminatory of the various alternative possibilities. Amorphy might imply a cold or aggregative, morphy a hot or disaggregative (fragmentational), birth or development. There could be clues about primordial vorticity, gravities, chemistry, violence or placidity, space-densities of matter, rates of events, simplicity or complexity, etc. In minimal gravitational fields, gradients, and forces monstrous crystals, foams, jets, and other structures could have formed. Extreme magnetic, electrical, chemical, and mechanical forces, gradients, fields, processes, and phenomena might have obtained in the cosmogonic epoch and made for bizarre morphogenesis (from the standpoint of our own morphogenetic epoch).

INTRODUCTION
M . . . . ogy
METHODS

IDEONOMIC METHODS

CHAPTER PURPOSE

Our purpose in this chapter will be only this:

To imagine, name, and succinctly define a great number, variety, and range of more or less distinct ideonomic methods of a general nature. By 'ideonomic methods' we mean simply this: Methods such as those that the community of ideonomists would naturally seek to develop and use in their work, methods with the capacity to advance the science as a science, methods that already exist in fields other than ideonomy but that in their essence are ideonomic, methods that are not yet in existence in any field but which ideonomy has the power or duty to add to the armamentarium of the world's intellectual and creative communities, and methods that it is important to introduce or perfect so that those persons who are not ideonomists can nonetheless make use of the techniques, organons, technological devices, investigations, literature, and other resources of ideonomy.

The concern of the chapter is breadth, not depth, of coverage. It will do little more than enumerate methods. Some of the methods will be ones that have already been tested and applied in ideonomy; others will merely have been alluded to or conceived of; and still others will be thought of here for the first time.

Inevitably these methods will vary greatly in the degree of their power and scope (in magnitude, if you will). Certain methods will bear strong analogy to others, or overlap or even be in conflict therewith.

Some of the methods we will name will be ambiguous, vague, poorly named, or understood at best intuitively or minimally. Some methods will deserve to be broken up into their overly individual or encompassing components at a later day.

A few of the methods may be fundamentally erroneous, defective, or even meaningless—mere words, perhaps. Though hopefully these cases will be very exceptional.

Some of these methods will be borrowings from other fields that have been, or are intended to be, remade for the purposes of ideonomy—or extended, supplemented, generalized, adapted, or transformed.

Methods that are of outstanding importance, scope, interest, power, promise, complexity, or difficulty will in many instances receive attention in their own chapters.

Other details about these methods that appear elsewhere in this book can be found by using the "Index".

DIVERSE METHODS NAMED AND BRIEFLY DISCUSSED

(1) COMBINATORIAL.

This is the most obvious ideonomic method, or class of methods, and it has already been made great use of. We have devoted a chapter to it, and use is made of it throughout this book. It is a method that is capable of endless further development and of perpetual variation, and its possibilities seem limitless. Such is its importance, in fact, that it forms the subject of an entire ideonomic division, Combinations and Mixology.

Major categories of things that can be combined for ideonomic purpose are: properties, dimensions, words, sentences, principles, laws, methods, ideogenic formulas, operations, things, classificational schemes, types, taxons, quantities, acts, assumptions, examples, products of ideonomic exercises, metaphors, analogies, forms of knowledge, changes, elements of appearance, forms, speculations, conditions, experimentations, theories, arguments, instances, events, processes, types of order, abstract sets, correlations, criteria, generalizations, representations, languages, patterns, solutions, strategies, capacities, levels, paths, goals, games, spaces, permutations, series, virtuals, negations, mechanisms, controls, rules, states, circumstances, dynamics, parts, constraints, probabilities, symmetries, and relations.

Things within the same category can be combined or the different categories of things can be combined.

Obviously the combinations can themselves be combined.

The many things can variously be combined in: sentences, texts, ideogenic formulas or exercises, models, simulations, languages, computer languages and programs, physical experiments, thought, organons, life, and elsewhere.

The things can be combined in suggestive, definite, exploratory, ever-varying, orthogonal, and evolving ways.

The process may be human, mechanical, a matter of man-machine or of interhuman interaction, or axiomatic.

(2) PERMUTATIONAL.

The order in which constant and variable terms appear in ideogenic formulas, and the sentences they create, can be varied. Such permutation can variously be: random or deterministic, finite or infinite, partial or exhaustive, defined or undefined, convergent or divergent, simple or conjoint, theoretical or empirical (a priori or a posteriori), denotative or connotative, probabilistic or nonprobabilistic, heterotelic or autotelic, etc. It may be recursive.

Permutations may occur in simple linear orderings or instead in arbitrarily complex multidimensional spaces and manifolds.

There may be concurrent permutations or modes of permutation.

The categories of combinable things that were listed above for the most part also permit treatment by the present method.

Once useful, good, best, specialized, or fundamental permutations—and permutational methods—are discovered they can be used and reused, in either specialized or generalized ways.

There can be higher-order permutations and these can be of arbitrarily high order.

Many of the other methods we shall discuss can assist with the use of this method or be aided by it in turn. As is so often the case in ideonomy, the proper relationship between these methods may often be synergistic rather than competitive.

(3) LINEAR ORDERINGS.

Simply putting disordered, randomly encountered, diverse, or other things in their proper, or in some meaningful or interesting, sequential order can be surprisingly worthwhile.

Such orderings can be useful, important, essential, heuristic, mentally stimulating, educational, good training for the mind, unexpectedly feasible, or instead unexpectedly problematic, difficult, or paradoxical.

Ambiguities, ignorance, needs, fundamental relationships, interdependences, opportunities, puzzling neighbors and distances, odd presences and absences, logical and illogical placements, and much else may come to light.

Alternative sequences, both real and merely possible, may be noted.

One may discover that a complete or perfect ordering is impossible, undesirable, or unnecessary.

Once things have been ordered in one way, other ways of ordering them become noticeable or possible.

When things are ordered in multiple and diverse ways, an internal checking becomes possible or the different orderings lead back to one another repeatedly with corroborative effect.

The linear ordering of sets of things enables the ordering of additional things by interpolation and extrapolation. Many valuable and testable predictions can be made, and the design of interesting experiments is suggested.

Different and seemingly unrelated orderings of different and seemingly unrelated things often lead to the recognition of extensive analogies and other relationships, both between or among the orderings and between or among the things they order.

The achievement of single and diverse linear orderings paves the way for the flourishing of "dimensional analysis and theory": the systematic discovery, exploration, and exploitation of the simple and intricate : quantitative and qualitative : dimensionalities of things, ideas, and physical and mental processes.

But to be more specific and concrete, some of the things that may be put in the sort of linear orderings we have in mind, or that represent the linear orderings themselves, include: the velocities, masses, sizes, populations, energies, durations, ages, entropies, costs, dangers, importances, probabilities, or rates of things; the measures of analogy, and difference, between things; the connectedness of things; the hierarchic ordering of things; the homology or mutual derivability of things; the combinability of different things; the relative simplicity and complexity of things; the comparative excellence of things; and the knownness of things.

(4) SYSTEMATIC REDEFINITIONS OF CONCEPTS.

How many different ways can a thing be defined? How many different ways should it be defined?

It often proves to be valuable, even essential, to redefine the same word, thing, or concept in many different ways, by many different means, for many different purposes, on different occasions, in different contexts, and so forth. An exercise that one would have thought redundant proves to be otherwise.

Even redefining, or attempting to redefine, the same sense of a thing can be instructive.

Why this should be so is not clear—or it is not clear what all the reasons are. Things and/or our ways and means of thinking about things may be far more complex than we imagine. The meaning of things may depend upon the meaning of other things, or upon their interrelationship, to an extreme degree or in a transcendent way; things, even in their essence, may be indissociable from other things—and possibly from any other thing.

Unique or standard definitions may be unsuspectedly limited or defective.

Definitions of things may create a need for, or illuminate the possibility of, other definitions. Perhaps the proper way to conceive of definition is as an open-ended or infinite chaining or constructive process. Perhaps some sort of mental structures are being built that define their own universe.

Definition may also be an auto-perturbatory process, or a process that as it proceeds does injury to, reconditions, or even redefines itself.

Actually there are many esoteric possibilities.

Evidence for the need for or value of redefinition is provided by those occasions on which one has encountered a somewhat different, or even a completely different, definition of a term than that with which one is familiar or than one would have been apt to put forward oneself, and the result has been surprise over the novelty and serviceability of the new definition, wonder at some nuance it detects that had been overlooked or gone unconsidered, appreciation for some insight it affords, or a feeling of humility because of the correction it makes in one's mental picture.

With a particularly important concept, term, or thing it may be of value to redefine whatever it is in twenty or more ways. Again, not just in different senses but in different senses of senses.

One learns that there are various canonical ways of redefining things, canonical ways that are universal—that apply everywhere and that are mutually necessary and complementary, or contrapletal.

As one repeatedly redefines a thing one notices that the redefinitions tend to form a system, or at once specify, share, and complete a semantic architecture.

TRANSFORMATION OF IDEONOMY INTO A PREDICTIVE SCIENCE

Things are often crude when they begin. Sciences begin as un-sciences. It requires vision to see at the outset what may develop, and justify the pathetic infant.

All sciences are developing. Their entitlement to be considered sciences, and the measure of their scientific maturity and evolution, is increasing. Sciences differ enormously in their comparative maturation or scientificality, as well as in the dimensions and forms of their scientificality.

Mathematics is perhaps the most developed of sciences, followed by physics. Biology is far less mature, but its scientific standard greatly exceeds the standards of the various social sciences. Among the weakest of sciences are art and philosophy, and indeed few individuals in these subjects even think of themselves as scientists; yet the potential of these fields to become true sciences is illustrated by musicology, the most scientific branch of the arts.

The most popular test of a science nowadays is power of prediction. A subject is thought to be scientific if and only if it can be used to foresee things in unexpected ways and degrees.

Or more elaborately, a science is supposed to be able to predict important and special things that are not otherwise predictable. Or, if they are otherwise predictable, that cannot by those other means be predicted with such ease, efficiency, power, scope, reliability, penetration, practical virtue, insight, specificity, and/or the like.

Other things may be asked of the predictive faculty of a science. A science is expected to make predictions that can be falsified by facts and either lead to refined predictions—or alterations in the structure of the science—or else to a fundamental invalidation of the science. By the last is meant that a science is supposed to involve certain assumptions critical to the survival of the science from which flow a host of predictions that share the property that none must be proven wrong by abstract theory or empirical demonstration.

The meaning of predictions is supposed to be clear and unambiguous, intrinsically and to people in general. This applies to both the theoretical meaning and to the experimental significance of the predictions. A science is supposed to make discrete and finite predictions about discrete and finite events involving discrete and finite phenomena, and discrete and finite means and methods of testing.

A science should make many predictions that can be checked immediately or in the not-too-distant future, with means that are already known or assured. Predictions should be made that have simple and inexpensive tests.

A science should have the power to make predictions whose nature is such that they lead on to other predictions with a certain inevitability and in an exponential manner.

It is considered desirable for a science to make predictions on the basis of laws, rules, theories, and axioms. The overall predictive power of a science should increase with time, and respond to direct efforts to enlarge it.

Where a science makes predictions it should simultaneously predict their probability of being right or wrong, and also the probabilities of possible multiple outcomes.

The making and testing of predictions should be an objective process. A science should be able to predict more and more with less and less. It is expected of a science that it make "quantitative" predictions, though this really means many different and separate things that are seldom distinguished and often confused.

ILLUSTRATIVE IDEONOMIC PREDICTIONS

What are some of the predictions that ideonomy might be expected to make, both at the outset and as it develops? Develops, that is, in respect to the number and sophistication of its methods and materials, wealth of its experiments and data, number and skills of its practitioners, perfection of its technology, breadth of its applications and aims, richness of its concepts, and power of its theory.

In a sense all of the elements of ideonomy constitute predictions. The scheme of divisions of the subject, for example, represents a prediction that the scheme approximates, to some extent, to the best such scheme that is possible, that independent efforts of other individuals would converge to an identical or analogous scheme under certain circumstances, that the set of domains recognized by the many divisions are distinct, complementary, and exhaustive, and that the set of divisions will be found to apply to any subject, topic, or problem whatever.

Similarly the organons of ideonomy should have very general validity and value.

Ideonomy may predict that the random combination of two sets of terms to generate a vastly larger set of composite terms will produce terms that have a certain average or distributed interest, validity, importance, range, diversity, probability, etc. It may make this prediction either based upon a prior comprehensive examination of the composite terms or else as a result of the empirical and/or theoretical analysis of but a small sample of the possibilities. Its prediction may also rest upon humanly or mechanically judged <u>analogies</u> between the given composite or uncombined terms, and <u>outside</u> terms, sets, or exercises; and such analogies may or may not reflect the <u>conceptual</u> nature of the analogized things.

Where ideonomy asks individuals to use certain schemes of classification, or certain decision trees or networks, it is also making predictions: say to the effect that the conceptual or operational structures have validity, uniquity, universality, excellence, or sufficiency.

Ideonomy may predict that certain concepts are divisible into, reducible or equivalent to, producible from, or transformable into certain other concepts. It may predict that certain concepts are combinable or contradictory.

Ideonomy can predict that a mathematical technique applicable in one area will be applicable in another, even where the two areas appear to be fundamentally unrelated or different.

It can be used to predict how a field will develop in the future, or how it could or should develop. It can predict the future fertility and sterility of various fields.

Advanced statistical methods can increase the predictive powers of ideonomy in ways and degrees that are almost fantastic or beyond imagining.

Ideonomy will acquire the ability to predict the ways in which arbitrary things bear analogy to, or differ from, one another; or the relationships between things based on their analogies; or the existence of undiscovered analogs of things.

It will be able to predict the course and structure of human thought, even before such thought has occurred.

It will predict the proper definition or explanation of concepts.

Given a partial description of someone's personality or behavior, it will predict other things not mentioned or known. It will predict the most natural relationships between different personalities, and how various personalities, or traits of character, can be logically or circumstantially derived from one another within some universal psychographic space. It will predict a person's beliefs, how he would behave in certain situations, what his inner feelings are, and how he perceives another person.

It will be able to predict the books, paintings, films, houses, food, and pieces of music that any given individual would be apt to like or dislike —eventually with greater accuracy, and psychological validity, than the person himself.

When a certain event happens it will predict its good and bad effects, and the range and order of those effects.

It will predict the existence or occurrence of generic and specific problems in hypothetical situations, and solutions thereto.

Where we are ignorant of things, it will predict the character and nature of the unknown.

Ultimately it will help man to predict the stories that unfold in inaccessible domains: how prehistoric man came to build himself shelters, for example, or how ancient winds sculpted the face of Mars, or life began from the primordial prebiotic soup, or a spider thinks about her mate, or a so-called "chaotic" event would occur in 722,099,849-dimensional mathematical space.

Ideonomy will be used to predict and guide the course of its own future development and use.

It is conceivable that the history of music represents the complex-but-orthogenetic exploration and development of some sort of compact thematic space, in which case it will possible to use ideonomy to predict the 'whole' future history of music, sensu a necessary structure in this natural—or 'preselected'—space.

Often ideonomy will be used to predict, not the unique course that events will take, but the set of compossible courses that must include the unique or actual course.

Ideonomy will be able to predict the set of changes that would tend to perfect an existing work of art.

It will predict the existence of unnoticed objects in a scene, using a partial description of the scene.

It will predict combinations of phonemes and morphemes of use in coining words that sensorily suggest, or suit, the things they name.

It will predict the labyrinthine interdependent probabilities of things.

Based on the answers to certain canonical or interactively generated questions, it will suggest what in general is apt to be right and wrong about a thing.

SYMMETRY AND IDEONOMY

Symmetry, which represents one of the most important and revered ideas in all of science, also offers—I increasingly feel—one of the best means of explaining what ideonomy is and why it makes such good sense.

It is to be regretted that we probably do not as yet have a truly adequate definition—or a deep understanding—of symmetry itself. The dictionary speaks of "due or balanced proportions : beauty of form or arrangement arising from balanced proportions", of "correspondence in size, shape, and relative position of parts that are on opposite sides of a dividing line or median plane or that are distributed about a center or axis : an arrangement or external form (as in a body, a design, or a grouping) marked by bilateral conformity or geometrical regularity"; and about the derived adjective symmetrical it says, "being of such nature that the terms may be interchanged without altering the character, value, or truth" (Webster's III; only some subsenses are quoted here).

I would add to these efforts to define symmetry a few of my own: order transcending change or transformation; identical pattern; any and all diffusions and hints of identity; the simplest regularities, or the actual manifestations—both discrete and continuous—of laws; the greatest system of invariants, or any of its examples or effects; the hierarchy of all informational (information-theoretic) structures; those features of any system that enable its things to be measured against or compared with one another, in the most transcendental way; the laws of equivalences; fundamental entities that enable different things to be mutually transformed or derived; convergent meaning. (Obviously some of these definitions are referring first to symmetries and thence to symmetry.)

One of the great students of symmetry, Hermann Weyl, remarked[1] of the symmetry of a crystal that it "is exhibited not only by its external shape but by all its physical characteristics." The given kind of symmetry embodied in a thing has ramifications, recurrences, unities throughout the thing.

Yet symmetry may be, not just a matter of static form or properties, but of dynamical behavior. In fact, there can be purely temporal symmetries.

With this generalization of the concept of symmetry to the temporal or spatiotemporal, we take the first step toward its ideonomic application to the general materials of thought and to ideas themselves.

Weyl also discussed the role of symmetry in the determination and evaluation of probability.

The role of symmetry in formal logic is obvious and has already been alluded to. But as Istvan and Magdolna Hagittai have written[2], "The human ability to geometrize non-geometrical phenomena greatly helps to recognize symmetry even in its 'vague' and 'fuzzy' variations... Symmetry in its rigorous sense helps us to decide problems quickly and

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1. Hermann Weyl, his book Philosophy of Mathematics and Natural Science (Princeton Univ. Pr., 1949; p290, in "Appendix F: The Main Features of the Physical World; Morphe and Evolution").
2. Istvan and Magdolna Hargittai, their book Symmetry through the Eyes of a Chemist (VCH Publishers, New York, 1987; p3-4).

qualitatively. The answers lack detail, however. On the other hand, the vagueness and fuzziness of the broader interpretation of the symmetry concept allow us to talk about degrees of symmetry, to say that something is more symmetrical than something else."

This realization of the utility of approximate or imperfect symmetry may, however, be somewhat misleading or shortsighted. What we may ultimately find is that what were once regarded as merely rough, intuitive, or figurative symmetries were in fact symmetries of a more complex, demanding, unfamiliar, or even of a higher-order character; but symmetries not a whit less exact.

Proper appreciation of these more general symmetries may presuppose the future acquisition of a basic understanding of the mechanisms underlying intelligence, either in brain or machine.

Since ideas depend on the mind and the mind depends on the brain and the brain depends on biology and biology ultimately depends on physics, physical symmetries must inevitably play roles in the symmetries of ideas, and the symmetries of ideas, to be translated into practice or into applied or public things, must relate back to physical processes and their symmetries. The philosophy implicitly being espoused here is neither dualism nor monism, in the traditional sense, but rather something in between.

Yet how could two ideas be "symmetric", in a sense and degree that even the chemist would respect?

This would not be an interesting question if the ideas spoken of were simply ideas about recognized symmetries, such as the symmetry of chemical enantiomers. Let it therefore be understood that the ideas are ideas of any type about any type of thing.

One way in which two seemingly disparate and unrelated ideas could be shown to be symmetric would be as a result of nonmetric multidimensional scaling revealing that, through a group of geometric transformations in an "abstract" (but natural) hyperspace, a suitable set of operations makes one idea equivalent to the other—say in structure, behavior, result, relationships, or implications.

Or perhaps two ideas might be shown to be exactly opposite but otherwise equivalent to one another.

Not all sciences, and not all scientists, are equally aware of the importance of symmetry. Mathematicians are the most aware, followed by physicists, then chemists, and somewhere down the line one runs into biologists; but by the time one gets to psychologists, geologists, meteorologists, and astronomers it is hard going indeed. Still, in every science there is at least some inkling of symmetry as it applies, or could apply, to the phenomena of that science.

Physics is not only more conscious of symmetry than is, say, biology, but it makes much more theoretical and practical use of the concept, and has developed far more powerful methods for exploring and exploiting it. If this seems odd, it is.

The sharpest gap between physics and biology in respect to symmetry has to do, however, with the relative mathematical and logical sophistication, complexity, fundamentality, hierarchical level, generalization, and unity of the greatest symmetries that have been mastered and used by the two sciences. Only in mathematics and physics does symmetry begin to reveal its fantastically strange and wonderful, transcendental, and regnant, meanings, powers, and possibilities.

One great feature of symmetry is that it gives one the power to predict things, even things that would not otherwise, or through other means, be predictable.

Nature, it has been said, abhors a vacuum, and where possibilities of symmetry are indicated, in equations or logic, they tend to be realized in physical or mental reality, either directly or indirectly, in some form or way or degree or sense or another (or multitudinously).

Moreover, symmetries imply other symmetries, which imply still other symmetries, and so on ad infinitum.

Even where theoretical symmetries are apparently in reality unrealized, that absence can be so puzzling to science that the attempt to account for it is often a source of other important discoveries.

In fact, asymmetry is itself a form of symmetry, and therefore absence can be a form of fulfillment.

The impression may exist that the concept of symmetry can easily be overused, when in actual fact this impression only exists because symmetry has been so little used, by comparison with the need or potential. When symmetry is used sparingly, it may be being used to its limit; yet paradoxically, when it is used lavishly it may not have any limit. Vigorous use may be necessary for broader legitimation, or for the differentiation and recognition of the greater opportunities, and the smooth, harmonious, and mutually explanatory integration of the many diverse possibilities.

Ideonomy has uncovered many such nonmonotonic principles.

Why is symmetry, both directly and symbolically, such a good means for introducing, explaining, and justifying ideonomy?

Part of the reason is that it constitutes a subject in its own right and this subject (which is sometimes called symmetrology) already exists, in effect outside the field of ideonomy. (Actually symmetrology should be regarded as a subdivision both of mathematics and of ideonomy.) Much work has been done in symmetrology, there are many results, and yet obviously nothing has been the result of my own intrusive hand, so that if I refer other persons to this field to get evidence about ideonomy indirectly that evidence may be especially persuasive because of its absolute independence.

Symmetry is a good metaphor for ideonomy, not only because of its universality, but because it illustrates how people in the most dispersed disciplines can refer to certain universal concepts that enable them to have something important to say to one another about the knowledge, experiences, and methods of the different fields, to gain interdisciplinary and transdisciplinary insights into their own subjects, and to free themselves from the ironic tendency of one's work to blind one to the real nature and greater possibilities of that work.

"WHAT SYMMETRY COULD MEAN IN IDEONOMY"

1. Reality is much more ordered than generally believed.
2. Form (morphology) characterizes things in general, including ideas, the behavior of things, and mental phenomena.
3. The logical and mathematical operations, relationships, concepts, and terms that characterize and allow the symmetries of physical things can also be used, with or without adaptation, to discover and characterize the unknown symmetries of ideas; e.g. ideas may have or allow symmetric opposites, reversals, rotations, reflections, higher-order types and opposites, hierarchies, loops, cycles, "groups", etc.
4. Different ideas tend to be proportionate and balanced.
5. Different sets of ideas (or sets of sets) can be shown to covary, contravary, etc. in (abstract) spaces, and can be mapped onto, or used to manipulate, one another.
6. Ideas are conserved (will be found to obey conservation laws), and will reappear endlessly in different places.
7. Ideas have laws, and it is the laws, not the ideas themselves, that are important.

"CONSEQUENCES OF SYMMETRY IN IDEONOMY"

1. Ideas, and ever better ideas, can be mass-produced by consulting their, and Nature's, symmetries.
2. Eventually it will be possible to manipulate and even develop ideas without paying attention to the ideas themselves or even knowing what the ideas are (just as is now possible with physical phenomena, using numbers, mathematics, or computer programs).

APPLICATIONS
Education

IDEONOMY'S FUTURE USE IN - AND TRANSFORMATION OF - EDUCATION

The issue is such that one approaches it with pain. Pain because, although the potential of ideonomy to revolutionize the field of education is probably unique, no element of modern society would appear to be more resistant to innovation.

Why is it that educators are unsurpassed in their inability to look ahead, to criticize the profound flaws and mediocrity of the status quo, to propose and embrace reforms whose necessity and inevitability are often transparent, to aspire to the achievement of any grand design, or to cooperate with one another for the sake of great and proper ends? Why do they disdain the experimental method and the theoretical vision that are the essence of the science that is the source of civilization?

What accounts for this intellectual, moral, and political failure? The sphinx of Thebes might put such questions.

A very young neighbor of mine once knocked on my door to ask if I could help him to find a diagram of a fish, which he needed for his seventh-grade class. We routed out the necessary drawing from an encyclopedia article, and I made him an enlarged copy. I also made one for myself. I did this, not because I liked the picture, but rather because I did not like it. I knew why Kevin O'Connell wanted the diagram, but as an ideonomist I was all too conscious of the missed educational opportunity that the actual diagram represented. So I wanted to see if I could improve upon the famous encyclopedia's fish.

The original diagram was the usual thing, a sketch of the fish with lines drawn to major anatomic parts with their names placed at the outward ends of the lines: nostrils, liver, pyloric ceca, air bladder, etc. But what meaning does that have to a kid? All he sees is a lot of odd words that are to be memorized, or copied when he redoes the sketch to impress the teacher with his art-work.

The meaning that was absent I proceeded to add. Below each of the names I gave all of the major and some interesting minor functions. I expressed these functions by using analogies to the functions of parts of his own body and of machines or other things with which he was apt to be familiar. I also defined the parts in ways that would enable their functional interrelations, or the operation of the whole fish, to be apparent. Where appropriate, I added definitions to parts of my definition. The "ovary" is part of a device that the fish uses to make copies of itself (the fish being but a copy in a whole series of copies of copies of copies of fish that runs like an endless chain from the past into the future and stocks all of Earth's lakes and rivers). The "stomach" breaks food up into its smallest parts - food molecules - which are floated throughout the body by the bloodstream and reassembled into the different machines and structures of the body, much as a skyscraper is assembled from the simplest materials. The "air bladder" is like the ballast tank of a submarine (which I explained in turn). Some analogies were explained by other analogies, and the different analogies were woven together.

In these and other ways the fish was turned into a universal cognitive phenomenon in Kevin's mind, and mere words and structures were remade into concepts, and concepts of concepts, and functional patterns, with a natural life of their own.

As it happened, it was the old diagram of the fish that my young friend wound up using. He liked the ideonomic version better himself, but was afraid his teacher would find it confusing.

"58 IDEONOMIC EDUCATIONAL INNOVATIONS"

1. All possible museums: SEE two charts.
2. ANALOGIES: e.g., randomly paired things, biological technology à la Helmut Tributsch, tools in chemistry, "human moments" in animals, generic processes, 12 x 12 things, archanalogs, coanalogs and their traits, analogies generated + ranked by multidimensional scaling, archanalogese, emotionalized forms, animals = persons, etc (SEE treatments).
3. Anatomy: e.g., high school anatomy taught in an inverse way - not, as at present, via a few species that are treated as 'islands' (e.g., fish, frog, mouse, earthworm, even a plant), but by beginning with UNIVERSAL (and functional) anatomy and then illustrating it in a few species; or fish anatomy taught via analogies (to familiar machines, industrial processes, the human body, and other creatures), metaphors, multifunctionality, high-level concepts, and maximally elementary concepts.
4. APPEARANCES: analyses of single and paired scenes (SEE charts), total order and content of single scene explored via simple and combined universal visual elements, myriontology of one thing (SEE charts), myrioramic rearrangements of one thing or scene, chains and other perceptual meta-structures, effects of all possible contexts of one sound, texture taxology, etc.
5. Canonical ideograms, 'ideonomic' statistical graphs, and ideocartographic atlases.
6. CHANCES and PROBABILITIES: e.g., aleatory pedagogy and learning; random numbers should be used to decide : topics or course of classroom discussion, homework, essay themes, places to visit or trip deviations, which aspects of things to study, questions to ask or ways to answer them, acted behavior or roles, and occurrences in games; "Universal Probability Scale"; animated films, computer simulations, educational games, and ideograms : demonstrating all possible : types, degrees, patterns, interactions, and effects : of chance; etc.
7. "Charts For the Mind" (SEE charts and lists).
8. Combinatorial ideonomy used to: drive classroom discussions, get ideas for papers, research, and theses, 'analyze and synthesize' subjects, connect topics, etc.
9. Computer models and simulations (SEE list).
10. Construction and use of organons: e.g., canonical, omnifarious, mnemonic, simple + complex, "template"-like, etc.
11. CRITICISMS: e.g., universal, specialized, and semiautomated; of paintings, people, appliances, civilization, ideas, etc; constant, objective, and exhaustive autocriticism; meta-criticism (higher criticism); etc.
12. DEFINITIONS: e.g., words and concepts defined and redefined in all possible ways via all possible means; concepts simultaneously generated AND DEFINED via combinatorial ideonomy; etc.
13. Devices that harness our latest and total knowledge of the brain and senses: e.g., to train "pit climbing and multidimensional mental parallax"; a computer program and machine that demonstrates all possible psychophysiological illusions; etc.
14. Education must be transformed into an EXPERIMENTAL science and social institution: it is immoral NOT to experiment with human lives.
15. EFFECTS: e.g., chains and networks of consequences, à la James Burke's television series + book "Connections" or that Louis L'Amour novel; charts depicting same (SEE); imaginable effects of analogous canonical changes in diverse things; multilevel, multidimensional, contradictory, paradoxical, and other types of : effects; etc.
16. EPOCHES: e.g., Hitler 'right', "How Wrong Might We Be?", war good, "Good In the Bad" + "Bad In the Good", and lists of heterodoxies and controversies (SEE lists).
17. Ergography: e.g., atlases, 208 universally investigable dimensions of scientific phenomena, etc (SEE materials).
18. ERRORS and fallacies: e.g., SEE lists of D.H. Fischer, I.J. Good, H. Gunkel, F. Bacon, of medical fallacies, etc; most universal, interesting, and important; etc.
19. EVENTS: e.g., all ordinary and extraordinary life moments - scaled (SEE lists); events in the lives of other organisms and in inanimate nature (SEE list); etc.
20. Exploration of idea spaces and the "ideocosm" (universe of ideas).
21. "Films For the Mind" (SEE list).
22. FORMS: "Atlas of Form", morphodynamics, morphogeneses, interforms, combinatorics, multidimensional scaling, computer exokaleidoscope program, atlases created and tested by pupils, pandisciplinary reexemplification, dimensionless reexemplification, etc (SEE lists).
23. FUNCTIONS AND ROLES: all for given things; SEE lists for sidewalks, maps, rugs, marriage, cosmetics, etc.
24. FUTURES AND FUTURIBLES: e.g., kids should be taught to imagine the future systematically, encyclopedically, and holistically; alternative scenarios of the future should be constructed and debated; etc.
25. GAMES: e.g., the "Game of Twenty Questions" and other ideonomic games (SEE list); computer games via scales (as of velocity or analogies) made random and then intuitively reordered by persons - to test, grade, train, as games, or to confirm, illustrate, or build ideonomy itself (SEE lists).
26. GEDANKENEXPERIMENTS: e.g., suggested en masse by combinatorial ideonomy; scenario writing, etc.
27. Geography: via (e.g., fractal) generator of all possible geographies, landscapes, features, and planets, or via device demonstrating all cartographic and geometric projections of maps (including everted globes, synthetic apertures or eyes, and anamorphoses) - to develop maximally free, 'unprejudiced', powerful, and multidimensional geographic imaginations.
28. HISTORIES: e.g., alternative courses of history, say had the Axis and not the Allied Powers won World War-II; historical analogies and metaphors; histories of ideas and their practical consequences; etc.
29. Idea banks.
30. Ideogenetic formulas and formularies (formula libraries) (SEE list).
31. Ideonomic educational technology: e.g., the "Computer Globe" (SEE list).
32. Ideonomic software: e.g., "ThoughtLab" (SEE list); software depicting : sequences, trees, networks, vergences, hierarchies, fractals, N-dimensional manifolds, etc : of pure and concrete : analogs, analogies, differences, and transformations : of things and concepts; software teaching development and use of art-generating algorithms; etc.
33. IGNORANCES: examples, genera, clusters, maps, hierarchies, reasons for studying, causes, effects, about single things, etc (SEE lists).
34. IMAGES: "Image Reactor", why 'image chains' transcend mere 'movies', idology, worldwide computer-network image museum (with up to trillion photographs), etc.
35. INVENTIONS: e.g., schools should have kids create new or imaginary : religions, art-forms, political ideologies or systems of government, sciences, worlds (or bioses, societies, towns, countries, planets, and universes), musical systems, sets of customs, ethics, industries, books, etc.
36. LANGUAGES: e.g., super-English and etymology courses instead of Latin or even foreign languages; combinatorial linguistics and linguistic engineering; such ideonomic exercises as "World Spring", "Re-Prefixation", "Human Kaleidoscope", and "Automated Etymology"; a special ideonomic language designed to help people think; etc.
37. MATHEMATICS: e.g., "experimental mathematics", dimensional analysis and dimensionless numbers, ratio spectra (of risks, masses, energies, 'prices' or economic values, etc), the number "100,000" 'explained' via multi-scale ratios repeatedly exemplifying it, etc; 'demathematized' mathematics using : words, analogies, differences, examples, metaphors, powers, results, combinations, diagrams, computed pure spatial forms or physical simulations, etc; wholly verbal dictionary or encyclopedia of mathematical concepts (using no numbers or equations, save redundantly); etc.
38. MOTIONS: e.g., generic, generic exemplified, systems of, causes, effects, etc (SEE lists).
39. Multidimensional scaling and neural nets: e.g., to pool and synergize knowledge, wisdom, and judgment; SEE list "65 Things Treatable Via MDS".
40. Music: e.g., taught via Robert Clark's 'horizontal representation of the pitch of notes' computer program; Richard Voss's fractal music; theme classification; machine to demonstratively vary in all possible ways; audiovisual synesthetic music; etc.
41. OPPOSITES: e.g., antisyzygies.
42. Pandisciplinary things: phenomena, processes, patterns, dimensions, laws, principles, forms, sequences or stories, hierarchies, anomalies, goods + bads, etc.
43. PARADOXES: universal.
44. PATHS: e.g., SEE chart "1-Day Path of Butterfly" and organons of examples, types, effects + behaviors, elements, causes, ways to treat, questions, reasons to study, etc.
45. PHENOMENA: teaching of as many basic or universal types of natural phenomena (in as many sciences) as possible.
46. POSSIBILITIES and NAUGHTS: e.g., types, causes, ranges, criticisms, effects, clusters, and universal exemplification.
47. PRACTICES: e.g., kids should be taught the human universe of all types of jobs, tasks, roles, and goals (à la the old U.S. Department of Labor "Occupational Handbook"); "Conduct" should be a 'new' subject taught to all at all levels, and embracing : acting, microkinesics, rhetoric, debate, psychodrama, self-development, scenario-enactment, autoscopy via advanced technology, etiquette, and ethics; etc.
48. QUANTITIES: "Atlas of Scale", universal scales of quantities (e.g., probability, risk, entropy, velocity, mass, flatness, population, unified high + low pressure, and multiple forms + units of energy), 100-scale computer program, training of intuitive and predictive powers a la Feynman, etc (SEE lists).
49. QUESTIONS: e.g., generic, all possible, important unanswered, speculative answers, ways of answering, etc (SEE lists).
50. Redesign of the educational system to maximize the individuality and diversity of the population: no child ever taught the same curriculum.
51. Serial or chained application of different (logically or randomly chosen) ideonomic subdivisions to single problems.
52. Special computerized tachistocope generating multiply and programmatically randomized sequences of images: e.g., for coalescent, protean, hallucinatory, oneiric, classificatory, and psychoscopic effects.
53. STORIES: e.g., generic stories and aspects of stories reexemplified by : people, fish, plants, volcanoes, diseases, stars, water molecules, music, and rainstorms.
54. Teaching should be taught to all: e.g., so that autodidacty will follow, kids can later teach their kids, students can understand their teachers and lessons better, kids will teach one another, and adults can effectively always be teachers and pupils of one another.
55. Textbooks and courses teaching ideonomy.
56. Use of ideonomy to enable kids to design their own curriculum and to redesign, or to endlessly evolve, the entire educational system.
57. VALUES: e.g., BADS, GOODS, OUGHTS, and BEAUTIES (SEE organons).
58. WISDOMS: e.g., generation, winnowing, classification, analysis, and application : of all possible aphorisms.

In this chapter I address two related but not identical themes: the ways in which our educational system can and should be transformed in the future, and the contribution that ideonomy can make to education. An inquiry into general needs and opportunities for scholastic innovation will inevitably identify areas where something like ideonomy could make a difference, and a discussion of ideonomy's educational potential will just as inevitably call attention to what is possible in education generally.

The different elements of education that allow for changes and improvements should initially be distinguished: technology; methods of teaching and learning; educators; students; curriculum (things taught and trained); goals of teaching and learning; materials; and institutions. By curriculum I comprehend all facts, ideas, wisdom, values, feelings, skills, traits of character, methods, purposes, or philosophies that are or may be taught or learned.

The first question is, at what age can and should ideonomy be taught or play at least an indirect role in the instruction of a child?

The answer to this question must to some extent be empirical, a product of experiments carefully conceived and executed and sufficiently prolonged to permit firm conclusions about the long-term and comparative mental development of tots reared with legitimate ideonomic methods and materials. At the time I write ideonomy is itself a mere tyke, and no effort has been made to conduct this exciting research.

It might be thought that ideonomy is too complex, abstract, and difficult to be communicable to very young children; that efforts to do so would founder on the concrete, simple, and inexperienced character of the infantile mind; that ideonomic concepts and methods could not be explained to or used by such incipient mentalities—efficiently, safely, pointfully, or at all.

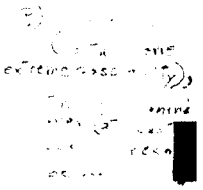
But objections like these either embody misconceptions or beg important questions. It is wrong to assume, for example, that ideonomy can only have a certain, known form; that its explanation or 'teaching' even requires words; or that those who are taught ideonomy must have as sophisticated a picture of the subject as their teachers do. Thus the medium through which ideonomy is taught, or by means of which it can help to shape the mind of an infant, may simply be that of music or sounds, of paintings or images, of touch, or of smells; nothing would be too elementary.

Ideonomy does not exist only at or above a certain level of complexity; the ideonomic—the world of 'ideonomic' phenomena, processes, relationships, and laws—represents a continuum that is equally active, real, and important in every element of reality, at every natural scale, and at every stage of mental development. Just as there is no greatest ideonomic lesson, there is no least.

Had the understanding of teacher and taught to be symmetric, all education would be impractical and absurd.

It is of course utterly premature to predict on the very day in which ideonomy is being born the limits that may or may exist to the condensability, simplifiability, and transformability of ideonomic methods, materials, and concepts.

It is also not known what the basic nature of the immature mind is, in part because the basic nature of the adult mind remains unknown. The adult mind may, for example, be present "in full"—preformed, as it were—in the youngest human brain; it may just be dimmer, in the sense that a holographic image remains complete, in a holistic or gestalt sense, but fades or grows dimmer in ever smaller or more broken up pieces of a hologram. To the extent that this is so, the future adult mind may reside addressably and educably—crying out for ideonomy—in the merest baby.



Finally we come to the most important point of all, that ideonomy by its very nature may be that subject most deserving of being taught young and first, and that is most capable of being taught to the otherwise untutored and unformed mind. It is, in its essence, the simplest subject and perhaps the most fundamental, natural, and intuitive. Certainly it could be argued that if taught young and first it has the power to simplify, ease, and amplify all that is taught and learned later; that it provides the proper, or a superlative, framework and machinery for all other knowledge and thought. It furnishes elements and tools from which and by which all higher and more complex ideas can be constructed or deduced. It can insure that the later adult mind will have a maximally simple, integral, and universal form, and perhaps be blessed with a degree of self-knowledge, self-mastery, and self-development that we who are <u>not</u> the product of an ideonomic upbringing would deem remarkable.

Like cellular automata in advanced versions of John Conway's Game of Life, ideonomy may offer those rules and states—those elements and processes of being—possessed of the most fertile simplicity and therefore able to define the total forms of possibility and the dance of life.

What better things to teach the unformed or youngest mind than the fundamental dimensions of reality, the alphabet and grammar and vocabulary that are the language of all that is possible, the basic formulas of creation and thought, the infinite-dimensional idea space that is the house in which that mind is destined to spend its entire life?

A fallacy that dogs all attempts to demonstrate through the study of early development that the content and structure of the psyche derive more from the physical structure of the nervous system at birth than from the subsequent sensorimotor contingencies of life, is that the importance of the latter in adding and shaping the fundamental elements of human psychology might reasonably be expected to fall off logarithmically with age, or conversely, to rise exponentially toward the moment of birth if traced backwards in time from the moment of death. Which is to say that the earliest definable events in the life of the nervous system—and here perhaps we must look even farther back than the somewhat arbitrary time of birth, or toward the moment of zygotic conception itself—may conceivably have an arbitrarily great and disproportionate importance in directing the psyche down one psychogenetic course rather than a zillion others. So honest experimental psychologists may be compelled to push their human and animal investigations into ever more primordial, brief, and esoteric epochs of psycho-neural development.

DEPICT THE HISTORICAL DEVELOPMENT OF CONCEPTS:

The primary focus should be upon the idea itself, or upon its cognitive dimensions and the ways in which these interacted with the practical world, and not—as is more common at present—upon the arbitrary, ordinary, or more familiar features and facts of the individuals and societies in which the concept happened, more or less by chance, to originate and evolve. Keen attention to the circumstantial particulars is not in itself inappropriate, but these should be kept subservient to the higher task of illustrating the life history of the concept as a transcendent natural phenomenon with very general and fundamental implications.

That the opposite approach predominates almost exclusively is of course perfectly understandable, because it is simple and demands so much less of both the teacher and his pupil. If there is the pretense that any and all facts contribute equally to an education, or that it is sufficient to equip a young person with a store of facts and a repertoire of skills, then the teacher is basically free to improvise in the classroom and to transfer without inspiration or comprehension what is recorded in teaching manuals and textbooks to the mind of the student. But the result of this reprehensible expedient will usually be a graduate who likewise has no true, deep, or creative understanding of the material.

Of course the historical development of a concept will not be unilineal; there will be convergent and divergent branches, transverse elements, and even semi-independent trees and other meta-structures contributing to the concept and to its larger context or matrix of relationships. Thousands of sub-concepts will have come together in and spun off from the concept itself, insofar as it is unique. This will be true whether the concept was Justice, Mass, Inequality, Perspective in visual art, or Earth As A Single Geological System.

Books treating the historical (and to some extent the possible future) development of one or more major concepts—e.g. of force, space, the quantum, time, motion, infinity, biological evolution, etc—have been written by Max Jammer, Paul Davies, Cassius Jackson Keyser, and others. These studies are as valuable for the way in which they suggest the general nature, feasibility, and importance of all such studies as for the remarkable things they accomplish with respect to the specific notions they treat. There should therefore be an ideonomic survey of the totality of studies of this kind—in books, dissertations, periodical articles, conference papers, etc—and from the resulting bibliography a standard set of publishings should be identified and maintained in one place in institutional libraries. The imagined survey should also include a systematic critique of the studies that ranks and distinguishes what they do and do not do and treat, the methods they use, the style they exhibit, the uses they have, etc.

INTRODUCTION
Methodology
Technology

IDEONOMIC COMPUTER SOFTWARE

The principal future use of the computer remains unheralded: not calculation (at least not for its own sake), not data storage and retrieval, but rather the manipulation, exploration, and generation of ideas. Ideonomy in other words, broadly defined to include ideonomic forms and applications of artificial intelligence.

That there may have been such an oversight is hinted by a sensation that one has on occasion when using contemporary computer software, an intuitive feeling that there is something basically wrong with or missing in such software. In the view of the ideonomist, there definitely is something missing, namely anything more than the slightest attention paid to ideas and to the cognitive aspects, needs, and opportunities of the software. Existing software, if you will, represents a sophisticated technical "shell" with a hollow core.

A glance at educational software makes this particularly clear. It is generally agreed that almost all such software is disappointing. It can teach knowledge and skills, but only superficially and in ways that do not begin to realize the potential or answer the need. The value of human instructors and of conventional textbooks far exceeds the value of current examples, forms, and techniques of educational software. It is also true that academic software does little that is qualitatively different or suggestive of the presumptive power of the computer to revolutionize educational methods or to develop novel mental skills in students.

For the most part educational software simply represents a mechanization of textbooks, tests, and other pedagogic materials and a partial (but momentarily inferior) automation of pedagogy. Or one could say more cynically that its major accomplishment has been to enlarge the recreational side of schooling by adding video games to the curriculum.

There are four ways in which ideonomy will change computer software:

i. By the addition of ideonomic elements to ordinary software or the ideonomic modification of the latter;

ii. Through the development of specialized ideonomic software;

iii. In terms of the development of general or truly universal ideonomic software;

iv. Via the production of ideonomy-based artificial intelligence software; and

v. Indirectly, through the contribution ideonomy can make to any form of planning, creativity, research, development, or implementation, including that involved in software design and exploitation in its totality.

The computer, computer science, and the computer industry can all be neatly divided into the two parts of computer hardware and software. One could define the distinction as being between all that which is "hard", or contributory to the basic physical structure and functioning of the computer or of its physical auxiliaries (the hardware); and all that which is "soft" because it contributes in a remaining way to the impermanent or adaptative side of the computer, to the computer in its processual or informational aspects, or to the external government of the computer (the software).

That is an imperfect definitional distinction even today, however, and in the future it will progressively lose most or all of its meaning.

"POSSIBLE ELEMENTS OF A MARKETABLE GENERAL IDEONOMY PIECE OF SOFTWARE"

1. Analogical networks and other semantic networks.
2. Charts of ideas and things (cf. #14).
3. Cognitive alphabets (sets of basic concepts that can generate other concepts).
4. Cognitive language (a special language for thinking).
5. Comparisonal scales (e.g. quantitative or analogical).
6. Composite : definitions, explanations, and concatenations : of ideas.
7. Concept hierarchies.
8. Cultured ideonomic: spaces, manifolds, tables, meta-structures, and nuclei.
9. Dictionary of universal concepts and ideonomic terminology.
10. Elementary and complex examples (of all sorts of things).
11. Encyclopedia of universal concepts.
12. Ergographies (systematic pre-descriptions of work that might or must be done and of the things that pertain to that work).
13. Idea permutations (consequential reorderings of sequences of ideas).
14. Ideogenetic formulas; formula libraries; algorithms for manipulating and transforming ideas.
15. Ideography (simple visual elements for representing ideas).
16. Ideomatics (the mathematics of ideas, including programs for doing statistical ideonomy).
17. Ideonomic and cognitive principles.
18. Ideonomic and cognitive: training programs, exercises, and games.
19. Ideonomic diagrams (especially ideograms), maps, and atlases.
20. Ideonomic experiments.
21. Ideonomic templates (computerized dynamic or semistable organons that allow the consequential insertion of different themes).
22. Ideonomic tests.
23. Ideonomic (ideonomy-serving) computer languages.
24. Ideonomic sequences, concatenations, and series.
25. Interlanguages and inter-concepts.
26. Lists of ideas and things.
27. Mnemonics (ideonomic memory aids).
28. Nonverbal ideonomy (i.e. visual and musical).
29. Peri-language and endo-language (language for treating language or concepts, and language covertly implicit in existing language).
30. Questionaries (ideonomic and general).
31. Recurring types of: charts, lists, chart and list items, ideonomic goals and methods, etc.
32. Universal taxological schemes for ideas.

"ThoughtLab"

One form in which ideonomy could be marketed, or simply made available, would be as a single extraordinarily diverse and powerful piece of software. In this form it would represent a universal organon, or tool of thought, "for treating any subject, idea, or thing".

If commercialized and sold under a name such as Mazda (the Persian god of light and spirit of good), Ideonomy or The Ideonomist, ThoughtMate, or—let us say—ThoughtLab, it could well turn out to be the most profitable and long-lived software product of all time.

Presumably it would constantly be updated, modified, and extended, and specialized versions might be marketed for various categories of users.

ThoughtLab would not have to compete with other ideonomic software. Indeed such software could be designed to function in synergistic combination with it and it could promote the sale of this less general software.

This general organon might also be designed for optional use in noncompetitive or synergistic combination with some sort of ideonomic Idea Bank computer network. In fact it might be manufactured in such a way as to ultimately facilitate the societal use and self-evolution of the Idea Bank.

Please see the table "Possible Elements of A Marketable General Ideonomy Piece of Software".

The question as to which ideonomic divisions, organons, and materials would be most appropriate to include or exclude in this product—a product presumably intended for home or microcomputers—is not addressed by this list. Rather the list is solely concerned with the diverse high-level categories of elements that might be suitable.

It is also unclear, at this point, which of these elements would be most and least appropriate, which would tend to be complementary or competitive, and which should be made central—or instead peripheral or subordinate—in the software.

Similarly the exact nature or full possibilities of such elements must await future research.

Terms used on the table are often defined and treated elsewhere in this book.

How might ThoughtLab come to be used?

A major user would inevitably be students, perhaps students at all levels. Versions of ThoughtLab might be created to serve different academic levels, or individuals differing greatly in age and sophistication. There might be versions for children barely out of the crib, in preschool, in elementary school and high school; for undergraduate, graduate, and postgraduate students; as well as for the teachers themselves, and other professionals. Presumably there would even be versions for adults in general.

Students who owned or had access to ThoughtLab or its equivalents might be at such an advantage relative to students without such access that there would be a scramble for acquisition, and an issue of social fairness might arise similar to that which is now familiar to us in connection with inequities in private and academic ownership and use of microcomputers, and with unequal access to supercomputers.

The value of ThoughtLab would be that of a powerful amplifier of intelligence, thought, knowledge, learning, and creative imagination.

A student bringing his schoolwork home could load ThoughtLab on his computer and use it to improve the scope, ease, excellence, and originality of his work.

He could use it to clarify key concepts, questions, and problems. To structure and enlarge the meaning of such information as he has. To find unexpected and important relationships among the objects, phenomena, events, circumstances, etc with which his assignment happens to deal.

To avoid fallacies, improve his arguments, decide upon purposes and goals in the work he is to do. To treat the meaning and implications of things at different levels and in terms of different dimensions.

To embellish his examples, address alternative points of view, and probe his own mind. To generate themes for an essay or plots for a story.

To construct diagrams—or create metaphors and analogies—for his concepts. To sequence his presentation.

ThoughtLab could be used to translate a specialized encyclopedia article, or an obscure or difficult topic, into more universal, simple, personal, or useful terms.

The student could use it to develop some inchoate idea he has.

The effect of ThoughtLab would be to make any book or library larger, any school course more thorough, any lesson more multidimensional, any classroom discussion more profound.

Scientists could use ThoughtLab to guide their theoretical speculations, laboratory experiments, or literature searches.

Businessmen could use it to improve their understanding of economic data and trends, to visualize and plan the development of new products, or to oversee the complex and interrelated work of a thousand employees.

Psychologists could use it to get a better picture of their patients.

The possible uses and users are endless.

1988 Oct. 26

INTRODUCTION
Project history
\Value

WAYS IN WHICH I SEEM TO HAVE BENEFITED FROM MY USE OF IDEONOMY

1. My use of language has improved: I make more and better use of metaphor and analogy, there is greater understanding of what it is that I mean (or others mean), logic is more nearly the master of language (rather than the opposite), words are used in a more ideational way (or as concepts rather than reified words), etc.
2. I constantly see all sorts of analogies between things (e.g. different fields).
3. My ability to understand diverse fields, new phenomena and methods, novel and complex concepts, human behavior and motivations, perspectives that are not my own, problems, purposes, goals, relationships, etc : is much greater.
4. I can spot fallacies and errors all over the place.
5. I constantly see things beyond and above conventional things.
6. I see all sorts of defects in things and am more critical.
7. I am more aware of large-scale and basic patterns.
8. I have more principles with which to reason and am more conscious and exploitive of such principles.
9. I find it easier to explain things to people.
10. When I have or encounter one idea it quickly leads to others.
11. Things appear to me to be much more interconnected.
12. My interest in things seems broader and greater.
13. I see many more sides to things and can easily manipulate them in my mind.
14. I can argue things better.
15. I am more noticing of the peculiarities of things.
16. I can make better use of the things I already know.
17. I am better at recalling and conceiving examples of things.
18. Abstract ideas give me less of a problem than previously.
19. I am more able to understand the functions, mechanisms, effects, and implications of things.
20. I can move more readily between generic and specific ideas.
21. I am constantly combining and transforming ideas to generate and explore other ideas.
22. My mind gives greater emphasis to processes than before, and less emphasis to mere things.
23. I am more able to ask and answer questions about things, even arbitrary things.
24. I have a greater appreciation of the absolute and relative scaling (or quantitative aspects) of things; I understand quantities better and I am more able to guess them.
25. I am continually generalizing the things I observe, read, or think of, and extending them elsewhere.
26. My thoughts are more unusual.
27. I can think better about the interactions of things.
28. I am much more conscious of assumptions and paradoxes.
29. I can analyze better the appearance of things.
30. I gain more from what I read and I assimilate it faster, and my general ability to learn things seems to have increased.

→ ADD: Figures #1 & #1?

"FORM-TEMPLATES FOR MAPPING IDEAS"

Patrick Gunkel

The set of ideonomic methods proposed here are strange, tentative, and only minimally tested. Readers may at first be deeply puzzled by these ideas and even think them farfetched or absurd. Even though I have not had an opportunity to investigate in any careful or systematic way the [feasibility, meaningfulness, special properties, requirements, possible importance, or theory] of these speculative techniques, I am intuitively convinced that they make good sense and that it will ultimately be shown that they possess some unusual merits and have a special role to play in ideonomy's methodological armamentarium. I have no way of knowing what their characteristic defects and limitations may be, and the determination of these is apt to be an experimental matter.

What I have to say about these weakly anticipated methods is, in any case, apt to be misleading at times, and posterity will probably view my commentary as naive and misfounded. But such are the problems of the pioneer!

Crudely stated, what I visualize is this. All the diversity of shapes that can be imagined by pure morphology should be applicable in various, and probably in innumerable, ways to the spatial representation of the semantic self-structure and interrelationships of all the types of ideas that are humanly imaginable.

Some of the reasons for asserting this are: 1. There may be something intrinsically spatial and morphic about the mind's concepts, 2. Or about the structure of reality, 3. Or about the mysterious interrelationship of mental and physical reality, 4. Or of what is real (the world of reality) to what is possible (the world of possibility); 5. Or about the structure, dynamics, or genetic heritage of the human mind and/or psyche, 6. Or about language or human language, 7. Or about the mind's peculiar cultural inheritance or practices; 8. Or these things may be true only because, and in the way and degree that, the mathematics of form and space, or of topology and geometry, or of their graphical representations or models, has some deep or happenstance affinity with the mathematics of algebraic, number-theoretic, logical, or other relationships.

I apologize for stating such a wide spectrum of hypotheses, and for then having to confess that it does not lie within my power to choose among them. The questions raised by this set of hypotheses are simply too big to answer now, or even to confront.

Returning to the description of what I actually have in mind, let me supply some specific examples:

1. Organons featuring pictorial sketches of sets of canonical and quasi-canonical forms, or genera and species of forms, might be examined to see what ideas they might release in the mind *in general*, or without concern for the production of certain ideas or of ideas pertinent to particular matters or interests;

2. On othe hand, such organons, sketches, and types might be consulted for the sake of triggering specialized ideas or ideas helpful in some purpose or task;

3. A universal or specialized scheme classifying types of forms might be consulted for triggering general or special ideas;

4. Such ideas, related or seemingly unrelated to morphology, might be stimulated by simply consulting [pictorial or purely verbal] [lists or schematizations] of forms' [generic or specific] [dimensions or properties];

5. To thus get ideas, organons depicting the [transformations, intertransformations, morphodynamics, or morphogeneses] of [forms or types of forms] might be consulted;

6. Countless other types of organons in the ideonomic division **FORMS AND MORPHOLOGY** might be turned to stimulate pure or applied ideas, in a random or more methodical fashion;

7. When sets of ideas (*idea-sets*) are being mapped via the statistical method of nonmetric multidimensional scaling (*nMDS*), the ideas in these idea-sets might be pre-positioned at various loci on shapes serving as *form-templates*; the loci might alternatively be [point-like, extended, or themselves shaped, structured, or textured]; and that which determines the pre-positioning of the given ideas might be:

[chance (or any of various stochastic methods or algorithms), intuitive or esthetic judgment (with or without explicit criteria), semiempirical (or empiriological) experimentation, various types of decision trees or *other* decisional structures, multipersonal decisions or interactions, mathematical formulas, sophisticated statistical methods such as nMDS, man-neural network interactions, perceived closed or open [idea-idea] relationships between or among specific subsets of an idea-set's ideas, study of variant representations (either formal or representing past findings or experiments), morphological patterns of absolute or relative motion of the ideas and/or form-templates (which, again, may variously be stochastic, lawful, intuitive, *etc*), human logical or formal judgment (about order, geometry, *etc*), or analogies (either positive or negative) to such morphic representations of other sets of seemingly unrelated (or perhaps partially or speculatively related) ideas].

8. In the case of #7, the form-templates used during the nMDS scaling of the ideas might either be thrown away afterwards as irrelevant, or at least kept hidden, (in which case they could be called throwaway *ghost templates*)—or instead retained and displayed, on some basis, in the final data or maps;

9. Positioning of idea-sets on form-templates, in connection with nMDS scaling, could also be done: either by the nMDS scaling process itself, or with some concurrent mathematical process exploiting human judgment; or else subsequent to the nMDS scaling or to the appearance of the maps resulting therefrom (in the latter case it could be termed *post-positioning* of ideas at morphological loci);

10. Either [hierarchical or nonhierarchical] [spatial or purely combinatorial] [clustering, grouping, sequencing, networking, *etc*] of

the ideas in an idea-set could be done by a person : for example, who might ask himself what *alternative* [clusters, groups, series, *e/vc*] subjectively [make the most sense, maximize contrast, minimize overlap, maximize dimensionality, maximize homogeneity, suggest the greatest richness of reciprocal implications, make sense in terms of some external referent or concept (or set of such referents or concepts), create the most structure intrinsically (or viewed for itself), make the most holistic sense, *e/vc*] : and then the [unique or plural] [form-templates and/or localizations of ideas on form-templates] that are implied by the decisions could be constructed automatically by a computer;

11. It may be conjectured that random or especially meaningful (or *natural*) placements or collocations of idea-sets on form-templates, or shapes of form-templates in the case of idea-sets, will—*in terms of the idea-sets*—also be meaningful, and irredundantly meaningful, when either of them are made to vary, whether the *morphological* basis of the morphological or positional variation is [random, morphogenetic, morphodynamical, or taxological];

12. The purely morphological form-templates being imagined might be [supplemented or complemented] by [colors, textures, symbols, or the equivalent of real-world objects];

13. The semantic significance of the form-templates might be modulated contextually, by [juxtaposing, superimposing, texturally imposing, or diachronically alternating] images of objects, scenes, or other form-templates;

14. A person might simply take the ideas of a given idea-set, as though they were tinkertoys lying on the floor, and arrange them into various shapes [say by placing them at various distances from one another, or by connecting them by linear links so that they have mutual angles, orders, structures, cycles, or even directions or levels, or by separating them by wall-like boundaries].

The results of such exercises might either be kept, or simply thrown away afterwards (because the subjective insights gained during the manipulative or exploratory process or performance are what are judged to be important, rather than any public or memorable products).

Such exercises might also be undertaken, not with the goal of finding the best or most meaningful spatial or morphological arrangements of the ideas, but rather with the opposite and paradoxical goal of discovering the worst, least meaningful, or most absurd arrangements of the same ideas. Certainly it might make sense to pursue both goals *separately*, since complementary insights might be obtained in this way; especially since the positive arrangements might then, or by virtue of the contrast, appear more meaningful to one.

After this general discussion of the concept of ideonomic form-templates, it is unavoidable that I provide an actual illustration.

The shape of the gridded form-template in **Fig. 4563**—which suggests a butterfly seen dorsad, an 𝕏, or a vergence—was generated by a computer using a mathematical equation. That shown is actually a two-dimensional

snapshot of what was originally a three-dimensional structure rotatable in 3-space in all six general directions (or in opposite directions about each of three axes), but I treated it purely two-dimensionally when I positioned the ideas upon it and it is as a stationary two-dimensional object that we consider it here.

The shape was selected in advance, mostly for its simple symmetry, without regard for the idea-set that was to be placed upon it (the identity of which, in fact, was unknown at the time).

From a set of fifty named emotions, three—**Love**, **Jealousy**, and **Pride**—were chosen and pre-positioned in the abstract map to serve as nucleative and orientative poles that would enable me to deduce some logical spatial and morphic organization of the other and larger set of emotions that were to be added later. **Love** being one of the most basic of emotions, it was inserted at the vertex of the form-template, and **Jealousy** and **Pride** were then stationed where I felt they would permit the intuitive operation of ideonomic or ideographic processes equivalent to interpolative, extrapolative, trigonometric, root-finding, generatrix, and other procedures in conventional mathematics.

I then addressed the problem posed in the legend of the figure: *"QUESTION: Given the above loci of three emotions in the manifold's structure, to which loci (nodes) would you [uniquely or alternatively] assign [either seriatim or synchronously] these emotions additionally:* [1]***Hate,*** [2]***Suspicion,*** [3]***Loneliness,*** [4]***Shyness,*** [5]***Boredom,*** [6]***Hope,*** [7]***Fear,*** [8]***Happiness,*** [9]***Admiration,*** [10]***Disgust,*** [11]***Caution,*** [12]***Amusement,*** [13]***Serenity,*** [14]***Guilt,*** [15]***Anger,*** [16]***Pity?"***

Note the COLOR KEY: [1•]{green}: The three prelocated, nucleative emotions (**Love, Jealousy, Pride**); [2•]{blue}: Subsequently located emotions (in numbered chronologic order); [3•]{red}: Emotions assigned multiple (≥2) loci.

As this key indicates, I assigned three emotions (**Caution**, **Amusement**, and **Guilt**) multiple (in the event, no more than dual) positions. I did this where I thought the symmetry appealing, or the ambiguity or duplication unavoidable.

The pre-superscripted numbers refer to the (chance) chronological order of addition of those secondary emotions to the template.

I found that, as is typical for analogous ideonomic procedures, as I added more emotions to the form-template the meaningfulness of the (subsequent *and prior*) placement of the emotions became ever greater, more recursive, more definite, more specific, more obvious—and yet also more complex, more problemmatic and contradictory (or *tensioned*), more demanding upon one's powers of memory and sight! There were temptations to reverse and redo the structure, but I resisted them (although it would also have been interesting to have yielded to them, so that, if I had had the time, I would have explored the consequences of separately using both an irreversible and a reversible rule).

Since **Hate** can be opposite to **Love**, I have tried to place it at an extreme. But, with respect to its center, there are *four possible* most-extreme loci in this form-template, rather than merely *two* or *one*! Such redundancy presents a fascinating semantic and cognitive problem. Still

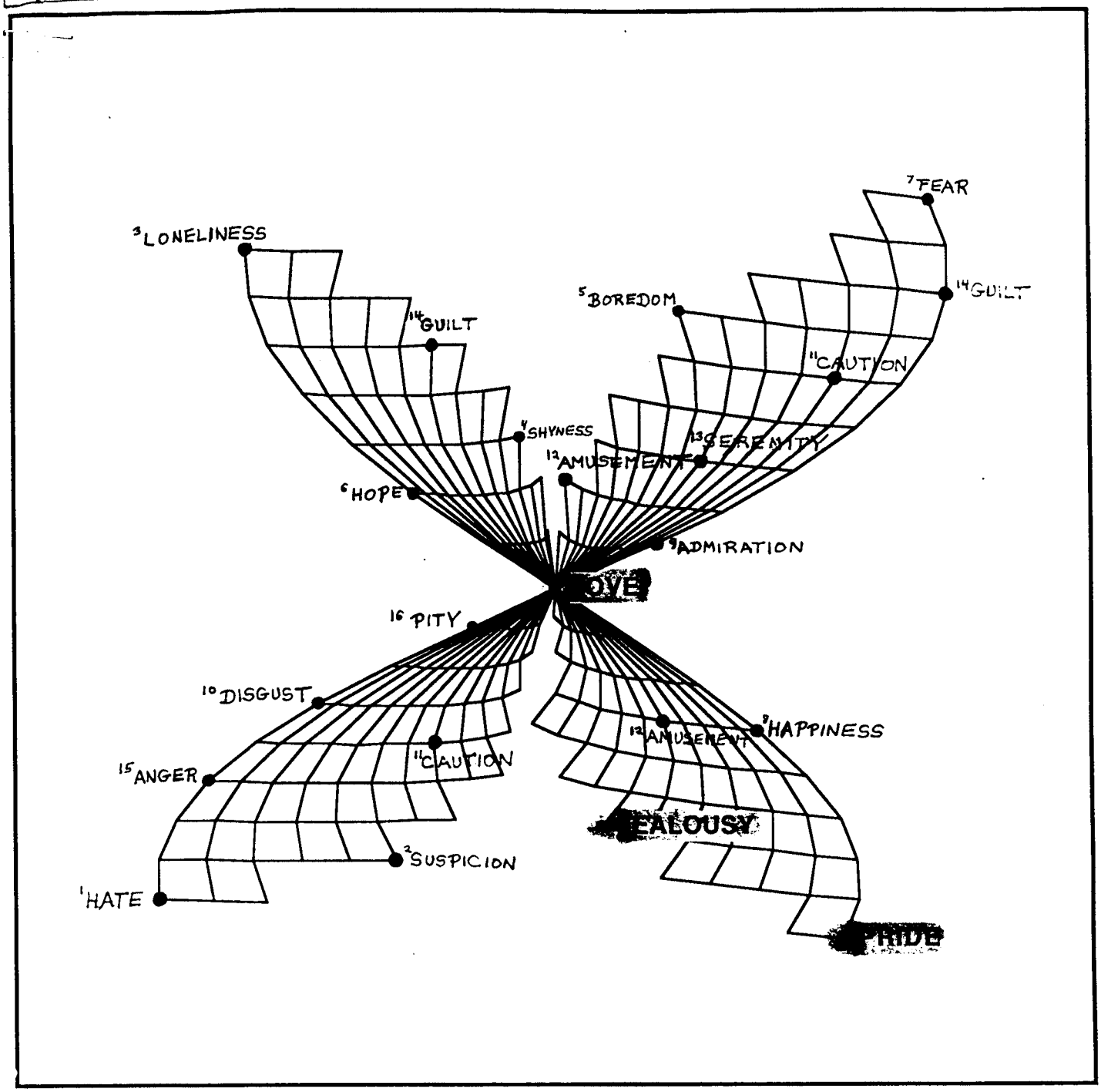
there are always infinitely-many symmetry considerations to guide one, and one finds, or senses intuitively, that there are always singular integrations of such superficially bewildering complexity. Which is indeed fortunate!

Fear is also an opposite of **Love**, but of a different kind than **Hate**, and so I have placed it on the other, diagonally opposite side of the **Love** vertex (or at $\Delta\varnothing = 180°$).

Sequences of problems, discoveries, and solutions like this reveal the unsuspectedly immense, and yet always thoroughly ordered and investigable, ideonomic complexity of ideas, or the intrinsic richness of the Ideocosm.

The difficulties encountered *en route* in this undertaking are actually delightful discoveries that challenge, stimulate, and expand the mind, and furnish deep insights into the ideas being considered.

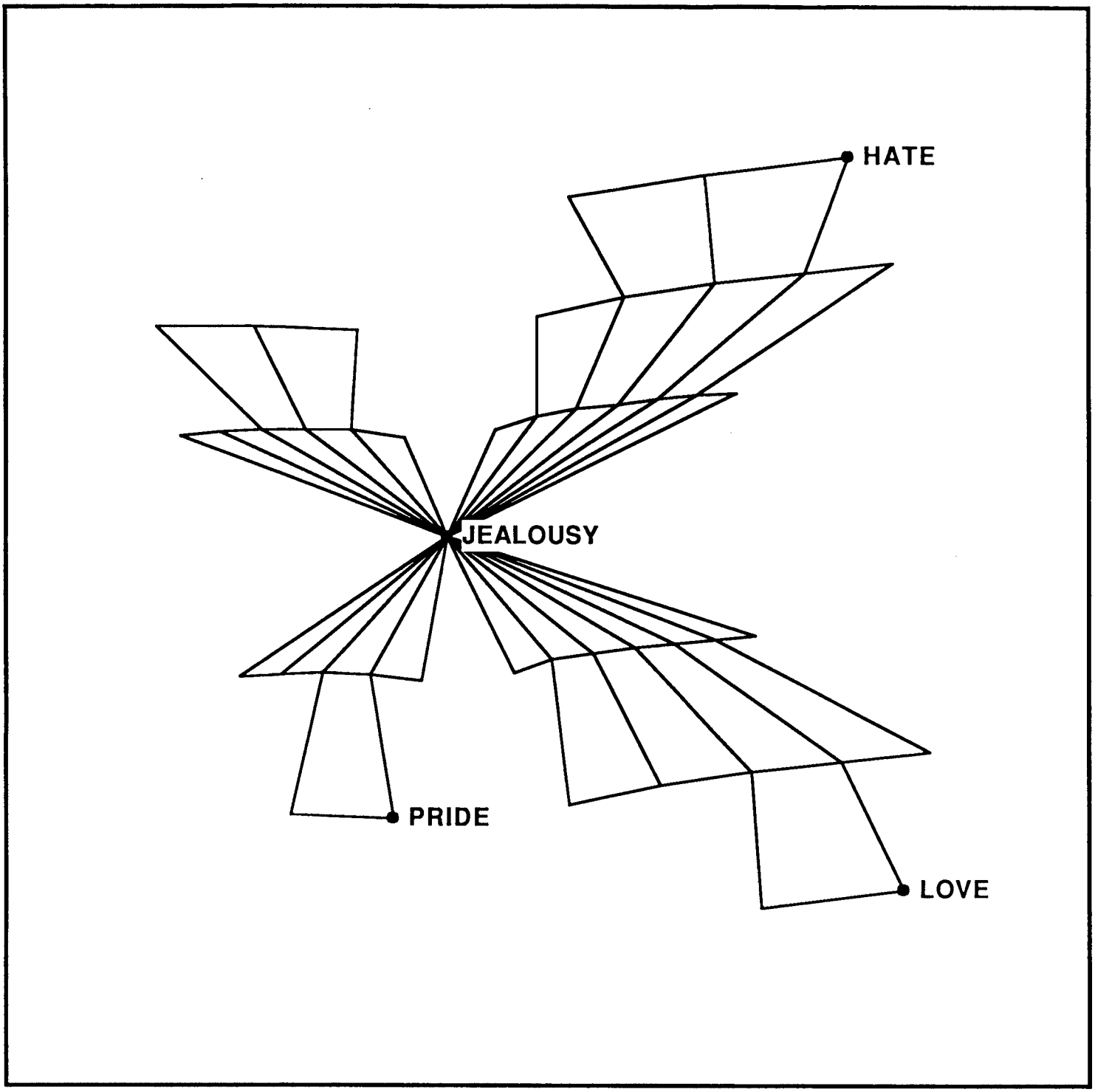
Figure 4563.



→ COLOR KEY:

[1]●(green): The 3 prelocated, nucleative emotions (Love, Jealousy, Pride)
[2]●(blue): Subsequently located emotions (in numbered chronologic order)
[3]●(red): Emotions assigned multiple (2+) loci.

Figure 1975.



QUESTION

GIVEN THE ABOVE LOCI OF FOUR EMOTIONS IN THE MANIFOLD'S STRUCTURE, TO WHICH LOCI (NODES) WOULD YOU UNIQUELY OR ALTERNATIVELY ASSIGN, EITHER SERIATIM OR SYNCHRONOUSLY, THESE EMOTIONS ADDITIONALLY:

Suspicion	Hope	Fear	Happiness	Caution
Anger	Guilt	Amusement	Boredom	Disgust
Pity	Loneliness	Serenity	Shyness	Admiration

APPLICATIONS
All
& Users
\ Ideonomy's Future

FUTURE USES AND USERS OF IDEONOMY

To truly understand ideonomy it is necessary to envision its uses and users, the myriad ways it might function in or contribute to ordinary life, both in the world as we know it and in the world of the future—perhaps changed considerably through the proliferating, interweaving, and exponential effects of ideonomy itself.

In the chapter before us we will examine such possibilities. No attempt will be made to be comprehensive. Attempts at encyclopedic forecasts are desirable, but not here; they would cause us to get lost in the detail. Instead we will sample the possible applications of the science of ideas to certain problems, phenomena, and tasks, in scattered fields, professions, and life situations. Barely a few words will be said about the many diverse possibilities. The objective is to create a large impression by saying little and to harness the imagination of the reader herself.

We may not describe things just right. We will overlook much that is more exciting and important in the immediate vicinity of points on our haphazard itinerary. We will deliberately understate and avoid things on occasion. But hopefully the result of our efforts will be a carnival of delicious new sensations and a continuing ferment in our readers' minds.

1. LITERATURE: Writers use to shape characters and plot and to invent new themes.

Combinatorial ideonomy might be employed to explore, either systematically or casually, all of the possible variations, nuances, and implications of a particular character type or trait of character: the world of psychic and social possibilities connected with a curmudgeonly old man perhaps, or of an elfin child, or of a married couple perpetually at war.

The emotions, thoughts, and impulses evoked by, the kinds of events apt to be associated with, a setting or landscape might be looked into via the possible random or constrained combinations, permutations, transformations, and evolutions of the essential elements and dimensions of human character, behavior, personality, consciousness, and life.

The world's writers might have access to an idea-bank computer network concreated by their united and spiritually interlacing efforts over time: to an abstract universe, at once closed and open (in the language of the physical cosmologist), of all possible dreams: an efflorescent "pan-oneirocosm" driven by an insatiable collective Eros to progressively conceive of, synthesize, and exploit infinitely many and diverse literary themes, devices, problems, solutions, figures, roles, circumstances, actions, plots, moods, attitudes, epiphanies, styles, and forms.

DIVISIONS OF IDEONOMY USED HERE MIGHT INCLUDE: Stories and Enology, Events and Synantemology, Metaphors and Tropeology, Psychic things and Psychology, Paths and Hodology, Images and Idology, Thoughts and Phrontology, Conflicts and Syrrhagmology, Surprises and Adocetology, Chains-of-consequences and Anyohormology, Behaviors and Ethology, Courses and Dromology, Languages and Semonamology, Circumstances and Symphorology, Roles and Morology, Values and Axiology, ... The list is endless.

2. BOTANY: Botanist uses to classify plants better.

By exploring literally millions of random combinations of hundreds of terms for plant dimensions, features, phenomena, types, and relationships he might discover unconsidered botanical 'concepts' of remarkable interest explicitly named by or implicit in a tiny subset of the whole.

After pondering these, new ways of systematizing known flora might crystallize in his mind.

APPOSITE IDEONOMIC DIVISIONS: Taxons and Taxology, Types and Typology, Appearances and Phenology, Analyses and Merismology, Elements and Stoichiology, Combinations and Mixology, Differences and Heterology, Criticisms and Momology, Definitions and Orismology, Emergents and Blastology, Functions and Draology, Errors and Sphalmology, Descriptions and Graphology, Forms and Morphology, Hierarchies and Klimology; Informations, Data, and Menymology, Trees and Dendrology, Properties and Usiology, Niches and Clithriology, Relations and Dochology, Quantities and Posology, Rules and Canology, Series and Irmology, Spaces and Spatiology, Unifications and Harmozology, Purposes and Bulemology, Languages and Semonamology, and Laws and Nomology.

3. EDUCATION: Students use to arrive at ideas for papers and dissertations.

High school pupils asked to write an essay on any theme or topic that interests them might use their computer to range through the ideocosm in search of some neat possibilities.

First they might use hierarchic menus to examine organons contained in the divisions concerned with Things, Examples, Instances, Events, and Knowledge. Next they might apply the division Questions to get ideas about the thing or things they had selected. Turning to the division Answers they might identify a favored way of replying to the problem or puzzle addressed by their paper. Finally, Tactics and Strategies are divisions that might help them increase the power and persuasiveness of the essay they would submit to their teacher.

The matter treated by such a paper might be nuclear weapons, the question asked 'Would 10% of the U.S. nuclear arsenal be just as effective?', the answer 'Yes—if the weapons were made ten times more reliable!', and the persuasive strategy used, transforming the normal perspective of the reader in order to seduce her—or one's instructor—via the elements of surprise and novelty.

Graduate students in geology might use ideonomy to explore ways in which geologic phenomena naturally change, or would change in certain farfetched but instructive, circumstances. These could suggest gedankenexperiments from which brilliant ideas might be derived for their required PhD dissertations.

To illustrate this with a trivial but 'actual' example, my computer generated this random dyad: 'When reefs happen to evolve, what are the effects?' For me that is an interesting question, one that triggers creative—and autodidactic—thoughts. I find myself wondering what the types, degree, chronometry, and generalized geological effects of the progressive and adaptive evolution of coral-reef organisms and ecosystems may have been over the history of the Earth. Since coral reefs are massive structures, even on a planetary scale, may they have undergone biological revolutions that have in turn revolutionized crustal geomorphology or even geophysics?

Were I a geology graduate student I might here and now decide to make my dissertation an inquiry into whether differences between modern and ancient crustal geology exist that might be attributed to the biological evolution of worldwide reef systems. Perhaps there have been effects upon volcanism, plate subduction, continent formation, orogeny, and geochemical cycles—among other things?

APPLICABLE DIVISIONS OF IDEONOMY INCLUDE: Things and Ontology, Examples and Tissology, Knowledges and Epistemology, Questions and Pysmology, Answers and Chresmology, Strategies and Strategology; Debates, Arguments, and Agonology, Changes and Tropology, Gedankenexperiments and Phronopirology, Connections and Desmology, Corollaries and Diocology, Implications and Semasiology, Concepts and Ennoology, Extensions and Ectasology, Generalizations and Eurynology, Hypotheses and Thesology, Interests and Kedology, Possibilities and Prositology, Preparations and Stolizology, Principles and Axiomology, Speculations and Scemmology, Theories and Theorology, Problems and Aporology, and Solutions and Acology.

4. MILITARY SCIENCE: Army uses to explore all possible battle formations and troop movements.

Army tacticians would find it useful to explore the tens of thousands of distinct species of forms contained in The Atlas of Form that is imagined elsewhere in the present book. Of particular value would be those diagrammatic charts devoted to the morphological genera: Boundaries, Bridges, Bundles, Cabbages (the two-dimensional subset), Clouds, Clusters, Curves, Diaper patterns, Dividers, Fabrics, Forks, Fractals, Hierarchies, Holes, Horseshoes, Hourglasses, Imbrications, Instellations, Knots, Line-clumps, Fans, Meanders, Networks, Nodes, Osculations, Polygons, Radiations, Ribbons, Rings, Rows, Spirals, Tessellations, Thalwegs, Trees, Waves, Yokes, Angles, Blobs, Braided ropes, Chevrons, Lobes, Chains, Comets, Corners, Cracks, Crenellations, Crosses, Discoids, Domains, Feathers, Fingers, Flames, Hair-masses, Hooks, Indentations, Inflorescences, Lines, Points, Soils, Splatters, Swirls, Tangles, Turbulences, and Zigzags. (Names of genera, and types of form accorded generic status in ideonomy, are currently in flux.)

Within the same division of Forms and Morphology numerous other organons could be helpful, notably ones dealing with such shapes in terms of their: causes, effects, interrelations, independent and reciprocal transformations, combinations, series, degrees and extremes, ambiguities, elements, dimensions, exemplifications by diverse phenomena or in various subjects, mathematical and qualitative laws, geneses and dissipations, physical dynamics, self-combinations and iterations, dynamical interactions, similarities and differences, complex symmetries and "groups", opposites and antisyzygies, topological deformations, motions and transitivities, and so forth.

The value of such studies could be multifold. It could help students of military history understand what happened or did not happen in past battles, help teach military tactics today, or help the computer simulation, or actual conduct, of future defensive or offensive actions. Possibilities that were overlooked or never considered could come to light: weaknesses in maneuvers, clever counteractions, feints, new ways to distribute troops or to extricate them from an envelopment or disembogue them through a treacherous defile, or equivalences between divergent orders of battle.

OTHER APPLICABLE IDEONOMIC DIVISIONS: Motions and Kinology, Tactics and Apatemology, Opportunities and Kairology, Operations and Hosiology, Paradoxes and Paradoxology, Paths and Hodology, Patterns and Digmology, Strategies and Strategology, Quantities and Posology, Reactions and Anabolology, Roles and Morology, Functions and Draology, Rules and Canology, Shortcuts and Brachistology; Simplicities, Simplifications, and Litology; Solutions and Acology, Transformations and Diaplastology, Trees and Dendrology, Virtuals and Mimology, Abilities and Anystology, Acts and Pragmology, Alternatives and Allagology, Analogies and Icelology, Analyses and Merismology, Assumptions and Lemmology, Behaviors and Ethology, Clusters and Botryology, Combinations and Mixology, Conflicts and Syrrhagmology, Convergences and Syrrhology, Decisions and Legology, Defects and Ateleology, Descriptions and Graphology, Differences and Heterology, Distributions and Strotology, Effects and Anyology, Events and Synantemology, Environments and Periontology, Flows and Rheology, Games and Condacology, Gedankenexperiments and Phronopirology, Geneses and Plastology, Goals and Balbology, Illusions and Apatology, Instances and Mericology, and Uses and Chraology.

5. POLITICAL SCIENCE: Government uses to maximize the diversity, efficiency, and synergism of scientific and technological research.

Those government agencies that are the primary funders of scientific research in the United States—such as the National Science Foundation—might increasingly come to rely upon ideonomy to anticipate future research areas and needs, to plan research programs, to direct inquiry in the most desirable directions, to coordinate the multitude of contemporary endeavors, and to assess the results of investigations.

Through ideonomy such support might become less restrictive and more embracive, or be redesigned to promote the richness, pluralism, and imagination of science. Currently, by contrast, the effect of such agencies is often to discourage the pioneer and to limit the scope of scientific investigations to existing, narrow, tired, and trivial lines of research.

SOME PERTINENT IDEONOMIC DIVISIONS: Work and Ergology, Courses and Dromology, Concepts and Ennoology, Decisions and Legology, Discoveries and Cyreology, Domains and Temenology, Chains-of-consequences and Anyohormology, Essentials and Onistology, Evaluations and Crinology, Experiments and Pirology, Extensions and Ectasology, Fields and Gunology, Functions and Draology, Futuribles and Mellontology, Generalizations and Eurynology, Goals and Balbology, Heuristics and Heuretology, Hypotheses and Thesology, Ignorances and Agnosology, Instruments and Labology, Interests and Kedology, Inventions and Porizology, Knowledges and Gnosology, Limitations and Horology, Needs and Chreology, Networks and Dictyology, Hierarchies and Klimology, Niveaus and Anabathmology, Nonexistences and Anontology, Opportunities and Kairology, Paths and Hodology, Perspectives and Apopsology, Plans and Medology, Possibilities and Prositology, Predictions and Stochology, Preparations and Stolizology, Present and Artiology, Problems and Aporology, Proofs and Dictology, Purposes and Bulemology, Questions and Pysmology, Properties and Usiology, Resources and Plutology, Shortcuts and Brachistology, Solutions and Acology, Answers and Chresmology, Speculations and Scemmology, Strategies and Strategology, Surprises and Adocetology, Tactics and Apatemology, Taxons and Taxology, Techniques and Technology, Theories and Theorology, Total knowledge and Pantology,

Transcendences and Pereology, Uncertainties and Aoristology, Uses and Chraology, Values and Axiology, Wants and Himerology, and Methods and Methodology.

6. PSYCHOLOGY: Psychologist uses to explore particular personality types.

The organon "Hierarchy of Universal Processes" could be consulted to gain insight into the processes underlying, or that may simply be associated with, certain forms of human character or traits thereof.

For example, dyadically, how might 'jealous character' arise from 'bonding processes or mechanisms'? The obvious or fundamental ways could be indicated, having been decided upon via theory, intuition, experimentation, or other means: emulation of a jealousy-prone idol, absorption from a like parent or 'mother's milk', tendencies or capacities of various personality traits to 'bond' with one another—possibly even to assemble into complex logical, cultural, or biological structures, mechanisms, or 'organism-like elements of character'; synergistic cross-bonding between the different causes—or effects—of jealousy; hypothetical tendencies of people who are jealous in identical or unrelated ways, to bond together socially; natural bonding of the jealous to those of whom they are jealous; e/vc.

The enumerated ways could then be multiply ordered in various structures by means of, or with respect to, various principles, dimensions, concepts, themes, ideals, purposes, phenomena, methods, relationships, conditions, etc: e.g. in terms of importance, primacy, homology, generality, separability, dependence, or centrality.

The predefined branching at various levels of the dendriform "Hierarchy of Universal Processes" could function heuristically to suggest other subordinate, superordinate, clustered, and complementary taxons of processes that might naturally coexist or cooperate with such bonding processes in jealous personalities.

PERTINENT DIVISIONS INCLUDE: Psychic things and Psychology, Processes and Sisology, Causes and Etiology, Effects and Anyology, Types and Typology, Taxons and Taxology, Properties and Usiology, and Geneses and Plastology.

7. CINEMATOGRAPHY: Animators use to create protean environments and rich phenomena.

Animated films that are made today (1987) feature highly simplified, formalized, static, and dull landscapes or 'settings'. The reasons for this lie in the extreme labor costs of the human animators who must draw or paint each movie frame or video image almost de novo whenever the backdrop or other environmental elements undergo all but the simplest visual transformations, or whenever their form or content changes in an essential way; in the feebility of modern computers, in the nonexistence of any general theory of morphogenesis and transformation, in the rudimentariness of artificial intelligence, and in the failure to apply ideonomic principles, methods, knowledge, and idea-sets to the animation process.

Future animators will exploit ideonomy's schemes of classification of the generic and other taxonic elements of which natural scenes are composed and by means of which they may be reconstructed, evolved, canonically transmuted, or advanced naturally in arbitrary directions, to arbitrary goals, along arbitrary courses, or in arbitrary ways.

Such phenological schemes, taxons, principles, laws, and calculi will also enable the animation community to analyze and describe in truly fundamental ways the actual visual structure, content, life, and interest of all of the different scenes found in nature or accessible through human experience. A comprehensive survey and lawful distillation of earthly tableaux will result, and it will confer upon the animator a cosmoramic, cosmoplastic, and cosmopoietic power and authority that is Olympic.

Combinatorial ideonomy can make for a kaleidoscopic form of animation in which every object, texture, feature, phenomenon, arrangement, activity, perspective, or percept in or of a synthetic scene or environment is in instantaneous, perpetual, irrepetitive, fundamental, multidimensional, all-encompassing, ever-evolving, interdependent, nomothetic, and quasi-biological flux.

The garden through which a cartoon character walks can consist of flowers that are each unique and maximally different, and exhibit an apparent variety unexampled in nature herself, wherein small and narrow variation is the rule.

Ideonomy will enable such visual scope and diversity to be achieved with minimal demands upon computer hardware and software. Even the present home computer could produce staggeringly fluid and complex scenes. The non-ideonomic generative, managerial, manipulative, and interactive principles that are the basis of today's software are profoundly inefficient.

The animator will also be able to exploit ideonomy's knowledge of tens of thousands of species of forms, of the mutual transformations of same, of the myriad physical, symbolic, and plastic aspects and elements of 'all possible' images, of vast analogical spaces, of the encyclopedia of life's events, of the 'periodical table' of motions of things, and of all of the 'stories' that can be told about things.

SOME OF THE RELEVANT DIVISIONS OF IDEONOMY: Appearances and Phenology, Combinations and Mixology, All possible universes and Hypercosmology, Changes and Tropology, Beauties and Kalology, Behaviors and Ethology, Chains and Ormology, Series and Irmology, Chances and Tychology, Circumstances and Symphorology, Coevolutions and Syndiatyxology, Connections and Desmology; Contents, Parts, and Merology; Cooperations and Synergology, Corollaries and Diocology, Courses and Dromology, Co-probabilities and Synicology, Decisions and Legology, Descriptions and Graphology, Differences and Heterology, Analogies and Icelology, Ecologic things and Ecology, Effects and Anyology, Elements and Stoichiology, Emergents and Blastology, Environments and Periontology, Essentials and Onistology, Events and Synantemology, Examples and Tisology, Excellences and Aristology, Expectations and Elpology, Experiences and Idrology, Extensions and Ectasology, First principles and Archelogy, Flows and Rheology, Forms and Morphology, Functions and Draology, Fundamentals and Thelymology, Games and Condacology, Generalizations and Eurynology, Geneses and Plastology, Groups and Stellology, Hierarchies and Klimology, Illusions and Apatology, Images and Idology, Individuals and Idiology, Interdependences and Allelology, Knowledges and Epistemology, Languages and Semonamology, Laws and Nomology, Levels and Blathrology, Mechanisms and Mechanology, Metaphors and Tropeology, Methods and Methodology,

Mind and Noology, Models and Plasmology, Motions and Kinology, Networks and Dictyology, Operations and Hosiology, Paths and Hodology, Patterns and Digmology, Perspectives and Apopsology, Phenomenons and Phenomenology, Possibilities and Prositology, Practices and Praxology, Acts and Pragmology, Principles and Axiomology, Processes and Sisology, Properties and Usiology, Psychic things and Psychology, Reactions and Anabolology, Realms and Epirology, Recursions and Apsology, Relations and Dochology, Resources and Plutology, Roles and Morology, Rules and Canology, Self-effects and Autanyology, Self-relationships and Autodochology, Shortcuts and Brachistology; Simplicities, Simplifications, and Litology; Simulations and Pirohyparology, Spaces and Spatiology, Spectrums and Iridology, Stories and Enology, Taxons and Taxology, Techniques and Technology, Things and Hylology, Thoughts and Phrontology, Transformations and Diaplastology, Types and Typology, Unifications and Harmozology, Uses and Chraology, Vergences and Chiazology, Virtuals and Mimology, Wants and Himerology; Wholes, Gestalts, and Holology; Coordinate systems and Pantothenology, and Sets and Thetology.

8. VISUAL ARTS: Artist uses to train her eye.

Much of art is seeing in the first place, and much of the artist's training is a process of learning how to see and of disciplining vision. Many artists may have a natural talent for seeing. Other artists may only acquire this skill through effort and schooling. A few artists may never really learn how to see their subjects, their materials and tools, and the progress or results of their work properly, and their entire life's work may suffer from this disadvantage. Moreover, undoubtably there has never been an artist in the history of the world whose vision has been perfect, infinite, or incapable of correction, improvement, or transfiguration.

Ideonomy seeks to identify, classify, define, and revelatorily recombine all of the primary and N-ary elements, phenomena, and processes of visual perception and experience, and the unique results of such an endeavor could be taught. In this way the artist's vision could be made more fundamental, comprehensive, conscious, rational, controlled, and creative, and more universal in the sense of transcending such arbitrary and unnatural elements as may render the visions of different artists idiosyncratic and incommunicable to other persons.

Yet the teaching of what is more basic to vision and art could also promote that part of the differentiation, specialization, and multiplication of artists' visions that is eminently, or nonetheless, desirable.

Nature is presumably richly laden with things that are the exact equivalent of secret codes, and if we are to see ever more deeply into nature and into ourselves it is essential for us to recognize, crack, and exploit these codes—or the primitive languages, vocabularies, grammars, messages, and metaphors of natural phenomena, human experience, and thought.

The surfaces of objects exhibit a world of textures that ideonomy could help to categorize into natural or useful types and taxons, or via universal schemes of classification.

The systematic properties, dimensions, possibilities, and gestalts of the textures of objects may normally tell the mind a great deal about the nontextural meaning of those objects, or convey useful or essential information about their spatial orientation, illumination, density, material composition, external and internal structure, microstructure, age, etc.

Future ideonomic research could give the artist greater access to this information, and greater power to say things by means of it. She could learn how to distinguish and depict the surface textures of a young and an old pear, for example, or those differential textures of objects that have semiconscious aural significance.

By identifying different textures, or the elements that contribute to those textures, ideonomy could be used to create computer-graphical programs that would allow the artist to vary experimentally all of the quantitative and qualitative dimensions and interdependences of those textures, to passively and actively explore the universe of all possible textures, to systematically change and transform the textures of given objects or within given scenes, to efficiently recognize all textural clues, to train her mind to do equivalent things, to think and operate on the transcendent level of textural processes and dynamics, to penetrate deeper into the textural content and meaning of historical works of art, and to fully exploit her heightened vision of texture in her art.

A FEW RELEVANT DIVISIONS: Appearances and Phenology, Taxons and Taxology, Languages and Semonamology, Elements and Stoichiology, Transformations and Diaplastology, Combinations and Mixology, and Perspectives and Apopsology.

The Ideonomic Division
MOTIONS AND KINOLOGY

Within ideonomy the suffix "-matics" is reserved for the mathematical subfield of any field corresponding to a given subdivision of ideonomy; and wherever possible, "-ology" is used to designate the field as a whole. Yet this is not the only reason why kinematics does not appear in the title of this chapter. "A branch of dynamics that deals with aspects of motion (as acceleration and velocity) apart from considerations of mass and force," it is too narrowly associated in the world's mind with the physicist's subset of types and examples, problems and laws, of motions; and even there, in physics, there are aspects of motion that it neglects or has never thought of as being possible.

It is therefore far more appropriate to jettison the word kinematics in favor of kinology, as ideonomy undertakes to generalize the study of motion to all sciences, to the absolute totality of known and possible types, systems, phenomena, and realms of 'motions', and to the set of all subfields of the study of such exhaustive movement. Or to let kinematics survive as mathematical kinology, a subfield of same.

OVERVIEW OF THE CHAPTER - AND DIVISION

That it may be understood in advance what all would be done in the chapter lying before us, and what all should be done when ideonomy has completed its work in this area (or perhaps it would be better to say—once, having laid the necessary foundations, it is really able to begin, or to be used for, such work), I will now touch the heads of some of the most interesting possibilities.

What are the SYSTEMS OF MOTIONS that are found in, or pervade, the universe? The human body, the planetary ecosystem, the solar system, our galaxy of stars and nebulae, a company of soldiers in battle engaging an enemy company, the busy and interconnected body of a plant's roots, a hive of ants in its dynamic totality, the hemispheric turmoil of a detonated nuclear bomb, the orchestrated interplay of electrons in a television set, the coordinated interadjustment of a matrix calculation, the society of thoughts and generalized impulses that is the human mind, the progressive movement of results among ideonomy's divisions and organons, the chained and criss-crossing choreography of an unfolding chemical reaction - all of these constitute concrete examples of systems of motions that are the stuff of which the world is made. But what are the types, and the universal species and genera, of these systems? What defines the same, what do they imply, and what do they mean? How and why do they form subsystems and supersystems, within and among themselves; and from what systems or system of motions of motions of motions... do systems of motions themselves arise, and to what do they pass - in the eternity of the universe?

What are the CO-MOTIONS of things, the things that move together, the ways they move together, the motions that only occur together with certain other motions, that are the conjugates, the companions, the spirits of these motions? When a thing moves, what other things are compelled to move; when a thing fails to move, what other things remain still as their essence? When one motion occurs because another occurs from which it may or may not be separable, what series of motions occur because they are in a like relationship to the first; and so on...? How are motions - all motions - required to be recursive by the fact, and as a consequence, of

"The Ideonomic Division MOTIONS AND KINOLOGY"

IDEAL CHAPTER STRUCTURE (Sequence of Subsections)

1. Introduction.
2. Importance of studying.
3. Related subdivisions.
4. Subfields.
5. Organons.
6. Terminology.
7. Examples of simple and discrete motions.
8. Examples of complex and compound motions.
9. Things: | Transported, transmitted, that move, or that involve motion.
10. Carriers.
11. Concrete and abstract motions.
12. Nonexistent motions.
13. Illusions.
14. Fictitious motions.
15. Virtuals.
16. Speculative motions.
17. Analogies between and among examples.
18. All motions of a particular thing.
19. Typology and taxonomy.
20. Genera.
21. Intergeneric similarities and differences.
22. Aspects.
23. Dimensions.
24. Combinable dimensions and types.
25. Important combinations.
26. Coordinates, reference systems, metrology, and measures.
27. Systems of motions.
28. Co-motions.
29. Contrary motions.
30. Progressive and retrogressive motions.
31. Independent motions.
32. Dependent motions.
33. Equilibrial and disequilibrial motions.
34. Sub-motions and super-motions.
35. Scaled motions.
36. Extremes, maxima, and minima.
37. Internal motions.
38. External motions.
39. Levels and hierarchies.
40. Causes and machinery.
41. Influences upon.
42. Critical and catalytic motions.
43. Effects and products.
44. Morphology.
45. Morphodynamics.
46. 'Order taxa' of motions.
47. Paths of motions.
48. Starts and finishes.
49. Antecedent and postcedent motions.
50. Entrained motions.
51. Sequences, chains, and series.
52. 'Melodies'.
53. Convergent, divergent, and vergent motions.
54. Networks and circuitry.
55. Multiplexing and plexure.
56. Hidden motions (crypto-motions).
57. Anomalies.
58. Paradoxes.
59. Ignorance.
60. The plenology of motion.
61. The mogology of motion.
62. Ideogenetic formulas.
63. Ideaphoric sentences.
64. Practical questionary.
65. The infancy and future of kinology.
66. Epilogue.
67. Student exercises.

these co-motions? To what extent, or in what ways, are the different co-motions cause of one another? In what co-motions do what co-motions return? What forms of immobility arise in a relative sense from the coexistence and interchange of these co-motions and infinite sets thereof? Which co-motions are degenerate, which productive; which co-motions, and which systems thereof of ever-higher degree, are multiply degenerate and/or productive, in ever-greater ways and degrees? What co-motions are hidden, and how intensively and extensively covert may they be? How close to the essence of things are these co-motions? As for concrete examples of what is meant by co-motions, at least of the very simplest kind, think of a ballerina's accelerated rotation as she pulls her limbs inward to approximate a line with her body, the counter-leaning of the body to automatically compensate for the extension of an arm or the lifting of a coffee cup, the mutually chasing balls of a hurled bola, the reciprocating pistons of a car engine, the complex synchronized movements of a mechanical watch—or the mere proportionate movements of its hands, dog chasing cat, the differential and integral flexures of the points on a fluttering pennant, the proportionate and partially interdependent motions of diverse atoms in the vast biogeochemical cycles of the earth, the conjugate and disjunctive movements of our two eyes, the simultaneous ascent and descent of nearby water surfaces during the passage of waves, the movement of a bunching wave down a highway of cars or of a discrete advance down a queue of theater-goers, the x,y-movements of an advancing pen, and the interdependent movements of different types of chess pieces (during a particular game or considered universally, sub specie aeternitatis). More complex co-motions will be considered later and elsewhere.

CONTRARY MOTIONS ("anti-motions", as we will call them later) are exemplified by opposite lanes of traffic, the retrograde orbiting of Jupiter's outer moons, the central ascent and peripheral descent of air in a thermal, the contrary rotation of adjacent solenoidal convection cells, the simultaneous centrifugal and centripetal flows in the axon of a brain neuron, anabolic and catabolic—and amphibolic—biochemical pathways in metabolism, an alternating current in a wire, respiratory inspiration and expiration, concurrent immigration and emigration, reciprocal prolation and oblation of a sphere, flight of electrons from a squeezed piezoelectric crystal, the abstract anti-motion of the Roman Catholic Counter-Reformation, the counterflow of fluids in a heat exchanger, a nuclear counterstrike or the convergence of missiles and intercepting antimissiles, a chemical counterreaction, ripostes, legal statements and counterstatements, anadromous migration of salmon, countermovement of electrolytes, and the arterial and venous circulations. Such opposite motions may or may not be: compresent, coinstantaneous, synchronous, isochronous, isochronic, coordinated, phasal, in any precise or unique mutual spatial direction, of identical or similar form, type, nature, or cause, equal, proportionate, stoichiometric, symmetric, antitypal, interdependent, and/or the like. Nevertheless, the great challenge is to discover all actual and possible examples, species, genera, taxa, systems, structures, laws, etc of contrary motions—of all phenomena, entities, sciences, etc—and then to completely characterize these contrary motions with respect to which are and are not—and why, how, in what degree, and with what consequences they are and are not—the foregoing things.

A matter of considerable interest is the possible extent of INDEPENDENT MOTIONS, or to which motions in general, or of particular type, are independent of other motion, particular types of motion, or the motion of particular things, or are independent of anything whatever in any sense whatever. Knowledge of such instances, forms, senses, and degrees of independence of, in, and among the diverse motions of diverse things would have many uses: it could excite the further investigation of such independence, assist generally with the characterization of the motion of things and with the explanation and grand theoretical unification of such motion, and initiate many technological advances. The discovery that entities, processes, or phenomena that are intimate to one another in space, time, and function are unexpectedly or even paradoxically independent in certain of their motions or systems of motions, often turns out to be important: it may imply the existence of an unsuspected degree of complexity, perhaps irreconcilable with the current theory or picture of things; it may hint a hierarchy or certain asymmetries; it may require a reclassification of familiar phenomena; it may mean that there are entirely new paths of research to pursue, and define those paths; it may suggest that things should be reordered, re-concatenated, or reconfigured; it may signify that there are barriers, shields, alignments, diversions, or mathematical terms, relationships, or derivations that have not yet been discovered; it may speak of stabilizing forces or self-stabilizing mechanisms; it may point to the failure of distributive, associative, commutative, or other laws; or it may be important in other ways. Interesting problems exist in science just now because of the existence, or of some evidence for the existence, of unexpected forms, degrees, or senses of 'independence' in the motions of: the inner and outer parts of galaxies, the internal layers of the earth, the outermost parts of the atmospheres of earth and Venus relative to the lower layers, the planets of the solar system (i.e. the distribution of momenta is peculiar), Jovian jet streams, etc. Unquestionably there are innumerable cases of independent motions, or of strange independencies of motions, that have yet to come to light. Perhaps such motional independences will be found in the relative or absolute motions of: certain biochemical pathways and cycles, geographic ranges of species within evolving ecosystems, new subatomic particles, microkinesic facial kines, groups of muscles in certain actions (say the fine structure thereof), or the historical diffusion of various cultural innovations (where coupling would have seemed more likely).

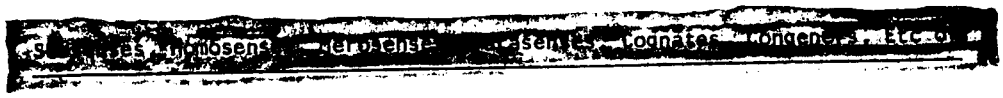
Of opposite nature but complementary interest are the DEPENDENT MOTIONS of nature: or the possible extent to which motions in general, or motions of particular type, are dependent upon other motion, particular types of motion, or the motion of particular things; or are dependent upon anything whatever in any sense or degree whatever. Such dependences may variously: imply the existence of new or novel phenomena, provide ways of measuring and observing phenomena (either directly or indirectly), supply keys for the progressive investigative retrieval of entire systems and series of motions, effects, causes, and laws, find technological applications, paradoxically enable the characterization of independent motions and aspects of motions and of what is variously independent of motions, etc. How far [in space and time; backward into the past and forward into the future; across or through intervening phenomena or motions; up or down various scales or hierarchies of size, energy, mass, velocity, &vc] do motions, systems of motions, or the effects or causes thereof extend? What hierarchies, networks,

'conversation' between foreground figures and the evocative backdrops.
33. Sense of movement in the foreground is greater.
34. Silential.
35. Objects new and old are compresent.
36. Some phase of water (H_2O)—of natural origin—is visible in the background.
37. Wisps of the man's combed hair mimic the wispy streaks of clouds in Scene-I.
38. Both scenes could prompt philosophical reflection.
39. Greatness apparent in the mass and grandeur of the cloudscape assimilates to the greatness of age of the elderly man.
40. Vertical elements on the left side lean to the left (cf.#19).
41. Both scenes contain oblique elements.
42. Both share rectilinear and curvilinear lines and objects.
43. Long, narrow tubular elements occur in both scenes.
44. The countless tiny aggregated leaves in Scene-I are analogous to the pile of wood shavings in Scene-II, as well as to the collection of small tools and objects in the toolbox.
45. Wrinkles on the man's forehead are echoed by the streaked cloud mass.
46. The webs of branches and branchlets in the first scene resemble the raised venation of the backs of the man's hands.
47. Moreover (v.#46), both are (bilaterally) paired.
48. Mottling of the clouds in Scene-I bears analogy to the blotches of the floorboarding in Scene-II.
49. Masses of objects in the background repeatedly overlap and obscure one another.
50. Overall lighting is subaverage.
51. Illumination is concentrated in many small patches.
52. Circumscribed holes occur between the boughs and between the man's arms.
53. The door in Scene-II recalls the median vertical and rectangular interspace between the two trees in Scene-I (cf.#21,#22).

plunges backward, away from the viewer.
29. Whereas the foregound figure in Scene-II is solid, the corresponding figures in Scene-I are perforated and mainly empty.
30. Most of Scene-I is lit by transmitted light, most of Scene-II by reflected.
31. Multilevel (or any) horizontal planes are lacking in Scene-I.
32. Scene-II is casual, Scene-I dramatic.
33. Scene-II is practical, Scene-I experiential and transcendental.
34. Scene-II is mundane and prosaic, Scene-I elemental, extraordinary, and sublime.
35. Yet (v.#34) Scene-II (showing how a wooden decoy is carved) is novel, Scene-I familiar. (?)
36. Whereas Scene-II is personal and intimate, Scene-I is impersonal and transhuman.
37. Coloration of Scene-II is less pure.
38. Scene-II gives a sharper sense of the present.
39. Yet (v.#38) the present in Scene-II also seems broader and fuller (cf.#38).
40. Also (v.##38-39) permanent objects predominate in Scene-II, whereas transience is the hallmark of Scene-I (cf.#38).
41. Yet (v.##39-40) Scene-I seems to suggest events or an event of longer duration and a more gradual nature (cf.#39,#40).
42. Scene-I refers to the future (or past).
43. Foreground is in darkness in Scene-I, brightly illuminated in Scene-II.
44. Scene-II's interest is more diverse and complex.
45. Scene-I is more ambiguous and subtle.
46. One appreciates Scene-I emotionally, Scene-II more analytically.
47. Scene-I whispers to the viewer that there is something he must do, Scene-II is silent in this respect.
48. Scene-II is both visual and tactile, Scene-I unisensory or visual-and-thermoceptive.
49. Scene-I is more massive.
50. And voluminous.
51. The meaning of Scene-I is instantaneous and direct, whereas with Scene-II it emerges gradually and self-interactively.
52. Scene-II has ubiety, Scene-I does not.
53. Scene-I lacks the abundant right angles characteristic of Scene-II.

NOTE REGARDING THE OBVERSE:

Actually there are many (it is literally conceivable that there 'are' infinitely many) different-but-related concepts that properly belong or relate to the two allocative categories simply referred to on the chart as Positive Analogies and Negative Analogies; some of which are worth listing dicolumnarly (all have been compared and judged essentially, or definably, irredundant):



"POSITIVE ANALOGIES"

1. Identities;
2. Commonalities;
3. Similarities;
4. Analogies;
5. Meta-Analogies;
6. Homomorphisms;
7. Equivalences;
8. Symmetries;
9. Equalities;
10. Convergences (cf. "divergences" on right; convergences as between the two scenes or whatever);
11. Corelata (cf. "disrelata" on right);
12. Commensuratenesses;
13. Homoousias (identities in essence or substance);
14. Homo-Congeries (like heterogenies);
15. Homologies;
16. Homotaxies (e.g. like form via like origin);
17. Homotheties (similar orientations of similar things);
18. Homotopies (identity or correspondence as to relative place, say between or among parts);
19. Homonomies (like, consistent, related, identical, conjoint, or complementary laws or rules);
20. Homotransformations;
21. Et cetera.

"NEGATIVE ANALOGIES"

1. Nonidentities;
2. Noncommonalities (things not shared by but found unilaterally in two or more scenes or things);
3. Differences;
4. Catalogies (negative analogies);
5. Nonequivalences (say of function or role of parts of the scene or thing);
6. Divergences (SENSU: divergence as specifically between two or more scenes or things);
7. Dissimilarities (say differences of similar things rooted in their very similarities);
8. Contrasts;
9. Antitheses (vide one sense in Websters III; say the case where in each of two scenes there exist multiple congeneric parts of opposite nature);
10. Antinomies (opposite, different, unrelated, or contradictory laws or rules);
11. Incommensuratenesses;
12. Inequalities;
13. Disrelata;
14. Meta-Catalogies (higher-order catalogies);
15. Antistrophons (say inverse relations or correspondences);
16. Asymmetries;
17. Heterologies (opposite of "homologies");
18. Heterotaxies (opposite of "homotaxies");
19. Heteroousias (opposite of "homoousias");
20. Hetero-Congeries and Absence of Homo-Congeries;
21. Heterotopies;
22. Et cetera.

vergences, plexures, circuitries, or other structures or meta-structures of dependent motions and dependencies of motions are there, both in general and in the case of particular scientific phenomena? What things limit, amplify, modulate, redirect, combine, originate, mediate, transform, interrelate, &vc such dependencies? How do kinological dependencies change and evolve? Specifically: how does the movement of river water depend upon its sediment load or the irregularities of the shore; of a door, upon the number of its hinges; of the value of a stock, upon expectation; of a growing root, upon instantaneous insolation; or of an occular saccade, upon age? As for motions that depend upon other motions: how does or may the geographic movement of a species depend upon the degree of equilibrium—or disequilibrium—of its genome; the motion of a sunspot, upon the motion of other sunspots; of one theme in a symphony, upon the motions of another; of one bird in a flock of birds flying in formation, upon the motions of its neighbor; or of one photon, upon other photons in the same wave packet? One or any number of motions, types of motion, or motions of things can 'depend' upon one or any number of other motions, types of motion, or motions of things in terms of any of an infinity of different forms, types, or senses of such dependence, including: causal or acausal, symmetric or asymmetric, graded or all-or-none, alternating, fixed or variable, proportionate or disproportionate, commutative or noncommutative, associative or nonassociative, distributive or nondistributive, progressive or regressive, simple or complex, homogeneous or heterogeneous; deterministic, stochastic, or probabilistic; monotonic or nonmonotonic, direct or indirect, hierarchic or nonhierarchic, quantitative or qualitative, universal or local, limited or unlimited, special or general, transitory or permanent, absolute or relative, mutually synergistic or antagonistic, conservative or nonconservative, unidimensional or multidimensional, and so forth.

What are all of the PROGRESSIVE AND RETROGRESSIVE MOTIONS that do or could occur, that do not or cannot occur, that are known to occur or might be imagined? What are all the dimensions, properties, types, species, genera, taxa, taxonomies, systems, causes, effects, corollaries, relata, mathematics, and possibilities of these motions, qua progressive or retrogressive? What are all the things and types of things that do and do not exhibit each; which of the foregoing are exhibited by any given thing; and what are the reasons for and implications of these relationships, and the interrelationships thereof? What things exclusively exhibit or involve progressive or retrogressive motions, and which motions are exclusively of one or the other type? What are the trajectories, ranges, and limits of such motions? How are they both relative and absolute? What are all the possible 'abstract' senses of such motions? How are such motions complementary and antagonistic? What movements of what organisms are partly or wholly reversible or are wholly irreversible? Why don't (more) birds fly backwards? Or do they? What physical, chemical, or mathematical processes are purely progressive, at least in and of themselves; and what, in the largest sense, might their existence imply? One might suppose the orbital motion of the planets to be entirely progressive; but in fact it can be retrogressive in a relative sense, orbital elements can retrogress, and there may be trans-Plutonian planets with retrograde orbits. To what extent does the flow of groundwater in aquifers occasionally reverse? Can a plant's roots grow backwards or just forwards? Similarly, does the axon of a neuron sometimes retrogress?

Both EQUILIBRIAL AND DISEQUILIBRIAL MOTIONS are worth talking about. These are motions that cause, result from, or are associated with equilibria or their increase (in the first case) or disequilibria or their increase (in the second). Thus one could speak of the upward accretional movement of polar ice, downward gravitational displacement of continental crust under this load, and global recession of the ocean from the land during ice ages as "disequilibrial motions"; and of the set of reversed motions (or anti-motions)—downward and inward shrinkage of ice fields, isostatic rebound of the crust, and worldwide marine transgression of continents—towards the end of ice ages as "equilibrial motions". Let us assume that some catastrophe occurred in the middle of an ecosystem—a great prairie fire, say, or the infall of an asteroid. Disequilibrial motions (such as mixing and radiative movements within and among the populations of different species) and equilibrial motions (such as the possible resorption of subpopulations expelled from the ecosystem or even a holistic knitting back together of the original biogeographic structure of the latter) would ensue, including ones of considerable theoretical interest.

There are SUB-MOTIONS AND SUPER-MOTIONS, in the sense that within or below given motions—or motions on a given level—there can be other motions of a lesser order, size, magnitude, &vc; and in the sense that given motions or a given level of motions may themselves fall under or be contained in higher or greater levels, orders, sizes, magnitudes, &vc of motions. To illustrate what is meant, if the given motion is the advance of a car past a pedestrian (that is, the elementary movement of an automobile), then the car's vibration would be a sub-motion and the making of a cross-country trip a super-motion. Again, if the shaking of a tree limb is the motion, then leaf flutter is one level of sub-motions and the bendings, torsions, and tremblings that occur on the level of the tree as a whole represent super-motions (although motions can of course just as easily be dichotomized as trichotomized—e.g. the limb motions are super-motions to the leaf-flutter sub-motions). If the given motions are the leaf flutter, then leaf rattle or quiver might be sub-motions thereof, and twig wind wiggle a finer level of super-motions. The number of levels and systems of sub-motions and super-motions may be finite and small or instead enormous or even infinite; in addition to this ordinal variability (of successive and addable levels and motions), the cardinal fineness and range of gaps and levels of (successive and addable) sub-motions and super-motions may also have infinite variation—or be infinitesimal, finite, or infinite. The phenomenon of turbulence exemplifies indefinitely many and fine sub-motions, super-motions, or levels thereof. It is unknown how many discrete or levels of sub-motions and super-motions are found in the brain or are necessary to describe the neurology, logic, or noology of the mind. The number and fineness of motions and kinetic levels is likewise unknown for, inter alia: the universe as a whole, the systematic motion of the interior of the earth or one's body, the dynamics of the earth's atmosphere, the diachronic audiospectrogram of human speech (or of its perception), and the system of motions of society as a whole; and it is almost impossible to understand these hierarchic systems of motions by reference to mere parts of them or via a less than comprehensive (sub-diapasonal) theory. Of great interest are the

possible and actual ways in which sub-motions and super-motions, and levels thereof, may be causes and effects of one another—with any and all degrees, types, and mechanisms of reciprocity and asymmetry, of primacy and secondariness (or "n-ariness"), of convergence, divergence, and vergence, of closure, openness, and cybernetics, of excitation and relaxation, and so forth. How could one define the degrees of freedom or kinetic laws at one level of motion without reference to sub-motions and super-motions at other levels?

SCALED MOTIONS are motions that have been emplaced on some quantitative or qualitative scale or set of scales. The scale may be either explicit—an actual unidimensional or multidimensional graph; or merely implicit in some quantifying index or indices. Scales can be either objective or subjective (representing intuitive estimates). They can be cardinal or ordinal. They can be linear or nonlinear. They can, in fact, have an infinity of properties and vary in an infinity of ways. Scaling of motions can facilitate their: modeling, analysis, interpretation, comparison, experimental investigation, description, differentiation, analogization, discussion, etc. What are all possible, appropriate, and best scalings of all motions, species and genera of motions, systems of motions, motions associated with particular or generic phenomena, etc—both in general and for various specific and generic tasks, ideonomic purposes, etc? When a large number of either like or very diverse motions are co-scaled, mentally interesting or scientifically important coincidences and regularities have a tendency to come to light; and such exercises can train and refine man's kinological intuition, imagination, and logic. That scaled can be motions themselves or qua motions, or things involving or involved in motion; the former may be scaled by actual measures of movement or motion, per se, the latter perhaps for nonkinetic (non-kinometric) quantities such as mass.

"TABLE OF 106 'EXAMPLES OF MOTIONS OR OF THINGS INVOLVING MOTION'"

1. Adrenalin released from adrenal medulla in emergency.
2. Animal.
3. Arm.
4. Atomic nuclei between stars.
5. Atom's boundary.
6. Aurora.
7. Brain lemniscus in phylogeny.
8. Brownian particle.
9. Bucket brigade.
10. Bullet.
11. Cave through limestone.
12. Celestial body (e.g. comet, planet, star, galaxy).
13. Cell.
14. Child running errand.
15. Chromosome.
16. Cloud.
17. Continent.
18. Convict escaped from prison.
19. Cosmic expansion.
20. Cosmic-ray shower.
21. Cytoplasm.
22. Decay of proton after ~~10^-34y (hyp.).
23. Development of symphonic theme.
24. Dog chasing cat.
25. Dollar bill.
26. Drift of cow path across the years.
27. Dust particle in upper atmosphere.
28. Earthquake.
29. Earth's axis.
30. Electron in earth current.
31. Elongation of human body during development.
32. Escape of air from punctured balloon.
33. Exhaled air.
34. Eyeball.
35. Ferris wheel chair.
36. Flapping pennant.
37. Flow of energy within human body.
38. Flow of heat in solid.
39. Fluttering leaf.
40. Food in alimentary canal.
41. Galactic arm.
42. Gene WITHIN genome.
43. Geological fault.
44. Gnat gyrating.
45. Gravitational wave.
46. Growth of meuse.
47. Harvested crop.
48. Head hair.

(CONT.)

(CONTINUATION OF TABLE)

49. Hole in crystal lattice.
50. Ice cap.
51. Infectious virus.
52. Iridescent film on soap bubble.
53. Key in lock.
54. Knuckle in fistfight.
55. Lightning bolt.
56. Mantle convection cell.
57. Marine transgression.
58. Memory in brain.
59. Metastable co'orbiting of pair of erroneous ideas.
60. Migrating bird.
61. Million-year expansion of hominid brain.
62. Mountain.
63. Neologism.
64. New idea.
65. Ocean wave.
66. Oil drill.
67. Order to march in army.
68. Person.
69. Plant.
70. Pollutant in aquifer.
71. Population center of U.S..
72. Prairie fire.
73. Presidential candidate out on the stump.
74. Raindrop.
75. Residence.
76. Reversal of human queue.
77. Rising skyscraper.
78. Ritualistic circumambulation.
79. River's banks.
80. Root.
81. Rumor.
82. Ship vortex trail.
83. Shock wave from supernova.
84. Silkworm pheromone molecule signaling across three miles.
85. Skyscraper in windstorm.
86. Soil.
87. Soliton.
88. Sound through atmosphere.
89. Spermatozoon in copulation.
90. Splatter cone.
91. Spreading photon wave front.
92. Stock on stock exchange.
93. Subducted crustal plate.
94. Summoned antibody.
95. Sunspot.
96. Swelling nuclear bomb mushroom cloud.
97. Tongue in speech.
98. Tooth cavity.
99. Traveling salesman.

(CONT.)

(CONTINUATION OF TABLE)

100. Tumor.
101. Twirling ballerina.
102. Water aboil in kettle.
103. Water molecule in hydrological cycle.
104. Wave of laughter in auditorium.
105. Whirling motor armature.
106. Writing pen point.

"TABLE OF 187 'GENERAL TYPES AND ASPECTS OF MOTIONS'"

1. Absolute — VS. — Relative, Differential, Systematic, Configurational.
2. Accelerational, Increasing — VS. — Decelerational, Decreasing, 'Degenerate'.
3. Actual — VS. — Potential.
4. Adaptational.
5. Additive — VS. — Subtractive — VS. — Multiplicative.
6. Affine.
7. 'Algebraic — VS. — Geometric — VS. — Topological'.
8. Alternational.
9. Ambiguous, Myrioramic — VS. — Unambiguous.
10. Amoeboid.
11. Anastomotic, 'Vascular'.
12. Anisotropic — VS. — Isotropic.
13. Artificial — VS. — Natural.
14. Associative — VS. — Nonassociative.
15. Attractional — VS. — Repulsional.
16. Autochthonous — VS. — Allocthonous.
17. Auto-rotational — VS. — Angular.
18. Bend-like.
19. Bidimensional.
20. Bidirectional, Nonmonotonic.
21. Bite-like.
22. Bounded, Partitioned, Circumscribed — VS. — Unbounded.
23. 'Brachiational'.
24. Branching, Arborescent, Inflorescent.
25. Bulge-like — VS. — Dimple-like.
26. Central — VS. — Peripheral.
27. Chaotic, Orderless, Undirected, Random, Disorganized, Erratic — VS. — Ordered, Organized, Directed.
28. Circular — VS. — Circumgyratory (allo-revolutionary), Orbital.
29. Circulatory.
30. Circumductional.
31. Circumfluent.
32. Collective, Combined, Group, Systemic, Coupled, Dependent, Interdependent.
33. Collisional.
34. Commutative — VS. — Noncommutative.
35. Concatenational (chain-like).
36. Conductive — VS. — Conducted.
37. Conformational.
38. Consequential — VS. — Irresultive.
39. 'Contagious'.
40. Continuous — VS. — Discontinuous, Halting, Interrupted.
41. Contravariant — VS. — Covariant.
42. 'Controlling — VS. — Controlled'.
43. Convergent, Confluent, Centripetal.
44. Convulsive — VS. — Spastic-like.

(CONT.)

(CONTINUATION OF TABLE)

45. Crease-like.
46. Curvilinear.
47. Cycloidal, Trochoidal, Advancing-wheel-like.
48. Dance-like.
49. Definable — VS. — Indefinable.
50. Definite — VS. — Indefinite.
51. Deflational, Contractional, Compressional.
52. Deterministic — VS. — Indeterministic.
53. Deviational — VS. — Regular.
54. Diagonal, Oblique.
55. Diffusional — VS. — Convectional, Advectional.
56. Direct — VS. — Indirect.
57. Discoidal, Concentric.
58. Dissimilar, Catalogous, Nonequivalent, Heteromorphic, Unrelated, Non-co-taxonic.
59. Distributive — VS. — Nondistributive.
60. Divergent, Diffluent, Centrifugal, Efferent.
61. Echo-like, Ballistic-like.
62. Elastic — VS. — Inelastic.
63. Endogenous, Autonomous — VS. — Exogenous, Heteronomous.
64. Energy-consuming, Disequilibrial — VS. — Isentropic, Equilibrial.
65. Engulfing, Enclosing, Circumcrescent, Submergent.
66. Enwrapping-like.
67. Eversional.
68. Evolutionary — VS. — Nonevolutionary.
69. Exchange-like.
70. Explosional — VS. — Implosional.
71. External — VS. — Internal.
72. Field-like — VS. — Fluidal — VS. — Current-like (stream-like) — VS. — Lattice-like.
73. Fold-like.
74. Fractal, Scale-Invariant, Self-Similar — VS. — Non-Fractal, Scale-Dependent.
75. Fundamental — VS. — Superficial.
76. General — VS. — Specific.
77. Grabbing-claw-like.
78. Helical, Helicoidal, Vortical, Symplectic.
79. Heterogeneous, Multiform, Heterologous.
80. High-frequency, Frequent — VS. — Low-frequency, Rare.
81. Homogeneous — VS. — Inhomogeneous.
82. Homologous, Homogenic — VS. — Heterogenic (separately caused).
83. Hyperdimensional.
84. Imbrication-like.
85. Immixtural.
86. Important — VS. — Trivial.
87. Incremental, Stepwise — VS. — 'Complete'.
88. Independent, Individual, Free.
89. Infinitesimal — VS. — Finite — VS. — Infinite.
90. Inflational, Expansional, Extensional, Attenuational.
91. Initial — VS. — Intermediate — VS. — Final, Terminal.

(CONT.)

(CONTINUATION OF TABLE)

92. Instantaneous — VS. — Temporary — VS. — Secular.
93. Interpositional, Interfluent.
94. Intussceptional.
95. Invasional, Influent, Afferent.
96. 'Inversional', Reflectional.
97. Isolable — VS. — Unisolable.
98. 'Kinematic' — VS. — 'Dynamic'.
99. Lateral, Sidewise, Transverse, Horizontal.
100. Linear (arithmetic) — VS. — Nonlinear — VS. — Exponential.
101. Local — VS. — 'Global' — VS. — Universal — VS. — Regional — VS. — Cellular.
102. Longitudinal; Forward, Progressional — VS. — Backward, Reverse, Retrogressional.
103. 'Markovian — VS. — Non-Markovian'.
104. Matrix-Like.
105. Merarchic — VS. — Holarchic — VS. — Sterarchic (holonomic) — VS. — Holomorphotic.
106. Microscopic (microcosmic) — VS. — Macroscopic — VS. — Pancosmic.
107. Minor — VS. — Major; Small — VS. — Big.
108. Monogenic, Monogenetic — VS. — Polygenic, Polygenetic.
109. Monomorphic, Delomorphic, Singular.
110. Morphogenetic.
111. Necessary — VS. — Evitable.
112. Objective — VS. — Subjective, Perceived, Illusory, Simulated.
113. Open — VS. — Closed.
114. Original — VS. — Reactional, Reciprocal — VS. — Interactional.
115. Orthogonal, Rectangular.
116. Oscillatory, Vibrational.
117. Outward — VS. — Inward.
118. Parallel — VS. — Antiparallel [sensu Collinear, Circumaxial, Coaxial, or Coplanar]; Corotating — VS. — Antirotating.
119. Past — VS. — Present — VS. — Future.
120. Pendular.
121. Perfluent, Percolative, Permeational, Penetrative.
122. Periodic, Cyclic, Phasal, Repetitive, Harmonic — VS. — Aperiodic, Episodic.
123. Peristaltic.
124. Persistent — VS. — New.
125. Physical — VS. — Biological — VS. — Purposive.
126. Plexural, Knot-like.
127. 'Pointlike' — VS. — 'Lineal' — VS. — 'Areal', Surficial — VS. — 'Volumetric'.
128. Positive — VS. — Negative.
129. Protean, Kaleidoscopic, Irrepetitive.
130. Protrusional, Extrusional, Emergent, Expulsional.
131. Proximal — VS. — Distal.
132. Pulled, Pulling — VS. — Pushed, Propulsive.
133. Pulsatory (breathing).
134. Radial.

(CONT.)

(CONTINUATION OF TABLE)

135. Real — VS. — Virtual, Abstract.
136. Rectilinear.
137. Rheostatic.
138. Ripple-like.
139. Saltatory.
140. Scansorial (climbing).
141. Self-defining.
142. Self-dissimilar.
143. 'Self-Propagating'.
144. Self-referential (self-motion).
145. Separational, Fissional — VS. — Integrational, Fusional — VS. — Segregative.
146. Similar, Analogous, Equivalent, Homomorphic, Related, Co-taxonic.
147. Simple — VS. — Complex.
148. Sinuous, 'Tortuous'.
149. Sinusoidal, 'Undular'.
150. Slide-like.
151. Slow — VS. — Fast.
152. Smooth — VS. — Turbulent.
153. Solenoidal (roll-like).
154. Spiral (circumvolutional).
155. Stairs-like.
156. Stoichiometric — VS. — Nonconservational.
157. Stratified, Hierarchic — VS. — 'Flat', 'Granular'.
158. Strong — VS. — Weak.
159. Substitutional.
160. Sudden, Abrupt — VS. — Gradual.
161. Superordinate — VS. — Subordinate.
162. Superpositional, Superfluent, Multiplexed.
163. Swallow-like.
164. Symmetric, Group-theoretic — VS. — Asymmetric — VS. — Antisymmetric.
165. Synchronic — VS. — Sequential, Serial.
166. Synergistic — VS. — Antagonistic.
167. Syntropic — VS. — Antitropic.
168. Tessellation-like.
169. Toroidal.
170. Transitive — VS. — Intransitive.
171. Translational.
172. Transportive, Transported — VS. — Non-Transportational, Stationary.
173. Tridimensional.
174. Twist-like.
175. Typical — VS. — Atypical, Anomalous.
176. Unidimensional.
177. Unidirectional, Monotonic.
178. Uniform, Invariant — VS. — Variable.
179. Unique — VS. — Multiple — VS. — Multitudinous.
180. Vectorial, Radiational.
181. Vergent, Decussational.
182. Vertical; Upward — VS. — Downward.

(CONT.)

(CONTINUATION OF TABLE)

183. Wandering, Meander-Like, Circumforaneous.
184. Warp-like.
185. Whipping (flagellar).
186. Winding, 'Aegagropilar' — VS. — Unwinding.
187. Wobble-like.

SCIENCE BEFORE AND AFTER IDEONOMY
An Instructive Comparison

Earlier in the Ideonomy Project I took note of the fact that our Earthly environment is naturally radioactive, and I conjectured that such natural radioactivity not only may have played a role in the origin and evolution of life but might be important to life now and in the future. About this notion of a "critical background" I wrote, "Conceivably the maintenance of people and other organisms of the present day . . . unknowedly presupposes perpetuity of the normal level or qualities of background radiation here on Earth . . . In effect, a certain level of rock energy may be essential to our biological equilibrium."

Of course at the time what I largely if not entirely had in mind was "the prevention of . . . catagenetic debilitation, dissolution, and effacement" by the mutagenic (and hence presumably reequilibrative and transmutative) effect of radioactivity. But it is possible—or now that I reflect, probable—that to some extent I was also imagining an even more general biological role of radioactivity, and, in particular, a role in biontic (not just hereditary) processes and in the maintenance of human health (at least in epidemiological terms).

Why might natural radioactivity have a positive role, or at least an habitual importance, not just on an evolutionary scale, nor even on just an hereditary scale, but on the much more intense scales of ontogenetic, lifetime-genomic, and general physiological processes? The uniquely high (more than just chemical) energy of many radioactive decays, collisions, and reactions might be one reason; and also the radically different physical basis, the very rarity, the utterly random and supra-chemical (not chemically controllable) nature, the minimal length scale, the minimal temporal scale, and the quantum-mechanical discreteness, discontinuity, and fundamentality of such events. In addition to high energy I mentioned the minimal length scale, but the last is somewhat misleading in that the virtually instantaneous radioactive event can produce a micro-explosion with a radius or volume that, in a relative sense, is biologically extraordinary, if not actually unique, for being so 'large'.

The student of biological evolution could easily conclude that life has some great craving to stop or a fundamental tendency to become stagnant, and if this is true, then radioactivity may be the one irresistible force that always drives it forward or at least elsewhere. Even within the lifetime of an organism there may be such a tendency toward stagnation, perhaps caused by the undeniable attractions of simplicity, repetition, endless self-imitation, and physical conservation; and here, too, radioactivity may be the salvific champion of change, adaptation, and experimentation.

Possibilities of a somewhat opposite nature might likewise explain the hypothetical positive value of radiation to life: species or bionts may constantly and cumulatively change in a way that would ultimately be debilitating were it not for radioactivity as the source of a more revolutionary form of change, or perhaps for change in the basic structure of the genome. Perhaps both genotypal and phenotypal change are two-level processes, and the deadening or trivializing effect of the lower-level overly gradual and specific change needs to be periodically offset by higher-level jumps and transformations induced by radioactive events.

Sc. News, 1988 Oct 14:v134,#16:p254

Radon: Is a little good for you?

Risks now associated with low-dose exposures to ionizing radiation have been extrapolated from effects seen in people exposed to high doses – generally atomic-bomb survivors, recipients of early X-rays, or workers in uranium mines. Because no one has established that there is a threshold to radiation effects – a level below which no hazard exists – policymakers have conservatively assumed that even tiny exposures present some risk. However, controversial new radon studies in humans now challenge the no-threshold view – and even go a step further. They hint, as a few animal studies have, that it's possible some radiation may actually be beneficial.

The studies, by Bernard Cohen at the University of Pittsburgh, compared U.S. data on average indoor-radon levels with average lung-cancer rates for the county in which each measurement was taken. According to the no-threshold theory, Cohen says, one would expect to find a trend toward higher lung-cancer rates for those counties with the highest indoor-radon averages. But to the contrary, he says, "we found there's a strong tendency for counties that have high radon levels to have low lung-cancer rates."

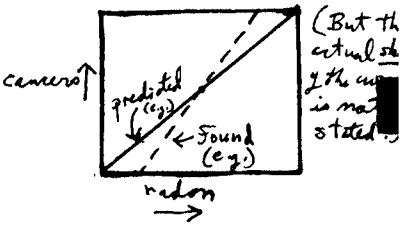
One study, representing data from 415 counties, was based on 39,000 measurements taken in the main living rooms (not basements, where readings are typically highest) of homes in which the residents had purchased their first radon test kit. Based on the radon average, a no-threshold estimate would have predicted female lung-cancer rates 25 percent higher than the national average. Instead, Cohen says, "the data show a 30 percent decrease." Comparisons for men and women in the 10 states for which there are data on 10 or more counties give similar "negative correlations in 80 percent of the cases. And in the states where there is a positive correlation," he adds, "it is very slight and not statistically significant." But this study was clearly nonrandom, since it involved only homes where the residents were worried enough to pay for radon measurements.

In a separate study, Cohen made similar comparisons for about 1,200 homes – this time selected at random – in 40 counties having the highest and lowest U.S. lung-cancer rates. Again, Cohen reports, in every case the radon level for low-lung-cancer counties was much lower than had been predicted, and the radon level in high-lung-cancer counties was much higher than predicted.

He reports similarly perplexing data from Scandinavia. For example, though Finland's average indoor-radon level is about 2.5 picocuries per liter (pCi/l) in air – about 2.5 times the world average – its female lung-cancer rate is only about 70 percent of the average for industrialized countries, he says. Cohen also cites five state-sponsored studies completed within the past year – in Florida, South Carolina, New Jersey and two in New York – that "showed the same trends."

These data do not suggest that people exposed to high radon levels have a low cancer risk, Cohen says, because a large body of data compellingly links high-radon exposures to lung cancer in underground miners. Rather, he says, it calls into question the no-threshold theory – because if there is no threshold, average county measurements should correlate directly with observed lung-cancer incidence. However, should further studies support the negative association found in these studies, Cohen says, scientists may soon be forced to ask the even more revolutionary question: Do small radiation exposures actually confer some sort of protection against lung cancer?

These data "certainly look counter to what you'd expect," says C. Richard Cothern, a radon-risk analyst and executive secretary of the Environmental Protection Agency's scientific advisory board committee on environmental health. But even if Cohen's interpretation is right, Cothern says, the Pittsburgh scientist can't prove it with these studies because "none of his data are truly random – they all have some kind of bias." Rather than prompting criticism of the study design, Cothern says, these biases should be recognized as inherent limitations in the available data.



Natural radioactivity might also be important to life for reasons not related to its intrinsic virtues but rather having to do with constitutional adaptations that life may have made to the general physical norms of its ancient and contemporary regimes.

In short, life may have a profound tendency to bring itself into equilibrium with the fundamental conditions of its long-term environment, to become isomorphic to that environment, to average the properties of its world and circumstances, to trace a middle path, to define its health by the avoidance of the opposite extremes of what is too much or too little, and yet to exploit at the same time the dual thresholds represented by the opposite margins of its optimum.

What I had theorized originally, then, was that there might be an optimal range of radioactivity for efficient evolution and public health, deviation from which in either the direction of more radioactivity or of less radioactivity, would be bad for life and bad in proportion to the amount of the deviation, according to some (unspecified) curve.

In terms of human health, at least, I was going out on a limb; quite a considerable limb, in fact.

Recently (I am writing this 1988 N) a problem for public health has come to light that was unexpected. The radioactive gas radon is constantly being emitted at Earth's surface as a result of the decay of radioisotopes within our planet, and it has been found that this natural pollutant tends to become trapped and concentrated indoors, especially in certain houses and in certain geographic regions. Calculations suggest that thousands of people may be dying annually from the radiation they are exposed to in this way (e.g. 20,000 from lung cancer in the U.S. alone).

It is an ironic situation, given that estimated mortality from artificial radiation—either constant or catastrophic—is orders of magnitude less, and yet public fear of nuclear reactors has extinguished the growth of the nuclear-energy industry worldwide, at least momentarily.

Moreover, some elementary ideonomic principles and common sense (which regrettably is uncommon) could have led to the years-earlier discovery of the natural problem. For example, the general and generalizable scientific observation that things that are continually being produced and that continually flow over a long path, through a complex environment, and over interfaces or discontinuities, have a tendency to become temporarily trapped and concentrated, typically by many orders of magnitude; the common fallacy of taking a single measurement (say at a certain point in space or time; where there is a huge range over which sampling could instead be done) or an average (either comprehensive or band-limited) and treating it as a complete quantitative or qualitative description of a situation, or as equivalent to an index of some other variable that is one's essential concern; the principle that human inventions, creations, accomplishments, actions, and effects that at first appear to be without precedent, exemplification, analog, equivalent, equal, or transcendent in nature, are usually discovered subsequently to have been, on the contrary, a part of nature that simply went unnoted; the general principle that nature exhibits great and surprising variation in all things; the principle that true risk should be defined against a norm or with a natural base line or with nature as a control; and the principle (a specialization of one of the principles above) that artificial or anthropogenic hazards, risks, and evils will ordinarily be found to preexist or be surpassed naturally (directly, analogically, or aspectually).

But science, and even more so public policy, tend to be remarkably unprincipled.

What has been discovered even more recently, and what is altogether astonishing, is that not only may the assumed mathematical relation between the quantity of radiation to which people are exposed and the amount of mortality resulting therefrom be nonlinear, but it may even be nonmonotonic.[1,2]

The prevalent dogma in health physics has been the "no-threshold theory", according to which there should be no minimal amount of radiation that is pathogenic, carcinogenic, teratogenic, or the like, and a trend should exist toward higher rates of lung cancer, say, in places where ambient radon is greater.

Yet what a massive study done by Bernard L. Cohen, of the University of Pittsburgh, seems to have found is "that mortality is significantly lower where radon exposure is high—the opposite of what is expected."[2] Consequently "scientists may soon be forced to ask the even more revolutionary question: Do small radiation exposures actually confer some sort of protection against lung cancer?" The latter concept is called "hormesis".

Although it is somewhat inappropriate, and certainly risky, to report in a book like this a bizarre scientific result that has only just been announced and that has not yet been subjected to the fiery tests of critical evaluation, lengthy debate, and replication proportionate to the would-be importance of the result, it was in the present instance too great a temptation for me to resist, because of the power of the thing reported to illustrate the kind of difference that ideonomy could be expected to make to the way science is done: a difference at once quantitative and qualitative.

Actually there is an assonance between what Cohen found and what some other recent studies have found[1]. Yet there are methodological quibbles to be answered, and from a theoretical point of view—even though I am not a specialist in Cohen's field—I personally find it almost impossible to think of any intuitively plausible mechanism for the hypothesized phenomenon of hormesis (or of any chain of physiological events apt to make low-level radiation more beneficial to man than harmful).

Of course poverty of imagination may account for my failure, and nature is full of surprises and shocking things. There is even a key ideonomic principle to that effect!

If the reported result is valid, it corroborates my prior conjecture that there is an optimal level of environmental radioactivity for human health. It would not prove the surmise, of course, because doing so would also require it to be demonstrated that the overall health and average life-span of the human population is diminished not only when existential radiation

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1. "Radon: Is a little good for you?", Anonymous, Science News, v134 #16 p254 (1988 O 16); length = 1 column.
2. "Radon Retried: Its danger and the value of remedies are both in dispute", Tim Beardsley, Scientific American, v259 #6 p18 (1988 D); length = 2 columns.

rises above a certain level but when it falls below a certain level as well.

Whether my conjecture was right or wrong is not horribly important. The point I wanted to make is that ideonomic thinking could easily lead to the adventitious introduction of a general principle into the analysis of the probabilities of a situation such as that imagined, and that the effect of this new qualitative or logical element could be to significantly alter the conclusions drawn about those probabilities and about the possibilities of the situation generally. What I mean when I say that the introduction of the principle would be "adventitious" is that traditional science would almost never have recourse to such a principle, because it eschews the qualitative in favor of the quantitative, because its picture of nature is dominated by narrow phenomena or narrow concepts of phenomena, because it has little faith in general principles and has never attempted to employ them systematically, because it has misconstrued the Baconian method as positivistic and anti-theoretical, because it undervalues the importance of symmetry (or, more precisely, of comprehensive and omnifarious symmetries) in nature, and for other reasons.

The principle that is relevant to what I wish to discuss is that: Nature in general (and biological nature in particular) habitually displays and exploits bidirectional optimums (or omnidirectional optimums, to speak even more generally and truthfully).

For my purpose here it would probably be appropriate to rephrase, or to specialize, the principle to: For any physical dimension possessed of a range and of obvious biological importance, life, over its billions of years of evolution, has probably learned to accept, exploit, and demand an optimal subrange of that dimension that corresponds to the normal environmental subrange—or average—of that physical dimension over evolutionary time; so that at the present time there can be both too little and too much of the relevant quantity, with insalubrious effect.

This principle can be used to illustrate the radically different way in which science unguided by ideonomy (or pre-ideonomic science) and science guided by ideonomy (post-ideonomic science) would be expected to investigate the general nature and possibilities of the universe.

Biological and medical research not aided by ideonomy, or unmindful of ideonomic principles, would presumably proceed very much as it has in the past, and therefore its discovery of whatever optimal dimensions of the sort being imagined actually do exist would ordinarily be stumbled upon upon by chance, disconnectedly, inconsecutively, and with little comprehension of their general significance and utility. Research of this sort would be—as it has always been—inefficient, wasteful of time, resources, and effort, narrowly motivated, highly redundant, undirected, and—in general—less intelligent. It would arrive more slowly at that big picture whose obtention is the ultimate goal and purpose of all science.

Ideonomically inspired bio-medical research would proceed very differently.

First it might conceive and vastly refine the foregoing principle. Make it more precise, resolve its ambiguities, work out all of its logical implications, etc.

Then it might select a random set of maximally diverse physical dimensions that are known to be central to the life of organisms and test the principle to see whether it applies to each of the dimensions: whether life does in fact have an optimal range and minimal and maximal thresholds for good and bad effects in terms of the dimension, and if so, how important such things are to it, or to understanding the nature and possibilities of life in general.

It might deliberately choose for this experiment a set of bio-physical dimensions that the concept of such an optimum would seem the least likely to apply to or to find exemplification in (such as radioactivity); or a set of dimensions about which the least is known.

It might conduct such a 'test' in any or all of three ways: by checking the literature to uncover what is already known; by theorizing about the different dimensions to see whether an "optimum" in fact makes sense or is probable in their case, or would imply anything immediately checkable; or by actually performing biological experiments.

What it would determine from this initial small-scale test of the principle is whether it is probably valid and its potential universality or generality. There would also be an indication of the actual cognitive and heuristic value of the tentative principle.

If the principle passed this preliminary and yet highly important test, then ideonomically guided science would next undertake to systematically imagine all of the canonically important physical dimensions to which the principle might apply or that might exhibit bio-physical optimums.

And at this point it might at last make use of classical scientific induction by testing the validity and meaning of the principle of a bidirectional optimum for all of the imagined dimensions, doing this more or less seriatim or in parallel (or en echelon, if you will).

Afterwards the confirmed optimums could be tied together in all sorts of interesting and necessary ways, via both theory and experimentation. Even the infirmed optimums could be exploited at this synthetic stage (almost anything is liable to be grist for ideonomy's mill).

What has just been proposed is a formal investigation of the ideonomic hypothesis that, in biology, many or all major deviations from average or equilibrial levels of some basic physical : dimension, property, quantity, parameter, etc : may tend to be unhealthy, or e.g. have adverse effects on public health.

Such an investigation of the generalization, however, would be beyond the purview of the one-man Ideonomy Project. In lieu of it I will take a casual look at a few of the most obvious dimensions of life's environment to see whether, based upon my own limited knowledge, the postulated optimum obtains.

1. Total mineral content of drinking water. A massive study done of the English population that sought to determine if the hardness or softness of tap water in different national regions in earlier decades exhibited any statistical correlation with the incidence of diseases such as atherosclerosis found a significant dependence: softened (demineralized) water seemed to be pathogenic. Of course it can be expected that the water drunk by our various phylogenetic ancestors was normally relatively dirty. Clean water is therefore in this sense abnormal, or the sort of major deviation from an optimum that, per the hypothesis under consideration, should indeed be pathogenic.

I am unfortunately ignorant of any corresponding study that may have been conducted of the effects upon animals or man of reliance upon excessively dirty or mineralized water. Intuition would certainly suggest that there must be a limit in this direction as well, however, and not simply owing to an intolerable viscocity!

2. Atmospheric humidity. Hot or cold air that is saturated with moisture, and air that is extremely dry, are certainly uncomfortable, but are they necessarily unhealthy? Are popular beliefs to that effect mere superstitions?

In certain cases of diabetes excessive humidity is bad, if just because human skin develops fungal infections more readily.

A hot and humid climate is stressful in ways that could aggravate a number of ailments in a very indirect way.

In arid climates nasal mucosae are liable to dry out and crack, which can lead to mucosal infections.

3. Oxygen content of air. Anoxia can lead to suffocation.

But too much oxygen is also bad and can result in oxygen poisoning.

4. Atmospheric ions. Effects of the ionic state of the atmosphere on the health and comfort of man and other organisms have long been indicated, but the results of the myriad studies that have been done remain highly controversial.

It is not just the absolute charge that is important, apparently, but the electrical sign of the charge; and one would tend to suspect that the degree of ionization of individual ions, mixture of ions, molecular species, species of organism, ionic history (time spectrum), and other physical parameters, and complex intercorrelations of parameters, may also be important or decisive.

For example, negative ions seem to be healthy for people because they are antiseptic, or unhealthy for bacteria.

5. Atmospheric pressure. The known bad effects of ultrabaric air on divers are becoming more numerous (recently liver and brain damage have been found to occur, in a cumulative way, even at pressures that previously were thought safe).

The bad effects of low atmospheric pressures are well-known, and the symptoms of "high-altitude sickness" include headache, insomnia, pulmonary edema, and mental disturbances. I myself have found that, even after acclimating for two months, I am utterly unable to do mathematics at an elevation of three kilometers (where the pressure is 7/10ths that at sea level).

6. Consumption of vitamins. A shortage of vitamins in the diet is pathic by definition.

As for hypervitaminoses, it used to be thought that these were limited to vitamins A and D. But as a result of the popularity of supplementary-vitamin capsules and megavitamin therapies in recent years, there are now reasons to believe that there can be excesses of other vitamins.

Speaking once again from personal experience, I discovered many years ago that if I took massive doses of ascorbic acid (vitamin C) I experienced chronic nasal congestion, and that massive niacin (vitamin PP) impaired my concentration as much as being mildly inebriated.

7. Gravity. As yet we have no technology for amplifying natural, or creating artificial, gravitation, but we can temporarily simulate extreme gravities in the laboratory via centrifugal force. If animals, plants, or microbes have ever been centrifuged continuously for months or years to see if their health or condition would be affected by this treatment, then I have no knowledge of what was learned. Obviously the transient high g forces produced by the extreme deceleration at the termination of a fall from a cliff can be injurious to one's health, but an organism would probably be harmed even if, over a prolonged period, it were subjected to a virtual gravity of little more than 1 g.

Astronauts who orbit Earth in what is effectively zero gravity for times of the order of one year develop serious problems, the full gravity of which, especially for future stays lasting many years, is probably not yet known. Decalcification of bone, amyotrophia, and vestibular disorientation are just three of the problems.

In summary, one gleans the impression from this handful of cases that the proposed principle may be 'generally' valid and that it might even be valid universally. But much more will have to be learned before universality is 'demonstrated' (rendered probable, or far more probable than non-universality), or even before one would be justified in assuming that the generalization would thereafter be found to be valid in a majority of cases.

Essentially two ideonomic steps have been taken in this chapter so far.

The first of these steps was the conjecture that there may be both a maximal and a minimal quantity of environmental radioactivity that is compatible with full (optimal) human health.

This conjecture occurred simultaneously with, and as a function of, the tentative formulation of a general biological principle to the effect that life will tend to become unhealthy whenever—and in the measure that—its environment's fundamental physical dimensions deviate in any direction from whatever had been the average or middle range over (all or perhaps just recent) evolutionary time.

Notice from the parenthetical clause, incidentally, that the proper formulation of the principle actually remains uncertain in major respects.

The second step, whose implementation was of course merely begun in this chapter, was the attempt to verify the more or less universal proposition represented by the principle through the classical method of enumerative induction (or by enumerating and examining all of the instances to which the principle 'applies').

A third step, however, would be to generalize the generalization itself, say by generalizing some of its terms, or by transforming the principle so that it can apply to a larger set of things or to different types, or even taxons of types, of things.

This process or act, as well as the result thereof, might be referred to as hypergeneralization.

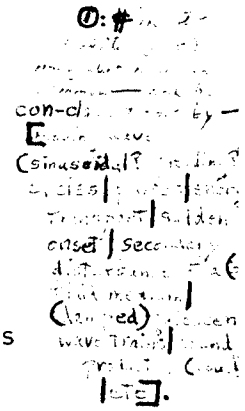
EVENTS
: | ANALOGIES
| COMMONALITIES
Ideopoesis
: Combinatorial

TEST OF THE UNIVERSALITY AND FERTILITY OF THE ORGANON "GENERIC THINGS EVENTS MAY HAVE IN COMMON"

The 73-item organon "Generic Things Events May Have In Common" can be at once tested and demonstrated by applying it to combinations of various examples of events. These events may either be restricted or unrestricted, in their types or in the phenomena or subjects they represent. Ultimately all of these cases should be explored.

Let us see what happens when items from this organon are applied to pairs of items from the 47-item organon "Universal Examples of Particular Events Ideonomy Could Help Clarify". Items will be chosen from the two organons by chance.

(1) Do the events [a]DRUMBEAT and [b]SUBMARINE PASSAGE OF TURBIDITY CURRENT : have [c]TAXONS in common? -



Unfortunately it is a hard question to answer in advance of there having been constructed a general taxological scheme comprehending named higher, same-level, and lower taxons of events, and possibly prior to there having been distinguished many different types of events.

But the minute one begins thinking about the problem one realizes that the answer has to be yes. This is in part simply because of the effortless ease with which one can imagine myriad taxons of anything, including taxons able to contain the most disparate (or arbitrary) things.

A trivial example of an imaginable taxon able to include both events above would be a taxon of all or some 'violent events at a solid-fluid interface'. That would be a generic (containing) taxon. On the other hand, a specific (contained) taxon would be 'cases with transverse movement in addition'; that is, an important subset of both drumbeats and turbidity currents will involve marked sidewise movement (in the first case in the form, say, of slippage of the drumstick while in contact with the drumhead). ⓘ

(2) Do the events [a]ENTRY ADDED TO LEDGER and [b]COLLISION OF TWO CONTINENTS : have in common [c]INEQUALITIES? -

The space in the ledger before and after being filled involves a temporal inequality, and of course various row or column inequalities can exist in special cases. As for continental collisions, there can be velocity, inertial, force, and directional inequalities associated with the longitudinal motion, but also various transverse, vertical, and torsional kinematic and dynamic inequalities and intricate inequalities relating to the meetings of the jagged edges of the continents. The forces driving the opposed continents may also be unequally maintained over time.

Returning to the accounting event, although ledger credits and debits that involve identical sums of money would seem to be absolutely equal (on paper), in reality they can never be strictly so, but must always instead involve numberless subtle inequalities (that are never mentioned in textbooks on accounting).

(3) Do the events [a]TRANSITION TO MATHEMATICAL CHAOS and [b]OSCILLATION OF GLOBAL SEA LEVEL : have [c]SPATIAL DIVERGENCE 'in common'? -

Once again the answer is yes. Chaotic transitions can produce an explosively widening tree of bifurcations. Oscillating sea level is associated with diverse forms of 'spatial divergence': of continents divided by seas, of seas retracting from points on land, of geoid changes, of rising polar caps, of the bottom from the top of the sea, etc.

And of course certain sea-level oscillations may actually be "chaotic", in form or cause.

(4) Do the events [a]STAR'S DEATH and [b]AIRPLANE CRASH : have [c]RAPID OSCILLATIONS in common? -

Stars can die in a variety of ways, from violent explosions, collisions with other stars, gravitational collapse into black holes, exhaustion of nuclear fuel, and radiative cooling - all of which will give rise to at least some rapid oscillations. Rapid oscillations are associated with the causes and courses of plane crashes in a great many ways (e.g. a major cause of such disasters has been the aeronautical phenomenon of stall flutter).

My bet is that the rapid oscillations involved in the two disparate events have identical, analogous, or related mathematical or physical forms or causes, and that in an ideal world students of both phenomena would exchange notes regularly.

(5) Do the events [a]DECLARATION OF WAR and [b]EVALUATION OF A PAINTING : have [c]EVOLUTIONARY CURVES in common? -

Surely some sort of sigmoidal or logistic curves will be connected with both events (which is not to say that other types of curves should be absent; on the contrary, a great variety of curves are apt to be simultaneously relevant to the causation, course, and effects of the phenomena).

Since both war and perception of art are biological—in fact, anthropological—phenomena, shared evolutionary curves are virtually inevitable for the events in question. Deep analogies and homologies may even exist.

Sensu lato, "declaration of war" can be construed as including the subsequent psychic, social, and political reactions to the declaration proper. All of these will be human phenomena, and per se will involve a multitude of universal, psychophysiologically rooted curves.

These five examples suffice to demonstrate the validity, universality, and fertility of the organon they were meant to test.

Were the organon used in connection with more advanced ideonomic tools and methods its power, value, and interest would be far greater (as would be true for any organon).

NEW WAYS OF COGNIZING KNOWLEDGE

The presumptive widespread adoption and scientific development of ideonomy in the future can be expected to lead to radically different ways of representing knowledge and of operating with it.

Naturally it is very hard to foresee the precise nature of these changes and what all they will encompass, and harder yet to describe what one intuitively anticipates to other persons in a meaningful and vivid way.

However, it is vitally important to at least attempt to do these things in the present book, and that is what I undertake to do here. The peculiar difficulty of the task means that my words will often have more of a metaphorical than a literal truth. And yet in the view of ideonomy metaphorical speech, and not a deceptively simple literalism, will frequently be the best vehicle for the discovery and expression of reality.

One of the most successful procedures in ideonomy to date consists of taking a thing such as an hourglass that has the ability to serve as a broad analog, or so-called archanalogon or simply archanalog; listing various things that can serve as diverse analogs, or so-called co-analogs, of it; listing what one concludes from the study of these co-analogs are the set of traits, called semi-generic traits, that they tend to share; and then, finally, constructing a massive table in which as columns and rows all of the co-analogs are intersected with all of the semi-generic traits. Subsequent careful consideration of each of the many intersections or so-called cells of this table—to confirm their validity, imagine their meaning, and rank their importance—will invariably result in the discovery of a large number of new, thought-provoking, and highly useful ideas.

But undoubtedly the greatest value of this procedure lies elsewhere. It has to do with the transformation the exercise produces in the structure, outlook, and activities of one's mind. It renovates, redirects, and noticeably enlarges intelligence, if only in an incremental way when performed just once. It leaves behind as a useful residue another 'mental frame' for understanding and dealing with things, not just with the things that were explicitly addressed by the exercise itself but things in general or things universally.

It is important to grasp the nature of this alteration, or more precisely, the potential difference the alteration could make, when properly understood and guided, and in concert with a great number of other such alterations of individual minds and of human minds collectively, or as they work together productively and progressively over history.

What I would emphasize, based on my own experience, is this.

All of the various intersections or cells of the table have some sort of mutual significance, or are consignificant.

But this consignificance is by no means that of a finite and static constellation. Rather it is a progressive function of the number of successive iterations of comparisons of the many different cells with one another as infinite sets in infinite cycles or series.

Moreover, it is intensely dynamic. The process seems to lead to the mental discovery of new things that then figure in the process in the role of being new and additional things, and the mind that engages in this process seems to catalyze itself and to itself become something greater and different.

What the many different cells of the table actually each seem to provide is a tool with which the mind can choose to operate upon the other cells or tools, when the table is being used to confront the nature of some phenomenon or the possibilities of some concept.

Each of the cellular tools is different and unique, and the ensemble of these cellular tools is a menu of alternative choices able to function as a sort of cognitive toolbox.

Again, the different cells of the table can be thought of as providing the mind with different so-called degrees of freedom. By combining these consignificant logical degrees of freedom with one another, either in parallel or series, the mind can fashion an endless variety of intellectual constructs bearing on the nature and practical possibilities of whatever concept or thing the toolbox-like table is momentarily being used to consider. These constructs should not be thought of as purely artificial, or as purely arbitrary inventions of the imagination, for at least in retrospect they have something of the character of empirically discovered natural phenomena or of necessary things. But their absolute nature is as difficult to decide upon as is the absolute nature of the entities of mathematics (a problem that has been a source of interminable controversy).

Think of the table as being the compound eye of an arthropod, and its lattice of cells as the eye's ommatidia.

Assume that the table in question is that for the archanalog hourglass, and that it is being used to consider an oak tree in the aspect of an hourglass.

In each of the ommatidial cells of this refractive table there is, in effect, a separate and always peculiar image of the oak tree, or of the mind's concept of an oak tree.

It is not just a matter of the oak tree concept looking somewhat different from each and every ommatidial perspective, however. The point instead is that each ommatidium sees or reveals something more about what an oak tree is and means essentially, and something that is complementary to and the canonical completion of all of the other ommatidial revelations.

The essential variation in each ommatidium attests to the real but unsuspected conceptual or phenomenological complexity of the oak tree.

But once again I stress that not even these things can begin to suggest the full ideonomic import of such a table.

INTRODUCTION
Technology
Ideonomy's future

PROPHETIC DREAM:
Description of A Future Ideonomic Laboratory

In 1984, shortly after I began the multiyear Lounsbery project to lay the foundations for what would hopefully turn out to be a science of ideas, I had one night a wonderful dream. I awoke from this dream queerly certain that it was prophetic. Yet what the dream had envisioned was fantastic.

I dreamt I was in a house and that I was descending from the ground floor to a lower level via spiral stairs. These gave access to a remarkable underground laboratory.

A single capacious room, its every wall was filled with meters and screens and graphs; with buttons, dials, keyboards, control sticks; and with things unidentifiable and mysterious (at least in retrospect). Think of the control room of a nuclear reactor or the crowded cockpit of a modern airliner.

All of these busy and imposing panels, I knew, had but one purpose: the visualization, generation, manipulation, and endless exploration of ideas, on the basis of their lawful relationships.

I was in an ideonomic laboratory of the future.

With the sophisticated technology that surrounded me it was possible to examine and experiment upon ideas just as though they were physical objects and phenomena.

They could, in effect, be resolved into that microcosm of inner detail that we see when we peer through our most powerful microscopes.

Their mutual effects could be probed, much as we explore chemical reactions and the interactions of elementary particles.

Their complex internal life and evolutionary patterns could be investigated, just as we research the biology of organisms.

The laboratory's multiform instruments of display enabled one to simultaneously visualize individual ideas or individual interactions of ideas in hundreds of different and yet intricately interrelated dimensions—both qualitative and quantitative.

The operator of the laboratory became the equivalent of a noonaut: a vehicular traveler through the fundamental structure of mind itself.

The tools of this laboratory permitted one to take any idea whatsoever apart and to reassemble it in new ways. Ideas could be altered, given new properties, and transformed into other ideas.

Instruments gave one the ability to efficiently and directedly combine ideas in myriad ways so as to vicariously construct logical structures and cognitive processes of a monumental and superhuman order.

INTRODUCTION
? Epilogue
\FUTURES

FANCIFUL MICRO-PORTRAIT OF IDEONOMY'S FUTURE

Idea-trees are grown. Once planted, each tree may grow ever larger, more branched, higher and broader, more diverse, individual, specific, and general, more complex, more meaningful and elegant, more useful, more fertile, more self-referential, etc in the course of time.

Just as a bonsai may live on for 800 years, and be maintained and shaped as a multigenerational work of art, so also—since it is immortal, infinitely more so—may an idea-tree live as a concreation of tens, thousands, even billions of interested persons, as the meaningful convergence, divergence, and revolving vergence of their myriad ideas, over milliseconds, minutes, months, decades, millennia, or unimaginable but ineluctable eons.

The idea-trees not only grow and evolve but propagate in a variety of ways or otherwise transmit their essence, their fruit, and even their characteristic methods of cultivation. They emit propagules that take root and arboresce in the neighborhood and around the ideonomic world (or Ideocosm). Bits of them are by human gardeners grafted onto other idea-trees. Whole trees are hybridized. And the increasingly clever humans exploit ideonomic forms of genetic engineering to evolve from one primordial tree what are equivalent to a tree, and trees of trees, of that tree.

Below the ground of their truncal or germinal idea, the idea-trees also develop backward, in the inverse arborescence of an expanding root system of ideas ever more logically prior, disintegrated, primitive, and hence potentially revolutionary.

As the idea-trees form and develop, rules, patterns, principles, and concepts are conceived of that not only have the power to modify the tree of their origin, but many other trees besides or even trees in general. In fact these things have a tendency to acquire a life of their own, and give rise to trees purely made up of ideonomic rules, patterns, principles, and concepts.

Whole forests of idea-trees emerge, which fragment, spread, and compete geographically.

Idea-trees also give rise to other forms of idea-life that are not strictly trees, being more like bushes, forbs, vines, epiphytes, grass, fungi, algae, viruses, or more like animals such as nematodes, endoparasitic worms, insects, or the smartest mammals, or like entire ecosystems or novel categories of organisms.

They are likewise a contributing source of proliferating and accumulating analogs of purely physical phenomena and entities and of machines: e.g. of soils, rivers, lakes, mountains, clouds, winds, lightning, atmospheres, as well as motors, houses, cars, and electrical circuits.

As the idea-trees evolve, their internal structure, composition, and functions—their anatomy, physiology, and chemistry if you will—becomes more and more differentiated, sophisticated, and complex.

INTRODUCTION

THE STUDY OF KNOWLEDGE IS SELF-INFINITE

An important ideonomic principle holds that the study of all knowledge is an infinite and endless endeavor.

This means that any datum, axiom, concept, description of a phenomenon, statement of a relationship, methodological principle, or thought must inevitably have associated with it an infinity of corollaries, meanings, implications, cognitive problems, and possibilities for further thought.

The analysis of knowledge gives rise to new possibilities for knowledge. To know one thing is to know that one does not know some other thing. To know a thing in one way is to possess an option for knowing it in some other way.

As one's knowledge of a thing increases one also becomes conscious of higher, better, and more fundamental ways of knowing, understanding, or investigating the thing.

One of the forms that the growth of knowledge has a tendency to take is that of a chain. Links in this chain may be existing elements of knowledge that can be bound together in interesting, important, or necessary sequences, new increments of knowledge that are implicit in the linear or branched structure of what has gone before, or unfolding investigatory problems or opportunities.

Relationships among different bits of knowledge may define a structure that is the equivalent of an infinite series in mathematics. Even though such a series is stated by a finite set of terms, it can be infinitely long, complex, and specific. The general question that readers should ask themselves is: If there can be such series in mathematics, or on the basis of number, then why should it not be possible to construct analogous infinite series specified by similar finite arrangements of finite terms, even when the terms are (supposedly) of a nonmathematical or extra-mathematical nature, and are such things as qualities, concepts, mental operations, words, or physical phenomena in and of themselves?

If such infinite ideonomic series can indeed exist, then it must surely be possible to combine many such series in order to construct—or to explore—arbitrarily complex, and likewise often infinite, ideonomic or cognitive structures.

Empirical or theoretical mental structures should have implications for, and natural relationships to, other such structures. Analogies and differences between mental structures should be infinitely complex and specific.

The Ideonomic Division
IMAGES AND IDOLOGY

By image is meant a visual representation, or some equivalent of a visual representation, of a real or imagined object, phenomenon, entity, scene, world, texture, feature, or equivalent thereof: usually one that is complex, and that is perhaps irreducible or the simplest description of itself or at least incapable of any simpler description. An image has finite spatial extension, but the space it represents or in which it appears may be either concrete or abstract—in whole or part. Typically the spatial dimensionality of an image is two or three and integral, though it may also be less, arbitrarily greater than three, or fractal. There can also be arbitrarily abstract residues, transformations, and analogs of images, but the proper ideonomic division(s) to assign them is uncertain.

Images and the science thereof, or idology, continuously and discontinuously intergrade with various other divisions and their objects of study: notably FORMS AND MORPHOLOGY, REPRESENTATIONS AND SCHEMOLOGY, APPEARANCES AND PHENOLOGY, DESCRIPTIONS AND GRAPHOLOGY, THOUGHTS AND PHRONTOLOGY, MODELS AND PLASMOLOGY, PERSPECTIVES AND APOPSOLOGY, PATTERNS AND DIGMOLOGY, PROJECTIONS AND SCIOLOGY, and WHOLES AND HOLOLOGY.

Initially the concern of this division should be understood as limited to images in the conventional sense, as they occur and are studied in neurology, psychology, noology, artificial intelligence, and the visual arts. Ultimately, however, the concept of an image, and the interest of idology, might be extendible and generalizable—even perforce—to increasingly strange, esoteric, surprising, and intellectually demanding forms, senses, aspects, phenomena, realms, and applications of 'images'. One already sees such an evolution and transformation occurring in higher mathematics, but the more extreme possibilities continue ad infinitum. I predict that it will one day be found that images and image processes have purely physical analogs, or that equivalent phenomena occur outside organisms and machines. Actually in modern relativity, quantum physics, and cosmology the things I speak of have already begun to emerge and be studied.

Progress in neural nets and artificial intelligence will make it possible to generate, reproduce, manipulate, and experiment upon images in the most rigorous, systematic, and lawful way, and when such a new era dawns the advancement of pure and applied idology will be straightforward, swift, and astonishing. We will glimpse at some of the consequences near the tail end of this chapter. There it will be seen that idological technology, or technoidology, will trigger educational, recreational, communicational, psychiatric, informational, artistic, computational, and industrial revolutions; that it will transform the instruments, methods, and organization of scientific research; that it will augment and diversify human intelligence; and that it will alter the very fabric of society.

Tomorrow's army of professional and amateur idologists will usher in a new age of adventure as the human race embarks upon the endless and infinite exploration, surveyal, and exploitation of the idocosm: the virtual universe of all possible images and imaginal sequences, structures, experiences, dimensions, and constructs.

CHAPTER FANCIES

Before we write or read this chapter let us indulge our fancy for what could or should appear in it.

We could enumerate and comment upon universal genera and species of images, upon dimensions, aspects, and elements of images, upon possible systematic transformations of images, upon comparisons and interrelations of various natural images, and so forth.

We could discuss why the ideonomic study of images is important. We could propose and demonstrate or test methods for investigating and making use of images. We could list and critique the ways in which images have been treated historically or are being researched and exploited today.

We could describe how images are generated by spatial and qualitative combination of their elements, or the rules, criteria, and open-ended possibilities of such combinations, permutations, substitutions, transformations, and configurations of finite or infinite elements.

We could actually use such things to generate or transform some images.

We could analyze the symbolic substrata of images, or the psychic and cognitive processes involved in the recognition, appreciation, or creation of images. The symbolic and cognitive elements, as opposed to the narrowly physical aspects, of images could be probed and classified.

We could consider the stories that are told, or that might yet be told, by temporally changing, developing, and sequenced images, and the ideonomic categories, mechanisms, and possibilities thereof.

We could attempt an exhaustive exploration of the total content and meaning of a single, random or remarkable image.

We could contemplate all of the possible alternative images of a single, ever-identical thing or scene.

We could sketch the extant and future technology required to analyze and synthesize images, or to originate idology or remake it into a true science.

We could excogitate the limited and infinite intellectual powers and skills of the mind that are required to master images in every way.

We could detail man's current ignorance of or about images, and the problems and needs of the science, technology, and art of images.

We could depict and compare different idological spaces, manifolds, and metastructures, and go on to illustrate and apply them.

We could look at one or more series, spectrums, or hierarchies of images.

We could indicate higher analogies between images.

We could attempt to maximally differentiate a set of images from one another.

We could suggest hypotheses and theories about the nature of images—in themselves or qua mental events or phenomena—and tests thereof.

We could visualize ways to quantify images, and hold a flame over the infinite mathematical world of their analysis and creation, which is illustrated in infinitesimal part by present accomplishments.

We could discuss the illusions from which images suffer and benefit.

We could develop a special terminology for treating images.

We could formulate principles to guide idological inquiry.

We could draw up a plan and program for the future development of the science of images.

IDEONOMY:
INTRODUCTION, FOUNDATIONS, AND APPLICATIONS OF THE SCIENCE OF IDEAS

Patrick Gunkel

VOLUME I,

"INTRODUCTION TO IDEONOMY"

PARTIAL TABLE OF CONTENTS:

What Is Ideonomy?

The short but most exact definition of ideonomy is *the science of ideas*. By a longer definition, it is the pure and applied science of ideas and their laws, and of the use of same to describe, generate, investigate, or otherwise treat *all possible ideas* related to any subject, problem, thing, or other idea.

The reference to "all possible ideas" might seem pretentious, but to some extent it really speaks of an *ideal goal* of ideonomy, rather to a thoroughness that is practically or directly attainable. On the other hand, there are mechanisms and means in ideonomy for very often achieving, or drawing surprisingly close to accomplishing, this goal on a finite basis. This will become apparent as one's picture of the new science grows.

The "laws" of ideas may simply be general patterns or significant regularities that, as such, have a somewhat law-like nature.

When a science is young or newly born, its scientific status is necessarily weak. Such laws as it might lay claim to will be crude,

approximate, and tentative, and perhaps more nearly of the character of principles, rules, or speculative postulates. The exception will be more finished laws imported from sciences already existing.

This juvenile status will apply, not just to the laws of the science, but to the subject as a whole. Sciences are born from something rather less than science. They are the unappealing product of unorganized facts, of a turgid and amorphous cloud of voiceless intuitions and half-formed ideas. Their entrance into the world may be guided and superintended by a bright vision, and encouraged by conditions in the general environment that are favorable and timely.

It is a wise world that does not judge too harshly of its young. It is well to wait a bit to see what will develop, and even to assist a new arrival in its trial steps. This is especially true where the infant is *so* unusual that it promises to be something altogether different.

About the Name

Supposedly the word ideonomy was first coined by the French Encyclopedists, and they, too, are said to have used it to designate a science of ideas. What is unclear is whether these men made any actual contribution to the building of ideonomy, especially in the present sense. Perhaps they simply employed the word as a synonym for logic, pantology, philosophy in general, or philosophy applied to creative or social purposes.

Ideology, in its original meaning, was the science of ideas; and the first definition of it given by *Webster's Third* is, "a branch of knowledge concerned with the origin and nature of ideas".

But tragically, from the present standpoint, the word eventually came to be used mainly in quite different ways, to refer to generic or particular doctrines or world views, and especially to sociopolitical programs, often of an extremist character. These things are virtually antithetical to what is meant by ideonomy, and, in fact, one hope in founding ideonomy is that it will sooner or later function as something of an antidote to the many petty, obnoxious, irrational, idiosyncratic, and heinous ideologies that flourish in and pollute contemporary civilization. Whereas ideologies typically offer simplistic pictures of reality whose main effect is to shut the human mind down, ideonomy by contrast represents a perpetual search for ever more universal, fundamental, and transcendent laws of ideas, the effect of which is to progressively divest the mind of all prejudices.

Perhaps if ideonomy develops into an accepted and successful science, the ideonomic community—with the ease of future telecommunicational technology—will one day vote to rename the field by restoring the much-to-be-preferred word ideology to its original meaning. The word ideonomy could then continue to be used within the science of ideas, but in the more narrow sense of referring simply to laws of ideas or to the study thereof.

Ultimate Purview of Science

That which can be treated scientifically is not fixed, but rather expands continuously over time. Things that previously were always beyond the reach of scientific method, or that no one had thought to treat scientifically, have either abruptly or gradually, but at the right historical moment, become the subject matter of a new science, or of an old science given added power.

The set of remaining things not amenable to the methods of *any* scientific specialty has at the same time always shrunk proportionately. The overall process could easily be extrapolated, causing one to arrive at the qualitative conclusion that eventually, and at a point not so distant in our future, all (at least *all known or familiar*) categories of things and phenomena will at last succumb to the evolving engine of science.

Someone sufficiently clever might even find it to be possible to make the great extrapolation not merely qualitative but also quantitative, by affixing some actual date to the time in the future when this expansion and engulfment is apt to have been essentially completed. Probably this universal milestone will be attained somewhere in the second half of the twenty-first century.

Let it be emphasized that what is being predicted here is not in any sense the final end of scientific discovery (indeed, the concept of such an end may even be meaningless for the sort of infinite process that the scientific adventure is likely to represent); but rather a day and age when there will no longer be major exceptions to the universality of scientific inquiry and capability.

The last great category of natural phenomena to surrender itself to the rigorous investigatory methods, tools, and goals of the scientific endeavor may turn out to be *ideas*.

This is a prediction that cannot help but puzzle many people. "Ideas! *Which* ideas?" they will wonder. "Ideas about what? Do not the various sciences already treat ideas? Is that not simply what is meant by theory? Or by the construction of hypotheses? Or by the pioneering speculations of the most imaginative scientists?"

The ideas that are being referred to, however, are *all* ideas. Especially ones that are independent of any single discipline or set of disciplines, and yet that are simultaneously illustrated by and applicable to the treatment of all possible categories of things.

I am afraid that saying this will do little to ease the perplexity of these people. "Either there are no such absolutely universal ideas," they will protest, "or they are few! And even if there *are* any ideas of this sort, then surely they can have almost no abstract or practical importance."

Of course between ideas that would be "absolutely universal" (whatever that might mean) and ideas possessed of the range of generality that is exhibited by the various concepts of today's specialized sciences, there might be any number of intermediate levels of generality of ideas—populated by an unknown number of ideas—and these might be of arbitrarily great importance. Up until now we may have lacked the necessary means, or perhaps the interest or will, to penetrate into and develop this intervening conceptual and cognitive realm, and in its

undeveloped state it may give the illusion of being ordinary, unimportant, and incapable of any special degree or form of development.

What may conceivably be of *supreme* intellectual importance is the discovery or progressive description of a single unified continuum that extends from whatever concepts are of the greatest possible universality to whatever notions are of the least; in other words, the working out of the finite or infinite manner in which ideas of every degree of generality are continuously derived from one another.

Idea of An Idea

Yet what *does* it mean to speak of an "idea"?

Oddly enough, even though ideas are obviously the central theme, or operational 'atom', of ideonomy, the problem of what the fundamental nature and definition of "idea" is—or of what the generic concept or thing "idea" represents—may lie outside the scope of ideonomy itself. The matter might more properly be addressed by such fields as noology, neurology, artificial intelligence, and even philosophy.

Or perhaps the issue really belongs to *meta-ideonomy*, much as the ultimate nature of number, and of mathematics itself, are the natural concern of metamathematics. (When the prefix "meta" is added to the name of a subject, it entitles inquiry into the subject's foundations.)

These questions not only touch on deep, unresolved issues in philosophy, but also suggest an empirical need for the future planning and execution of certain scientific experiments aimed at clarifying the nature of mental phenomena and the mutual relationship of the physical and mental orders.

At the present time it would be as pretentious to ask ideonomy for, as for ideonomy to attempt to furnish, any final or profound definition of "idea".

Of course, an ideonomist whose life was threatened would no doubt say many impressive things. "Ideas," he might announce, "are simply [significant and irredundant] rational [cognitive as opposed to essentially psychic] states [either discrete or quasi-discrete]", "are generic things", "are patterns of patterns", "are all that is higher", "are patterns that regulate thought", or "are transitive mental states."

Ennoia is an Ancient Greek feminine noun meaning idea, concept, or thought. Or etymologically, "a thing within the mind"—which probably is still the most honest definition of "idea"!

A source of confusion here is no doubt a fallacious concern over the assertion that ideonomy is to be the science of ideas. *All* sciences are sciences both of ideas and things, and they investigate the nature and possibilities of general ideas.

Ideonomy differs from other sciences *only in the degree of universality* of its ideas and interests, or in their irreducibility to any field or finite set of fields. A science such as biology is not regarded as less plausible because of the fact that, despite its use of concepts, it is unable to give a rigorous and essential definition of "concept".

Once again, although ideonomy is the science of ideas in general, it is particularly interested in discovering, developing, and using ideas that are possessed of *the greatest possible generality*. In other words, the *more general* given ideas are, the more interest they are apt to have to ideonomy.

At least this is true as a first approximation, since other properties condition the ideonomic interest and importance of different ideas, including the fundamentality, the simplicity and complexity, and the generative and explanatory power of ideas.

Nature of Science

Perhaps the most meaningful procedure to define ideonomy would be to say first what science in general is, and then to specialize this definition.

Science is organized knowledge and systematized inquiry.

It is the rigorous separation of truth from speculation, the methodical distillation of massive appearances and possibilities into the least and simplest realities.

It is the progressive discovery and employment of the most powerful principles of reasoning applicable in general or effective in specific cases.

It is the classification of things into analogous and derived types.

It is the discovery of the practical uses of knowledge.

It is the identification, and fitting together, of the continuities and discontinuities of things.

It is the having of all possible ideas, and their subsequent winnowing on the basis of experimental validation, explanatory power, and practical value.

It is the comprehensive exploration of all of the possible symmetries, combinations, permutations, transformations, evolutions, generalizations, and specializations of things, and the subsequent development of theories representing same in the most compatible, unified, synergistic, necessary, and predictive ways.

Is the ability to make reliable and accurate predictions about things in general.

Although many other things can and should be said in an effort to fully characterize the nature of science, these partial definitions will do for the moment.

To understand what is meant by ideonomy, then, imagine how each of these remarks might apply to *any* particular science, and especially to a science centered on the nature and uses of universal concepts.

By way of illustration, just as chemistry includes organized knowledge about molecules, and biology involves systematic inquiry into the nature of organisms, so ideonomy encompasses organized knowledge of and systematic inquiry regarding ideas.

Suffice it to say that ideonomy embraces any mean, method, concept, or research that might illustrate or contribute to a science of ideas; and therefore whatever enables ideas to be: discovered, described, compared, categorized, criticized, tested, improved, combined, manipulated, changed, boiled down into their essence, diffracted into their

multitudinous possibilities, investigated, communicated, taught, predicted or used predictively, or exploited.

Relations To Other Fields

It is easier to understand ideonomy in the context of other fields, both old and new, to which it bears some analogy.

It should be stressed, however, that although ideonomy is similar to, and in fact often complements and overlaps, these subjects, it is not to be confused with them, for it is easily shown to be a quite distinct and special discipline.

Ideonomy is intimately related to, and yet in many ways the opposite of, **mathematics**. There are powerful analogies, as well as homologies, between mathematics and ideonomy in terms of their structure, concepts, techniques, and purposes. The parallel is especially striking if the central theme of mathematics is considered to be *order* rather than *number*.

Indeed, if mathematics is a superscience of the *quantitative* laws of Nature, then ideonomy may ultimately lead to the emergence of a sister superscience of the *qualitative* laws of the universe or of physico-mental reality.

Philosophy and ideonomy might be thought synonymous, since both could be defined as universal inquiry into the nature and possibilities of ideas. Yet the word philosophy evokes very different pictures in the mind than ideonomy should.

Few philosophers would describe themselves as scientists, and few scientists would credit philosophy with practicing the scientific method.

Philosophy is really a maternal or miscellaneous discipline from which all other subjects originally spring. Ideonomy is itself a child of philosophy.

Logic, ideally the science of reasoning, is more concerned with the processes and products, than with the ideonomic elements, of reasoning. Moreover, the course of its development from Aristotle to the present day has been more idiosyncratic and specialized than what the concept of a science of reason would suggest. Its most advanced branch, formal logic, has been sterile, abstract, and largely useless, at least until very recently.

Noology, or what is currently termed **cognitive science**, is ideally the science treating all the possible forms and laws of intelligence. It is essentially concerned with modeling human and other minds and with fashioning a valid, fundamental, and universal theory of mind and cognitive phenomena. It is to be distinguished from psychology, the science of all actual and possible psyches and psychological phenomena, and the laws and behavioral manifestations thereof.

The related field of **artificial intelligence** is the branch of computer science that endeavors to invest machines with mind and reason, or, ideally, that would create all possible types and degrees of intelligence.

One of the natural subfields of noology should be modeling ideation, and of artificial intelligence the automation of ideation, but for some mysterious reason mere traces of these subfields are all that can so far be found in those disciplines. Yet for this very reason the future emergence of

ideonomy as an independent science should have high interest to cognitive and computer scientists.

Conversely, the methods and discoveries of noology and artificial intelligence will always be of enormous interest to ideonomy.

A field related to both ideonomy and artificial intelligence, but which is now (or in 1990) only a few years old, momentarily calls itself **artificial life**, or **artificial evolution**. Its concern is with modeling and mechanizing, not just mind, but life as a whole or in its essence. The principle that underlies this day-old science is the realization that the fundamental properties of "life" are by no means confined to, but rather are merely illustrated by, natural biology—that in fact or probability they are universal properties of all natural phenomena (transcendental as well as physical), and profoundly applicable to the future design and operation of all technology.

Artificial life is using processes of competition, mutation, recombination, natural selection, and massively parallel computation to enable things such as art, aircraft engines, ant behavior, software, societies, and ideas to *evolve*—to emerge, change, and become better—inside a computer.

The field of **systems science** deals, as does ideonomy, with the organization of large patterns and dynamic processes in a universal and abstract way. But naturally the unit upon which it focuses is essentially just that of a "system", which clearly is a far less general thing than the "idea" of ideonomy. Although systems science at present remains largely systems engineering, which is a branch of technology and a servant of industry, it is starting to become the tool of all the sciences that is its natural destiny.

The subfield, or superfield, of **general systems theory** is closer to ideonomy, but has yet to develop beyond philosophy and dilettantism.

Historical Anticipations

Although Francis Bacon, whom we will discuss below, appears to have had the earliest **general** vision of something like ideonomy, others before him may have glimpsed the possibility of such a science, but failed to pursue or record their 'bizarre dream'.

Certainly in pre-Baconian writings one can recognize in retrospect what could be described as "pieces" of ideonomy, and the operation in circumscribed areas of what were probably ideonomic principles, methods, and concepts. Implicit in ideonomy is a peculiar world view, and there are ancient hints of this also.

I am informed that in the surviving books of the Macedonian-Greek philosopher, logician, scientist, and universalist **Aristotle** (BC 384-322) there is much that is reminiscent of ideonomy. I have not had a chance to confirm this, but certainly it is an intriguing idea that the most seminal thinker in world history, and the man who basically founded classical science, may have had ideonomic thoughts over 2,300 years ago.

The Spanish ecclesiastic, mystic, scholastic philosopher, and poet **Ramon Llull** (or **Lully**) (AD ~1235-1316) interpreted all reality as the

embodiment of some aspect of the divinity, attempted to teach theology, philosophy, and the natural sciences as analogs of one another, and conceived of reducing all of human knowledge to first principles and of determining their convergent point of unity.

His principal work is collectively known as the *Ars Magna* or "Great Art". It includes the books *Arbor scientiae* ("The Tree of Knowledge"), an attempt to classify all knowledge under a unified plan; and *Liber de ascensu et decensu intellectus* ("The Book of the Ascent and Descent of the Intellect"), which describes the stages of intellectual development toward understanding all of existence with the help of his methods for combining ideas.

A summary of Llull's life, work, and influence, "The *Ars Magna* of Ramon Lull", is given by Martin Gardner in his book *Science: Good, Bad, and Bogus* (1981). Gardner lambasts Llull as a mystical fool whose methods, work, and ideas were utterly mistaken and almost worthless. Clearly designed primarily to entertain the public rather than sway the scholar, the sketch unfortunately comes across as prejudiced, superficial, and wholly one-sided.

Gardner is a popular writer on recreational mathematics, and an amateur magician. He is also one of the great and invaluable debunkers of pseudoscience. In this latter capacity, however, he sometimes gets carried away and overreaches himself. Actually, however, a professional cynic is seldom very profound, perhaps because cynicism and profundity are subopposite tendencies of the human mind.

Though Gardner's essay is denigratory and blemished, it happens to be the most substantial treatment of Llull in my possession, and so I will quote it at length here. (*I have edited, rearranged, and slightly added to this material.*)

> In 1274, while fasting on Mount Randa on the island of Majorca, he is said to have experienced a divine illumination in which God revealed to him the Great Art by which he might confound infidels and establish with certainty the dogmas of his faith. He retired to a monastery and wrote the *Ars Magna*, the first of about forty treatises on the working and application of his eccentric method. It was the earliest attempt in the history of formal logic to employ geometrical diagrams for the purpose of discovering nonmathematical truths, and the first attempt to use a mechanical device—a kind of primitive logic machine—to facilitate the operation of a logical system.
>
> Convinced that he had found a powerful weapon for spreading the faith, when combined with rational argument, he spent the remainder of his life in the restless wandering and feverish activity of a missionary and evangelical character. He made endless pilgrimages, seeking the aid of popes and princes in the founding of schools and monasteries where his Great Art could be taught. The esoteric character of his Art exerted a strong magic appeal. Schools and disciples grew rapidly.
>
> Llull was astoundingly prolific, writing over two hundred books (early authorities claimed several thousand), including many polemical, encyclopedic, dialogical, and aphoristic volumes, poetical works such as *The Hundred Names of God*, and allegorical romances. His fiction contains startling and imaginative conceptions that make it an imperishable part of early Spanish literature.
>
> The Great Art treatises apply Llull's (ideonomic) techniques to astronomy, chemistry, chivalry, ethics, grammar, law, logic, mathematics, medicine, military tactics, mnemonics, physics, politics, psychology, rhetoric, theology, zoology, and other subjects.
>
> Essentially Llull's method was as follows. In every branch of knowledge, he believed, there are a small number of simple basic principles or categories that must be assumed without

question. By exhausting all possible combinations of these categories we are able to explore all the knowledge that can be understood by our finite minds. To construct tables of possible combinations we call upon the aid of both diagrams and rotating circles.

For example (*figure 1*)*, we can lists two sets of categories in two vertical columns, then exhaust all combinations simply by drawing connecting lines as shown.

Or (*figure 2*)* we can arrange a set of terms in a circle, draw connecting lines as indicated, then by reading around the circle we quickly obtain a table of two-term (or *dyadic*, in ideonomic jargon) permutations.

A third method (*figure 3*)*, and the one in which Llull took the greatest pride, is to place two or more sets of terms on concentric circles. By rotating the inner circle we easily obtain a table of combinations. In Llull's time these circles were made of parchment or metal and painted vivid colors to distinguish different subdivisions of terms. There is no doubt that the use of such strange, multicolored devices threw an impressive aura of mystery around Llull's teachings that greatly intrigued men of little learning, anxious to find a short-cut method of mastering the intricacies of scholasticism.

One of Llull's ninefold circles is concerned with objects of knowledge—*God, angel, heaven, man, the imagination, the sensitive, the negative, the elementary, and the instrumental.* Another asks the nine questions—*whether? what? whence? why? how great? of what kind? when? where? and how?* Many of Llull's books devote considerable space to questions suggested by these and similar circles. *The Book of the Ascent and Descent of the Intellect*, using a twelvefold and fivefold circle in application to eight categories (*stone, flame, plant, animal, man, heaven, angel, God*), considers such scientific posers as: *Where does the flame go when a candel is put out? Why does rue strengthen the eyes and onions weaken them? Where does the cold go when a stone is warmed?*

Frequently Llull also employed the diagrammatic device of the tree to indicate subdivisions of genera and species. He intended it as both an illustrative and a mnemonic device. His *Principles of Medicine*, for example, pictures his subject matter as a tree with four roots (*the four humors*) and two trunks (*ancient and modern medicine*). The trunks branch off into various boughs on which flowers bloom, each flower having a symbolic meaning (*air, exercise, food, sleep, etc*). Colored triangles, squares, and other Llullian figures also are attached to the branches.

None of Llull's scientific writings added to the scientific knowledge of his time.

From Llull's writings it is clear that he thought of his method as possessing many values: Diagrams and circles would aid understanding by making it easy to visualize the elements of a given argument, would improve memory, and would have rhetorical value; their picturesqueness and mystery would arouse interest, they would help demonstrate logical proofs, and they would facilitate instruction. The method would assist investigation and invention. When ideas were combined in all possible ways, the new combinations would start the mind thinking along novel channels, resulting in the discovery of fresh truths and arguments. And the method was supposed to possess a kind of deductive power.

Although Llull did not regard his method as a substitute for the formal logic of Aristotle, or believe that the mere juxtaposition of terms would provide in themselves a proof by "necessary reasons", he did think that the mechanical combination of terms would enable a person to discover the necessary building blocks out of which valid arguments could then be constructed. Once again, he was convinced that each branch of knowledge rested on a relatively few self-evident principles which formed the structure of all knowledge in the same way that geometrical theorems were formed out of basic axioms, and that by exhausting the combinations of such principles it was possible to investigate all possible structures of truth and so obtain universal knowledge.

Of course there is a *trivial* sense in which the Llullian method of exploration *does* possess a formal deductive character: for if we wish to exhaust the possible combinations of given sets of terms, then obviously the method will do this for us in an irrefutable way. Llull's mistake, in large part a product of the philosophic temper of his age, was to suppose that his combinatorial method had useful application to subject matters where today we see clearly that it does not apply. Not only is there a distressing lack of "analytic" structure in areas of logic outside of logic and mathematics, there is not even agreement upon what to regard as the most primitive, "self-evident" principles in any given subject matter. Llull naturally chose for his categories those

that were implicit in the dogmas and opinions he wished to establish. The result was that most of his proofs were circular.

Such is Gardner's view. What can be said in reply to his criticisms?

Llull lived seven hundred years ago, and so naturally the methods and terms he used, the applications he made of his methods, and the results he got must seem antiquated and faintly ridiculous to us today. But none of this need say anything about the modern or future potential of Llullian methods and their ideonomic supersessors.

Gardner makes use of guilt by association in other ways as well. In his book he attacks Llull's character with all the gusto of a piranha. But would it make sense to expand *Physical Review* in order to cover *ad hominem* arguments and character analyses, or to psychographically reevaluate Newton's theory of gravitation? How is Gardner to deal with the many other, often indisputably great, men who have *also* had Llullian ideas or admired Llull—with Bruno, Leibniz, etc?

Gardner dwells sarcastically on the theological inspirations of Llull's method, and on Llull's rhapsodic and grandiose celebration of its powers and importance and the new vistas which he thought it opened up for humanity. - But what, then, of Newton's theology and alchemy, or the modern but no less wild theologism of a Cantor or Goedel? Were Llull's religious visions more absurd than the visions of the founders of any of the world's great religions? Was not Llull's poesy in style of yore? Does not new science often bring with it grand new perspectives and a rapture of same? And ultimately, is not the *real* question simply that of the validity or feasibility of a Llullian science, since the spectacular things foreseen by Llull would be little more than logical corollaries of the existence of such an *intrinsically* amazing organon?

Obviously there has been much pretentiousness, obscurantism, mysticism, abuse, delusion, error, fraud, and naivete associated with the use, explanation, interpretation, and teaching of the methods of Llull and his disciples, imitators, and cousins. But that was only inevitable, and such problems cannot be used to call into question, or to fault, the methods themselves or the fundamental inspiration that is their fountainhead.

The German-Italian cardinal, mathematician, scholar, experimental scientist, and philosopher **Nicholas of Cusa** (AD 1401-1464) is famous for his doctrine of *learned ignorance*, which held that knowledge of ignorance is the highest form of knowledge. This is resonant with the emphasis given in ideonomy to the systematic investigation and description of all forms of ignorance.

In the Renaissance, the Italian poet, scholar, architect, art theorist, mathematician, cartographer, and cryptographer **Leon Battista Alberti** (AD 1404-1472) wrote a book in which he presented a vocabulary and grammar of architectural form that were meant to function as an engine for the mechanical mass production of diverse architectural designs. Reportedly this specialized ideonomic tool served as the general basis for subsequent Renaissance architecture.

The philosophical father of modern science was Elizabethan statesman, philosopher, and essayist **Sir Francis Bacon** (AD 1561-1626).

Bacon is remembered by posterity primarily for his eloquent advocacy of organized scientific research, the testing of ideas by controlled and scientific methods, and a form of induction termed Baconian in his honor. (*Induction* is the process of reasoning from the partial, particular, or individual to the whole, general, or universal; and *Baconian induction* is the attaining of general statements on the basis of observations, comparisons, and experiments through intermediate generalizations and attention to negative as well as positive instances.)

It was probably Bacon's unprecedented, and at the time no doubt rather puzzling, proposal that there should be established special institutions devoted entirely to the systematic pursuit of scientific and *what we now term* technological research which after his death inspired the founding of the Royal Society, the French Academy, and their countless worldwide mimics over the centuries.

However, it was two contemporaries of Bacon, Italian mathematician, astronomer, and physicist Galileo Galilei (AD 1564-1642) and English physician William Harvey (AD 1578-1657), who first made major *use* of the experimental method.

What is unmistakable to an ideonomist examining the work of Bacon—which represented an ongoing, grandiose endeavor to fashion a new scientific philosophy and methodology—is that it *also* embodied one of the strongest early visions of ideonomy.

Bacon sought to classify the sciences and their contents, to compile principles of reasoning and identify the *ascending and descending scale of axioms*, to name and describe the most fundamental, common, and troublesome errors of logic and practice, to define the first and last objects of research, to circumscribe the permissible categories of phenomena, to call attention to those general instances of things that are the most instructive, to construct a new system of logic, etc. He emphasized the importance of inquirying into nature's [extremes, exceptions, anomalies, transformations, analogies, differences, degrees, perfections, combinations, hierarchies, changes, behaviors, causes, effects, etc]. He spoke of the need for a *Theory of Forms*, by which he meant investigation, knowledge, and exploitation of the *general patterns*, or the *qualitative* mechanisms, of things.

Yet why did the human race subsequently pay the least attention *to the ideonomic elements* of Bacon's magnificent program for future scientific research? One can only speculate.

Perhaps the world only has the patience or credulity to receive a few great ideas from a given individual. Maybe the timeliness and singular glamour of the experimental-inductive method swallowed up the total consciousness of posterity. Possibly the fragmentary nature of Bacon's general program, or his uneven exposition of it, may account for civilization's oversight.

Whatever the reason may have been, this omission has had as its tragic consequence that for almost four centuries now science as we know it has remained profoundly imbalanced and only half-complete: like a monstrous human being the right half of whose body is shapely, vigorous,

and total, while the left half is diminutive, fragmentary, grotesque, and paralyzed.

The quantitative form of science whose great engine is mathematics has evolved exponentially through the centuries to the thing of power and splendor, the paragon of logic and necessity, that we all admire, know so well, and make use of in every facet of our civilization; whereas the qualitative form of science has languished so utterly that we can no longer visualize its possibilities at all and we can only think of it pejoratively.

Yet this unnatural asymmetry in the heart of science poisons its accomplishment, degrades our faculties, warps our world view, and ultimately threatens our survival. It bars the extension of science to other dimensions of our existence and of the equation of human nature.

What sort of things would illustrate what is meant by "qualitative" here? Twenty prominent examples of qualitative things are *Forms, Categories of order, Analogies, Metaphors, Concepts, Logics, Stories, Wholes,* qualitative *Values, Goals, Principles, Niches, Methods, Models, Paths, Rules, Errors, Types, Complexities, and Theories.*

Such things are essentially only dealt with indirectly by modern, quantitative science.

Science is capable of taking many different but equally valid courses over history. However, if it has continued uninterruptedly in a single direction or on the basis of a single method for centuries, or since its inception, then an overwhelming illusion will exist that it could not have taken any other course in the past and that it cannot have any other form in the future.

Careful thought is capable of revealing the existence of this illusion and it can acquaint one with radically different forms and methods of science that are also possible.

Thus it can be imagined how, five-hundred years ago, logic and not mathematics could have been established as the basis for the subsequent development of modern science. The logic referred to might have been what we think of as formal logic, or else Boolean or symbolic logic, or some other system of logic. But as a result of this substitution, the relationship between logic and mathematics that obtains today might have been inverted, so that mathematics would seem to us absurdly abstract, fallow, and irrelevant, whereas logic would be a brilliant, sophisticated, eminently practical and productive instrument used constantly to predict, describe, and control things!

Similarly for the past half-millennium the style of science has emphasized convergence, exclusion, certainty, simplicity, limitation, specialization, regularity, and division *above all.* Yet it is possible to imagine it having pursued instead quite the opposite course, by having constantly sought, emphasized, and exploited divergence, inclusion, uncertainty and ambiguity, complexity, extension, generalization, irregularity or anomalousness, and unification. Although at first one would think the latter course irrational and contradictory to the essence or possibility of science, upon reflection one realizes that both courses could be equally systematic and result in comparably consistent, meaningful, predictive, and useful forms of science.

The distinction suggested above between ideonomy as qualitative—and mathematics as quantitative—science was of course a crude one. That it is not entirely valid is shown by the case of topology, a subfield of mathematics whose concern, *in a sense,* is wholly qualitative rather than quantitative. At the beginning of the twentieth century topology was treated as being just pure mathematics with little application to the physical *or practical* world, but now as we approach the twenty-first century the status of topology has changed drastically and it is regarded as an immensely utilitarian subject with a great deal to say about the physical and everyday world.

But let us return to the subject of the historical anticipations of ideonomy.

The German philosopher, logician, mathematician, scientist (physicist and geologist), historian, linguist, and theological writer **Gottfried Wilhelm von Leibniz** (AD 1646-1716) is regarded as one of the

greatest universalists of all time. Sometime before the age of 20 he appears to have had a magnificent vision of a universal system for reasoning whose creation would revolutionize human intelligence and civilization. Unfortunately it is not clear from his writings what the nature of this revelatory system would have been. Not only is their treatment of the subject ambiguous and incomplete, but they articulate a vision of several different systems or subsystems.

No doubt the calculus and logic which Leibniz did succeed in giving to the world were elements of his grand mystical vision. But I believe that they were much the lesser part, and that what the youthful Leibniz really saw in an unresolved or unretainable intuitive flash was an ideonomic system such as that which inspired, and which is initiated in, this book.

Another ideonomic element in the work of Leibniz was his espousal, formulation, and use of general principles concerning both necessary and factual (contingent) truths and able to guide and discipline reason.

Examples were his principles: Of identity, Of the best, Of sufficient reason, Of individuation, That everything possible demands to exist and will exist unless hindered, That activity is essential to substance, That a thing remains in its own state unless there is a reason for change, Of continuity, That every every action involves a reaction, Of the equality of cause and effect, Of maximum variety, That everything is everywhere the same, yet everywhere varied, Of maximum determination.

Deceptively simple scientific and cognitive principles like this can be remarkably powerful. Ceaselessly and universally, they can lead to new discoveries and wiser thought and action.

The Irish poet, wit, critic, churchman, and political pamphleteer **Jonathan Swift** (**AD 1667-1745**) gave us the brilliant satirical novel *Gulliver's Travels* in 1726. In Part 2, Ch. 5, Gulliver tells of an episode that occurred during his visit to the floating island of Laputa, when he was being given a tour of the Grand Academy of Projectors in Lagado by its warden. All of the five hundred or so rooms of this academy (an institution whose creation was clearly inspired by Salomon's House in Bacon's *New Atlantis*) were occupied by "projectors", individuals whose collective job it was to essentially reinvent the world. The first such projector encountered, for example, had been working for eight years on a project to extract sunbeams from cucumbers, which were to be put into hermetically sealed vials and released in raw inclement summers to warm the air. Another researcher exhibited an unpublished treatise he had written on the malleability of fire.

Eventually Gulliver was brought to that part of the Academy where the projectors in speculative learning resided.

> The first professor I saw was in a very large room, with forty pupils about him. After salutation, observing me to look earnestly upon a frame, which took up the greatest part of both the length and breadth of the room, he said perhaps I might wonder to see him employed in a project for improving speculative knowledge by practical and mechanical operations. But the world would soon be sensible of its usefulness, and he flattered himself that a more noble exalted thought never sprang in any other man's head. Every one knew how laborious the usual method is of attaining to arts and sciences; whereas by his contrivance the most ignorant person at a reasonable charge, and with a little bodily labour, may write books in philosophy, poetry, politics, law, mathematics, and theology, without the least assistance from genius or study. He then led me to the frame, about the sides whereof all his pupils stood in ranks. It was twenty foot square, placed in the middle of the room. The superficies was composed of several bits of wood,

about the bigness of a die, but some larger than others. They were all linked together by slender wires. These bits of wood were covered on every square with paper pasted on them, and on these papers were written all the words of their language, in their several moods, tenses, and declensions, but without any order. The professor then desired me to observe, for he was going to set his engine at work. The pupils at his command took each of them hold of an iron handle, whereof there were forty fixed round the edges of the frame, and giving them a sudden turn, the whole disposition of the words was entirely changed. He then commanded six and thirty of the lads to read the several lines softly as they appeared upon the frame; and where they found three or four words together that might make part of a sentence, they dictated to the four remaining boys who were scribes. This work was repeated three or four times, and at every turn the engine was so contrived that the words shifted into new places, as the square bits of wood moved upside down.

Six hours a day the young students were employed in this labour, and the professor showed me several volumes in large folio already collected, of broken sentences, which he intended to piece together, and out of those rich materials to give the world a complete body of all arts and sciences; which however might still be improved, and much expedited, if the public would raise a fund for making and employing five hundred such frames in Lagado, and oblige the managers to contribute in common their several collections.

He assured me, that this invention had employed all his thoughts from his youth, that he had emptied the whole vocabulary into his frame, and made the strictest computation of the general proportion there is in books between the numbers of particles, nouns, and verbs, and other parts of speech.

The Swedish scientist, philosopher, theologian, and mystic **Emanuel Swedenborg** (AD 1688-1772) seems to have been animated by a partially ideonomic vision throughout much of his life. Of course, an undifferentiated mystical vision is one thing, and the visualization of an operational scientific system quite another.

Swedenborg was deeply interested in the hierarchic and cosmological relationships between the finite and the infinite, as well as in the possibility of developing a language interlinking the two. For him natural phenomena were symbolic (anagogic) and had correspondences in higher realms; they were infinitely meaningful, and represented tools facilitating the infinite ascent of the mind.

The writings of the English philosopher, economist, and jurist **Jeremy Bentham** (AD 1748-1832) might be described as ideonomic, if only because of their painstaking elaboration and classification of innumerable logical and semantic distinctions and possibilities, having practical import, and the lists they construct and employ for this purpose. They have an ideonomic flavor, in other words.

In the year 1852 the English physician and philologist Peter Mark Roget (1779-1869) brought out the first edition of his Thesaurus of English Words and Phrases; Classified and Arranged So As To Facilitate the Expression of Ideas and To Assist In Literary Composition.

The scheme of organization which Roget followed in his book was set forth in a prefatory "Plan of Classification" and a "Tabular Synopsis of Categories". The revolutionary feature was that the major and general concepts that form the perpetual basis of human thought and communication were assembled for the first time in something like their (known and named) totality in one hierarchic, pyramidal, and cognitively neutral classification. In short, Roget took the far-flung and secularly disintegrated English language and began to rationalize it by means of universal concepts and a single self-explanatory tree of analogical and homological meanings.

Linguists who subordinate words to ideas, whose work is consecrated to the illumination of the natural order of ideas, for whom language is primarily a tool of thought, and whose grail is the perfection of that tool—linguists such as Roget, in other words—are entitled to be considered ideonomists. They are to be contrasted with the tribe of linguists who are not ideonomists, for whom ideas are secondary to words, syntax, rhetoric, human habits, communication, bits of information, logical mechanics, literature, or biological or physical phenomena. The latter category of linguists vastly outnumber the former: whence the nobility of Roget.

All of the men I will discuss in the remainder of this compact history lived on into the twentieth century. About almost all them I will have even less to say than what I said about the preceding set of individuals.

The reasons for my brevity here are several. I am not an historical scholar, and I possess no flare for biography. Hopefully in the future persons more able than I will research and present an expanded, deeper, and more systematic account of the ideas, methods, individuals, and movements of thought that ultimately led to the establishment of a science of ideas. About the persons I refer to I have in many instances read a great deal, but this reading for the most part occurred many long years ago, before the idea of ideonomy had crystallized in my mind and the importance of making notes and marking passages was evident. Passages in the writings of these persons, and of writings about them, do exist where the anticipation of or relevance to ideonomy is unmistakable and often extensive. Yet alas, I am unable to recollect the exact whereabouts of these remarks.

The bareness of my commentary is also to be explained by the little time I have to search through my library and files so as to rediscover such passages, relative to the demands of the rest of my writing and research program. Nor would it suffice to merely re-unearth the passages and my notes, because minimal scholarly and scientific standards would also require that I conduct a larger study of the works of these individuals, in part for the sake of accuracy, personal understanding, and completeness. In a sense, to do or undertake more would simply mean that I would really accomplish less.

It is to be hoped that in future editions of this book my historical and biographic pictures will have more detail and authority.

The American scientist, mathematician, logician, and philosopher **Charles Sanders Peirce (1839-1914)** was a co-founder of semiotics, which Webster's Third defines as "a general philosophical theory of signs and symbols that deals esp. with their function in both artificially constructed and natural languages and comprises the three branches of syntactics, semantics, and pragmatics". The parallel to ideonomy is obvious enough, although the implicit emphasis upon "language" has the effect of reducing the synonymy of the two subjects.

I have always felt a general intellectual closeness to Peirce that would be hard to explain, but not only in his semiotics but in his logic and philosophical cosmology are to be found countless doctrines and statements that have almost exact counterparts in my own past work, and much of this relatedness is pertinent to the origins of ideonomy. Not in a direct sense, however, for my ideas were not inspired by those of Peirce.

Ideonomy represents an outgrowth of my earlier philosophical writings, and of my philosophy of nature, the Efflorescent Worldview. In this work will be found equivalents of Peirce's notions about the open-endedness of the universe, because of the creative role of chance, the organic and evolutionary character of physical and mental reality, the centrality of triadic processes in the structure and genesis of reality, the inexhaustible logical unity and continuities of physico-mental reality, the unexpected role of value (e.g. of human meaning and aspiration) in the determination of "physical" reality, etc.

The German philosopher, philologist, cultural critic, and poet **Friedrich Wilhelm Nietzsche (1844-1900)** certainly did not anticipate ideonomy in any sense in his work, and his inclusion here must seem puzzling. My reason for mentioning him lies in various qualities of his style of writing, and in particular, in the uncanny complexity and contradictoriness of his ideas and of the ways he expressed them. Nietzsche has few rivals in the nearness to which he drew to the infinite logical complexity of appearances, possibilities, language, and realities that is the experimental and empirical world view of ideonomy.

Little known is that Nietzsche also developed an epistemology that held that everything represents a sort of projection or transformation of everything else, a doctrine that is also resonant with the ideonomic point of view.

The Anglo-American mathematician, logician, philosopher, and educationalist **Alfred North Whitehead (1861-1947)** is simply included here because of his philosophy of nature. Whitehead emphasized the infinite qualitative and phenomenological richness of the universe, its organic and partly mental character, the centrality of process and transformation, the infinite richness and power of logical relationships, the essentiality of imagination and emotion in the construction of a valid picture of the physical world, the interdependence of perception and truth, and the importance of systematic cosmology and of the evolution of ideas.

Whitehead sought to construct a system of logic out of projective geometry, in which experience would in a sense be primary (something which reminds one of what was just said of Nietzsche).

Yet another pertinent philosopher was the German-American **Arthur Oncken Lovejoy (1873-1962)**. Lovejoy advocated research into the historiography of ideas. This would study the inception, presence, influence, evolution, transformation, mistreatment, interaction, nature, and propagation of general ideas across human history and in very diverse provinces of thought and different periods.

Ideas which Lovejoy himself treated in this novel scholarly way included romanticism, evolutionism, naturalism, and primitivism.

He wrote[1]:

"The history of individual ideas as such—or the ideas entertained by men on individual questions which have seemed to them significant—is in great part still to be adequately investigated...

"There are ... many 'unit-ideas'—types of categories, thoughts concerning particular aspects of common experience, implicit or explicit presuppositions, sacred formulas and catchwords, specific philosophic theorems, or the larger hypotheses, generalizations or methodological assumptions of various sciences—which have long life-histories of their own, are to be found at work in the most various regions of the history of human thinking and feeling, and upon which the intellectual and affective reactions of men—individuals and masses—have been highly diverse...

"Through" such study, "the study of the (so far as possible) total life-history of individual ideas, in which the many parts that any one of them plays upon the historic scene, the different facets which it exhibits, its interplay, conflicts and alliances with other ideas, and the diverse human reactions to it, are traced out with adequate and critical documentation, with analytical discrimination, and, finally, with imagination—through this, I am persuaded, are to be disclosed many facts which throw into fresh perspective, and thereby invest with heightened interest and greater intelligibility, facts in other branches of intellectual history which, lacking such perspective, sometimes appear dull, unrelated, and more or less incomprehensible..."

The historiography of ideas "is still, I think, barely in its adolescence..."

In the writings of the American architect, mathematician, engineer, inventor, futurist, polymath, philosopher, poet, and gadfly **Richard Buckminster Fuller (1895-1983)** is to be found a style of discourse (of speech, writing, and thought) with which an ideonomist cannot help being sympathetic.

Conventional reality is reseen in terms of evolving and transcendental patterns that are exemplified by, and which unite, all fields, in terms of infinitely relativizing processes, and in terms of a dynamical geometry of thought (which once again makes one think of Whitehead, Nietzsche, and Leibniz).

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1. Arthur O. Lovejoy, his book Essays In the History of Ideas (1948, 1960).

The most wonderful thing about Fuller's work is its power to make one rediscover the world, its history, and its future from the vantage point of myriad, novel, and higher ideas—or to cause one to see reality in its totality as meaningful, connected, and necessary.

The Anglo-American banker, physicist, philosopher, and inventor **Lancelot Law Whyte (1896-1972)** sought unitary forms, patterns, laws, principles, and goals, and a new language based on them for advancing man's picture of reality and the sanity of civilization.

With the Bulgarian-Swiss-American astronomer, physicist, engineer, and ideonomist **Fritz Zwicky (1898-1974)** we arrive at the grandfather of ideonomy.

During the early 1930s, at California Institute of Technology, Zwicky contributed substantially to the physics of the solid state, gaseous ionization, and thermodynamics but soon turned to the study of supernovae, novae, and cosmic rays. By 1942 he began to develop a prototypal form of ideonomy that he later spoke of as "morphological research". Zwicky was using morphology in a continental European sense, little known to Americans, which designates the study of the structure or form of anything whatever, including abstract relationships or ideas, or any subfield or specialization of same.

The ideonomy of Zwicky was not just a philosophical vision. It was a practical methodology for solving real problems in science and life, accompanied by a philosophy of this methodology articulating its foundations, uses, and implications.

Zwicky wrote many books presenting and applying his methodology. Ironically, he is now famous as an astronomer—thanks to ideas he had as a result of using his ideonomic techniques, and the posthumously continuing confirmation of the predictions he made based on those ideas—but largely forgotten as a morphologist (ideonomist).

Actually his philosophy and methodology does continue to have exponents in astronomy, as well as engineering, but only on a very modest scale.

During his lifetime a Society for Morphological Research was founded in the United States.

I am told that in his native Switzerland Zwicky is a nationally celebrated figure. There is a Zwicky museum and a Zwicky foundation. The collected works of Fritz Zwicky are being published in a series of volumes and someone has written a huge biography of the scientist; unfortunately these books are only available in German.

No comprehensive or wholly satisfactory definition of "morphology" (as Zwicky once abbreviated his methodology) exists anywhere in the English writings of Zwicky. No doubt this was partly do to the open-ended nature of the field and Zwicky's methodological and philosophical additions to it over his life. He also probably regarded it as an avocation (if only because this neglect was made necessary by the insupportability of research in an unrecognized discipline).

Certainly there was an indeterminacy in his treatment of morphology. Sometimes he discussed it in the narrow sense of those few methods upon whose development and use he had concentrated in his own work, but other times his conception of the methods and purposes of the future field seemed to be more embracive and encyclopedic, and hence more suggestive of my own version and vision of ideonomy.

I will furnish a series of quotations from Zwicky's 1957 book Morphological Astronomy to give a sense of what he meant by morphological research:

"We shall call morphology the study of the basic patterns of things. Morphology, we claim, is going to be the prime symbol of the activities of modern man in the near future...

"The morphological mode of thought and action was conceived to break the vicious hold which the parasitic wild growth of complications exerts on life in all of its phases. Morphological thought and action are likely to be of value in all human activities, once such thought and action have been clearly delineated and fully developed, and once they have been practised by a sufficiently large number of people...

"The morphological method always attempts to attain the most general perspective. It seeks to furnish tools for total research in which no stone is left unturned and all selectivities are avoided...

"As a formalized tool of research the morphological method deals with the following three generic problems.

"a) What is the totality of possible solutions of a given problem? For instance, one may look for a general formula which gives all the prime numbers between 1 and n.

"b) What information can be gained with respect to the solutions of a given problem if not all but only a limited number of means of investigation are available? For instance, which regular polygons can be constructed, if only compass and straightedge can be used, while all other devices are excluded? The answer is that not all polygons can be constructed. While the triangle, quadrangle, pentagon, hexagon, octagon and decagon can be obtained, the regular septagons and nonagons cannot be constructed with compass and straightedge alone.

"c) Which means or devices are necessary as a minimum if one wishes to analyse all of the characteristics of a given phenomenon? For instance, how many devices are necessary to trisect a general angle? Such trisection, as is well known, cannot be achieved with compass and straightedge. But it can be done with a straightedge and a trisectrix curve.

"Basically these three problems are, of course, all of the same type. In order to solve any of them by the morphological method one may proceed as follows.

"I. The problem to be solved must be clearly formulated.

"II. All of the parameters which might enter into the solutions of the given problem must be analyzed.

"III. A generic 'morphological box' is constructed which contains all the possible solutions. This box is a multidimensional space or aggregate whose axes correspond to the various determining parameters...

"IV. The usefulness of all solutions in the morphological box is examined through a determination of their performance values. Performance can, of course, only be judged in the light of some desirable purpose. Prior to the estimate of the usefulness of the solutions available there must thus be established a realm of values. The morphology of values consequently becomes of importance and must be studied before one can judge the usefulness of any solution to any problem. Once the purpose to be achieved is decided upon, the performance value of various solutions of a given problem may be

graphically represented in so-called topological performance charts...

"V. Morphological thinking leads to the conviction that all solutions of a given problem which are derived by the morphological method not only can be constructed, but that under given circumstances every solution has its good use... This means that for the morphologist the realization and construction of some or all of the solutions of various problems which he has derived becomes a matter of course. Morphological thinking consequently is concerned with both analysis and construction, which are inextricably related to one another...

"Morphological thinking has previously been applied by modern science in many special fields but it was strictly formulated only recently. Some of the results achieved during the past century are the morphology of the possible classes of crystals; the morphology of the possible geometries and algebras; the morphology of the totality of the solutions of certain differential equations. The periodic system of the chemical elements, the knowledge of the possible states of the atoms and the transitions between them are examples of what the morphological method attempts to achieve, not piecemeal but through large scale systematic operations.

"Without formulating it, FARADAY in a masterful way applied morphological thinking to all his problems. Instead of losing himself in the investigation of this phenomenon or that, he occupied himself with the interrelations among all phenomena. Instead of viewing the world of physical happenings in the light of causal chains, that is, sequences of cause and effect, he explored the ties between coexisting aspects of nature. In visualizing the various fields which involve space, time, kinematics and dynamics, heat, electricity, magnetism, optics, chemical reactions and gravitation he searched for the bonds between them and he set out to investigate them systematically...

"The alchemists were searching for the imaginary philosopher's stone which would transform base metals into gold. In the morphological method may well reside the sought for magic of the philosopher's stone to turn much of what it touches into gold."

The Austro-Canadian biologist **Ludwig Von Bertalanffy (1901-19)** was the originator of General System Theory. It is said of him as a biologist that he "enlarged the idea of homeostasis (the maintenance of equilibrium) in biology to a dynamic concept of cells, organisms, and populations."

A system in physics and chemistry is defined as "any arbitrarily specified portion of matter under consideration, containing one or more substances in definite quantity and separated from the surroundings—the rest of the universe—by a recognizable boundary."

A systems engineering approach differs from a conventional design approach by the greater generality of its basic logical framework, and a greater concern with the fundamental objectives to be achieved.

The systems of systems science tend to be large and complex patterns of organization of phenomena, whose component parts interact so extensively that a change in one part is apt to affect many others. These systems may exist in a stochastic or partly stochastic environment, and yet they display characteristic regularities that transcend such variations or adapt to considerable perturbations.

Systems have also been defined as wholes or models, things to which they are certainly related.

The boundary of a system spoken of above need not be a simple, static, spatial one, but rather may be highly complex, abstract, and variable over time.

The systems view of nature emphasizes process, flow, the helpful partial divisibility of the universe into dynamical compartments that may combine hierarchically at different levels and horizontally as networks that are equivalent to mechanisms, and the tendency of arbitrary collections of things to exhibit emergent behavior and general laws.

What Bertalanffy essentially means by General System Theory is the maximal possible generalization of the concept and science of systems, and the treatment of systems mixing and transcending all fields, combining many different systems, showing the most complex systemic behavior, and extending even to mental phenomena and the world of abstract ideas.

Among the areas in which he foresees developments that should contribute to the emergence of General System Theory over the future are: cybernetics, information theory, game theory, decision theory, topology or relational mathematics, and factor analysis.[1]

"General system theory", Bertalanffy has written[2], "should further be an important regulative device in science. The existence of laws of similar structure in different fields makes possible the use of models which are simpler or better known, for more complicated and less manageable phenomena. Therefore general system theory should be, methodologically, an important means of controlling and instigating the transfer of principles from one field to another, and it will no longer be necessary to duplicate or triplicate the discovery of the same principles in different fields isolated from each other...

"The number of simple mathematical expressions which will be preferably applied to describe natural phenomena is limited. For this reason, laws identical in structure will appear in intrinsically different fields. The same applies to statements in ordinary language; here, too, the number of intellectual schemes is restricted, and they will be applied in quite different realms..."

Principles "such as those of wholeness and sum, mechanization, hierarchic order, approach to steady states, equifinality, etc., may appear in quite different disciplines..."

Addressing future tasks of General System Theory, he remarked that "the principles holding for any type of systems would have to be further developed. This is a concrete problem. For example, demographic dynamics may be developed homologous to mechanical dynamics... A principle of minimum action may be found in various fields, in mechanics, in physical chemistry in Le Châtelier's principle which, as may be proved, is also valid for open systems, in electricity as Lenz's rule, in population theory according to Volterra, etc. A principle of relaxation oscillations occurs in physical systems as well

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1. Ludwig von Bertalanffy, his book General System Theory; Foundations, Development, Applications (1968).
2. Ibid.

as in many biological phenomena and certain models of population dynamics. A general theory of periodicities appears as a desideratum of various fields of science. Efforts will therefore have to be made toward the development of principles such as those of minimum action, conditions of stationary and periodic solutions (equilibria and rhythmic fluctuations), the existence of steady states, and similar problems in a form generalized with respect to physics and valid for systems in general."

There have in fact been extraordinary strides in such directions in the 22 years since Bertalanffy made these observations, and such general patterns have increasingly come to light.

Anglo-American anthroplogist **Gregory Bateson (1904-1980)** believed, as someone said, that "the mental system that governs how we think and learn is the very same sort of system that governs the evolution and ecology of all life on earth." Bateson himself wrote that, "Insofar as we are a mental process, we must expect the natural world to show similar characteristics of mentality."

Bateson's view was that the investigations of mind and of biology or nature should be pursued as though they were essentially an inquiry into the same phenomenon or into its diverse and interwoven processes and manifestations.

Books of Bateson such as his Mind and Nature: A Necessary Unity (1979) are remarkable for their extreme use of metaphor and analogy to probe and describe nature, in the playfulness and experimentation of their ideas, in the richness of their devotion to high-level concepts and patterns of order, in their flouting of supposed boundaries between varied disciplines, and in their power to make one see new connections and think new thoughts.

They probably give a sense of what a person conversant in the future with a science of ideas may see the world as like.

The voluminous writings of the Argentine-Canadian physicist and philosopher **Mario Bunge (1917-)** have an ideonomic flavor for a variety of reasons.

They make heavy use of lists, and make an attempt to survey and conceive the possible canonical variations upon basic concepts, theories, and hypotheses throughout science and philosophy. Their approach to alternative possibilities is generally remarkably neutral, fair, and insightful, and does not disdain imaginative speculation.

They do not simply enumerate possibilities, however, but rather go on to classify them and to treat them in hierarchical, analytical, synthetic, and to some extent in interactive and combinatorial, ways.

There is constant attention to known or possible mechanisms that underlie the concepts or define their relationships and consequences. Whenever possible, actual physical mechanisms are adduced or considered.

Broad knowledge of science and mathematics is brought into play; a universal picture of nature is attempted.

The Amero-Anglican physicist **David Bohm (191 -)** deserves mention because of his philosophy of nature and mind, which is uncannily similar to my own.

For several decades Bohm has pursued a lonely, pioneering inquiry into the types of order that may exist as the fundamental basis of all of reality. Such investigation is nearly impossible to conduct. Not only

is the land unsurveyed, unvisited, and unknown, but by its very nature it requires for its discovery that the mind of the discoverer be rewritten and given a new logic. Appropriate language for its description does not exist and must be constructed, and itself explained. Yet what one finds, no matter how glorious it may be and often is, will at first mean nothing to other people.

New types of order are far more basic and important than new so-called scientific paradigms, and the revolutions they are apt to effect in science, thought, and civilization may be much grander and more thoroughgoing. Indeed, the conception of a novel category of order may leave the old vision of reality looking foolish and absurd.

A special interest of Bohm's philosophical writings is that they are grounded in, and arise from, a supreme knowledge of physics. Bohm knows and continues to contribute to the most advanced concepts there; he knows what our physical knowledge and ignorance are, what the great problems and mysteries are, and what methods and approaches are the most pertinent and promising. This is important because all ideas ultimately arise from experience and understanding of physical reality and the inexhaustible diversity of physical phenomena.

Abner Shimony once said of Bohm's work (in Nature), that it "conveys a sense of work in progress, which aims at a distantly glimpsed ideal of the unification of all the aspects of the world, and it is refreshingly free from claims that the ideal has already been achieved. The feeling of struggle in Bohm's book" (Wholeness and the Implicate Order) "is its most appealing feature."

There are occasionally valuable, rare hints of ideonomic methods and philosophy in the fictional and nonfictional writings of the Polish-Austrian science-fiction writer, philosopher, and futurist **Stanislaw Lem (1921-)**. A particularly hilarious example occurs in a story in The Cyberiad: Tales for the Cybernetic Age.

Lem also manages to give a sense of the extreme and perhaps infinite possibilities for future science, technology, and civilization that ideonomy constantly brings to light.

It was the present writer's privilege to know as colleague and friend the American mathematician, military strategist, futurist, social scientist, and polymath **Herman Kahn (1922-1983)**. Kahn cofounded and directed Hudson Institute, a public policy think-tank.

Kahn had a love-affair with ideas. His writings are full of myriad lists and charts, my experience with which was the origin of the "organons" that are the central tool of ideonomy. The purpose of these organons of Kahn's was to provide an instant overview of a topic, to define the many properties, concepts, problems, questions, methods, facts, relationships, and possible courses of events that pertain to or can help illuminate a subject or theme, and to stimulate creative thought and discussion.

In the ongoing work of American computer scientist **Douglas Lenat (1950-)** is to be found one of the closest approaches I know of in the field of artificial intelligence to ideonomy, or at least to the automation of ideation.

INSERTS:

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It is said that **John Stuart Mill (1806-1873)**, in an effort to correct what he considered to be deficiencies in the associationist psychology of his father James Mill (who had allowed no creative role to "mind"), ascribed an active role to "mind" and accorded new qualities to complex "ideas" instead of regarding them as merely a summation of simple "ideas." While the father represented the simple "mental compounding of ideas," the son held that "ideas" actually could be changed through "mental chemistry."

\ Methodology
\ METHODS
MDS

A MULTIDIMENSIONAL SCALING VERSION OF "WordSpring"

I often use the term "WordSpring" to refer to the genus of computer programs I have designed, or might yet design, to coin candidate words en masse by means of some form of combinatorial ideonomy; or to designate a specific or particular example of the genus.

Here I will depict a far more powerful, and more truly ideonomic, version of WordSpring that it would be easy to create with the help of nonmetric multidimensional scaling (MDS)[1]. Although at the time I write this I have not actually implemented such a sophisticated program, my experience to date with the methods it would employ assures its feasibility.

Nevertheless, many modifications of my account would no doubt be necessary and desirable, and it is impossible to anticipate the exact quantitative dimensions of the computer hardware and software that would optimal or appropriate, or the precise level of efficiency that given or lesser versions of this WordSpring would be expected to display.

What is obvious to me is that, as is true for almost any ideonomic computer program, a WordSpring program permits innumerable refinements, and types and taxons of types of refinements. Today's vision will be tomorrow's conceptual antique.

One of the simplest WordSprings attaches prefixes or prefixual combining forms, or adjectives or other words qua prefixes, to words, to suggest new words. The prefixes may be ones that have traditionally been recognized, or that the dictionary identifies, as being prefixes, or new prefixes formed, either previously in ideonomy or ad hoc, by conventional or unconventional modification of Ancient Greek or Latin, English, or other words.

The sets of prefixes and of words to be combined may initially be chosen at random, through their special pertinence to some theme or topic, or because of their being perceived as having greater ideonomic or generic character, conceptual purity, combinatorial power, logical or natural fundamentality, or cognitive value.

The actual basis for the subsequent combination of the linguistic elements in these preselected or predetermined subsets may be random (or stochastic processes), previously structured or ad hoc human judgment, grammatical rules or habits, classification by formal logic, psychometric or ideometric statistics, artificial-intelligence techniques, e/vc.

Assume that the WordSpring computer program to be extended via MDS is one that hitherto has combined at random and comprehensively such prefixes of or derived from Ancient Greek and Latin as lito- (meaning simple, frugal, or plain) or holico- (meaning general or universal), with such common or technical English words as volcano and immunogenesis, to yield such tentative words and word-senses as: lito-volcano (a simple, frugal, or plain volcano) and holico-immunogenesis (general or universal immunogenesis).

Notice that each prefix, and each artificial word, has several potential senses that are explicitly defined.

In practice a professional or lay ideonomist would be expected to examine the partial or exhaustive printout or on-screen list produced by this WordSpring in order to do such things as interpret, define, "anti-define" (circumscribe the meaning of), compare, differentiate, classify, illustrate, justify, criticize, rank, transform, perfect, winnow, and synthesize the many different neologisms.

To enable this WordSpring to make use of nonmetric MDS, its terms-to-be-combined would have to be prepared in advance by some suitable, literal or virtual 'weighting' procedure.

Such a procedure could be an Asynchronous and Dyadic Scaling MDS method that, say initially for the prefixes, would ask some such Recurrent Scaling Question as: "On a 9-point scale (of 1-9), how well does the (polar) prefix, X, work with the word Y?" (The coinage, even its candidate subsenses or alternative senses, could be shown on the computer screen simultaneously or optionally.)

Alternatively, the question might simply be one with a binary answer, or a question to the effect: "Does it (the prefix X) work with the word Y: Yes or No?"

The multi-point scale would of course represent an intuitional form of metric scaling, with the implicit metric presumably not formalizable in advance, and perhaps not even later. The reason why I suggested a 9-point multi-point scale is that it enjoys a simple symmetry much recommended by practice and experiment:

A SCALE OF 9 DEGREES:

1 'Minimally' 2 3 'Poorly' 4 5 'Moderately' 6 7 'Well' 8 9 'Maximally'

The procedure is called "asynchronous" because the things scaled are not scaled all at once, or synchronously, but rather piecemeal, in a disaggregated form by an iterative process. By contrast, the standard nonmetric MDS method asks one to simultaneously rank-order, say for mutual analogousness, all of the things that are to be scaled (or at least, that are to be antecedently, and determinatively, valuated).

The asynchronous procedure is specifically termed "dyadic" because each iterational step compares only two qualitative elements: referent (the polar prefix X) and relatum (the word Y). The quantitative elements represent the so-called valence of the dyadic formulas: the 9-point question represents a nonavalent dyadic formula, the yes-no question a bivalent dyadic formula.

(This terminology, incidentally, is at once peculiar to ideonomy and tentative.)

Once this first dyadic question was asked and answered, the computer would substitute another word at Y (or replace Y_1 with Y_2) while temporarily retaining the initial polar prefix at X (or prefix X_1), and the person doing the scaling—the scaler, if you will—would enter into the computer his next decision, thereby relating the same prefix to a second word.

Let us say that there are 100 such words to be scaled in this way. These are referred to as the Recurrent Set of Scaling Monads (they are monads, of course, because each is constituted of but one qualitative element). For each polar prefix, then, the computer would uninterruptedly run through the same 100-word Recurrent Set of Scaling Monads.

Subsequently it would exchange polar prefix X_2 for X_1, and ask another one-hundred questions, of the same generic form.

These polar exchanges of prefixes would continue until the last polar prefix, X_n, was fully treated by the 100-word Recurrent Set of Scaling Monads.

Were there to be one-hundred such polar prefixes, as well, so that $n = 100$, the human scaler would of course find himself asked to supply 10,000 answers to 10,000 questions (from 20,000 potential answers in the bivalent "Yes/No" case or from 90,000 potential answers in the nonavalent "Minimally ··· Maximally" case).

The 10,000 answers might be stored on a computer spreadsheet in a 10,000-cell area representing a table of one-hundred columns (representing the one-hundred polar prefixes) and one-hundred rows (representing the one-hundred-word Recurrent Set of Scaling Monads). The 10,000 decisions might be stored in binary notation (say with "Yes/No" converted into "1/0") or nonary notation (say "0/1/2/3/4/5/6/7/8").

The computer would then prepare these tabular data for submission to the cartographic MDS program in the following way.

Each column would be given the same order with respect to the 100-word set of scaling monads to enable the different columns to be cross-compared row-by-row or with respect to each dyadic scaling question, or to determine the absolute sum of the absolute row-wise numerical differences, in the case of all of the possible pairs of columns. The total number of pair-combinations is given by the formula $n!/r!(n-r)!$ For one-hundred columns, there would be several thousand of these bicolumnar distance-sums. Each of these sums would be subtracted from the maximum mathematically possible distance for any pair of columns (which in the bivalent and nonavalent cases imagined above would respectively be 100 and 800). The resulting differences would then represent the intuited overall semantic similarity between each paired column, and hence also between each paired prefix.

This set of prefix-prefix (or inter-prefixual) similarities would then be compiled as a square or triangular table of intuitive data. Such a table could then be submitted to the MDS-mapping computer program or subprogram.

I assumed above, in describing this WordSpring program, that each of the prefixes would be scaled by, or with reference to, no less than one-hundred words qua scaling monads. But this could be characterized as no less than 100-dimensional scaling of the prefixes, and experience has taught me that reliance upon merely half or even a fifth as many virtual scaling dimensions of this sort can produce excellent results. Such parsimony will enormously reduce the labor involved in the intuitive (human) scaling process.

Naturally curtailing the number of "in-scaling" elements or dimensions in this way will tend to lessen the intrinsic ideonomic complexity and possibilities of the data-set and of all treatments of the idea-set that might be derived from that data-set.

(Here I have coined the word in-scaling to serve as an adjective under the following definition: of, relating to, or being a stage in which things are initially prepared for subsequent actual or more advanced scaling, say by being intuitively or objectively quantified, weighted, or rank-ordered; and as a noun meaning: an in-scaling process, stage, or method.)

Once the prefixes were scaled in the above way, or for the ways and degrees in which they "work" with the words, the exercise could, in effect, be redone, but invertedly. The words would now serve as the (temporarily) fixed poles and the prefixes as the recurrent set of scaling monads. Thus the question might be, "...how well does the (polar) word, $\underline{X}_i$, work with the prefix $\underline{Y}_j$?"

This might seem redundant or at least quasi-redundant, with the second exercise being implicit in the first. But it could be argued that it would provide more accurate data about the fundamental relationships, and of course also a test of one's suspicions. There might prove to be only a partial redundancy.

What would be meant in these exercises by the phrase "...how well does ⟨BLANK⟩ work..." may perhaps, or alternatively, be: '...how semantically ⟨meaningful, novel, or ideonomically important or creative⟩ is the candidate neologism formed by the combination of the two elements?'

Or the question could be, '...how related is ⟨BLANK⟩ to ⟨BLANK⟩?'

Actually, the optimal arrangement might simultaneously make use of many such questions and many such scalings.

Conjointly, hundreds or even thousands of maximally diverse (or maximally comprehensive, irredundant, synergistic, e/vc) prefixes and words might be scaled and mapped in this way.

Later the different scalings and mappings might be co-scaled and co-mapped.

The different coinages produced might themselves be scaled and mapped.

The coinages, prefixes, words, and cartographic regions, dimensions, and themes might be scaled and mapped for relevance or fertility with respect to the diapason of alternative generic uses of the MDS WordSpring program.

For example, they might be scaled and mapped for which of them, in connection with either general or specialized things, is judged to be best at suggesting, leading to, or helping with such ideonomic things as: Questions, Criticisms, Uses, Inventions, Interests, Beauties, Meanings, Researches, Values, Dimensions, Ironies, Problems, Effects, Appearances, Assumptions, Changes or improvements, Combinations (with the other things), Mechanisms or causes, Classifications, Interrelationships, etc.

Something else that one might wish to co-scale and co-map into the data above would be the set of corresponding subjects or subfields thereof (e.g. astronomy, biology, art, etc).

One might also want to initially scale the prefixes, words, coinages, etc according to perceived temporal succession (or successivity), in order to enable the computer, alone or in conjunction with a human operator, to iteratively produce co-alternative thought-trajectories. The concept here is that, to some unknown combinatorial 'depth', various reasonable branching paths of words, concepts, or linguistic elements might at every moment be suggested by a computer, as a menu leading one in more useful, elaborate, self-consistent, or mutually defining directions of logic, imagination, or association.

EXAMPLES OF IDEA MAPS PRODUCED BY MULTIDIMENSIONAL SCALING

For anyone first encountering nonmetric multidimensional scaling, the technique can be puzzling. Examples of ideonomic plots made by means of the method need to be seen, studied, and explained. Ideally, the individual needs to try the technique himself.

Here I will present and discuss maps of various sets of ideas. Hopefully this will at least afford a preliminary sense of things to that majority of my readers who are novices in the method.

Really I'm a novice in MDS myself. Although I have considerable experience in using it (as will be seen below), and have recently contributed to its theory and specialization, I am by no means competent in its mathematical bases. There is no contradiction here, even if the situation is unusual. Thus one can understand something logically and intuitively without appreciating it mathematically; and vice versa (as is probably the case with most psychometricians who employ MDS, even on a daily basis). Possibly I am being more honest and precise than is normal (or acceptable).

FACES

I will begin with a simple exercise in which nine faces of persons were intuitively rank-ordered for analogousness to one another, to produce a two-dimensional map (see figure ____).

There is nothing whatever that is new about the exercise or its result, and psychologists have mapped sets of faces in multidimensional similarity space on occasions beyond number. The treatment of faces is not even especially ideonomic, although the exercise does fit within the ideonomic division Appearances and Phenology.

I start with faces, however, because the theme can illustrate how MDS works in an elementary and direct way.

Near the center or origin of the 2-D plot is the face of biologist David Baltimore. Evidently Baltimore's face represented an average in the simplest two-dimensional distribution of the set of nine faces.

The most prominent dimension implicit in the analogical data-set is shown as the diagram's horizontal axis (Dimension 1); the second most implicit dimension is represented by the orthogonal vertical axis (Dimension 2).

What properties are to be ascribed to these two dimensions? That is not clear. One can study the set of faces—their various distances, orders, and configurations in the diagram—and draw one's own conclusions.

One could of course test the hypothesis of various traits being mainly or only determinant of the plot axes by a series of MDS experiments with faces in which the natural embodiment of hypothesized facial traits was obvious and dominant; the present nine faces could be included in the larger sets of faces to confirm their responsiveness to the hypothesized traits and their certified axes.

Another test might be for an artist to modify the present nine faces only in respect to the hypothesized traits (say by increasing, eliminating, or transposing the traits in given faces).

Note the obvious clustering in the current plot: there are three spatial pairings of faces, and three faces (in the vertical central axis) that are by no means paired and that in fact are wholly isolated (Thomas Edison north, Baltimore central, and Frank Press south).

I should say a few words about how I chose the faces I did for scaling and about what was in my mind when I did the scaling (or the preliminary rank-ordering).

I excluded women's faces because I was afraid that gender would wind up dominating and trivializing the weighting.

When rank-ordering the pictures I tried to ignore age differences, facial hair differences, glasses, and dress. In the case of age, for example, this was often difficult, and sometimes it forced me to reconstruct faces imaginatively.

During the rank-ordering of the analogousness of each of the faces to all of the others, I discovered to my amusement that the face of one individual (indicated by "A" in the figure) almost always ranked near the top in similarity. Apparently this man has a universal face. Perhaps he is a politician? Less facetiously, there may be certain faces that have the status of common denominators in certain, or all, sets of faces; and perhaps, more generally, there may be visual objects, ideas, things, or variables possessed of a similar status.

If there are such things, they may be important to find for the sake of ideonomy. They might, for example, provide clues for the interpretation or proper organization of other variables. For a given idea-set, there may be several rather different, or multipolar, 'common denominators' of this sort.

As a caution, however, I should probably also mention that the visual contrast was especially poor in the photograph of the face that I have been describing as universal, so its seeming universality may merely have been an accidental result of the lower information content of such a washed photograph. (As has so often been the case in my ideonomic research, drastic shortage of time relative to the scope of the research has forbidden me to be systematic or careful. I do not like sloppy science any more than any other scientist.)

Another interesting observation I would make is that the first time I looked at the MDS map shown here, I was momentarily startled by a certain inability to distinguish any of the different faces. Apparently my brain was not used to finding a set of things like that so perfectly ordered in space. Of course after an instant consciousness of the dissimilarities of the faces reemerged. All of this illustrates the power of MDS to heighten the mind's awareness of what things are and are not.

EMOTIONS

The set of nonmetric multidimensional scaling exercises that I will now describe were far more elaborate and in a sense more truly ideonomic in character.

They concerned the perceived mutual analogousness of diverse emotions. I used various random subsets of a more nearly diapasonal set of 140 named emotions.

These were prepared for MDS mapping by the computer, not by the more traditional rank-ordering method used above for the nine faces, but rather by the more elegant Triadic Method.

Scaling a set of ideas or things via the Triadic Method is always an education and often a revelation.

The things treated suddenly exhibit similarities, divergences, forms of order, properties, simplicity, complexity, problems, incompleteness, etc. that one would never have suspected. Great insight is gained into their relationships, nature, and possibilities. Many illusions are shed and new perspectives acquired. An avenue is furnished into one's own mind.

So in the course of deciding whether emotion A (say grief) was more similar overall to emotion B (jealousy perhaps) or emotion C (pride?), and the like, I came to realize that individual feelings are not the simple or atomic things they are ordinarily taken to be, but on the contrary are infinitely complex, and such that they contain entire hierarchies.

One consequence of their hierarchic character is that some supposedly different emotions (e.g. amusement and disgust; or jollyness, bitterness, and sarcasm, considered as affects) may actually be the same emotion but at radically different scales (e.g. at 2-3 orders of magnitude greater 'temporal rate', say if there is high-frequency repetition of emotion, or of some physiological correlate of emotion, in the human brain).

Should this situation obtain, it would illustrate a very general ideonomic principle to the effect that things are often far simpler than assumed, and that many things taken to be different are often basically similar if not even identical.

Further ideonomic reflection upon this also led on to the following ideas.

If emotions have characteristic temporal periods, then what are the most extreme—the shortest and the longest—periods? And might we be mistaking these extreme-most emotions for novel psychic phenomena, or creating artificial boundaries between coessential phenomena? Thus might feelings, character traits, and character types all in reality form a continuum, or be part of the same temporal spectrum? Character traits and types might just be the slowest of all emotions, or emotions with periods approaching, equaling, or exceeding the human lifetime.

Conversely, emotions might simply be the fastest, briefest, or most variable of personality traits.

Before rejecting this proposal, one should at least ask oneself what the longest emotion is, whether we are in a position to know, or whether any reason can be given for why there should be a limit.

One could go further and hypothesize that ethological differences—differences in the behavior and behavioral character of different animal species—more or less represent a more extreme part of the same continuum.

What I also saw as I treated emotions Triadically was that different emotions turn into one another and subsume their (supposed) opposites. This was part of the reason I described emotions above as being infinitely complex. Certainly each emotion is a world that encompasses as much as we customarily attribute to all emotions taken together.

To be properly understood, every single emotion must, at minimum, be completely mapped onto every other individual emotion. Although doing this is feasible, I will not discuss the ways of doing it here.

Figure ____ shows the simplest two-dimensional MDS map that resulted from my Triadic scaling of 36 emotions using a set of 50 scaling dyads. The scaling dyads were what is termed "virtually intra-set" because the 36 emotions that were actually scaled represented a subset of the emotions that occurred monadically in the scaling dyads.

Only some, in fact only a tiny fraction (4%) of the possible scaling dyads that could have been constructed from the same set of different emotions were actually used. The subset that was used was chosen at random by means of random numbers; only inverse dyads were excluded, these being excluded for the obvious reason that they were tautologous.

Emotions were the very first things I mapped via MDS. It was fascinating to follow the evolution and transformation of the map of emotion space as I gradually scaled in more and more emotions. It was only necessary to make fifty binary, comparisonal decisions to add a new emotion.

I found that I could usually predict the rough location of a new emotion. Of course this does not imply that I could have constructed the entire map ab initio. The MDS computation was necessary to discover the basic dimensions and structure of the map in the first place. Once this clearly meaningful pattern was made visible, contextual relationships provided countless clues for where a new emotion, or a new set of emotions, should go.

The 36 emotions in the figure are distributed in the usual circular pattern, or concentrated at a unit radius from the origin of the diagram. More precisely, but as is again typical, the structure of the population of variables in the lowest-two-dimensional diagram is semicircular: a horseshoe with a gap. The pattern is more elliptical than circular; it is flattened vertically or stretched horizontally. The horizontal dimension, or Dimension 1, must therefore be especially obvious, intuitively, or much more important in the weighting than the next most implicit qualitative dimension, Dimension 2.

In the case of emotions Dimension 1 is easy to interpret, for what one would describe as good or pleasant emotions occur leftward in the plot, and bad or unpleasant feelings—feelings of an opposite nature—occur to the right. The nicest emotions, such as happiness, enthusiasm, and love, occur—and even tend to cluster—at the extreme left; conversely, the worst emotions occur and cluster at the extreme right (pain, shame, dullness, etc).

Upon closer inspection one realizes that the distribution is more multipolar than bipolar. The bad emotions on the right show a tendency to form two or three clusters. The northeastern cluster comprises fear, anxiety, terror, timidity. The southeastern cluster includes anger, irritation, disgust, indignation, etc. Finally in the mideastern clump one sees shame, hollowness, dullness, pain, and anguish.

Notice the naturalness, coherence, and semantic distinctness of these groupings. Not only are they strong evidence for the validity of MDS and the Triadic Method, but they attest to the power and precision of same. It is amazing that the seemingly crude device of the Triadic Method is able to discover such fundamental, complex, and delicate structure in an idea-set.

Emotions of an opposite nature tend to be found 180^{o} from one another or diametrically across the plot origin. Opposite admiration and wonder, for example, are irritation and boredom. Caution lies opposite security. Envy and admiration are opposite. So are respect and impatience.

Of special interest is the general field of emotions lying opposite or far from mischievousness. Evidently mischievousness partakes of the qualities of its neighbor security, and therefore opposes caution, anxiety, and respect; mischievousness often presupposes a certain bumptious or gay sureness, a careless flaunting of respect.

Yet variables merely aligned along a straight line, especially one that forms an axis through the origin, are often in some important respect semantically coherent, even though they may lie opposite. Perhaps this explains why surprise and loneliness share such a line with mischievousness, since surprise may be felt by those who do, observe, or are subjected to mischievousness, and being mischievous can for various reasons make one a bit lonely.

Solicitude probably occurs centrad in the map because one of its major senses is sympathetic concern for another person or something outside or other than oneself, which tends to make it closer to security than pure fear, say.

Simlarly surprise falls toward the center because as a feeling it is not necessarily bad, and may often be alloyed to delight.

Notice the many minor collinear progressions in the emotional map: e.g. solicitude, surprise, amazement, and wonder can in psychodynamics form a natural gradient (over which one or more dimensions increase in intensity).

There are more bad than good emotions in the diagram. This was probably due to chance: the outcome of the computer's random choice of a subset of 36 emotions from a more comprehensive set of 140.

Because of this predominance, the bad emotions occur on the positive (right) side of the horizontal axis (Dimension 1). Idea MDS distributions tend to be somewhat asymmetric, and the positive part of each dimension identified by nonmetric MDS is assigned to the most weighty or essential part of a dimension.

As a neuroscientist, I could not help wondering, as I examined the map of the 36 emotions, whether its structure and order might have some power to predict the natural structural and functional organization of those brain regions—especially the component nuclei of the hypothalamus and amygdala—that originate and control the corresponding emotions. Such cartographic agreement might be either direct (geometrically or topologically) or indirect (say by analogy to the mathematical transformations that are necessary to interpret the raw diagrams created by x-ray crystallography). I am certain there is at least partial isomorphy.

If so, either the MDS could be an effect of these brain patterns or both the MDS and brain patterns could be an effect or manifestation of the more or less natural, transcendental, or ideonomic morphology and morphogenesis of the emotions.

Possibly a three-dimensional MDS map of the emotions would be more apt to predict the neuroanatomy of the emotions, but the fact is that the brain uses both two- and three-dimensional organization.

Respect and mystery are located near zero on the horizontal axis, or in mid-arc between the subpopulations of good and bad emotions. This is easily explained. Respect can be a mixture of positive feelings such as admiration and negative feelings such as loneliness, caution, and fear; it is a kind of anxious admiration. Feelings of mystery may have similar bases: mixing feelings such as wonder, loneliness, anxiety, and caution (all important colors of the mystery novel).

One is forever thrilled when examining an MDS idea map by consciousness of the astonishing fact that the locations of all of the mapped ideas are globally controlled and that the patterns one sees are the intricately balanced expressions of global processes. The maps are really still photographs, or hierarchically discovered final (or metastable) equilibria, of cognitive flows.

Ideally, the meanings of all of the concepts or things—whose group portrait one is admiring—are interdependent, and at minimum the plot has the virtual aspect of a spider web whose nodes or drops of dew will quiver and shake whenever the web is touched anywhere or blown anywhere by a zephyr's playful caress. The frozen residences of the concepts are the sort of deception a Goedel or Heisenberg would appreciate.

I must hastefully add that there is nothing meaningless about them. It is only that the organic matrix of meaning—of different, complementary, and reciprocal meanings—is so full, so magnitudinous, that it essentially encompasses some great set of subconfigurations impossible to resolve by any representation of low, or perhaps of any finite, dimensionality. That seen in the web provided by the method is one, especially primary or useful, crystallization of what in reality is a living ideic entity, like the crystallization of DNA molecules that is only possible when life has been suspended for the sake of abstract observation by human beings.

Again I must emphasize that ideas in their true, self-infinite complexity are living things: not the kindergarten Forms of a Plato.

This long unsuspected, essentially temporal property of ideas leads to a magnificent array of methodological consequences and possibilities that I explore later.

One of the corollaries of the fact that the loci of the co-mapped ideas are globally governed, or holistically interdetermined, is that the semantic field of each idea has no finite radius or discrete boundary. Instead the meaning of each idea, or its package of properties, must in some sense be understood as being present, active, important, and visible everywhere in the general field of the diagram. The meaning of the concept represented by the emotion envy, for example, does not extend just a little ways along a line, or a radius of the concept's punctate locus, and then abruptly stop or plunge to a value of zero. The $n!/r!(n - r)! = 36!/2!(36 - 2)! = 612$ irredundant (imaginable) edges between the 36 emotions are not broken into exact halves, unequal halves, parts with intermediate gaps, or parts whose length sum is $0 < L_{\Sigma} > 2$ by the 1,224 semantic field radii of 36 emotional nodes. There are no empty spaces.

Nor have the 36 emotions 36 areal fields with equivalent finite, contiguous, or fractional properties.

There may be some finite or otherwise peculiar geometric manifold underlying the semantic space, but that is not obvious from the diagramed loci.

What all that means, in simpler words, is, for example, that even though impatience, envy, and suspicion are mapped in that order on a straight line, the quality of impatience is not excluded from being relevant to or characteristic of the distant emotion suspicion by the the collinear interposition of envy; and that in fact suspicion must be analogous, homologous, or related to, or a partial embodiment of, impatience (and not simply because beyond suspicion there are emotions such as hollowness that are even more remote from impatience).

Evidently emotions (and perhaps universally all ideas) are analogous, either intrinsically in nature or effectually in the human mind, to Leibnizian monads. The meaning in ideomaps produced by nonmetric MDS may be like the patterns in optical holograms that are reproduced everywhere in the hologram, but always in proportion to the size of whatever part of the hologram is being considered, and only completely in the hologram as a whole.

During the original Triadic Method scaling of the 36 emotions, when a sequence of fifty dichotomic questions was repeatedly being asked about the relative analogousness of each so-called polar emotion to the coalternative members of each pair (scaling dyad) of emotions, I was continually struck by the irredundant descriptive power of each of the fifty irredundant monadic emotions that were functioning in the fifty dyads. (There could have been as many as 100 irredundant monads in the set of fifty scaling dyads, but since each emotion was used twice, there were only 50. Of course the virtual descriptive meaning of a monad will depend upon whatever dyadic counterpart it happens to have, so in a sense, at least, there really were 100 irredundant monads.)

To some extent this illustrates the point I was making above, about the assimilability of an emotion or idea to a monad in the philosophy of Leibniz.

Readers may be curious to see the actual set of fifty scaling dyads that were used. These are listed as figure ____.

Although the dyads were randomly constructed, they could have been designed to be maximally diverse or nonequivalent, minimally redundant, maximally multidimensional, subtly interdependent somehow, semantically proportionate (commensurate) or all-scaled (harmonic, if you will), clear, biased in favor of some emotional centroid or psychological or ideonomic purpose, hierarchically irredundant, etc; either on an a priori basis or empirically.

Of course there are hidden advantages in using a random set of dyads and dyadized monads: known and unknown prejudices and biases tend to be excluded, multi-scale sensitivities are insured, useful redundancy is introduced (that can counteract errors and enable mental self-checking and compensation), etc.

The theory of what kinds of sets of scaling dyads may be best, both in general and for specific purposes or in specific cases, has never been worked out, and there has been virtually none of the prolonged and systematic practical experimentation that is surely necessary to test, refine, and even originate theory. Hence margins of possible improvement, and measures and kinds of defect, are not as yet known and may not be intuitable. A program to explore these things is critical to the future scientific development of ideonomy.

In principle, at least, selective subsets, or types of subsets, of scaling dyads may significantly contribute to Triadic MDS scaling's: efficiency, speed, reliability, sensitivity, specialization, breadth of utility, interpretability, organizational evolution or sophistication, etc.

A plausible way of refining the treatment of emotions by the Triadic Method would be to equip some or all of the scaling dyads or monads with general or appropriate definitions of the individual emotions. The different emotions could be defined in themselves and/or by contrast to such emotions as they are paired with (that is, the dyadic distinction or virtual dimension could be elucidated - or even tailored). Such definitions could be purely formal or illustrated by applications of the distinctions or a manifold of contrastive pairings of many different emotions.

These helpful definitions or illustrations might either always be present in a type of side-panel on the computer screen, or simply always be instantaneously accessible by computer commands.

How reliable is the analogical map of the 36 emotions that I produced by making 1,800 binary (dichotomic) decisions [36 polar emotions × 50 recurrent scaling dyads = 1,800 binary decisions involving 3,600 unary choices]?

The truth is that there are many different senses of "reliability" and many different tests thereof. Probably the most desirable option would be to simultaneously test diverse senses of my map's reliability in diverse ways, so as to produce a composite and fairly comprehensive indication of its qualitative and quantitative reliability. But in my case that is impractical; I have neither the expertise nor the time, and this book is not the place to investigate the matter.

A few of the tests of reliability that would be appropriate are:

(1) Mapping the same 36 emotions via a wholly different set of scaling dyads;
(2) Remapping the 36 emotions with various numbers and kinds of subtractions and novel additions (from or to the 36);
(3) My remapping the 36 with the same 50 scaling dyads but on a much later occasion (years later perhaps);
(4) Mapping of the 36 by another person or other persons; and
(5) My mapping the 36 emotions via the same scaling dyads as earlier, but with these greatly added to or greatly reduced in number.

In the event, I conducted a test expediently related to (1) and (5).

What I did was reuse my original data (1,800 binary decisions). I randomly split the 50 scaling dyads and my decisions respecting them in half to produce two completely nonoverlapping sets of 25 scaling dyads and 900 binary decisions. Both sets of course scaled the identical 36 emotions.

By means of this shortcut I was able to have my Systat MDS program produce two independent maps of the interanalogousness of the emotions that both relied upon my own intuitive judgment exclusively.

Juxtaposing this equivalent pair of emotional maps would immediately enable an almost crucial test of the validity, fundamental, and fundamentality of the emotional ideomap and of ideonomic MDS ideomaps in general: crucial in the sense that if the compared but homologous maps proved to be wildly or even moderately discrepant (or divergent in the configuration, sequence, and distance of the graphed loci of the 36 emotions), such a negative result would be hard to reconcile with the continued credibility of the technique.

Figure ____ allows the reader to himself compare the two maps.

Do! * →

Before commenting on the countermaps I should mention that when a computer performs its mathematical analysis and synthesizes an MDS map, it gives rotational and reflectional orientations to the patterns it depicts that may not be especially significant in themselves but that can confuse or completely mislead the person who is supposed to make sense of the plot. Trivial differences or noise in the MDS data can tilt, invert, mirror-reverse, or warp essentially homomorphic or invariant structure. Even kith and kin, topsyturned, may be difficult to make sense of!

As it happened, the halving of the 50 scaling dyads produced two noisier and randomly somewhat different data sets, as well as some changes in scaling biases, and apparently this was enough to invert the graphed idea-structure (overall emotional configuration) in the vertical axis or Dimension 2, in one 25-dyad map relative to the other 25-dyad map.

I have corrected the irrelevant flip in my figure to greatly ease comparison of the countermaps.

I think my reader will concur that the agreement between maps "A" and "B" is good, even excellent. To be sure, the two maps are not copies of one another—the structure in "A" cannot be exactly fitted to the structure in "B"—and a few of the emotions exhibit drastic displacements. Mystery, respect, loneliness, and solicitude all move a distance equal to about half of the vertical diameter of the structure when the countermaps are compared.

If these more mobile elements are subtracted, however, or kept from interfering with one's mental superposition of the two plot structures, the resemblance of the independent projections becomes striking.

The agreement is better for the subset of good emotions on the left than for the bad emotions on the right side of the diagrams. One can move clockwise almost continuously from mischievousness to security to serenity to amusement to pride to happiness to enthusiasm to love to admiration to wonder to amazement and finally to surprise (forgetting for the moment about the indiscipline of hope, respect, and solicitude). This is a journey of 180°, a half-circuit of our little world.

One has to wonder how perfect the gemination might have been had the countermaps been based upon disjoint sets of 50, 100, or even the maximal 612 scaling dyads. Would there be an imminent or eventual limit to the (arguably or aspectually desirable) convergence?

Even where emotions like mystery, respect, loneliness, and solicitude are greatly displaced in the countermaps, such translations or dispersions need not mean that the emotions are errant. Both positions may make excellent (perhaps different, nonmonotonic, or complementary) contextual sense. For instance, that loneliness should roost near to solicitude, sadness, and even indignation (which can alienate one) makes good sense; but its preferential attraction to the cluster of respect, terror, and fear (as well as solicitude, which has accompanied it) in the countermap is equally limpid.

Even if two distant or opposite positions of the same emotion make sense, incidentally, hypothetical intermediate positions might not make sense. This would be like two local maxima, in a neural net, that happen to be separated by an energetic, probabilistic, or dynamical valley. Then too, an intrinsically hyperdimensional (or simply hetero-dimensional) structure may be seeking but failing to express itself in the mere two-dimensional ideomap.

My experience with the MDS mapping of diverse idea-sets has taught me that the different ideas contained in these sets will differ greatly in their characteristic stability, inertia, and simplicity (or conversely, in their mobility, energy, and complexity), or that there is a natural range and dispersion in these respects. There are ideas that seem to be relatively more superficial, obscure, complex, indeterminate, inconsequential (less massive, as it were), or orthogonal to the idea-set or its momentary mapping, and these may display greater cartographic dispersion, ambiguity, fickleness, nonconformity, or the like.

And on the other hand there are ideas whose nature and cartographic behavior is the very opposite: that seem to be relatively more fundamental, clear, definite, simple, fixed, important (more massive, as it were), or codimensional with the idea-set or its momentary or perpetual mapping, and these exhibit the contrary cartographic tendencies.

The mobility of certain ideas in MDS ideomaps can be accounted for in a simpler way; ~~for~~ it is attributable to the insensitivity of the set of scaling dyads that were used to 'weight the ideas into' the data set, relative to the sensitivity of that same set of scaling dyads to the complementary set of ideas that map more stably and definitely.

This may partly or wholly explain the exceptional behavior of mystery and respect in the present exercise, for I was conscious at the time I used the invariant set of 50 scaling dyads to characterize them that they were unusually hard to treat by means of at least those particular emotional dyads, which seemed meant for a very different set of emotions. On the other hand, hope was likewise hard to 'classify' with the scaling dyads, yet its change of position in the countermaps is much less (albeit still significant).

INTRODUCTION
Methodology
/METHODS
Statistics
nMDS

MULTIDIMENSIONAL SCALING BASED ON DYADIC CHOICES
Observations and Speculations

Up until the time of writing (1989 F 26), the technique of multidimensional scaling that I have made the most use of has involved the rank-ordering of a set of things for their intuited overall analogousness to one another, or to one of their number at a time (referred to as a "pole"). Since the number of things being ordered typically is typically from fifty to a hundred, great strains are placed upon the memory, which must recall, to some extent, the accumulating reason for all of the orderings with respect to each momentary pole.

But more recently I have begun to develop and explore an alternative technique that may in many respects, and perhaps in an overall sense, be superior to the first technique. Certainly the new method has many special properties and great interest.

The way in which this second technique operates on the computer is by initially choosing, say at random, one member of the set of things, that are to be multidimensionally (and nonmetrically) scaled, to serve as a momentary "pole". A set of pairs of all the things then appears in two spreadsheet columns. To date the number of such pairs has been kept artificially equal to the total number of things, rather than being made equal to all of the possible irredundant pairs of the things, which would be roughly the square of the former, or to be absolutely precise, would be the number of combinations of n things taken r at a time, nCr, per the formula:

$$nCr = \frac{n!}{r!(n-r)!}$$

Since $r = 2$ here, the exhaustive sets of pairs would equal: for 10 things 45 pairs, for 50 things 1,225 pairs, and so forth.

The reason why the extreme restriction has been practiced to date has simply been lack of time, and the priority of quickly exploring many different alterations and applications of the technique.

Once the set of paired things has been created in the two columns, the computer repeatedly asks one to choose from each pair the member of the pair that one believes the so-called pole (or polar thing) is most analogous to: e.g. in the case of 50 emotions, a computer program asks, say, "Which paired emotion is 'DISGUST' most analogous to?" This question might force one to decide between anger or pity, and answering this question would normally take one to another and different pair.

Each such decision is made by either depressing a key in favor of the thing (emotion, in the above case) that happens to be highlighted, or by moving the highlight to a neighbor and pressing the same key.

When using such a restricted set of pairs (or of dyadic choices), I have necessarily retained the same set of pairs (dyads) for pole-after-pole (to permit subsequent statistical analysis to be done), but I have designed the computer program so that each time a new polar thing is installed, the order of the set of pairs is randomized. The reason for this is the usual one in ideonomy: to prevent spurious and fatiguing mental cross-associations that would occur with an invariant order of presentation.

Technically, the ideogenic formula used, and the ideonomic propositions that result, are triads with a dyadic component addressed by a monadic component.

In a sense one could distinguish the new technique from the old by saying that it forces one to make (analogical and descriptive) decisions about each polar thing that are extremely superficial (purely dyadic, and, in effect, 'discrete rather than continuous') and yet that are also, as a result, maximally diverse, multidimensional, broad, and protean; that are minimally biased; that are quantitatively maximal; etc.

If one is simply using a partial set of all of the possible pairings of things, the method enables one to rank-order (or weight) far larger sets of things in the same amount of time (or in far less time per pole). In fact, when I first developed the method, my first application of it was to the rank-ordering of the mutual analogousness of a set of 907 maximally diverse things (such as hormone, ocean, sieve, and orchestra).

It is to be observed that the effect of each of the dyads is to define a peculiar and unique bipolar dimension. One such "dimension", in the case of the set of emotions, would be "Anger-ness vs Pity-ness". Although such a dimension may seem arbitrary, trivial, and wanting in simplicity, it can be shown to be—or found to be—almost arbitrarily special, necessary, fundamental, and simple in an infinite-dimensional mathematical space (of the sort that is now used constantly by physicists).

For 50 emotions, the number of such abstract or virtual dimensions would be 50 (with the pairs number = the emotions number) or (with the complete set of pairs, given by nCr with r = 2) 1,225 (or 24.5 times greater). This means that each emotion would be explicitly characterized in a 50-dimensional space (at minimum) or (at maximum) a 1,225-dimensional space. (The implicit dimensionalities, of course, might be anything.)

It is appropriate at this point to emphasize the formidable number of binary decisions that are necessary if each member of a set of things is to be analogized to all of the irredundant pairs of that set of things, which is given by the formula nCr with r = 3. For 50 emotions the required number of decisions is 19,600 (or 16 times what it would be with the pairs number per emotion = the emotions number). That is a sizable number, to be sure, and yet it is only 23% the number of seconds in a 24-h day (86,400).

When one orders, classifies, differentiates, or analogizes a set of things via such an enormous number of decisions or such enormous dimensionalities, it results in a fantastically specific, full, and complex semantic characterization of those things.

Part of the reason for investigating these dyadic multidimensional scaling possibilities lies in the value they might conceivably have to neurology, noology, and artificial intelligence. The brain, for example, may naturally employ dyadic techniques; and even if it does not, that, too, would be worth knowing.

One of the wonderful things that happens in the course of ordering a set of things by such random pairs and one pole at a time, is that as one passes on to successive poles and re-encounters the identical set of pairs, the set of monads embraced by the dyads gradually takes on a higher significance. The things, in effect, become ever less thing-like and ever more symbol-like. The successive cycles weave and interweave the things, and the meanings of the things, and ultimately the things acquire such an extreme order of complexity, and exhibit such ambiguity and interdependence, that they seem to surrender their importance and specificity to the sequential process itself.

What I am referring to is hard to describe, and to be fully understood and appreciated it needs to be experienced directly.

BOOK: Ideonomy.
CHAPTER: Multidimensional Scaling of Ideas.

(1)

The method whose application to ideonomy I will describe in this chapter is not one upon which I have any expertise. Consequently there is much in its connection about which I will have nothing to say, and much of what I do have to say may be poorly expressed, superficial, or simply wrong.

Yet so clear is the value to ideonomy of the statistical method known as nonmetric multidimensional scaling, that I am compelled to discuss it at some length. The method offers something to the science of ideas that no other method manages to offer, and it is necessary for the creation of materials, and for the production of data, that are essential for the implementation of many other ideonomic techniques and endeavors.

Moreover, the existing literature on MDS (as the method is commonly abbreviated) does not illustrate other than in a minimal and irrelevant way the powers and possibilities of MDS for treating generic ideas.

(2)

A CURIOUS CASE
And Possible Implications of the Curious Case

A fascinating exercise is to imagine all of the simple, pairwise or dyadic, combinations of the divisions of ideonomy with one another that suggest possible future subfields of research, either in ideonomy itself or outside of it.

Assuming the number of divisions to be 250, then in theory there could be as many as $250^2 = 62,500$ such dyadically defined subfields. Since for each division-division intersection, the dyadized terms could be interpreted in many different ways, the possible number of fields of investigation that the exercise might serve to suggest could even be many times 62,500.

But on the other hand, many of the intersective combinations might turn out upon inspection to be vacuous, trivial, redundant, or unresolvably obscure, so the actual number of fields of practical significance suggestible by the exercise could also be much smaller.

I have already done the proposed exercise in a very partial way, and it was because of my direct experience that I described this most elementary undertaking in combinatorial ideonomy as "fascinating".

My major experiment was conducted in the following way.

The divisions of ideonomy are named by means of binomens, where one element of each binomen refers to the essentially unique thing or "object" studied in the given division: e.g. "forms" in the division Forms and Morphology, or "changes" in Changes and Tropology. It was by this thing or object part that I referred to the divisions in the experiment.

My approach was simply that of constructing one enormous table in which rows corresponding to divisions were alphabetically intersected with columns corresponding to those same divisions to produce as many cells as the number of divisions squared.

Although I will here speak of the number of divisions as being 250, which is close to the number I often recognize currently, the actual number at the time was somewhat different. The exact number is not important, in part because there are no fixed number of ideonomic provinces.

Mentally I imagined the linkage of one division to another as being mediated by the dual and ultimately ambiguous connective "of or re". This was crude but sufficient for my purpose at the time, although it often required that I remember the sense of semantic directionality in which I at first—often rather arbitrarily—regarded a division-division dyad, when I later reversed the dyad to extract its inverted meaning. I suspect the way in which I treated this order had a tendency to drift over time because of mental fatigue, and certainly I did not employ at the time any notational means for rendering the generic or specific asymmetry explicit (or unambiguous and invariant). Moreover, there were many occasions when, for either objective or subjective reasons, any semantic asymmetry between forward and backward dyads was simply too slight to be discernible.

These problems remain unsolved even now.

I made some effort to scale such directed dyads as I looked at for what would be my subjective estimate of what was either their relative or absolute, either importance or interest (I am afraid I can no longer recall which of these four possibilities was the case).

The scaling was minimal, say only a matter of from three to five degrees. For example, I see that for a while my technique was to use a set of five colors to indicate in each cell whether I thought a would-be research field implied by the formal formula "division 1 of or re division 2", variously or progressionally: (1) made no sense, (2) dubiously made sense, (3) made sense, but sense that remained to be determined, (4) made a great sense, or (5) had extreme interest or importance.

In some of these exercises I also made use of various symbols that I defined in a key. For example, "H" might have been used to indicate that the indicated field, albeit feasible, would be especially hard to create, apply to things, or even merely define; "M" implied that in place of a single field, two or many more or less distinct fields were to be imagined; and still another symbol might have been used to indicate that not all of what the ordered dyad would logically suggest would in fact make sense (making the case one of partial validity).

In the event, I found to my surprise and delight that probably the majority of the dyadically imagined fields did make sense: tens of thousands, in other words.

Not only did they make sense, but the very act of analyzing them to see whether they made sense inevitably led to a great number of exciting ideas for research avenues to pursue to science and other areas.

The exercise was a milestone in ideonomy because, conducted at the beginning of the Ideonomy Project as it was, it provided a first test and successful demonstration of the principle that large sets of basic concepts can be combined with one another en masse to readily generate a stupendous number of meaningful, important, and intellectually provocative ideas, and an instantaneous portrait of an entire realm of possibilities, even a realm hitherto almost untouched and unglimpsed.

Another thing I realized at the time was that the multitude of possibilities, relationships, and ideas generated in this way are apt to have, not just individual, but mutual or interactive significance. It was obvious, in other words, that the thousands of implicit fields would have literally innumerable pure and applied implications for one another, or for the fostering of collaborative inquiry.

But I should illustrate what I have been discussing with at least a single actual example.

Such an example was the intersection of the division Trees and Dendrology with the division Inequalities and Anisology. (The first of these, however, is now usually treated as being part of another division.)

This intersection asked one to evaluate "trees of inequalities", and inversely "inequalities of trees", as potential present or future areas of inquiry.

A brilliant young mathematician to whom I mentioned the two things, Michael Larson, immediately apprised me that the first already corresponds to an active and important mathematical subfield; in fact, he gave an illustrative example of such a tree or hierarchy of inequalities.

As for the second, if there are trees of inequalities in mathematics, then it automatically follows that there must also be investigable inequalities of such trees.

I also experimented with the use of three, even four, ideonomic divisions in combination to suggest such future fields of research. Of course the possible number of multiple combinations is much greater: potentially 250^3 = 15,625,000 triads, 3,906,250,000 tetrads, etc. Yet once again I found that the combinations tended to suggest plausible, important, and irredundant fields of general and specific inquiry.

It was some time after I conducted this family of experiments that I suddenly realized what was implicit in just the exercise in which the division-division dyads were scaled for judged interest of the fields they suggested.

For it would be possible for a computer to take such weightings and use them to automatically predict what would be the best or optimal divisional triads, tetrads, pentads, and so on up to the 250-ads; and not only the best combinations but the best permutations. In fact, there would be no reason to stop with the 250-ads (other than the obvious impossibility of achieving any exhaustive computational search!). The computer could, in theory, go on to explore and optimize combinations of the 250 divisions involving ordered reuses of the divisions, or effectively more than 250 divisions at once; or even infinite sequences of divisions, and the permutations thereof. The consequence would simply be the indication of more and more future fields of thought, experimentation, and applied endeavor.

Yet this immense, even infinite number of predictions and optimizations would result from nothing more than the original, finite and small, set of dyadic data.

Naturally over time adjustments and refinements could be made, and various methods of human interaction with the unfolding predictions could progressively improve the optimality, interest, and value of the results, and their specialization in connection with particular disciplines, themes, and concerns.

The sequences of divisions could be used to suggest not just optimal, complex and specific, fields of research, but chainings of methods, concepts, phenomena, objectives, decisions, etc, that would constantly offer researchers great menus of alternatives and alternative courses to follow, and much more freedom of choice.

IDEAS IN PSYCHOLOGY

Produced By the Ideonomy Project

As the Ideonomy Project proceeded it soon became obvious that psychology, for all of its ambitions and pretensions, remains a very primitive science indeed.

It was in a way ironic that this was the conclusion drawn by an inquiry conducted in a vastly more rudimentary subject such as ideonomy. But actually the assessment of psychology as being a largely juvenile science is common, even in the discipline itself.

A field is judged to be "scientific" if, and to the extent that:

1) It can predict things—things of both a fundamental and a random nature—and can make these predictions more reliably, meaningfully, and usefully than might be possible with any other means;

2) It can truly explain the patterns, causes, effects, interrelations, and general possibilities of its phenomena;

3) It comprehends all pertinent phenomena, and excludes other phenomena as irrelevant or nonexistent;

4) It provides powerful and efficient methods for dealing with such phenomena; and finally,

5) It furnishes the simplest and most fundamental laws, principles, and concepts for discovering, classifying, organizing, understanding, and exploiting the phenomena.

Let the third requirement be understood to mean that, for a field to be maximally scientific, its imagination must be 'exhaustive'.

A powerful hint of the present crudity of psychology is the ease with which plausible, attractive, and unexplored theories, hypotheses, and concepts can be conjured up, both as alternatives to existing ideas and as entirely new ideas or as ideas pertinent to psychological phenomena that have hitherto gone unconsidered.

Moreover, there is nothing canonical about current psychological ideas—nothing which suggests that they fit together in natural and necessary ways that define and exhaust the entire framework of psychological phenomena and possibilities, or that they even spring from any consciousness of the reality of such a framework.

For the most part not even the most preliminary criteria and tests are supplied for theoretically and experimentally comparing and choosing among the different ideas that have been proposed.

The testimony of the natural sciences, of mathematics, and of ideonomy is that, whatever the nature of reality may ultimately turn out to be, it will certainly possess a strangeness, grandeur, and complexity that is utterly unexemplified by contemporary psychology.

In the brief Ideonomy Project there was no opportunity, and no effort was made, to systematically and encyclopedically anticipate the future possibilities of psychology, or even to methodically criticize what psychology has been and is now.

The new and interesting ideas that were imagined with the aid of ideonomy, and that are surveyed in this chapter, were seldom explored or developed carefully, and such—perfectly appropriate—systematic attention will have to wait until another time.

Each of the ideas presented could serve as a springboard for the development of yet other ideas, often ideas that could prove to be at least as radical and important as those that inspired or led to them.

CONVERSATIONAL TOPICS

Patrick Gunkel

As a science, ideonomy can *alternatively* operate on many different levels of abstraction or concreteness, or of generality or specificity. It may also operate on two or more such levels *simultaneously*. In the latter case, its higher-level functioning may be *either overt or hidden*; which is to say that the [concrete, specific, particular, and individual] [ideas and things] with which it appears to be [exclusively or centrally] concerned may be [invisibly controlled, influenced, or generated by, or involved with] [comparatively or absolutely] nomothetic [elements, concepts, processes, laws, and purposes].

Human conversation is preoccupied with a quasi-finite set of endlessly recurring topics, themes, and matters—most of which are, from an ideonomic point of view, and in the senses just considered, of a relatively low-level nature.

Still, ideonomy can be applied to conversation in a variety of ways:

It can be used to achieve a universal classification and fundamental description of the things of which such dialogue consists; of its [contents, methods, purposes, types, courses, dynamics, and possibilities]. It can reveal the : structure, branching, anastomoses, braiding and multiplexing, stratification, orthogonal turnings, cartography, etc : of a given conversation or of different conversations. It can identify the universe of conversational themes and the intricate interconnections and other interrelations thereof. It can be employed to evaluate and criticize dialogues.

Moreover, it can be exploited to train, facilitate, and improve future human conversations (the conversations of individuals and that great and eternal conversation represented by civilization itself over historical time); and it can also help to bring about the emergence of purely mechanical (or machine) conversations and monologues.

Across human history various systems and forms of technology have come into existence that have served and furthered conversation (*e.g.*, spoken and written language, exchange of letters, telephony, computer networks, and fax machines). Much more advanced devices and systems can be expected to appear in the future, and ideonomy may greatly aid their evolution.

A typology of conversation's major themes is given in **Fig. 3418**, "*184 Primary Topics of Conversation*". A number of these are broken down into their subtopics in the sublists of **Fig. 9202**, "*Secondary Topics of Conversation*". If the one-hundred-eighty-four primary topics were **all** equally diffracted into secondary topics by one-hundred-eighty-four sublists of this sort, then the total number of second-level themes might be around $184 \times 60 = 11{,}000$.

Although any attempt here to diffract the topics of conversation into all of their, in fact *innumerable*, subthemes and sublevels, would be both inappropriate and impossible, a sense of the limitless hierarchical possibilities may be gotten from a series of figures.

Love was one of the topics identified as primary in **Fig. 3418**, and most persons would probably agree that it is one of the handful of archetypal conversational, *and human*, themes. It is exploded in **Fig. 2238**, "*Subthemes of Conversations About 'Love'*", into its major subtopics.

Risk—or more specifically, love-related risk—is one of these secondary topics, and its still more specialized (third-level) possibilities are differentiated in **Fig. 4350**, "*Subthemes of Love's Risks*".

One of the key risks of love identified in this figure is that it may involve illusions of some sort. **Fig. 3263** names or suggests some of the categories of such romantic illusions. I should explain that the figure was created by consulting a relevant table, of approximately four-hundred "*Generic Themes of Illusions*", in the ideonomic division **ILLUSIONS AND APATOLOGY**. Those generic themes of illusion judged to be most involved, or the greatest risk, in love, I culled. Actually I proceeded with my selection alphabetically, and I stopped, for want of time, when *Combinability* was reached!

Finally, on a fifth level, the theme of 'the illusion, or illusions, of abundance in love', that is found in the previous figure, is the conversational subtopic to which **Fig. 2036**, "*Illusions of 'Abundance' That Are Among the Risks In Falling In Love*", is devoted.

I also illuminate, in **Fig. 0778**, "*Effects of Love; Specifically, 41 Feelings Of [Or Ideas, Concerns, Decisions, Or Actions Based On Feelings Of]...*", another hierarchic branch that could be followed from the major love themes in **Fig. 2238**.

Here is how these conversational organons might '**work**', in combination with one another.

First imagine that not only the organons actually shown here have been created but the ~$1{,}000^2$ others that are implicit in the ~$1{,}000^3$ entries (and branches thereto) that would result if all of the primary conversational topics were resolved into as many levels, and into organons as large (*e.g.*, consisting of from ten to a hundred entries), as in the present illustrative treatment of the topic *love*.

Of course everyone will protest at this point that, from a practical point of view, the creation of such an astronomically large hierarchic organon will always be impossible. But the complaint is easily answered.

What is envisioned is not the grand polyorganon's production by a single, wonderfully prolific individual (devoting his entire 350-million-second work-lifetime to this one endeavor), but rather its *concreation* by huge numbers of casually interested individuals, or volunteers, over a global Idea Bank computer network at some inspired future moment.

Considering the universal interest and utility of this conversational organon, it would not be so hard to imagine a million people volunteering a million organons, say by individually investing under an hour's attention to the task, essentially all at once in the most massive, level-five phase.

There are also two other general ways in which the stupendous organon could be generated:

1) By manipulations, transformations, and editings of other existing organons and of the accumulating pieces of the conversational organon itself.

2) Mechanically, by the—humanly aided or unaided—efforts of computers.

As for actual methods and means in these two cases, ideonomic organons at every level of generality and specificity could be exploited to assist the task. Presumably most would already exist.

A glance at the primary and secondary conversational topics tabulated in the chapter reveals that a large number correspond, either directly or indirectly, and by name or in essence, to divisions and subdivisions of ideonomy, or to other universal or major concerns of ideonomy. Countless organons connected with these could therefore be harnessed to define or suggest the content and structure of the multi-level conversational sub-organons.

Irrelevant and redundant items, in or among these organons, could be dropped; inappropriately named or worded items could be restated; the connection of items—or of whole organons—to the concerns of conversation, where obscure, could be made more explicit; and overlooked items could be added.

Chunks of various organons could be surgically removed and spliced into new organons or into the machinery of the grand conversational organon. Lower-level items and chunks could be moved upwards, higher-level ones shifted downwards.

Similar movements, and analogical mimicries, could occur crosswise among countless organons coexisting within the same hierarchic level.

The new organons created in these ways would imply or assist, sequentially, the creation of still other organons.

Ideonomic formulas could be devised making use of generic and specific terms to modify and change the significance of given items, and whole organons, in the usual magical way. (It is always surprising to find that this is possible: that one or a few new terms can drastically alter the meaning or application of a large set of other terms to which they are applied, that a fixed set of ideas can be reconceptualized or reused in endlessly novel ways, or that the diverse possible combinations of a small set of items can seem to encompass a universe of meaning and possibility.)

Multidimensional scalings and morphisms, neural nets, semantic networks, and many other ideonomic techniques could be exploited to generate the million or so suborganons of the grand organon.

Developers and users of this system, then, would be expected to heavily annotate its items and organons. Included in these notes would be records of personal experiences, mentions of interesting paths traced within the Conversational Organon, appraisals and criticisms of what exists, requests made to other persons or to posterity for extensions and supplements, names and electronic addresses of individuals conducting or interested in conducting certain kinds of conversations or conversations about certain topics, recordings and collations of actual conversations, ideonomic formulas for guiding, fertilizing, or actually generating certain conversations, indications of interconnections between the Conversational

Organon and the rest of ideonomy itself, organized advice for how to use the organon, and a history of how the worldwide process of conversation has been evolving as a result of the organon and of ideonomy—attaining new niveaux and exploring new themes, dimensions, styles, realms, and possibilities.

AN EXPERIMENT IN THE CREATION OF ORGANONS BY NONIDEONOMISTS

The organons that appear in the present book were almost all constructed by the author. About the only exceptions are the handful of organons that form the topic of this chapter. Because they are so exceptional, the casual experiment that produced them was of crucial importance.

It was this for several reasons:

Persons with an exaggerated notion of my own specialness could easily suppose that the creation of these rather novel things called organons demands some rare, possibly even unique, talent or genius. From this they could go on to conclude that the mass creation of organons—that might almost be thought necessary for the establishment of ideonomy as a genuine science—will only be achieved with difficulty, if at all. Or perhaps the worry is that I might have to play a critical tutorial role in transferring my aptitude, methods, and insights to a rather substantial number of apprentices. I would share this worry—given how often in the past the terms of my existence have quite frankly been precarious—were it not for the fact that I disagree with the point of view associated with it.

So it was necessary to demonstrate that other persons, and even people in general, could create organons of real merit and utility, and do so efficiently and perhaps without special training.

Moreover, could they bring into existence a random sample of those myriad organons of predefined type for which there is the clearest need, organons that would provide the subdivisions of ideonomy with their basic machinery?

It was also desirable as a part of this experiment to test the practical, and hence real, value of the organons created as a result of the experiment, by attempting to apply them to random but generically pertinent matters. To find out, in other words, whether such organons would actually be helpful in understanding the world better or in efficiently promoting the having of good ideas.

Of course the experiment could also provide a rough quantification of the amount of work that is apt to be necessary for a community to develop ideonomy into a working science. And clues about what instruction in ideonomy should be like.

Another hope was that the experiment would supply some indication that organons created by many people can be more diverse in style and method and encompassing in scope and content than organons entirely the product of one hand.

At the same time a partly opposite or contradictory hope was that the experiment would show that organons independently fashioned by different individuals tend to be sufficiently consistent that they can function together within a single theoretical and methodological framework, and that they collectively realize the same prior vision of a science.

The experiment reported here was conducted early in the Richard Lounsbery Foundation's Ideonomy Project.

One division of ideonomy, Capacities and Hicanology, was chosen—using a a random-number generator—to be the subject of all the organons that would be created. The reason for only one division instead of several was that in this way the created organons could all simultaneously be applied to the same matters, and hence their conjoint value could be shown or evaluated. Organons, after all, are meant to be used in concert with one another and to have synergistic effect.

"ASSIGNED 10-ENTRY ORGANONIC CHARTS TO AID THE IDEONOMICAL TREATMENT OF 'CAPACITIES'"

FOREWORD: Seven individuals were asked to imagine 10 things they would consider suitable as entries on an ideonomical chart intended to serve as an organon within the division 'capacities' of pure ideonomy. Each person was assigned a different chart title in advance, selected by a random number, with the list "Sixty Recurring Chart Types" used as a template. The entries that were proposed as a result of this request are listed below.

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(1) Robert Clark, CHART #14: "Generic Consequences of CAPACITIES".

A. HAVING TO DO WITH FEATURES OF THE EXTERNAL WORLD:
1. Repetitive actions.
2. Patterns of growth and evolution.
3. Patterns of decline and decay.
4. Patterns of conflict.
5. Multiple instabilities.
6. Absorptions of energy.

B. HAVING TO DO WITH EFFECTS ON OBSERVERS AND THINKERS:
7. Uncertainties of description.
8. Uncertainties of prediction.
9. A sense of mystery, wonder, and efflorescence.
10. Pregnancy.

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(2) Mark Colby, CHART #15: "Definitions of Terms Relevant To the Ideonomical Treatment of CAPACITIES".

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

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(3) Patrick Gunkel, CHART #20: "Futuribles Regarding CAPACITIES".

1. Things acquire new, novel, or more numerous capacities.
2. Enlarged or reduced.
3. Extended to new things.
4. Become controlled or controllable.
5. Superseded or replaced by other capacities.
6. Become understood.
7. Quantitative changes in have qualitative effects.
8. Changes of have increasingly broad and paradoxical effects.
9. Become increasingly explicit.
10. Become more consistent and reliable.

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(4) Betsey Dyer, CHART #23: "Generic Assumptions Regarding CAPACITIES" [and their complementary opposites].

1. Constant or static.
   Dynamic or fluid.
2. Dimensional [e.g. volumetric or fractal].
   Dimensionless [e.g. as mind in one sense is].
3. Arithmetical or algebraic [additive, multiplicative, distributive, associative, e/vc].
   Nonarithmetical.
4. Dependent on other characteristics.
   Independent of other characteristics.
5. Divided or divisible into aliquot quanta, parts, or units.
   Indivisible, undivided, or homogeneous.
   Divided or divisible [in fact or only] into [aliquant, unequal, heterogeneous, nonequivalent, or anisotropic] [parts, sources, determinants, attributes, or forms].
6. Energetic.
   Nonenergetic.
7. Gradational.
   Quantal.
8. Has or may have limits, boundaries, or borders.
   Unqualified or lacks--or lacks certain--limits, boundaries, borders, or constraints.
9. Cannot include whole universe (because dependent on contrast).
   Can include whole universe.
10. In mind of beholder or investigator (exists because it is looked for or measured).
    Independent of observer and absolute.

(5.) Grant Murray, CHART #28: "Generic Ignorance Regarding CAPACITIES".

1. Ignorance regarding the definition of capacities.
2. Ignorance regarding the degree of capacities.
3. Ignorance regarding the existence of capacities.
4. Ignorance regarding the relations of capacities.
5. Ignorance regarding the number of capacities.
6. Ignorance regarding the need for capacities.
7. Ignorance regarding the value of capacities.
8. Ignorance regarding the generation of capacities.
9. Ignorance regarding the fluctuation of capacities.
10. Ignorance regarding the cause of capacities.

(6.) David Bermudes, CHART #42: "Principles Guiding the Ideonomical Treatment of CAPACITIES".

1. Measurements of capacities can be made.
2. Interfacing of capacities can occur.
3. Dimensions of capacities can be measured.
4. Fluctuations of capacities can be determined.
5. Definitions of capacities can be made.
6. Entropy of capacities can be formulated.
7. Limits of capacities can be measured.
8. Composition of capacities can be determined.
9. Fractions of capacities can be measured.
10. Identities of capacities can be made.

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9. Fractions of capacities can be measured.
10. Identities of capacities can be made.

(7.) Barry Hershey, CHART #43: "Typical Questions About CAPACITY".

1. What factors [increase or decrease] capacity over time?
2. Does capacity vary depending on the capacity of an element of a thing?
3. Does a thing have recurring maximum capacities?
4. Are there correlations between other independent factors with a thing's capacity?
5. Are there different ways to measure capacities that result in fundamentally different answers?
6. What independent factors [stimulate or cause] testing of a thing's maximum capacity?
7. Does an element of a thing [expand, diminish, or leave untouched] the amount of the thing's capacity?
8. What is the process that occurs to test the capacity of a thing?
9. What is needed to expand a thing's capacity?
10. In what ways might we be incorrect in our measurement of a thing's capacity?

Seven individuals were asked to imagine ten things that they would consider to be suitable or especially appropriate as entries on an ideonomic chart intended to serve as an organon within the division. Each person was assigned a different chart title in advance, selected by random number from the table "Sixty Generic Organons To Re-Create In Many Or All Ideonomic Divisions" (please see). As is true in most good science, these assignments were probably not entirely random. But the main way in which I intruded here was by climbing aboard—out of curiosity, and perhaps paternal jealousy—as the seventh list-maker. No one complained, at least.

Who were the other six people? They were all friends of high intelligence who had already had some exposure to ideonomy, mostly through casual conversations and from having been shown some of the lists and charts I had prepared at that early point in my project. Robert Clark was a professor of law at Harvard, Mark Colby a student of philosophy, Betsey Dyer a professor of biology, Grant Murray an adolescent prodigy whom I occasionally employed in the project, David Bermudes a graduate student in biology, and Barry Hershey the founder and president of an insurance company.

Most of the assignees finished their organon in about one week. Two individuals had trouble understanding what was expected of them (they were also the ones least familiar with the subject); coaching corrected the problem in one case, failed in the other.

The organons that resulted from these people's efforts are assembled here as the table "Small Organons Prepared Experimentally By 7 Persons For Use In the Ideonomic Division 'Capacities'".

I was delighted with these organons. After testing them, as described below, I concluded that the experiment had provided a sure indication that ideonomy could be 'created by the masses and used by the masses'.

Obviously the organons can be improved upon; the one thing they certainly are not is comprehensive. But their shortcomings are equally excused by the casual nature of the assignment, the random selection and allocation of the organons-to-be, the quickness of the work, the lack of training and coaching or consultation, the novelty of the task (the fact that virtually none of the assignees had previously constructed an organon), the absence of financial or other incentives in the work, the isolation of the assignees (rather than compresence or collaboration), and no doubt the deliberate terseness of my instruction.

Notice that some of the organons are a little more complicated than the others (for better or worse); some use more words, some less.

To test these organons I modified their items slightly, but without altering their essential meaning, so that the computer would be able to automatically combine them with random items from a large organon that I had previously prepared under the same division, "100 Examples of Capacities" (see).

I will now proceed to discuss just a few of the thousands of combinations, or ideonomic propositions, that were generated in this way. The accompanying propositional tables represent tiny random—unwinnowed and unordered—samples of the complete sets of propositions (idea spaces). It would have been more dramatic, perhaps, to have devoted these tables instead to the best propositions I could find in exhaustive searches. But there is a special virtue in humility.

"EXAMPLES OF CAPACITIES"

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1. CAPACITY OF art for assimilating technological innovations.
2. Atmosphere's CAPACITY for creating storm systems.
3. Atmosphere's CAPACITY for productive (precipitation-increasing) nucleation.
4. Atmosphere's CAPACITY for weather control.
5. Balloon's CAPACITY for expansion before bursting.
6. CAPACITY OF a bathyscaphe for withstanding ultra-high pressures deep in the ocean.
7. CAPACITY OF a battery for absorbing electric charge.
8. Biogeochemical cycle's CAPACITY (for transporting quantities of a chemical element or molecular species).
9. CAPACITY OF the biological environment to endure industrial stress.
10. Biological evolution's CAPACITY for secular acceleration.
11. CAPACITY OF the bios to adapt to climatic change.
12. CAPACITY OF the body to FIGHT disease.
13. Body's CAPACITY for tolerating a toxin.
14. Body's CAPACITY for WITHSTANDING disease.
15. CAPACITY OF the brain for experiencing intense pleasure.
16. CAPACITY OF a bridge to support an excess load without failing.
17. Building's CAPACITY for withstanding earthquakes.
18. Car's seating CAPACITY.
19. CAPACITY OF Charles Dickens' novels to go on serving successive generations of schoolchildren.
20. CAPACITY OF a child for tolerating trauma without lasting psychic injury.
21. CAPACITY OF a city for assimilating an influx of the poor from the countryside.
22. CAPACITY OF a city's storm sewers for removing street waters from a sudden downpour.
23. CAPACITY OF a committee for reaching agreement over a controversial issue.
24. Composer's CAPACITY for improvising on a musical theme.
25. CAPACITY OF a computer for organizing great masses of information.
26. Credit cards' CAPACITY for criminal abuse.
27. CAPACITY OF a culture for surviving technological transformations of the social environment.
28. CAPACITY OF desert soil to support plant and animal life.
29. Digestive system's CAPACITY for using an exotic diet.
30. CAPACITY OF the dinosaur fauna to adapt to the evolution of mammals.
31. Diplomacy's CAPACITY for resolving international disputes.
32. Earth's demographic CAPACITY.
33. CAPACITY OF an economy to recover from a depression.
34. Ecosystem's CAPACITY for enduring disruption.
35. Electric charge or electron storage CAPACITY.
36. CAPACITY OF an electrical fuse to endure an excessive current without blowing.
37. English language's CAPACITY for expressing complex and subtle ideas.
38. Enzyme's catalytic CAPACITY.
39. CAPACITY OF an expert to answer questions about hypothetical situations.
40. Eyeball's CAPACITY for orbital rotation.
41. CAPACITY OF a factory for being reconfigured.
42. CAPACITY OF a family for surviving an alcoholic breadwinner.
43. Firm's CAPACITY for exploiting a windfall or opportunity.
44. Gene's CAPACITY for recombination.
45. Genome's CAPACITY for synthesizing ARBITRARY phenes.
46. CAPACITY OF a great composer like Mozart to produce one great work after another.
47. Heat CAPACITY.
48. CAPACITY OF a high cliff to resist the interminable onslaught of the tempestuous sea.
49. CAPACITY OF a homeostatic air-conditioner for cooling a room during torrid weather.
50. CAPACITY OF the human eye for discriminating minute details.
51. Human memory (short and long term) CAPACITY.
52. CAPACITY OF the human mind to absorb new scientific knowledge.
53. Human skeleton's CAPACITY for supporting great weight.
54. CAPACITY OF the human trunk to rotate relative to the hips via the spine.
55. CAPACITY OF the human voice for rapid speech.
56. Hydroelectric power plant's generative CAPACITY.
57. Information channel CAPACITY.
58. Information processing or computational CAPACITY.
59. Information storage (computer memory) CAPACITY.
60. Kettledrum's CAPACITY for musical nuance.
61. Literary theme's CAPACITY for novelistic development.
62. Loudspeaker's CAPACITY for producing undistorted sound.
63. Macromolecule's CAPACITY for structural variation.
64. CAPACITY OF man for making the best of an unfortunate situation.
65. CAPACITY OF a man to work efficiently while going without sleep.
66. Material's CAPACITY for being magnetized.
67. Mathematical equation's CAPACITY for processing a numerical task.
68. Mechanical wristwatch's CAPACITY for future improvement.
69. Military pillbox's CAPACITY for surviving heavy bombardment.
70. Military tactics' CAPACITY for rapid transformation.
71. Mind's CAPACITY for ignoring sensory distractions.
72. Molecule's CAPACITY for combining with other molecules.
73. CAPACITY OF a muscle for contraction and relaxation.
74. Musculature's CAPACITY for executing complex movements.
75. CAPACITY OF a nation to WITHSTAND military attack.
76. National economy's CAPACITY for RECOVERING from wartime destruction.
77. Neuron's CAPACITY for conveying unusual information.
78. Ocean's pollution CAPACITY.
79. Organism's CAPACITY for withstanding starvation.
80. Painting's CAPACITY for saying many things simultaneously.
81. Person's CAPACITY for self-deception.
82. CAPACITY OF a phone to contain adolescents forcing themselves into it out of sheer zaniness.
83. CAPACITY OF a phonograph for faithfully reproducing exotic recorded sounds.
84. CAPACITY OF a river to erode the land.
85. Scientific instrument's CAPACITY for giving fast responses to environmental changes.
86. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion.
87. CAPACITY OF a secretary to take hurried dictation.
88. CAPACITY OF a seedling for further growth in a favorable environment.
89. Sensory receptor CAPACITY (e.g. total sensa or bits per second).
90. Single word's CAPACITY for being reused in novel ways (polysemy).
91. Slurry pipeline transport CAPACITY.
92. CAPACITY OF a society to assimilate new laws enacted by its legislature.
93. CAPACITY OF a solvent for absorbing a solute.
94. Species' adaptive CAPACITY.
95. Stream's sediment transport CAPACITY.
96. Switching CAPACITY.
97. Thundercloud's CAPACITY for generating lightning discharges.
98. Tinkertoys' CAPACITY for being rearranged into novel shapes or analogues of things.
99. Warehouse (volumetric/total items) storage CAPACITY.
100. CAPACITY OF a window to resist gale-force winds.

"BARRY HERSHEY'S TEN 'QUESTIONS ABOUT CAPACITY' TESTED AGAINST 'EXAMPLES OF CAPACITIES'"

Are the Deutomeral Questions Apposed To the Protomeral Examples Often Pertinent?

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1. CAPACITY OF a muscle for contraction and relaxation. ⟶ Does a thing have recurring maximum capacities?
2. National economy's CAPACITY for RECOVERING from wartime destruction. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
3. Neuron's CAPACITY for conveying unusual information. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
4. [redacted] factors stimulate or cause testing of a thing's maximum [redacted]
5. CAPACITY OF the dinosaur fauna to adapt to the evolution of mammals. ⟶ What is needed to expand a thing's capacity?
6. Eyeball's CAPACITY for orbital rotation. ⟶ What factors increase or decrease capacity over time?
7. [redacted] ⟶ What factors increase or decrease capacity over time?
8. CAPACITY OF the biological environment to endure industrial stress. ⟶ Does capacity vary depending on the nature of an element of a thing?
9. Tinkertoys' CAPACITY for being rearranged into novel shapes or analogues of things. ⟶ Does a thing have recurring maximum capacities?
10. Literary theme's CAPACITY for novelistic development. ⟶ Are there correlations between other independent factors with a thing's capacity?
11. Credit cards' CAPACITY for criminal abuse. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
12. Species' adaptive CAPACITY. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
13. CAPACITY OF a high cliff to resist the interminable onslaught of the tempestuous sea. ⟶ What is needed to expand a thing's capacity?
14. CAPACITY OF an expert to answer questions about hypothetical situations. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
15. [redacted] ⟶ Does an element of a thing expand, diminish, or leave [redacted] the amount of the thing's capacity?
16. [redacted] ⟶ Does an element of a thing expand, diminish, or leave [redacted] the amount of the thing's capacity?
17. National economy's CAPACITY for RECOVERING from wartime destruction. ⟶ Does capacity vary depending on the nature of an element of a thing?
18. Balloon's CAPACITY for expansion before bursting. ⟶ Are there correlations between other independent factors with a thing's capacity? ⟶ E.g., 'Rate of inflation'; 'Atmospheric pressure encountered'; 'Air temperature'; 'Tautness of balloon's skin'; 'Balloon's shape'; 'Balloon's inner surface area'.
19. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion. ⟶ Does capacity vary depending on the nature of an element of a thing?
20. Musculature's CAPACITY for executing complex movements. ⟶ Does an element of a thing expand, diminish, or leave untouched the amount of the thing's capacity?
21. Thundercloud's CAPACITY for generating lightning discharges. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
22. CAPACITY OF the biological environment to endure industrial stress. ⟶ What is the process that occurs to test the capacity of a thing?
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24. Human memory (short and long term) CAPACITY. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
25. Loudspeaker's CAPACITY for producing undistorted sound. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
26. Mechanical wristwatch's CAPACITY for future improvement. ⟶ What factors increase or decrease capacity over time?
27. Heat CAPACITY. ⟶ Does capacity vary depending on the nature of an element of a thing?
28. CAPACITY OF an expert to answer questions about hypothetical situations. ⟶ What is the process that occurs to test the capacity of a thing?
29. Loudspeaker's CAPACITY for producing undistorted sound. ⟶ Does a thing have recurring maximum capacities?
30. Genome's CAPACITY for synthesizing ARBITRARY phenes. ⟶ What factors increase or decrease capacity over time?
31. Single word's CAPACITY for being reused in novel ways (polysemy). ⟶ Are there correlations between other independent factors with a thing's capacity?
32. Painting's CAPACITY for saying many things simultaneously. ⟶ Does a thing have recurring maximum capacities?
33. Stream's sediment transport CAPACITY. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
34. CAPACITY OF the brain for experiencing intense pleasure. ⟶ What is the process that occurs to test the capacity of a thing?
35. CAPACITY OF the human eye for discriminating minute details. ⟶ Are there different ways to measure capacities that result in fundamentally different answers?
36. Military tactics' CAPACITY for rapid transformation. ⟶ Are there correlations between other independent factors with a thing's capacity?
37. Hydroelectric power plant's generative CAPACITY. ⟶ Are there correlations between other independent factors with a thing's capacity?
38. CAPACITY OF a secretary to take hurried dictation. ⟶ What is the process that occurs to test the capacity of a thing?
39. CAPACITY OF a family for surviving an alcoholic breadwinner. ⟶ Does capacity vary depending on the nature of an element of a thing?
40. Mind's CAPACITY for ignoring sensory distractions. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
41. CAPACITY OF the bios to adapt to climatic change. ⟶ Are there correlations between other independent factors with a thing's capacity?
42. Body's CAPACITY for tolerating a toxin. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
43. Literary theme's CAPACITY for novelistic development. ⟶ Does a thing have recurring maximum capacities?
44. Genome's CAPACITY for synthesizing ARBITRARY phenes. ⟶ Are there correlations between other independent factors with a thing's capacity?
45. CAPACITY OF the human voice for rapid speech. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
46. CAPACITY OF Charles Dickens' novels to go on serving successive generations of schoolchildren. ⟶ Does capacity vary depending on the nature of an element of a thing?
47. Mechanical wristwatch's CAPACITY for future improvement. ⟶ What is the process that occurs to test the capacity of a thing?
48. CAPACITY OF a computer for organizing great masses of information. ⟶ Are there different ways to measure capacities that result in fundamentally different answers?
49. CAPACITY OF the bios to adapt to climatic change. ⟶ In what ways might we be incorrect in our measurement of a thing's capacity?
50. CAPACITY OF an electrical fuse to endure an excessive current without blowing. ⟶ Are there different ways to measure capacities that result in fundamentally different answers?
51. Switching CAPACITY. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
52. CAPACITY OF a seedling for further growth in a favorable environment. ⟶ What is the process that occurs to test the capacity of a thing?
53. Kettledrum's CAPACITY for musical nuance. ⟶ Are there different ways to measure capacities that result in fundamentally different answers?
54. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
55. Material's CAPACITY for being magnetized. ⟶ Does a thing have recurring maximum capacities?
56. Composer's CAPACITY for improvising on a musical theme. ⟶ What is needed to expand a thing's capacity?
57. Stream's sediment transport CAPACITY. ⟶ Does a thing have recurring maximum capacities?
58. CAPACITY OF a bathyscaphe for withstanding ultra-high pressures deep in the ocean. ⟶ What is needed to expand a thing's capacity?
59. CAPACITY OF the human eye for discriminating minute details. ⟶ Are there correlations between other independent factors with a thing's capacity?
60. Ecosystem's CAPACITY for enduring disruption. ⟶ What factors increase or decrease capacity over time?
61. Atmosphere's CAPACITY for weather control. ⟶ Does an element of a thing expand, diminish, or leave untouched the amount of the thing's capacity?
62. Diplomacy's CAPACITY for resolving international disputes. ⟶ Does a thing have recurring maximum capacities?
63. Biogeochemical cycle's CAPACITY (for transporting quantities of a chemical element or molecular species). ⟶ What is needed to expand a thing's capacity?
64. Gene's CAPACITY for recombination. ⟶ Does a thing have recurring maximum capacities?
65. Atmosphere's CAPACITY for creating storm systems. ⟶ Does a thing have recurring maximum capacities?
66. Human skeleton's CAPACITY for supporting great weight. ⟶ What is the process that occurs to test the capacity of a thing?
67. CAPACITY OF a factory for being reconfigured. ⟶ What independent factors stimulate or cause testing of a thing's maximum capacity?
68. CAPACITY OF a homeostatic air-conditioner for cooling a room during torrid weather. ⟶ What independent factors

—— BARRY HERSHEY'S ORGANON, "QUESTIONS ABOUT CAPACITY" ——

The full title of the first table of ideonomic propositions—"Barry Hershey's Ten 'Questions About Capacity' Tested Against 'Examples of Capacities'; Are the Deutomeral Questions Apposed To the Protomeral Examples Often Pertinent?"—could confuse the reader and should be explained.

You will note that the items on this table consist of two parts, the first an extra-sentential phrase and the second an interrogatory sentence, followed by a rightward arrow. The adjective protomeral (prō'tämə,rəl) refers to the first, phrasal part of these virtual ideonomic propositions, whereas deutomeral refers to the second part, the apposed (appended) question.

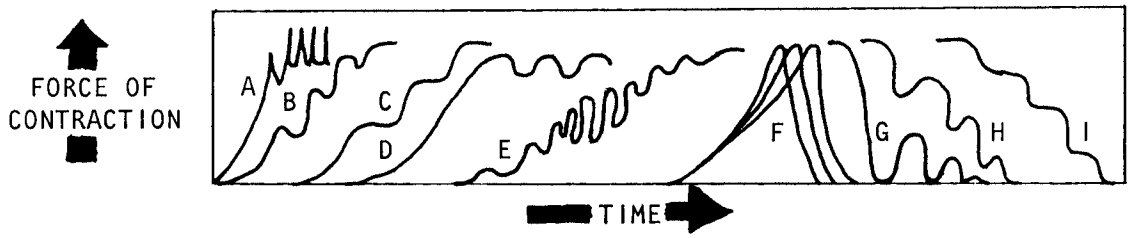
As you will have guessed, the **protomer** represents the 'example of a capacity' that was chosen at random by the computer from the organon "100 Examples of Capacities", and the **deutomer**, the random selection from the Hershey organon "Typical Questions About Capacity".

We are effectively being asked by each of these ideonomic propositions not only whether the deutomeral question is meaningful in terms of and relevant to the protomeral capacity, but whether the relationship is important or potentially valuable, or the sort of thing that could be sufficiently helpful in a net and practical sense that someone researching capacity—either in a general way or in connection with a specific matter—would find it worth his while to consult an organon containing such questions. Do the questions, or the complete propositions that contain the questions, have notable power to stimulate the mind and to contribute to its skills in treating any and all capacities of any and all things?

1. CAPACITY OF a muscle for contraction and relaxation. → Does a thing have recurring maximum capacities?

This first proposition from the table is not only meaningful and intelligent but quite interesting—in a variety of ways. It asks a question that the physiologist should already have addressed, or if he has not, that physiology must one day answer.

If a muscle does in fact possess recurring maximum capacities for, say, contraction, then these might show up in a variety of ways on a laboratory graph plotting time rightward against, say, force of contraction upward. For example:



Curve (A) in this graph suggests that even if the basic force exerted by a muscle tends to round off at a plateau, a series of spike-like bursts of higher contractional force might occur atop and across the plateau.

Curve (B) models a force curve gradually oscillating upward despite, or perhaps via, temporarily backsliding subcurves; an ascending series of submaxima, in other words.

Curve (C) suggests a similar curve, but one stepping upward via a series of temporary pauses or plateaus—as though a series of energy or work elements or systems were gradually being superadded or optimized by a sequence of priming pulses, cycles of adjustment, feedback, or self-stimulation.

Curve (D) visualizes an oscillating final plateau.

Curve (E) suggests a force curve that as it rises upward develops oscillations that become maximally resonant midway, and then gradually damp to nothing as the curve attains its maximum. This might variously hint that there is a lack of integration in the muscular or neuromuscular system, that the system operates by feedback (perhaps resonant feedback), that the system employs some sort of inversional mechanism, that higher derivatives are important, etc.

Curve (F) is meant to suggest that the continuous contraction of a muscle is actually underlain by a series of brief contractions by a succession of different muscle fiber groups or subsystems with increasingly retarded force curves or maxima.

Curve (G) suggests one way in which the contractive force of a muscle might eventually decline through fatigue: by a series of oscillations with descending maxima but whose minima are all zero.

Curves (H) and (I), finally, are simply the descending equivalents (reflectional isomorphs) of (B) and (C), respectively.

Of course one is free to think of the original question in quite different ways. For example, if a person embarks on a weight lifting program and as a result becomes more muscular and stronger, may there remain dimensions of his strength or components of his musculature whose maximum capacities are perforce unchanged? Perhaps muscle fibers increase in number or efficiency but not in individual strength; or there is some tradeoff between short-acting and long-acting fibers that redistributes force or work over time.

Another possibility is that there are cyclic or aperiodic fluctuations of a muscle's capacity on some timescale; there might even be a whole hierarchy or spectrum of them, and life monitoring should be done to see if cycles may even exist with periods of many months, years, or decades.

There should probably be similar but independent studies of muscular relaxation, which might not be simply the reverse of contraction.

Are there types or dimensions of muscular capacity whose maxima are surprisingly invariant ('recurrent') across the entire human population or even in animals (say by contrast with the variability and covariation of other types or dimensions of capacity)?

2. National economy's CAPACITY for RECOVERING from wartime destruction. → What independent factors (stimulate or cause) testing of a thing's maximum capacity?

It should be appreciated that the experiment that is here being reviewed was actually conducted several years before. Since it was an informal experiment, little effort was made at that time to learn from those who prepared the organons what precisely they may have meant in the case of items that now seem ambiguous or obscure; and at this point too much time has passed to expect these individuals to be able to correct the problem.

The word "testing", for example, may refer either to an examination or to a difficult situation that requires maximum effort or ability. Also the phrase "stimulate ... testing" is too narrowly specific and lacks vigor or directness; it is hard to get excited about.

Frankly the same thing could be said about the whole of this ideonomic proposition. It makes sense but it is not very interesting.

No doubt part of the reason is that recovering from wartime destruction would itself seem to be a maximal test of a country's economy. Yet one realizes after a little thought that there are many circumstances that would complicate the process of restoring a shattered economy, apart from a great degree of prior destruction: postwar social chaos, poor leadership within the country, defective or malicious guidance of the process of recovery by any victorious powers, economic discrimination by other nations, wartime depletion or mismanagement of national resources, malaise or a lack of national will, bad luck (say in the form of repeated crop failures caused by drought, or of global economic stagnation), etc.

3. Neuron's CAPACITY for conveying unusual information. → In what ways might we be incorrect in our measurement of a thing's capacity?

But here, once again, is an item that I find to be interesting and challenging. It leads one to speculate about many possibilities.

We may err in our measurements of neurons' capacity for transmitting data because we have no real knowledge of 'secret codes' that might be employed by these cells; because we are ignorant of the fact that within neurons there are structures and processes whose reception of incoming data is immediate, perfect, and lasting, but whose processing or externally measurable or significant use of that data is delayed for a very long while, possibly even days or years; because we underestimate the extent and destructive effect of other information that exists or operates within or among the neurons; because neurons also exchange data by means other than classical action potentials—such as electrotonic field transients or drift, slow flows of substances across synapses or intercellular spaces, or various glial paths; because the fundamental referents of transmitted data at either end of a neural path—external sensa or muscular events, or other neural or bodily events—are more or less unknown; because we are ignorant of the mathematics that underlies transmission; because we are far short of having the computer power that is necessary to fully analyze interneuronal traffic; because different neurons may be far more specialized than we suppose; because to properly quantify information flow in the brain we may also have to understand the mind; because at the present time we have little ability to distinguish between what constitutes information and what constitutes noise; because neural information is more temporal, and perhaps more nonlinear, than has traditionally been assumed; because currently there are only a few

physiological and anatomic dimensions of a neuron that we can and do measure —as opposed to the millions or more dimensions that are actually there and that deserve to be measured; because the experiments we perform are all designed to measure average, rather than maximal or optimal, capacity or operation of neurons; because to properly measure neural information it is also necessary to measure redundancy, autocorrelation, and hierarchical change (i.e. change of change of change...); because if one is to truly measure a neuron's capacity the neuron must be measured in vivo, or in its natural environment and employment; because the transmission of information among neurons may be multiplexed to an unknown degree; because our present ways of measuring the informational capacity of neurons may distort what is measured and hence yield false data; or because of other reasons.

4. Gene's CAPACITY for recombination. → What independent factors (stimulate or cause) testing of a thing's maximum capacity?

Perhaps the capacity of a genome for genetic recombination is not time-invariant but rather varies over time in a major way. If there is such variation, it might be random, periodic, or controlled; and if controlled, the regulation might be local, global, from elsewhere in the cell or body of the organism, or by events outside the organism.

Conceivably the most important use that life makes of genetic recombination is to facilitate adaptation or respeciation during rare moments of ecological disaster in Earth's history. Or its key role might simply be to assist with the normal transitions between or emergence of new species.

But what might be meant by the words "independent factors" in the deutomeral question, either here or in some other ideonomic proposition? Factors that are mutually independent, either facultatively or essentially, in respect to their causes, effects, behaviors, or natures? Factors that the capacity of the thing is a function of, but which are not in turn, or in any way, a function of—or controlled or influenced by—that capacity?

Of course there are no simple answers to these questions. Instead the questions provide options.

One might wonder whether transient genetic recombinations occur within different somatic cells in the course of an organism's lifetime that serve the momentary special needs of the individual cell in which they occur, but which are perhaps reversed shortly thereafter, once the needs have been met?

The ideonomic proposition seems a valid and good one.

5. CAPACITY OF the dinosaur fauna to adapt to the evolution of mammals. → What is needed to expand a thing's capacity?

The question that is asked here is rather the reverse of that which is more commonly asked. The rarity or unknownness of the opposite question —which, in effect, would have us ask whether, or in what measure, the dinosaurs may have lasted longer than one would have thought possible, say under the circumstances of their actual extinction—may be what justifies its consideration. This is because one point of view often becomes so dominant that it wrongfully prevents the simple asking of another question, even though the asking of the latter might paradoxically be a way of providing suppor for the dominant view, or two points of view treated as opposite might not in fact be wholly contradictory. Thus there must be senses in which dinosaurs lasted both longer and shorter than one might have expected.

Asking what would have been needed to allow the dinosaurs to adapt—that presumably the dinosaurs did not have or acquire—can assist with the search for and discovery of other 'negative' features of dinosaurs, and other 'positive' (and advantageous) features of the mammals that evolved 'to' displace them.

Then, again, it might develop that the assumption that dinosaurs lacked certain features—that may or may not have been possessed by mammals—has been wrong. Recently, for example, some paleontologists have proposed that at least some dinosaurs may have been warm-blooded, swift and agile, parental, familial, smarter than historically believed, etc.

Any such weakening of assumed mammalian advantages would diminish the case for theories about why the dinosaurs disappeared that postulate a greater ability of mammals to compete with dinosaurs directly, or an ability to outlast the dinosaurs by making more efficient use of changing resources in the environment or simply by being hardier in the face of climatic change.

6. Eyeball's CAPACITY for orbital rotation. → What factors (increase or decrease) capacity over time?

As the extraocular muscles age their suppleness, innervation, fiber population, contractive power, resistance to fatigue, responsiveness to neural stimulation, cooperative efficiency, and degree and of course speed of contraction will all diminish. So will the energy, speed, and efficiency of the nervous system that controls them. These factors will decrease the eyeball's capacity for orbital rotation.

Inevitably there will be other changes that tend to increase it—in some sense or other, such as mental training or perhaps more simplified eye movement—but in most respects the rotational capacity of the eye must decrease in a net sense over later life.

In early life, on the other hand, the capacity to rotate the eye presumably increases with time in most or all respects.

It would be of great interest to learn whether or not evolution has installed in the eye and visual system any compensatory devices to offset aging, either directly or by 'tricks', or any physiological counter-trends that, in effect, exhibit 'negative aging'. Or is aging throughout the body either positive or zero, but never negative?

Future biological engineering of human beings could encourage or initiate such negative aging; human development, as a result, would be augmented.

"ROBERT CLARK'S TEN 'GENERIC CONSEQUENCES' OF CAPACITIES' TESTED AGAINST 'EXAMPLES OF CAPACITIES'"

Are the Deutomeral Consequences Apposed To the Protomeral Examples Often Pertinent?

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1. Body's CAPACITY for WITHSTANDING disease. ⟶ Multiple instabilities?
2. CAPACITY OF a child for tolerating trauma without lasting psychic injury. ⟶ Patterns of growth and evolution?
3. Hydroelectric power plant's generative CAPACITY. ⟶ Absorptions of energy?
4. Digestive system's CAPACITY for using an exotic diet. ⟶ Absorptions of energy?
5. CAPACITY OF an economy to recover from a depression. ⟶ Patterns of growth and evolution?
6. CAPACITY OF Charles Dickens' novels to go on serving successive generations of schoolchildren. ⟶ Patterns of conflict?
7. Sensory receptor CAPACITY (e.g. total sensa or bits per second). ⟶ Repetitive actions?
8. CAPACITY OF the human mind to absorb new scientific knowledge. ⟶ Patterns of conflict?
9. Biological evolution's CAPACITY for secular acceleration. ⟶ Patterns of conflict?
10. Military tactics' CAPACITY for rapid transformation. ⟶ Repetitive actions?
11. Military tactics' CAPACITY for rapid transformation. ⟶ Uncertainties of description?
12. CAPACITY OF an electrical fuse to endure an excessive current without blowing. ⟶ Uncertainties of prediction?
13. Switching CAPACITY. ⟶ Multiple instabilities?
14. CAPACITY OF a child for tolerating trauma without lasting psychic injury. ⟶ Absorptions of energy?
15. CAPACITY OF a bathyscaphe for withstanding ultra-high pressures deep in the ocean. ⟶ Patterns of decline and decay?
16. Painting's CAPACITY for saying many things simultaneously. ⟶ Patterns of decline and decay?
17. CAPACITY OF the body to FIGHT disease. ⟶ A sense of mystery, wonder, and efflorescence?
18. CAPACITY OF the brain for experiencing intense pleasure. ⟶ Patterns of conflict?
19. CAPACITY OF the brain for experiencing intense pleasure. ⟶ Patterns of growth and evolution?
20. CAPACITY OF a computer for organizing great masses of information. ⟶ A sense of mystery, wonder, and efflorescence?
21. Literary theme's CAPACITY for novelistic development. ⟶ Patterns of conflict?
22. Military tactics' CAPACITY for rapid transformation. ⟶ Pregnancy?
23. Thundercloud's CAPACITY for generating lightning discharges. ⟶ Repetitive actions?
24. Mind's CAPACITY for ignoring sensory distractions. ⟶ Multiple instabilities?
25. CAPACITY OF a phonograph for faithfully reproducing exotic recorded sounds. ⟶ Pregnancy?
26. CAPACITY OF a high cliff to resist the interminable onslaught of the tempestuous sea. ⟶ Pregnancy?
27. CAPACITY OF a society to assimilate new laws enacted by its legislature. ⟶ Multiple instabilities?
28. Body's CAPACITY for tolerating a toxin. ⟶ Multiple instabilities?
29. Stream's sediment transport CAPACITY. ⟶ A sense of mystery, wonder, and efflorescence?
30. Enzyme's catalytic CAPACITY. ⟶ Multiple instabilities?
31. CAPACITY OF an electrical fuse to endure an excessive current without blowing. ⟶ Patterns of growth and evolution?
32. Atmosphere's CAPACITY for productive (precipitation-increasing) nucleation. ⟶ Multiple instabilities?
33. Information channel CAPACITY. ⟶ A sense of mystery, wonder, and efflorescence?
34. Biological evolution's CAPACITY for secular acceleration. ⟶ Patterns of decline and decay?
35. CAPACITY OF the biological environment to endure industrial stress. ⟶ Patterns of decline and decay?
36. Material's CAPACITY for being magnetized. ⟶ Patterns of decline and decay?
37. Information channel CAPACITY. ⟶ Uncertainties of prediction?
38. CAPACITY OF the brain for experiencing intense pleasure. ⟶ Pregnancy?
39. Balloon's CAPACITY for expansion before bursting. ⟶ Uncertainties of prediction?
40. CAPACITY OF a battery for absorbing electric charge. ⟶ Patterns of conflict?
41. CAPACITY OF the human eye for discriminating minute details. ⟶ Patterns of decline and decay?
42. Macromolecule's CAPACITY for structural variation. ⟶ Multiple instabilities?
43. Mechanical wristwatch's CAPACITY for future improvement. ⟶ Multiple instabilities?
44. CAPACITY OF a phone to contain adolescents forcing themselves into it out of sheer zaniness. ⟶ Repetitive actions?
45. National economy's CAPACITY for RECOVERING from wartime destruction. ⟶ Patterns of growth and evolution?
46. Painting's CAPACITY for saying many things simultaneously. ⟶ Pregnancy?
47. CAPACITY OF a battery for absorbing electric charge. ⟶ Uncertainties of prediction?
48. CAPACITY OF a phone to contain adolescents forcing themselves into it out of sheer zaniness. ⟶ Uncertainties of prediction?
49. CAPACITY OF a factory for being reconfigured. ⟶ Uncertainties of description?
50. Enzyme's catalytic CAPACITY. ⟶ Uncertainties of description?
51. CAPACITY OF a homeostatic air-conditioner for cooling a room during torrid weather. ⟶ Patterns of conflict?
52. Balloon's CAPACITY for expansion before bursting. ⟶ Uncertainties of description?
53. CAPACITY OF a seedling for further growth in a favorable environment. ⟶ Uncertainties of description?
54. CAPACITY OF art for assimilating technological innovations. ⟶ Uncertainties of prediction?
55. Species' adaptive CAPACITY. ⟶ Patterns of conflict?
56. Slurry pipeline transport CAPACITY. ⟶ Patterns of decline and decay?
57. Atmosphere's CAPACITY for creating storm systems. ⟶ Patterns of growth and evolution?
58. CAPACITY OF a man to work efficiently while going without sleep. ⟶ Repetitive actions?
59. CAPACITY OF Charles Dickens' novels to go on serving successive generations of schoolchildren. ⟶ Patterns of decline and decay?
60. CAPACITY OF a computer for organizing great masses of information. ⟶ Uncertainties of description?
61. Neuron's CAPACITY for conveying unusual information. ⟶ Patterns of growth and evolution?
62. Human memory (short and long term) CAPACITY. ⟶ Uncertainties of description?
63. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion. ⟶ Pregnancy?
64. CAPACITY OF a seedling for further growth in a favorable environment. ⟶ Absorptions of energy?
65. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion. ⟶ A sense of mystery, wonder, and efflorescence?
66. Slurry pipeline transport CAPACITY. ⟶ Patterns of conflict?
67. CAPACITY OF a man to work efficiently while going without sleep. ⟶ Patterns of decline and decay?
68. Stream's sediment transport CAPACITY. ⟶ Uncertainties of description?
69. CAPACITY OF a river to erode the land. ⟶ Patterns of growth and evolution?
70. CAPACITY OF a battery for absorbing electric charge. ⟶ Patterns of decline and decay?
71. Sensory receptor CAPACITY (e.g. total sensa or bits per second). ⟶ Pregnancy?
72. Organism's CAPACITY for withstanding starvation. ⟶ Pregnancy?
73. National economy's CAPACITY for RECOVERING from wartime destruction. ⟶ A sense of mystery, wonder, and efflorescence?
74. Digestive system's CAPACITY for using an exotic diet. ⟶ Patterns of growth and evolution?
75. CAPACITY OF an expert to answer questions about hypothetical situations. ⟶ A sense of mystery, wonder, and efflorescence?
76. Biological evolution's CAPACITY for secular acceleration. ⟶ Patterns of growth and evolution?
77. CAPACITY OF a bridge to support an excess load without failing. ⟶ A sense of mystery, wonder, and efflorescence?
78. Loudspeaker's CAPACITY for producing undistorted sound. ⟶ Multiple instabilities?
79. CAPACITY OF a window to resist gale-force winds. ⟶ Uncertainties of description?
80. Person's CAPACITY for self-deception. ⟶ Uncertainties of description?
81. Enzyme's catalytic CAPACITY. ⟶ A sense of mystery, wonder, and efflorescence?
82. CAPACITY OF the human mind to absorb new scientific knowledge. ⟶ Patterns of growth and evolution?
83. Scientific instrument's CAPACITY for giving fast responses to environmental changes. ⟶ Repetitive actions?
84. Body's CAPACITY for WITHSTANDING disease. ⟶ Patterns of decline and decay?
85. CAPACITY OF a scientific principle to be generalized sans failure or fundamental distortion. ⟶ Uncertainties of description?
86. CAPACITY OF a bridge to support an excess load without failing. ⟶ Patterns of growth and evolution?
87. Ocean's pollution CAPACITY. ⟶ Absorptions of energy?
88. CAPACITY OF the human eye for discriminating minute details. ⟶ Repetitive actions?
89. Tinkertoys' CAPACITY for being rearranged into novel shapes or analogues of things. ⟶ Repetitive actions?
90. Firm's CAPACITY for exploiting a windfall or opportunity. ⟶ Multiple instabilities?
91. Mathematical equation's CAPACITY for processing a numerical task. ⟶ Uncertainties of prediction?
92. CAPACITY OF a muscle for contraction and relaxation. ⟶ Patterns of decline and decay?
93. CAPACITY OF a phonograph for faithfully reproducing exotic recorded sounds. ⟶ Absorptions of energy?
94. Heat CAPACITY. ⟶ Patterns of growth and evolution?
95. Genome's CAPACITY for synthesizing ARBITRARY phenes. ⟶ A sense of mystery, wonder, and efflorescence?
96. Body's CAPACITY for tolerating a toxin. ⟶ Patterns of growth and evolution?
97. CAPACITY OF a nation to WITHSTAND military attack. ⟶ Absorptions of energy?
98. Mechanical wristwatch's CAPACITY for future improvement. ⟶ Patterns of decline and decay?
99. Electric charge or electron storage CAPACITY. ⟶ Patterns of decline and decay?
100. CAPACITY OF a nation to WITHSTAND military attack. ⟶ Patterns of growth and evolution?
101. Switching CAPACITY. ⟶ Patterns of decline and decay?
102. CAPACITY OF a high cliff to resist the interminable onslaught of the tempestuous sea. ⟶ Uncertainties of prediction?
103. Balloon's CAPACITY for expansion before bursting. ⟶ Absorptions of energy?
104. Thundercloud's CAPACITY for generating lightning discharges. ⟶ Uncertainties of description?
105. Atmosphere's CAPACITY for productive (precipitation-increasing) nucleation. ⟶ Repetitive actions?

— ROBERT CLARK'S ORGANON, "GENERIC CONSEQUENCES OF CAPACITIES" —

If you refer back to the master table "Small Organons Prepared..." and find in it the 10-item organon that was contributed to it by Harvard Law School professor Clark, you will see that it divides the general effects of general capacities it names into two groups: (A) six having to do with features of the external world, and (B) four having to do with effects on observers and thinkers. It is therefore a minimal or bi-level hierarchy. Probably it was inevitable that my legalist friend would submit a hierarchy, for he is infatuated with the subject. He has published an ideonomic article on organizational hierarchies based on analogies to plant anatomy. No doubt his hierarchism can be psychogenetically traced to the fact that he was once in training to be a Roman Catholic priest.

As in the previous section, we will examine a table representing a random sample of a far larger idea space that was created by a computer using the 'two-dimensional' intersection of the items of the small organon with the resource organon "100 Examples of Capacities". The dyadic ideogenetic formula that produced the ideonomic propositions had the same structure as the earlier formula: protomeral example of a capacity, followed by an arrow, followed by an interrogatory deutomer, which in this second exercise asked one to consider whether some random generic consequence of capacities might in fact be a particular consequence of the antecedent example of a capacity, and if so, what the implications might be. (Please see the table "Robert Clark's Ten 'Generic Consequences of Capacities' Tested Against 'Examples of Capacities'...")

1. Body's CAPACITY for WITHSTANDING disease. → Multiple instabilities?

In principle, even simple forms of capacity can give rise to multiple (coexistent) instabilities, but complex forms of capacity, or the capacity of a complex thing, are especially apt to produce such plural, diverse, or complex instabilities.

Conceivably the body's mechanisms for fighting and preventing disease represent a complex system that ordinarily is relaxed into an N-dimensional dynamic equilibrium. This system may derive its peculiar power from the singular complexity of such "metastable polyequilibrium". Perhaps the immune system has been evolved into a uniquely indeterminate, protean, and pluripotent state—'a nursery of all possible things'—marked by fantastically high 'organizational energy' and 'informational richness or density'. It may have been perfected to detect and explosively amplify the most minute and arbitrary physical, chemical, and biological patterns; to counter its enemies with a coinfinite deviousness and with total and self-divergent change; to instantly change—in a synchronous and coordinated way—in a thousand or more dimensions; to perpetually recombine, permute, transform, transvalue, converge, diverge, and adjust its set of elements; etc. (All this pro tanto, of course.)

Contagious diseases may have evolved, and may even now evolve, precisely by emulating the most fundamental, essential, law-like, and stable features of the organism they attack (i.e. parasitize), thereby inducing the protective counter-evolution by the parasitized (or all) organisms of pseudo-opposite features: such as multiple instabilities, fake chaos, etc.

The supreme evolutionary importance of fighting disease may also cause disease-fighting mechanisms to have a tendency to develop overcapacity and overactivity. If an organism is too successful at protecting itself from external pathogens, endogenous diseases may emerge or become more important; a species that becomes invulnerable to contagious diseases may cease to profit from a healthy form of natural selection and become dangerously overspecialized as a result. In addition, disease-fighting mechanisms can cause the body to fight itself, not merely in the beneficial sense of removing diseased, defective, and undercompetitive elements—or of fighting endogenous 'diseases' that must constantly have a tendency to emerge—but in the pathological sense of autoimmune diseases and their hypothetical analogs.

2. CAPACITY OF a child for tolerating trauma without lasting psychic injury. → Patterns of growth and evolution?

Psychologists have discovered that children who are the victims of grave trauma have a tendency to subsequently develop either into disturbed or defective children and adults, or into "superchildren" and supernormally tough, able, healthy, achieving, and virtuous adults.

Childhood trauma may therefore have developmental consequences that are both novel and worth studying for the light they can throw, say through exaggeration or contrast, upon normal development. One might also generalize the previous observation: perhaps the massive amount of individually tiny adversities that are found in normal childhood add up to something that is critical to healthy development.

That the net effect of developmental trauma is often highly beneficial could be taken as a sign that normal childhood is not as perfect as is usually assumed and that something important is missing, something that it might be possible to provide in nontraumatic ways.

Attempts to rid childhood of frights, stresses, anxieties, adventures, and dangers—on the assumption that these are debilitating or at least unnecessary—may be profoundly wrongheaded, and could conceivably be doing great harm to the strength of character and general humanity of the future adults who will have been the product of such softheaded "experiential engineering".

3. Hydroelectric power plant's generative CAPACITY. → Absorptions of energy?

That a 'consequence' of a power station's capacity to generate energy is the absorption of energy is of course obvious. The law of the conservation of energy variously demands that the energy cannot be created ex nihilo and so the generator must 'absorb' (receive) it from 'elsewhere' or, momentarily, from some other state (indirectly it is 'taken' from the gravitational pulling, compression, relaxation, 'torquing', etc—the process permits and indeed requires many diverse descriptions or 'codescriptions'—of the million-to-the-power-of-five-water-molecule water column that drives the dam turbine; and directly, from the turbine); that the energy exceeding the virtual energy-storage capacity of the generating station be absorbed elsewhere (used by remote consumers) so as to make room for the generation ('absorption') of additional energy; that such energy as is inevitably lost from the 'power circuit' (in generation,

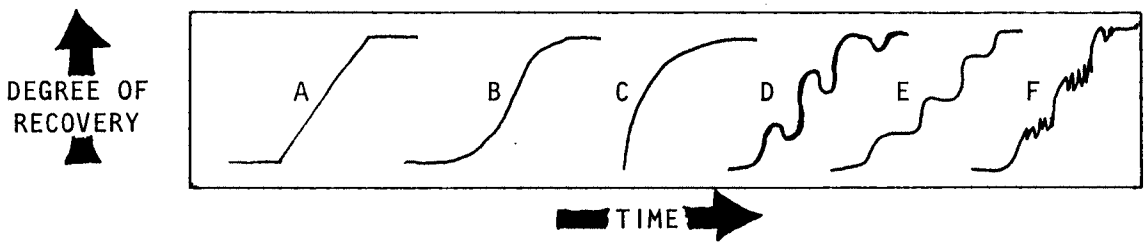
storage, transformation, transmission, and use) through its inefficiencies (thermodynamic, inductive, radiative, and other), be 'absorbed and desorbed' by a cascade of environmental elements (as heat outflows in fractured neighborhood rock and the granular soil, for example); etc.

4. Digestive system's CAPACITY for using an exotic diet. → Absorptions of energy?

The answer is yes but it is trivial. Extraction of energy is half of the function of digestion.

5. CAPACITY OF an economy to recover from a depression. → Patterns of growth and evolution?

Clearly patterns of growth and evolution are an inevitable consequence of economic recovery from any depression. But they can be this in different ways and senses that are of interest when worked out in the mind. Again a graph with various alternative curves can be used to suggest and distinguish ideas:



Over the long term, any economy grows and evolves. But perhaps the qualitative course such growth and evolution takes (over the same quantitative range) is different when it is preceded by a depression? If so, is there a tendency for it to be more efficient or less efficient (than in the smooth case)? From a secular perspective, are depressions and recessions—or economic cycles in general—good, bad, or of no consequence? Arguments can easily be made for each of these alternatives.

6. CAPACITY OF Charles Dickens' novels to go on serving successive generations of schoolchildren. → Patterns of conflict?

The works of the great novelist have so many different and unrelated virtues that their appeal has outlasted many sociocultural cycles and much drift and evolution of tastes, customs, and environment. Yet having this capacity has inevitably produced many types and patterns of conflict.

The different types of external changes, for example, have not been synchronous or equal. Class differences have narrowed even as certain familial cruelties have persisted.

Social reforms Dickens sought to spur through his novels have in many instances been achieved, and as a result, although the novelist's reformatory spirit probably remains just as timely nowadays, the specific problems around which his stories were built have become alien to today's students.

The capacity of the novels to serve so many successive generations has brought them into conflict with those more recent works of literature that might have replaced them, and has produced conflicts among advocates.

7. Sensory receptor CAPACITY (e.g. total sensa or bits per second). → Repetitive actions?

The example of a capacity being referred to here might perhaps be expressed better as 'The capacity for a sensory receptor to receive, process, and transmit sensory information...'

That "repetitive actions" could easily be a consequence—as well as a cause or source—of receptoral capacity, or of an increase of same, is clear. The activation and discharge of any sensory receptor is a unit of an endlessly repeating cycle. The receptor, more generally, is comprised of an intricate system of biochemical and biophysical processes that repeat themselves over and over again to give the receptor its capacity for handling sensory data.

Precisely repetitive actions may be necessary to perfect the accuracy of the receptor's messages to the nervous system. A cyclic process of especially high frequency may aid the quantification and encodement of the torrential stimuli that are constantly being received from the external world.

Molecules and membranes that have been deionized must be reionized.

The sensory capacity of a receptor may even depend upon a vast spectral hierarchy of temporal cycles and its actional harmonics.

The body's far-flung receptors are often under the efferent control of the central nervous system, and the effective capacity of a receptor may well depend in part upon the repetitive precision or dynamics of such interactive modulation.

The ideonomic proposition would appear to make a great deal of sense and to give rise to a valuable discussion.

THE SIGNIFICANCY OF COMBINATIONS

Patrick Gunkel

Why is it that combinations of ideas, or combinatorial ideonomy, have so great an interest to the human mind? Whence the fascination? For that matter, what explains the *general* interest that combinations of all manner of things have? Of course, *all things*—whether words, objects, sensa, events, realms, or people—are in effect simply 'ideas in the mind'.

These are profound questions and exceedingly hard to answer. ***But a number of hypotheses are decidedly worth considering:***

(1) The *real* [importance, meaning, or control] of the [ideas and words] we use may not actually lie at that one level, or solely at the one level, [of which we are conscious or at which we normally operate or think we operate or would assume we operate]; instead it may reside at some higher or lower level, or be distributed over a [variety, continuum, field, hyperspace, or paradoxical *discontinuum*] of levels or quasi-levels—or it may be holistic or holonomic.

(2) What we think of as [distinct, discrete, and self-existent] ideas may in reality be *operations or laws*—or simply [states, products, illusions, symbols, self-references, associations, transient conditions, or events] created by [mental operations or existential activities].

(3) Not ideas but their variations and variances, or possibly not even the latter but rather the covariances and contravariances of ideas, or even emergent patterns, may be what is truly or most important.

(4) The value of combinations (in both the nounal and verbal sense) may not be *'positive'*—or wholly or mainly positive—but *'negative'*. Say in the sense that by [casually or systematically] consulting them the mind is better able to [recognize, turn aside, preclude, understand, extinguish, or cope with] 'negative' [things or ideas]: *such as* [errors, illusions, fallacies, misconceptions, pathoses, defects, irrelevances, noise, trivia, fictions, idiosyncrasies, quirks, mere coincidences or chance, mimics, redundancies, excessive symmetries, redundant recurrences or circularities, redundant transformations, close analogs, dense relata, redundant paths, divertive lures, half-truths, *etc*].

(5) The chief benefit of combination may be that, possibly in a unique way, it: [exercises the mind, motivates the mind, energizes the mind through recreational acrobatics or the stimulation of play, leads the mind to Socratic self-discoveries and self-mediated discoveries, self-liberates the mind, catalyzes the growth of knowledge (and knowledge of knowledge) by defining the possibilities and structure of knowledge and of thought or of the mind itself, *etc*].

(6) Not *things* but the *relations* of things, or transcendent perspectives, may be what are [fundamentally or mainly] important.

(7) [Things, reality, or possibility] may be [vastly or even infinitely] more [complex and diverse] than what they appear to be or than they have traditionally been assumed to be.

(8) Things in *Nature itself*, or intrinsically, may arise from combinations and combinatorial [processes and laws], possibly even

[through and as] a combinatorial [hierarchy, metastructure, or metastructure-of-metastructures].

(9) The *brain itself* may operate via combinatorial [processes, laws, mathematics, elements, principles, relationships, structures, or organs]; and possibly these are [evoked, emulated, appproached, tapped into and exploited, mastered, provoked, sympathetically interacted with, complemented or supplemented, overridden, redirected, rendered more conscious or explicit, corrected, *e/vc*] by combinatorial ideonomy.

(10) Combination may serve to [define, classify, order, or exhibit] the total [set, range, or landscape] of possibilities, *from which* [advantageous, optimal, systematic, and unhurried] *selection can then be made*.

(11) The fundamental combinatorial [elements, dimensions, properties, phenomena, *etc*], of Nature or the mind, may be unexpectedly finite or quasi-finite.

(12) *Surrogate* combinations of *surrogate* ideas may provide a : [neutral, analogical, illusionistic, mentally-associative, mnemonic, metonymic, oblique, tangential, destabilizing *'jamais-vu'*), ambiguous or all-suggestive, noisy or busy, protean, irritative, creatively self-contradictory, omnidirectional, divergent, synthetic, vergent, plexural or multiplexed, recursive, random or stochastic, apeiron-like, "chaotic", self-organizing, 'template soup-like', *e/vc*] : medium for the emergence of ideas.

There are many remarkably interesting things that can be said, at the proper moment, in connection with these twelve generic hypotheses.

But, for example, it could be surmised that the various known Heisenberg uncertainty conjugates or relations, in physics, actually merely represent our discovery of the very first and simplest examples of innumerable other instances of certain *inherently indeterminate combinations* of certain sets of certain things or ideas. (This attractive speculation is pertinent to several of the hypotheses.)

To give another example, the physicist John Wheeler commented to me that the significancy of combinations might relate to their *having more entropy*.

EXCERPT FROM 1991 January 17 LETTER FROM PATRICK GUNKEL TO EDWARD FREDKIN:

What I am really trying to do goes way beyond just finding a grant to extend my project for two years, so that I can finish writing (a first edition of) the book on that subject.

My hope is that circumstances will emerge that will enable me to spend the remainder of my working (vigorous) years on the sole—but to the finite human lifetime, *disproportionate*—task of completing the creation of a minimal picture of what ideonomy is or could be.

Such a task would encompass the enumeration of the principles and concepts of the promising new science; progressive working out and demonstration of a great body of methods (as is already proceeding); correcting what hitherto have been extreme but unavoidable inequalities in the degree of development of the hundreds of divisions of the naturally huge (but integral) science [thus only last week did I *begin* to construct the division "Probabilities", whose theme is central to modern science—*begin* to construct it, but with what are already some dazzling results!]; painstaking identification of tens-of-thousands of fundamental so-called "ideosets" (sets of ideas) and "ideoclusters" (natural clusters of ~2^1-2^3 supremely important ideas); and the use of statistics and massive numbers of intuitive valuations [weighting, ranking, chaining, grouping, differential classification, *etc*] to experimentally discover and map thousands of "ideospaces" (transcendental or merely cognitive spaces of ideas), "ideostructures" (configurations of ideas in such spaces), "metastructures" (grand universal manifolds and lattices of ideas and things), and "ideic phenomena and stories" [*e.g.*, temporal phenomena and events naturally exhibited by or associated with ideas or all of the foregoing; and—what are equivalent to mathematical series—'stories' that my work has clearly shown to be *implicitly* present in all ideas and that ideas are eager to tell *about themselves*, via semantic deconvolution and recursion, when assisted by a computer—which simply acts as their 'voice'].

The life task I speak of would *furthermore* require that I construct—in a systematic and complementary fashion—myriad [generic and special] organons (the concept of which is already familiar to you) and "ideoformulas" (the ideonomic analogs of mathematical formulas, the propositions of logic, or the functions and other operational strings of computer science); define and explore millions of [actual and potential] [combinations, permutations, transformations, interrelations, interactions, and cooperations] of ideas, that are or may be [meaningful, important, and productive], organize the whole (on the basis of what comes to light) in ever more [powerful, intricate, simple, symmetric, and <logically and cosmologically> *necessary*] ways, characterize for other persons the [generic and specific] [applications and implications] of the all, and *myself* make productive use of the constantly developing [means, methods, insights, concepts, and logics]; anticipate and aid the construction—and synthesis with ideonomy itself—of diverse forms of ["ideotechnology" and ideotechnologic devices] (any and all [ideonomic *or* ideational] technology is termed ideotechnology); guide the coevolution of ideonomy and the complex of fields closely related to it (such as cognitive science, artificial intelligence, information science, or the very new disciplines of artificial reality and artificial life); and—as a worldwide community of ideonomists presumably comes into existence in the years ahead, and ideonomy itself becomes ever more complex and broken up into specialties and the inevitably warring schools—act socially to maintain the unity and internal intercourse of ideonomy (which I could do *ex officio*, as its presumptive Founding Father).

NOTES ON WONDERFUL GROUP OF INTERRELATED IDEAS DEVELOPED IN DISCUSSION WITH BETSY DYER ON 1985 MAY 4, DEALING GENERALLY WITH POSSIBILITIES FOR QUASI-BIOLOGICAL EVOLUTION AND SOPHISTICATION IN THE PURELY CHEMICAL REALM:

THE BROAD THEMES:

1. Possibilities for QUASI-BIOLOGICAL structures and processes having evolved in molecules: A. Essentially SANS any biological HELP;

2. Possibilities for QUASI-BIOLOGICAL structures and processes having evolved in molecules: B. Having had at least SOME, more or less necessary biological HELP, either passive (environmental) or active;

3. Possibilities for the evolution and existence of **QUASI-GEOLOGICAL and QUASI-METEOROLOGICAL processes, structures, and phenomena** in macromolecules and micromolecules, including analogs of the following:
   (1) Rivers,
   (2) Davis-type erosion cycles,
   (3) Orogeny,
   (4) Soil and soil layers,
   (5) Volcanoes,
   (6) Caves and speleogenesis,
   (7) Whirlpools and eddies,
   (8) Ocean waves,
   (9) Clouds, storm fronts, and thunderclouds,
   (10) Lightning,
   (11) The atmosphere (a 'pericellular atmosphere');

4. **Possibilities for** the evolution and existence of both **LOW- AND HIGH-TECHNOLOGY 'MACHINES'** (mechanical structures, processes, and systems) **in** (nonbiological and biological) **molecules**, including the following:
   (1) Photo-mechano-electrical generators of electricity (even in photosynthesis),
   (2) Capacitors or batteries to store electrical energy,
   (3) Simple and complex electrical, electronic, or even photonic circuits (with analogs of familiar components),
   (4) Augers or drills (of bacteriophages??) to drill holes in the cytomembranes of invaded cells;

5. **Possibilities for** the evolution and existence 'intra-molecular' equivalents of **all of the MAJOR BODILY SYSTEMS** of organisms, including analogs or precursors of the following macroorganismal systems:
   (1) Digestive,
   (2) Eliminative,
   (3) Skeletal,
   (4) Muscular,
   (5) Nervous,
   (6) Sensory,
   (7) Endocrine,
   (8) Circulatory,
   (9) Reproductive;

6. These forms of 'pure molecular evolution' may have been what

preceded and GAVE RISE TO conventional LIFE or biological evolution.

SOME SPECIFIC IDEAS:

1. There should exist various literally **INTRA-MOLECULAR CHEMICAL REACTIONS** and mechanical operations in which one site on or within a molecule acts distally on another site on or within the same molecule (via diffuse chemical reactions, 'directed' [actively site-targeted] chemical reactions or quasi-biological processes, dispatched supra-chemical entities [à la trucks, chemical messengers, robots, workers, or the like], electrically-wired messages, 'radio messages', temporary or permanent arm-like or tentacular appendages, endo- or exo-skeletomuscular systems, or the like);

2. Macromolecules, at least, should have **things like DIRT**, scratches, broken bones or nonfunctional (unrepaired) parts, garbage, etc (on their surfaces or in their interiors);

3. Molecules probably have something **like ELECTROENCEPHALOGRAMS** ('electrophysiograms'?);

4. Certain MACROMOLECULES should possess and may have evolved (via purely chemical evolution) a single **CENTRAL CAVITY or many such** cavities, wholly or partly closed to the environment, or even a series of concentric 'cavities' or closed spaces, possibly of a tendentially spherical shape; molecules may use these cavities to more or less actively or passively engulf (ingest) other, smaller molecules, or pieces of larger molecules or of environmental materials, say in an amoebic, jaw-and-esophagus, or trap-like manner, to digest, assimilate, or chemically process and transform molecules or materials, and to afterwards eliminate the residue by returning it to the environment; even if of a non-opening nature, these cavities may have evolved because they possess—or were able to develop—various special chemical and physical characteristics, processes, and mural or floating components; these cavities may have been the true origin of biological cells and possibly other (spherical and completely nonspherical) organelles; there may even have been a prebiotic 'purely chemical' ecosystem of coevolutionary molecular species in these intra-molecular cavities, and these complementary and competitive chemical species may have been the direct antecedents of 'true' biological species, organelles, biomolecules, and biochemical processes; in effect, contrary to the usual picture, primordial cells may have begun, not as hollow 2-spheres, but as 3-spheres or as 2-spheres with arbitrarily thick walls or multiple cavities;

5. Some molecules should have the equivalent of an outer membrane or **SKIN** or of a multilayer derma, possibly with the development of various systems of proto-organellic submolecules, chemically differentiated sites, micellar regions, or virtual organelles—playing specialized transport, processing, attractive, homeostatic, etc roles;

6. Some molecules, especially large and complex ones, should exhibit a multitude of filamentous, ciliar, setiform, hair-like, microtubular, and even mat-of-**HAIR-LIKE** (myceliar) **STRUCTURES** on their surfaces; some may even have the equivalent of a miniature microtrabecular matrix of hollow tubes in their interior;

7. Some molecules should have structures serving (surprisingly complex and seemingly 'purposeful') **external and internal MOVEMENT of a quasi-biological kind** (including intra-molecular, epi-molecular, or even inter-molecular mechanical transport, rearrangements, and

'metamorphoses', as well as external locomotion, reflexes, tropisms, taxes, or even quasi-ritualistic patterns of behavior); they may even behave in ways suggestive of the sensorimotor reactions of simple animals;

8. The absolute totality of the chemical properties and behavior that characterize a given molecular species, particularly in the case of the very largest molecules, must be practically inexhaustible and only infinitesimally known or explored; it must span a **temporal range** (a range of characteristic time constants of diverse sub-phenomena, or of temporal stabilities and instabilities) extending from more than billions of years down to attoseconds, from the eternity of >10^17 seconds to the instantaneity of <10^-18 (**>>117 octaves**); because of this incalculable temporal complexity and combinatorial polymorphism, individual molecules must continually modify their behavior in response to minute environmental contingencies and their own kaleidoscopic internal history, and the history of the earth may have provided a wonderful opportunity for these molecules to have evolved in a **'PURELY MOLECULAR'** sense by processes of natural selection operating outside biological **EVOLUTION** proper, but over similarly vast periods of time;

9. The traditional picture of molecular species as delomorphous—as having a single, specific, fixed, characteristic, simple, wholly endogenous form—should be tested to see whether it is wrong, in the sense that it deserves to be superseded by **a more idiomorphous** and AMORPHOUS **CONCEPT OF** what **a given MOLECULE** or molecular species is actually like.

"SIMPLE COMBINATIONS OF DIVISIONS"

Patrick Gunkel

About the simplest task that can be done by means of combinatorial ideonomy is that of exploring the possible elementary combinations of two or more whole divisions of the science.

The superficial crudity of such investigations is deceptive, for few things in ideonomy are more critical [to the initial determination of the <nature and possibilities> of the field, to it's early self-organization and ongoing <growth and evolution>, to that crystallization of a global structure without which specific ideonomic research would have to remain isolated within ideonomy itself and be unable to profit from—or contribute to—the power of the whole, and to making the would-be ideonomist acquainted with both the complex personality and the overwhelming hidden simplicity of his discipline].

But what is to be meant by *combining divisions*? *How* is this to be done? Are there *different ways* of doing it? *Why* is this being done? What would be expected to *result* from it? What *does* result? And what ultimately are to be *done* with these results?

Here are some other questions that will be addressed in this chapter:

Which of ideonomy's divisions are apt to combine in the most interesting and important ways *with divisions in general or universally*? Which divisions are apt to be more selective, to have a more [narrow or specialized] range of other divisions with which they [naturally, insightfully, or usefully] [combine or otherwise relate]? Finally, what divisions should be the most resistant to any process of divisional combination?

How can that which results from the combination of certain divisions be used to determine other combinations of divisions that it might then be appropriate to submit these results to for further processing or so that they can be combined in turn with additional results?

Here are some senses in which divisions can be combined, or some specific reasons for combining them:

The attempt to combine two divisions contrasts them and thereby reveals their actual [structure and content].

One can explore how divisions might combine to [create or suggest] possible new fields of [research or endeavor] [that would be expected to exist in the future or that might be initiated now].

Simple comparisons of divisions, or attempts to combine them, may suggest novel ideonomic divisions.

Combinations of divisions can suggest a [need or opportunity] for the creation of numerous ideonomic organons, of both [generic and specialized] nature.

Combining divisions can suggest major ideonomic [concepts, themes, problems, methods, *etc*].

A systematic endeavor to combine divisions *en masse* can lead one to perceive possibilities in the simpler combinations that would otherwise have eluded one.

Probing possible combinations of divisions can suggest important ideonomic formulas. It can also suggest ideospaces that need to be investigated, or whose complementarities are critical to understanding the structure of the natural world.

A larger sense of the ways in which different divisions can be 'combined' may be gotten from **Fig. 67097, "Ways Divisions Can Be *Combined*"**. The combining process can occur *in either* direction (*i.e.*, columns ***A*** —> ***C*** or ***A*** <— ***C***) or in *both* directions (columns ***A*** <—> ***C***). Where it occurs in both, it may do so either *synchronously* or *sequentially*. Moreover, in principle, it may [dependently or independently] involve any *sets* of the entries in the table's three columns.

Fig. 67097,

"Ways Divisions Can Be Combined"

NOTE: Entries in the three columns (**A, B, C**) are combinable *in any order*; should they *seem* to share the same row in the table, that is wholly irrelevant, for the table is in truth rowless.

(A) These Things, *I.A.*, [Belonging To Or Associated With] [One Or More] Divisions:	(B) Can Be:	(C) These Things, *I.A.*, [In, Of, Or Involving] [One Or More] Other Divisions:
Analogies and metaphors	Added to, multiplied with, used to exponentiate, interpolated in, *etc*]	Analogies and metaphors
Analyses	Analogized or shown to be equivalent to	Analyses
Answers and solutions	Co-classified with	Answers and solutions
Concepts	Compared with	Concepts
Constants, variables, factors, and functions	Defined by, used to define, reciprocally defined with, or used to co-define 'third' things in conjunction with	Constants, variables, factors, and functions
Dimensions	Distinguished from	Dimensions
Elements [generic and specific]	Fused, unified, or synthesized] with	Elements [generic and specific]
Evidences, <proofs and disproofs>, arguments, logics, *etc*	Inter-defined with	Evidences, <proofs and disproofs>, arguments, logics, *etc*
Examples	Shown or used to [supplement or complement] (or be [supplemented or complemented] by)	Examples
Generalizations, extensions, and applications	Shown to be identical to	Generalizations, extensions, and applications
Groups and *categories*	Shown to contain or be contained in	*Groups* and *categories*
Hierarchies	Stimulate [ideas about, discussions of, or research in]	Hierarchies
Ideo-structures, ideo-metastructures, and ideo-panstructures] ("ideo-" = [ideic or ideized]; ideized = [<equipped with, being, treated as, or involving> actual ideas, potentiated for possible ideas, ideonomically <prepared, treated, or transformed>, *e/vc*])	Subordinated or superordinated to (or be made to serve or be served by)	Ideo-structures, ideo-metastructures, and ideo-panstructures] ("ideo-" = [ideic or ideized]; ideized = [<equipped with, being, treated as, or involving> actual ideas, potentiated for possible ideas, ideonomically <prepared, treated, or transformed>, *e/vc*])
Ideoclusters	Substituted for or used to obviate	Ideoclusters
Ideonomic formulas	Transformed into, derived from, or intertransformed with	Ideonomic formulas
Ideosets	Treated for symmetries with	Ideosets

Ideospaces	Used to construct things when combined with	Ideospaces
Means, resources, and devices	Used to illustrate	Means, resources, and devices
Measures	Used to make more meaningful	Measures
Methods, operations, tactics, strategies, and systems	Used to modify	Methods, operations, tactics, strategies, and systems
Organons [*e.g.*, lists, ideograms, *etc*]	Used to transcend	Organons [*e.g.*, lists, ideograms, *etc*]
Patterns	Used to [improve, perfect, or evolve]	Patterns
Phenomena and meta-phenomena	Used to [interpret, model, evaluate, criticize, or bound]	Phenomena and meta-phenomena
Philosophies	Used to [structure, order, or sequence]	Philosophies
Principles, advice, rules, laws, *e/vc*		Principles, advice, rules, laws, *e/vc*
Processes and meta-processes		Processes and meta-processes
Products		Products
Properties		Properties
Purposes, motivations, and goals		Purposes, motivations, and goals
Questions and problems		Questions and problems
Referents		Referents
Relationships		Relationships
Schemata		Schemata
Sequences		Sequences
Series, scales, and spectra		Series, scales, and spectra
Standards and ideals		Standards and ideals
Syntheses, gestalts, and perspectives		Syntheses, gestalts, and perspectives
Tests		Tests
Themes		Themes
Theories and hypotheses		Theories and hypotheses
Types, taxons, alternatives, possibilities, and classifications		Types, taxons, alternatives, possibilities, and classifications

THE nMDS IDEOMAP 'GENERIC RELATIONS'

Patrick Gunkel

The *"nMDS Map of the Mutual 'Relatedness' Distances of 15[of 59] 'Generic Relations' [Scaled Via the Triadic Method, Using 59 Intra-Set Scaling Dyads and [15x59]-885 Dichotomic Decisions]"* (**Fig. 9278**) is the product of an exercise, in the key ideonomic division **RELATIONS AND DOCHOLOGY**, that was based on the old tabular organon "59 'Types of Concerns of Relationships' " (see **Fig. 8707**).

The essential nature of the latter organon has always been rather obscure and difficult to precise, either verbally or intuitively, and its title reflects this difficulty. (Problems of this curious sort are occasionally encountered in ideonomy. Conceivably they have the potential to ultimately throw important light on the nature of the mind, brain, logic, and/or Ideocosm.) The organon was originally created as part of a multipartite chart-organon, or *polyorganon*, treating the Universal [Genera and Species] of Networks, in which it served to identify the possible [objective or virtual] interrelationships [within and defining the structure of] [ideonomic or any] networks [their links or their nodes], as well as [among different networks, in <complex or hierarchic> networks, or among their representations].

The taxon-defining elements used to construct this organon in the division **NETWORKS AND DICTYOLOGY** were themselves derived from an earlier but equivalent chart-organon which represented an attempt to comprehensively compile the Universal [Genera and Species] of Hierarchies which underlie all of [physical and mental] reality.

It is an interesting pedigree, then: [1]organon of hierarchy taxa → [2]polyorganon of network [taxa *cum* relations] → [3]universal organon of types of concerns of relationships → [4]organon of universal genera of relations → [5]nMDS map of the mutual relatedness of generic relations → [∞]? (hypothetical derivative organons of the future). Such a sequence illustrates how organons should pullulate and evolve in ideonomy's future.

The table has a subtitular legend which instructs one on how the listed items are to be approached: "READ: *'Relationships [between or among] things may [variously or simultaneously] be [concerned with or based upon]...'* " (Notice that the table could actually be used—recursively—to discover, classify, improve, or control the relationships among the items in the table *itself* and in the derivative nMDS map!)

Proceeding to the analysis of the map:

The **northern** tetradic constellation, $\mathbf{C}_1$: [F]Event + [H]Hierarchy + [K]Origin + [I]Homology : is easily interpreted as a discrete conceptual entity, or as a set of four Relational Genera commonly related to a noumenon whose character may be paronymously evoked, as by the phrase *sequential dependence upon an antecedent*, or by *strict dependence*, or simply by *consequentiality* or *derivation*.

On the other hand, the **western** triadic constellation, $\mathbf{C_2}$: [D]Degree of freedom + [J]Logical modality + [L]Possibility : seems to relate to *divergence* or *separation*, to *ambiguity*, or to the [*partial-dependence, partial independence*] of having a *constrained freedom to change*. ([F]Event could *also* be put in $\mathbf{C_2}$, for both semantic and topographic reasons.)

This is a *freedom* (*per se*) *to differ*, and so appropriately there lies opposite from it the **eastern** hexadic constellation, $\mathbf{C_3}$: [E]Equivalence + [N]Similarity + [B]Contrast + [C]Definition + [A]Aspect + [G]Grouping.

This constellation in effect defines a super-relationship having to do [with *convergence* or *combination*, with *description*, with *interdependence*, with *noninteractive parallellism or comparison*, or with *symmetry*] of relata. These things are related to the northern constellation $\mathbf{C_1}$, but perhaps one could say that the nature of the dependence is no longer causal.

[C]Definition may generate and use [B]Contrast. [B]Contrast is antisyzygially related to [E]Equivalence and [N]Similarity.

Why have [A]Aspect and [G]Grouping been included in $\mathbf{C_3}$? If the relation which one thing presents to another, or in which it is treated in respect to another, is a matter of [A]Aspect, then the relationship is [analogous or related] to a description, [C]Definition, or [E]Equivalence. Similarly, [C]Definition involves [G]Grouping things with respect to other things; and [G]Grouping generally make use of equivalences ([E]Equivalence).

Whereas the northern constellation $\mathbf{C_1}$ essentially defines a *backward super-relationship wherein relata are dependent upon prior superordinate relata*, the **southern** Generic Relations comprising the approximate tetradic constellation, $\mathbf{C_4}$: [G]Grouping + [M]Relevance + [O]Use + [L]Possibility : are of an opposite nature, and involve a *forward super-relationship of the possible applications of present relata to future relata*, or the *open-ended implications of things*.

"THE FUTURE OF IDEONOMY AND ITS IMPACT"
(Anticipatory Calendar)

LAG (yrs)	*YEAR*	*EVENT*
0	1992	***Ideonomy*** **Book Published.**
0.2	1992	**Reviews** In Popular Press and Professional Journals.
0.3	1992	**Companies Begin To *Develop*** First Ideonomic Software **Products.**
0.3	1992	*Gunkel* **Speaking Tour.**
0.3	1992	Massive **World Press** Interest (Interviews and Articles).
0.3	1992	Scattered Scientists and Other **Individuals Begin To** Try To ***Use*** (and Test) Ideonomy.
0.3	1992	**Worldwide Inquiries** To Gunkel.
0.4	1992	*First* **Teachers *Try*** To Use and Teach Ideonomy.
0.4	1992	**People Begin To *Create*** and Extend Ideonomy [Organons, Divisions, Methods, Software, and Hardware].
0.5	1993	*Gunkel* **Collaborates On** Development of Ideonomy **Software.**
0.7	1993	*Gunkel* ***Overview*** **Article** For Major Scientific Journal.
0.8	1993	**'Ideonomic' Neural Nets** *Under Development.*
0.8	1993	**Complementary Fields Explore** How Ideonomy May Be Helpful [A.I., Neural Nets, Hypertext, Hypermedia, Library Science, Creative Thinking, Neuropsychology, Cognitive Science, Linguistics, Etc].
0.8	1993	People Begin To Collaborate On Ideonomic Work *Via Computer Networks* (Precursors and ***Analagen*** **of Idea Banks** For Pure and Applied Ideonomy].
0.9	1993	*Gunkel* Publishes First ***Specialized*** **Articles** On Results and Aspects of Ideonomy.
0.9	1993	**References To** "Ideonomy" Begin To Appear In Journals and Books; Some Use Word To Name What <u>They</u> Have Been Doing Or Propose Doing.
1.2	1993	Others' Journal Articles Start To Report **Results of Attempts To Test and Use** Ideonomy.
1.7	1994	First Ideonomy Software (**Ideaware**) ***Sold.***
1.9	1994	First Ideonomy ***Sessions*** **At Conferences.**
2	1994	First Ideonomy **Conference** Held.
2.5	1995	"Ideonomy" **Familiar *Word* In Relevant *Professions.***
3	1995	Ideonomy A ***Budding*** **A.I. Subfield** (Approach).
3	1995	Pioneer Ideonomy **Company.**
3	1995	***Second*** Ideonomy **Conference** (Hereafter Annual Event).
4	1996	Ideonomic Research Groups Spring Up In Academe and Research Institutes.
4	1996	**Association** of Ideonomists Formed.
4	1996	**Journal** of Ideonomy Started.
4	1996	**Many** Professional and Popular **Books** On Ideonomy.
4	1996	**University Courses** On Ideonomy Appear.
5	1997	"Ideonomy" Almost ***Household*** **Word.**
5	1997	Marketing of the First ***Sophisticated and Universal*** **Ideaware** (*a la* "ThoughtLab").
8	2000	First Ideonomy **Institute.**
9	2001	**Million Organons** Exist.

10	2002	**Name** of Field ***'Free'*** **To Revert To "Ideology".**
10	2002	**Supercomputers** Specially ***Designed*** **To Do Ideonomy** Exist.
11	2003	***1,000*** Professional **Ideonomists** Worldwide.
11	2003	Ideonomy Triggers **Educational Revolution.**
12	2004	***Powerful*** **"Idea Bank"** Computer Networks Exist.
13	2005	First Nobel Prize Won Via Ideonomy.
13	2005	Ideonomy **Doubles** Rate of **Invention** (Patents y^{-1}?) In US.
13	2005	Revolutionary Emergence of **"Kaleidoscopic Industry"** (Due To Ideonomy + A.I.).
14	2006	Strong Development of **"Cognitive Language"** Occurs.
16	2008	**Academic Degree** Offered In Ideonomy.
17	2009	Idea Industry Produces ***1/1,000*** **of** US **GNP** (~$8B/1992$).
18	2010	Ideonomy's **Evolution** ***Mostly*** **Automated** (A.I.-Like).
20	2012	**10,000** Professional **Ideonomists** On Earth; 30% Annual Growth.
25	2017	**Computers** Are ***Mainly*** For **Ideonomy** and A.I..
25	2017	Ideonomy Gains **Departmental Status** At Some Universities.
27	2019	Idea Industry Produces ***1/100*** of US **GNP** (~$100B/1992$).
50	2042	Ideonomy **As Developed and Important As Mathematics.**

"TRANSDIVISIONAL ORGANONS"

Patrick Gunkel

Certain ideonomic organons are termed **generic organons** because they are unusually generic (or general) in nature, content, reference, or utility. The name may or may not be meant to distinguish them from related **specific organons** that actually exist or whose concept has at least been explicitly formulated.

In the course of the Ideonomy Project a determined effort was made to create, or at least imagine, sets of organons answering to the special needs and possibilities of particular Divisions of ideonomy. After a while it was noted that organons of a very similar nature were often appropriate for two or more Divisions or even for arbitrary (all) Divisions.

This fact was regarded as fortunate for several reasons: it tended to imply that the organons that were being created, or such organons in general, have *truly fundamental* reasons for being; it would make the scientific development of ideonomy easier, faster, more direct, and more plannable; and it showed how ideonomy could be used to facilitate its own evolution—or to *bootstrap* itself.

In the jargon of ideonomy, an [organon, **organon-shell**, or **titular organon**] that [cuts across, combines, recurs in, or simultaneously serves] [all, most, many, or at least two] ideonomic [Divisions or superdivisions] is termed a **transdivisional organon** {*see Glossary*}.

A transdivisional organon that is *truly* able to serve all ideonomic divisions is a **pan-divisional organon**. There are at least sixty transdivisional organons that are pan-divisional or nearly so (see **Fig. 55,262**).

A dagger {†} may be used in the titles of transdivisional organons to signify that, whenever that Generic Organon is to be *specialized* for a given Division, the name of the [Division, Divisional Theme, or Divisional Object] [in singular or plural form, as appropriate] is to be introduced at that point in the title.

Fig. 55,262,
"Sixty More Or Less Pan-Divisional Organons"

1. "Advice On Treating †"
2. "Alternative Treatments of †"
3. "Analogs To †"
4. "† and Ideonomy's *Other* Interests"
5. "[Bases, Sub-Principles, and Corollaries] of Principles Pertinent To †"
6. "[Basic and Recurring] Decisions In Treating †"
7. "Beyond †"
8. "Causes of †"
9. "Comparative Relevance of the Division † To Diverse Matters"
10. "Complex †"
11. "[Connections and Analogies] Between †"
12. "Consequences of †"
13. "Definitions of Terms Relevant To †"

14. "Dependence of Methods On Principles In the Case of †"
15. "Designs [Of Or Involving] †"
16. "Dimensions of †"
17. "Fallacies Anent †"
18. "Futuribles Re †"
19. "Genera of †"
20. "Genera of Analyses of †"
21. "Genera of Assumptions Re †"
22. "Hierarchies of †"
23. "Homothematic †"
24. "Ideals Relevant To †"
25. "Ignorance Re †"
26. "Illustrative Ideonomic Treatments of †"
27. "Importance of †"
28. "† In Connection With A Single Thing"
29. "Infinite †"
30. "Interrelationships of Principles Pertinent To †"
31. "† Issues"
32. "Known Examples of †"
33. "[Limitations, Defects, and Boundaries] of the Division †"
34. "Master Organon of Organons Treating †"
35. "Matters Worth Treating Re †"
36. "Meta-Dimensions of †"
37. "Observations On Treatments of †"
38. "Other † By Analogy"
39. "Plan For the Future Study of †"
40. "Possible Future Rosetta Stones For Treating †"
41. "Possible Sources of Knowledge Re †"
42. "Principles For Treating †"
43. "Questions To Ask In Treating †"
44. "Relationships Between [Pure and Applied] Treatments of †"
45. "Relevant Concepts In Treating †"
46. "† Scale"
47. "Senses of †"
48. "Specific Routines For Treating †"
49. "Speculative Examples of †"
50. "Structure of †"
51. "Subfields of the Study of †"
52. "Taxology of †"
53. "Types of Relationships [To Or In Connection With] †"
54. "Typical [Answers and Solutions] Re †"
55. "Typical Qualifications of Truth Re †"
56. "Typical [Surprises and Counterintuitive Possibilities] Re †"
57. "Universal Patterns [Of, Involving, Or Re] †"
58. "Use of Those Organons Treating †"
59. "Ways of Presenting †"
60. "What Ideonomy May Do For the Study of †"

These sixty organons are of such immense importance to ideonomy that I will comment upon each of them. Doing so is appropriate in any case because some of their titles are vague, ambiguous, or otherwise misleading. Also, all of their mutual differences and relationships should

be made explicit, although of course a mere start can be made here. (Where these titles actually refer to particular Divisions—rather than simply alluding to all Divisions via a dagger—the reader may wish to consult the discussions of those Divisions elsewhere in this book.)

1. "Advice On Treating †". Summarized here may be the accumulating [lessons and counsel] of the worldwide ideonomic community about the [practical, alternative, necessary, and best] [generic and specific] ways to [approach, treat, or use] [the <Theme or Division> or their organons].

Topics covered might include: •[Useful preliminaries, •Things to check first, •Ways to prepare, •Planning and structuring research, •Rules and principles, •Methods, procedures, materials, and tools, •Iterative, recursive, and hierarchic elements of a treatment, •Distributions of emphases, •Possibilities to eliminate, •Other work to consult, •History of treatments and accomplishments in the area, •Things to expect, •Contingencies and hazards, •Prudent redundancies, •Tests, •Standards, •Economies, •Parallel and sequential tasks and subtasks, •Competitive and fungible options, •Alternative starts and finishes, •Follow-up work, *etc*]. The organon relates to the Division WISDOMS.

2. "Alternative Treatments of †". What are all of the [different and alternative] [existing or creatable] [generic and specific] **methods** [for treating † or for treating it in different ways]? This organon could [assemble, entitle, define, distinguish, classify, evaluate, map, systematize the <practical and theoretical> interrelations of, *e/v* illustrate] this set of [methods and treatments]. The organon relates to such Divisions as ALTERNATIVES and METHODS.

3. "Analogs To †". Key things that are different from and yet [similar or related] to the [Theme or Division]. It can be valuable to know what these are, not only to avoid confusion but to profit from the [additional or alternative] possibilities that analogs have a tendency to suggest.

Perhaps this organon should be renamed "Mimics of †", or the like, to prevent its confusion with organons—especially "Other † By Analogy".

Analogs (both positive and negative) of ANALOGIES include: [•IDENTITIES, •COMMONALITIES, •EQUIVALENCES, •VIRTUALS, •symmetries, •conspecific and congeneric things, and even •DIFFERENCES]; of FORMS: [•structures, •textures, •APPEARANCES, •Metastructures, •MANIFOLDS, •configurations, •patterns, •maps, •SPECTRUMS, •PATHS, •SERIES, •MODELS, •REPRESENTATIONS, •PERSPECTIVES, •CLUSTERS, •SETS, •COMBINATIONS, •ORDERS, *etc*]; and of ERRORS: [•ILLUSIONS, •BADS, •DEFECTS, •costs, •risks, •discontinuities, •UNCERTAINTIES AND DOUBTS, •failures, •ANOMALIES, •IMPOSSIBLES, •CHANGES, •COMPLEXITIES, •DISPROOFS, •NAUGHTS, •DISJUNCTIONS, and even •GOODS].

Obviously the present organon relates to the Division ANALOGIES.

4. "† and Ideonomy's Other Interests". [Simple and synergistic] combinations of the [Division or Theme] with ideonomy's *other* [Divisions, Themes, and *countless lesser* <subdivisions, subthemes, topics, interests, concepts, purposes, methods, activities, *etc*>].

5. "[Bases, Sub-Principles, and Corollaries] of Principles Pertinent To †". The organon is naturally related to such Divisions as FUNDAMENTALS, PRINCIPLES, and COROLLARIES. It is important to know the [bases and mechanisms] of the principles with which one reasons. Possessed of such knowledge, one may find it easier [to apply the

principles, to choose the <right or best> principles, to understand what results from the use of principles, to <situationally adapt, extend, or ultimately transcend> principles, to coordinate many different principles or integrate their diverse products, to be the master—rather than the slave—of the principles one uses, *etc*]. Given ideonomic principles also typically have [unique or coalternative] corollaries.

6. "[Basic and Recurring] Decisions In Treating †". For example, what decisions tend to recur again and again in branching series and loops? Actually there are *even pandivisional* decisions of this sort, such as decisions about [what to include, what to exclude, what order things should be treated in, what things are to be treated as more important than others, *etc*]. This organon relates to the Division DECISIONS.

7. "Beyond †". This (type of) organon might [describe, contrast, or treat], *i.a.*, things that [immediately or ultimately] [lie beyond, transcend, or come after] the [Division, Theme, or some <treatment or example> thereof], and that [may or may not] [be analogous to, derive from, or be an <evolution, change, or transformation> of] †. It relates to such Divisions as TRANSCENDENCES and TRANSFORMATIONS.

8. "Causes of †". What are it's [causes, origins, bases, mechanisms, influences, laws, *etc*]?

9. "Comparative Relevance of the Division † To Diverse Matters". Its relevance to general [problems, subjects, themes, purposes, *etc*] compared to the [quantitative and qualitative] relevance thereto of ideonomy's *other* Divisions. Including "relevance" in such senses as: [applicability, past application, connectedness, importance, divisional needs, analogy, homology, *e/vc*].

10. "Complex †". The more [complex, subtle, massive, *e/v* difficult] [types, cases, aspects, or elements] of a Theme are often especially [interesting, challenging, or important]. Knowing about them may make one more [cautious, careful, or capable] in dealing with them, more aware of [boundaries, paradoxes, illusions, needs, opportunities, covert simplicities, *etc*]. This organon can help one characterize the [types, causes, effects, couplings, laws, *etc*] [of complexity or of the complexities of the <Theme or Division>].

11. "[Connections and Analogies] Between †". How are † [typically or necessarily] [connected or analogous]? The organon may depict [interrelated †, <clusters, networks, groups, or series> of †, laws governing the interrelations of †, *etc*]. It relates to the Divisions ANALOGIES and CONNECTIONS.

12. "Consequences of †". Organon [describing or for <investigating, determining, or exploiting>] the [generic, specific, instantial, or collective] [physical or abstract] [consequences, effects, corollaries, *e/v* implications] of the Division's subject-matter in general (or of various [types, examples, or aspects] of it).

For example, if a physical entity is to be imagined as having a specific Form (*sensu* †), how may that [cause, influence, clarify, bound, extend, specialize, *e/vc*] its [genesis, behavior, ontology, appearance, utility, potentialities, laws, classification, *etc*]? Or what [are and are not] the [probable or possible] consequences of a generic [Decision, Change, Function, or Error]? This organon relates to EFFECTS and other Divisions.

13. "Definitions of Terms Relevant To †". Succinct definitions of key terminology. This organon is related to the Divisions DEFINITIONS and LANGUAGES.

14. "Dependence of Methods On Principles In the Case of †". It is important that the relationships between ideonomic [methods and principles] be illuminated. If one knows [how and why] a method derives from, or depends upon, certain principles, one may be in a better position [to judge and shape what results from its use, to refine it, to combine it with other methods, to explain it to other persons and justify its products, *etc*].

15. "Designs [Of Or Involving] †". This organon would treat the Cybelology [Order Taxons and Metastructures] [of, involving, or pertinent to] the [Theme or Division] †, in general or in specific cases.

For example, [whether or how] Stories {[generate, arise from, *e/v* can be treated via] [holonomic *e/v* symplectic] Orders or [contain *e/v* are contained in] metastructural hierarchies}.

16. "Dimensions of †". This might treat the scope of the study of the Theme, or else the more or less fundamental dimensions—and perhaps properties—of the Theme or Division.

17. "Fallacies Anent †". Organonic overview of [universal, common, possible, and important] [fallacies, illusions, and errors] associated with the [Theme or Division]. The organon may [list, classify, map, define, *e/v* illustrate] the Theme. The organon relates to the Divisions ERRORS and ILLUSIONS.

18. "Futuribles Re †". Suggests [representative or especially interesting] future possibilities [of or involving] †. The possibilities in question may have to do with [scientific discoveries, technological developments, the introduction of new methods, industrial applications, sociocultural consequences, *etc*]. The organon relates to the Division FUTURIBLES.

19. "Genera of †". This organon pretends to identify the most [general, basic, diverse, complementary, common, important, *e/v* interesting] types [of † or of things in the Division †]. It is especially related to the Divisions TYPES, TAXONS, and GENERALIZATIONS.

20. "Genera of Analyses of †". Sets forth the various meaningful types of analyses of that are [possible, canonical, or desirable], that [may or may not] have been [done or tried] in the past. Relates to the Division ANALYSES.

21. "Genera of Assumptions Re †". Whenever we [think of or treat] † we will perforce be making a variety of assumptions. This organon describes the general nature of these assumptions and their commonest [types, causes, effects, signs of existence, interactions, *etc*]. A better understanding of it may be gotten by consulting the Division ASSUMPTIONS.

22. "Hierarchies of †". Diverse hierarchies [of, involving, or based on] †. The hierarchies may [govern behavior, describe <past or future> chronology, assist classification, show the ordered derivation of <properties or concepts>, *etc*]. The levels of such hierarchies may be [<discrete or continuous>, <finite or infinite>, *etc*]. This organon of course relates to the Division HIERARCHIES.

23. "Homothematic †". This organon may be generic in two senses, for not only is it transdivisional but it invites countless intradivisional specializations. The homothematic organon applies the [Division or Theme] to a single [thing, concept, or theme]; or sometimes one of the latter to one of the former. Its purpose may be [illustrative or investigatory]. *Another* transdivisional organon might be constructed to operate *in conjunction with* this generic organon by identifying the range of generic themes that are especially suitable as the basis for creating homothematic organons of both [generic and specific] type within the various Divisions.

By way of illustration, a homothematic organon in the Division GENESES might have as its specific (yet perhaps transdisciplinary) theme the Genesis of Complexity, and treat the most important [aspects and possibilities] thereof.

24. "Ideals Relevant To †". What are the [ideal or perfect] things that would be [sought or achieved] through the [Theme or Division]?

For example, an ideal behind the study of IGNORANCES might be [absolute or infinite] knowledge, an ideal in studying KNOWLEDGES absolute wisdom, an ideal in studying WISDOMS might be absolute good, an ideal motivating the study of GOODS absolute beauty, *etc.* An ideal of the Division FORMS is a complete understanding of morphogenesis. Divisions especially pertaining to this organon include [GOALS, ULTIMATES AND ENDS, PERFECTIONS, and SUPREMES].

25. "Ignorance Re †". What is it that we [do not or may not] know about the [Theme or Division] †? What is our [generic and specific] ignorance, and what are the characteristic [bases, elements, interrelations, costs, and corollaries] of this ignorance?

26. "Illustrative Ideonomic Treatments of †". [Organon-genus, organon-species, or organon-world] offering a diverse exemplary set of [miniature, modeled, or summarized] treatments of Theme † [by or *a la*] [ideonomy or Division †]. The treatments chosen may be [random, typal, chrestomathic, or supreme]. Methods may be exhibited or simply their results. Such organons may variously treat {[heterogeneous, orthogonal, complementary, opposite, homogeneous, or singular] [things, themes, *e/v* subjects], and † in either a [generic or specialized] way}.

For example, these organons might simply take the form of copies of these organons annotated with experiences when applied to specific cases.

27. "Importance of †". This central organon identifies the importance [of the Division or of the <study or treatment> of its Theme]. It gives, or can help one to discover, the reasons for, or the [values and purposes] of, such endeavor. It may also define the *general* importance of the Divisional Object *itself.*

28. "† In Connection With A Single Thing". The organon tries to depict all of the [diverse and interrelated] ways in which the [Theme or Division] [<applies or relates> to or is exemplified by] a particular individual thing. The thing in question need not be anything special and may even be something chosen at random. The Division INDIVIDUALS may be referred to if one wishes to acquire a better sense of what the organon involves.

29. "Infinite †". This organon might [be, model, or characterize] adinfinite [treatments or organons] for [Theme or Division] †; or treat adinfinite [types, examples, or aspects] of †. "Adinfinite" *sensu* [evolution, complexity, diversity, utility, generalizability, implications, *e/vc*]. It relates to the Division INFINITIES.

30. "Interrelationships of Principles Pertinent To †". Treated by this organon are the systematic interrelations of the many different ideonomic principles that have to do with the [Theme or Division]. What are the mutual [analogies, differences, origins, complementarities, common elements, dependences, laws, symmetries, homologies, hierarchic relationships, conflicts, relevances, corollaries, *etc*] of the principles? What are their redundancies? What is their comparative worth? The organon relates especially to the Division INTERDEPENDENCES AND RECIPROCITIES.

31. "† Issues". There are various general and specific issues that are characteristically associated with each ideonomic Division and with its Theme. These include [philosophic, logical, methodologic, linguistic, and other types of] issues. Such as [•How the Division is to be defined and what it should not be confused with; •What its scope and boundaries with other Divisions may be; •What the historical role of the Division's Theme has been; •What problems are associated with the Theme or are apt to attend its treatment; •Whether the Theme has an absolute and fundamental or a purely relative status; •How broad the Theme's exemplification in things may be, *etc*]. •What controversies exist or a•re possible in connection with the Theme? •What pertinent theories and hypotheses have been advanced? •What experiments have been performed? •What goals and priorities should be considered?

32. "Known Examples of †". This is perhaps the very first organon that should be constructed for each Division. Its object may be the humble one of supplying a [random, typical, diverse, or suggestive] sample of [cases, instances, or examples] of the Theme, or of the Theme in connection with a broad assortment of [fields, phenomena, topics, *etc*]. It can be turned to whenever there is a need in ideonomy for things to test its methods or for the Division to be shown at work. But above all, from study of the content of this organon the ideonomist can be led to identify the [abstract and lawful] [properties, dimensions, types, taxons, *etc*] of the Divisional Theme and to construct those other organons that are specifically concerned with them.

33. "[Limitations, Defects, and Boundaries] of the Division †". Characteristic [boundaries, defects, or limitations] of the [Division or Theme].

34. "Master Organon of Organons Treating †". Organon (either paper or computer) indexing and perhaps [summarizing, contrasting, interrelating, mapping, scaling, evaluating, *e/vc*] [many or all] [major *e/v* minor] [extant or possible] organons [transdivisional or not] [centered on or <related or applicable> to] the [Theme or Division]. The table being commented on here is itself such a master organon.

35. "Matters Worth Treating Re †". What is meant here *is either* suggested uses of ideonomy in the case of the of Theme, *or else* an identification of the various [lesser, component, and subordinate] [themes and objects] of the Division.

36. "Meta-Dimensions of †". A *meta-dimension* is [a dimension **of** a dimension, a dimension **of use in** <characterizing or evaluating> a dimension, a **higher-order** dimension, or a **higher-level** dimension]. This organon treating meta-dimensions [of or involving] [Theme or Division] † is complementary to the pan-divisional organon concerned with the (simple) dimensions [of or involving] the [Theme, Division, Object, subject, products, or relata] †.

Meta-dimensions may variously [criticize, help analyze the <meanings, bases, or possibilities> of, interrelate, classify, combine, transcend, supplement, facilitate the <management or operational use> of, help relate to specific <subjects, themes, or problems>, *e/vc*] the [dimensions or properties] of things.

For example, if one is tempted to list the generic dimensions of Forms (dimensions such as [length, width, curvature, angle, discontinuity, self-connectivity, generative axes, *etc*]), one may next want to list the meta-dimensions of the dimensions one thinks one has identified (meta-dimensions such as the dimensions' degrees of [fundamentality, interest, importance, divisibility, definability, mutability, *etc*]), and use these to [evaluate, better understand, and extend] one's set of dimensions.

37. "Observations On Treatments of †". This organon *either* reports [noteworthy, common, or miscellaneous] things that have been observed in the course of the Division's [use or development], *or else* provides similar commentary on purely imaginative treatments.

38. "Other † By Analogy". Use of [examples or types] of the Theme to suggest, through analogy, other possible [examples or types] of it.

39. "Plan For the Future Study of †". [Synoptic or detailed] [illustrative or recommendatory] plan for the systematic [universal or specialized] ideonomic [investigation of the Theme or development of the Division] in the future. The organon may treat [probable, alternative, or appropriate] [exploratory or exploitative] [paths, methods, work, problems, results, solutions, opportunities, needs, resources, *e/vc*]. It relates to the Division PLANS.

40. "Possible Future Rosetta Stones For Treating †". A *Rosetta stone* is defined by *Webster's Third* as "something that furnishes the first clue to the decipherment of a previously incomprehensible [system of ideas or state of affairs]". The eponym for this concept was a "stone found in 1799 that is celebrated for having furnished the first clue to the decipherment of Egyptian hierglyphics since it bears an inscription in hieroglyphics, demotic characters, and Greek"—whose eponym in turn was "Rosetta, {a} city in northern Egypt near which {the Rosetta stone} was found".

All ideonomic Divisions necessarily possess both [problems requiring and means allowing] the invention of Rosetta stones of various sorts. The eventual [development and use] of these cognitive tools will be greatly aided if thought is given in advance to defining what they might [be and do]. The purpose of the present pan-divisional category of organon, then, is to explicitly identify the range of such possibilities.

41. "Possible Sources of Knowledge Re †". For example, various: [tests, experiments, researches, instruments, mathematics, simulations, sciences, techniques, technologies, resources, phenomena, natural systems, *etc*].

42. "Principles For Treating †". Such principles may alternatively be [philosophic, ideonomic, or narrowly Divisional]. They may be principles that [promote clarity of thought, facilitate discovery, motivate inquiry, lead to efficient or elegant use of resources, reduce problems, *etc*].

43. "Questions To Ask In Treating †". This organon presents the typical questions [explicitly or implicitly] asked [about anything by the Division or in connection with the Theme]. To get a better sense of it consult the Division QUESTIONS.

44. "Relationships Between [Pure and Applied] Treatments of †". The purpose of this organon is to help coordinate the centrifugal but

[interdependent and synergistic] [pure and applied] halves of ideonomic [knowledge and endeavor] in the treatment of † (just as a similar—poorly met—[need and opportunity] exists to coordinate the two great hemispheres of pure and applied mathematics).

45. "Relevant Concepts In Treating †". The organon may [identify, assign names to, define, classify, indicate the relationships of, *e / v* illustratively <combine, manipulate, and apply>] the key concepts of the [Theme or Division]. It relates to the Division CONCEPTS.

Thus a critical concept in treating either [Negatives or Opposites] is the mathematician's notion of [*duals* or *duality*]; in treating States-and-Conditions, the concepts of *boundary* and *entropy*; and in dealing with Forms, the idea of *symmetry*.

46. "† Scale". This organon would present a [complete or partial] scale of [quantitative or qualitative] degrees [of the Theme or of its exemplification]. There might also be many such scales (and perhaps separate organons) dealing with the degrees of different [senses, forms, or exemplifications] of the Theme.

47. "Senses of †". The concern here is with all [possible or important] alternative [definitions or senses] [of the Divisional Theme or of the Division itself]. In the Division APPEARANCES AND PHENOLOGY, for example, "appearance" could variously be understood in senses [limited to vision or extended to audition, restricted to physical or enlarged to embrace sheerly mental apprehension, confined to one person's perspective or broadened to include *all persons'* or even *all possible* perspectives, *etc*].

48. "Specific Routines For Treating †". What is meant by *routines* here are not ideonomic *methods*, which are the concern of another pan-divisional organon, but merely [tactics, strategies, and rules] that practice may have [suggested, certified, or standardized] or that may derive from [common sense, theory, or analogies among ideonomic Divisions]. Any major field—computer science, for instance—regularly employs thousands of such micro-generic routines.

The organon relates to such Divisions as PRACTICES, TACTICS, STRATEGIES, and RULES.

49. "Speculative Examples of †". The concern of this organon is with possible or hypothetical, rather than concrete or known, examples of a Division's Theme. *Per se*, it serves to enrich imagination and to widen or transcend familiar horizons. Yet it may originate in the organon that gives known examples of the Theme, or it may actually be used to help make the latter more complete.

50. "Structure of †". Structure [of †, of examples of †, of the subject of †, or of Division †]. The Division's [extant or ideal] [instrumental, material, thematic, and conceptual] content and the content's [pure and practical] : [partitioning, organization, connectivity, symmetries, naming, homology, evolution, interaction, management, vergence, levels, weights, dimensionalities, spaces, laws, *raisons d'etre*, sequences, entropies, states, indeterminacies, limitations, and relationships to the <structure and content> of other Divisions].

51. "Subfields of the Study of †". Such an organon will describe both [transdivisional subfields (each of which correspond to one of ideonomy's so-called "practical divisions") and the idiosyncratic subfields of †]. Examples of the former include [foundational, descriptive, mathematical, mensural, terminological, and classificatory] subfields.

52. "Taxology of †". The organon [offers and assists] [systematic and hierarchical] classification of [the Theme and its <congeners and relata>]. Consult the Division TAXONS for a larger picture of [this organon and its possibilities].

Among other things, this organon may treat: {[past, present and future] [general and specific] [simultaneous and competitive] [finite and infinite] [abstract and practical] [ideonomic and non-ideonomic]} [ways, methods, means, tools, systems, and purposes] [of or for] classifying the Theme or its [types, taxons, examples, instances, referents, relata, elements, properties, *e/vc*].

53. "Types of Relationships [To Or In Connection With] †". This organon describes, not the *mutual* relationships of † (which is the job of other organons), but rather the major types of relationships between † and things other than † (or things in general). It relates to RELATIONS and other Divisions.

For example, Forms typically relate to other things by [containing, limiting, organizing, creating, *e/v* revealing properties of] the latter.

54. "Typical [Answers and Solutions] Re †". This organon [presents and discusses] the most [generic, fundamental, universal, lawful, distinct, exhaustive, useful, insightful, systematic, *e/vc*] [types and modes] of [answers and solutions] to the most [generic, fundamental, universal, interesting, important, distinct, transdisciplinary, *e/vc*] [problems, questions, needs, tasks, *etc*] [of or relating to] [the Theme, Division, or ideonomy].

55. "Typical Qualifications of Truth Re †". The [typical and possible] [degrees, senses, dimensions, complexities, limitations, defects, nonmeanings, and analogs] of truth [or intergradations of truth and falsehood] connected with the [Theme or Division].

56. "Typical [Surprises and Counterintuitive Possibilities] Re †". Surprises are only surprises if they are not foreseen, paradoxes only paradoxes if they are not explained. Both surprises and paradoxes—in connection with any Theme—have generic [types, elements, and relationships] that can be helpfully identified in advance. Such anticipation is the purpose of this organon.

57. "Universal Patterns [Of, Involving, Or Re] †". Examples of such universal patterns include both [transdivisional and intra-divisional]: [thresholds, cascades, chain reactions, cycles, waves, phase changes, turbulence, bifurcations, self-organization, solitons, pathoses, axes, poles, singularities, *etc*].

Consult the Division PATTERNS to explore the gamut of [possibilities and reasons] for this organon.

58. "Use of Those Organons Treating †". The organon describes *how to use* each of the organons that [belong or are applicable] to the Division.

59. "Ways of Presenting †". The organon offers a systematic overview of the ways of [describing, representing, organonizing, symbolizing, or communicating about] the Theme, whether by [words, numbers, pictures, movies, models, computer programs, demonstrations, scales, metaphors, special notation, games, icons, or other means].

60. "What Ideonomy May Do For the Study of †". Finally, the anticipated general [value and consequences] of ideonomy for the subject represented by the Division are described by this organon.

The order in which these sixty organons were just presented was simply alphabetic. But in **Fig. 55,263** they have been placed in three semantic clusters, each of which is linearly ordered internally. Of course, countless other orderings are both [possible and connecessary].

Fig. 55,2623
" Attempt To Cluster the Sixty Pan-Divisional Organons By 'Relatedness *Vel* Analogousness' "

CLUSTER I

1. "Structure of †"
2. "Subfields of the Study of †"
3. "† Issues"
4. "† and Ideonomy's *Other* Interests"
5. "Comparative Relevance of the Division † To Diverse Matters"
6. "[Limitations, Defects, and Boundaries] of the Division †"
7. "Dimensions of †"
8. "Meta-Dimensions of †"
9. "† Scale"
10. "Hierarchies of †"
11. "Definitions of Terms Relevant To †"
12. "Relevant Concepts In Treating †"
13. "Senses of †"
14. "Taxology of †"
15. "Genera of †"
16. "Homothematic †"
17. "† In Connection With A Single Thing"
18. "Known Examples of †"
19. "Speculative Examples of †"
20. "Complex †"
21. "Beyond †"
22. "Analogs To †"
23. "Other † By Analogy"
24. "[Connections and Analogies] Between †"
25. "Types of Relationships [To Or In Connection With] †"
26. "Universal Patterns [Of, Involving, Or Re] †"
27. "Designs [Of Or Involving] †"

CLUSTER II

1. "Principles For Treating †"
2. "Interrelationships of Principles Pertinent To †"
3. "[Bases, Sub-Principles, and Corollaries] of Principles Pertinent To †"
4. "Dependence of Methods On Principles In the Case of †"
5. "Genera of Assumptions Re †"
6. "Typical Qualifications of Truth Re †"
7. "Fallacies Anent †"
8. "Typical [Surprises and Counterintuitive Possibilities] Re †"
9. "Ignorance Re †"

CLUSTER III

1. "Questions To Ask In Treating †"
2. "Typical [Answers and Solutions] Re †"
3. "[Basic and Recurring] Decisions In Treating †"
4. "Advice On Treating †"
5. "Use of Those Organons Treating †"
6. "Illustrative Ideonomic Treatments of †"
7. "Observations On Treatments of †"
8. "Genera of Analyses of †"

9. "Matters Worth Treating Re †"
10. "Specific Routines For Treating †"
11. "Alternative Treatments of †"
12. "Relationships Between [Pure and Applied] Treatments of †"
13. "Plan For the Future Study of †"
14. "Futuribles Re †"
15. "Ideals Relevant To †"
16. "Importance of †"
17. "Consequences of †"
18. "Causes of †"
19. "Infinite †"
20. "What Ideonomy May Do For the Study of †"
21. "Possible Future Rosetta Stones For Treating †"
22. "Possible Sources of Knowledge Re †"
23. "Master Organon of Organons Treating †"
34. "Ways of Presenting †"

Nonmetric multidimensional scaling (nMDS) should be used to create ideomaps of the ideospaces of the set of sixty pan-divisional organons, and of [transdivisional or ideonomic] organons *in general*, based on [analogousness, practical relatedness, temporal permutations, synergism, and various other Scaling Relations].

One such ideomap is shown in **Fig. 43,543**. The [2-D, D_3 x D_4, D = 4 comap] of this has also been reproduced, as **Fig. 43,544**.

It is easy to think of *other* transdivisional organons that [can and should] exist, in addition to the foregoing.

Some obvious ways of stimulating a flow of ideas about possible organons are as follows:

(1) One can imagine ways of [logically **modifying**, transforming, reconstituting, improving, generalizing, specializing, subdividing, analogizing, supplementing, combining, 'intermediating', assisting, inverting, redirecting, *e/vc*]—or of doing things orthogonal (maximally unrelated) to—**the sixty** earlier organons.

(2) One can consult the hundreds of **ideonomic divisions** for the [ideas, methods, needs, activities, relationships, domains, structures, desiderata, productions, logics, *e/vc*] they [directly and indirectly] suggest, [both when considered **alone and** when pondered for their <**combinations** and permutations>].

(3) One can reflect in a similar way upon the list of thousands of major **ideonomic concepts**, and their organonic possibilities.

(4) One can imagine the organonic implications of ideonomy's thousands of different [identified or as-yet-unimagined] **methods**, both singly and in their zillions of [meaningful, important, complementary, transcendent, and unpredictable] combinations.

The first of these "ways" can be illustrated by the earlier transdivisional organon "Dimensions of †". This really deserves to be split into separate organons: one treating *dimensions*, *sensu stricto*, of †, the other •*properties* of †.

It might be prudent to subdivide many of the other organons that were proposed as well: **"Genera of †"** into that and •"Species of †". **"Importance**

of †" into a pair of organons explicating the •importance of the Theme †— and the •importance of the Division [or of <studying or treating>] †. **"† Issues"** invites many splits—*e.g.*, into organons developing the "Issues", •"Problems", and •"Theories" [of or re] †. **"[Limitations, Defects, and Boundaries] of the Division †"** should perhaps be diffracted into separate treatments of $\bullet_{1\text{-}12}$["Past" *vs.* "Future"?] ["Limitations" *vs.* "Defects" *vs.* "Boundaries"?] of † *qua* ["Division" *vs.* "Thing"]. The **"Matters Worth Treating Re †"** should arguably be •"† Subthemes", on the one hand, and •"Things Exemplifying †", on the other. And so forth.

Thinking about the original organon-set in a more general way can lead one to imagine such organons as •"Interrelations of the Genera of †" and "† Compared".

The creation of a category of transdivisional organon •"Clusters of †", inspired by the Division CLUSTERS, would exemplify the value of consulting the entire list of named ideonomic Divisions. Similarly the Division COMBINATIONS suggests that there could be an organon such as •"Generic [Types, Modes, Bases, Dimensions, Degrees, *Raisons*, Theories, *e/vc*] of [Fundamental, Interesting, Important, Canonical, Or Ideogenic] [Simple, Multiple, Serial, Or Self-Evolutionary] Combinations of †-[Things, Referents, Or Relata]". ELEMENTS suggests •"Elements of †". GENDAKENEXPERIMENTS suggests •"Gedankenexperiments Re †". The Divisions EVENTS and STORIES suggest the organons •"Events [Of, Re, Or Involving] †" and •"Stories [About Or Involving] †". CHANGES and TRANSFORMATIONS suggest •"[Changes and Transformations] [Of Or Re] †".

In fact, most of the original "sixty" organons were themselves [based on or inspired by] Divisions.

As for the method of [mentally or experimentally] 'combining' two or more Divisions to suggest novel organons, its efficacy can perhaps be illustrated most instructively by the combinability of those very Divisions that inspired those of the original sixty organons that were based on single Divisions, to 'produce' meaningful new organons with formulaic titles: •"**Ignorance** Re **Effects** of †" — •"**Consequences** of **Ignorance** Re †" — •"**Hierarchies** of **Ignorance** Re †" — *etc.* {Words that [homonymously or synonymously] correspond to Divisions are in bold.} Incidentally, notice that these titles really represent *triads* of Divisions.

Of course, combinations of [Divisions *other than* those which were explicitly mentioned in the titles of the "sixty"] can suggest a *much larger* set of valuable organons, such as: •"**Past Discoveries** Re †" (or •"**Historical Evolution** 'of' †") — •"[**Sequences**, **Chains**, **Paths**, and **Series**] [Of Or Re] †" — •"[**Criticism** Or **Evaluation**] of [**Past** Or **Present**] †". •"[**Outline Or Overview**] of **Current** (Non-Ideonomic) [**Knowledge** Of Or **Work** [Re Or Involving] †" is co-inspired by the Division PRESENT THINGS.

As for the value of referring to a list of ideonomic methods to get ideas for new transdivisional organons, consider the case of the method *permutation*. Would an organon like •"Permutations of †" truly make *transdivisional* sense? The question can be answered via [sampling or induction]. — Are [generic or specific] permutations of [PATTERNS, USES, CHANGES, *e/v* other Divisions] sufficiently [irredundant, interesting,

important, fundamental, useful, known, problematic, many, complex, definable, universal, *e/vc*] to merit [compilation, definition, classification, description, development, illustration, *e/vc*] by a special organon?

In order to properly address this question, it is first appropriate to list various alternative [bases, senses, or dimensions] of such permutation. These include: [•event sequences (chronology), •cause sequences (etiology), •<permissive and opportunistic> sequences, •effect sequences, •adjectival sequences, •adverbial sequences, •cause hierarchies, •transformational sequences, •classification hierarchies, •leveled scales, •dendritic sequences, •sequences of combinations, •cyclic sequences, •content hierarchies, •spatial sequences, •<definitional or explanatory> sequences, •*e/v* myriad other kinds of permutational ordering].

Certain sets of generic **patterns**, then, have preferred orders, in that if the permutation were different, some or all of the intra-set patterns [would not occur, would no longer make sense, would be changed in <form or significance>, *e/vc*]; or in that their different permutations have different [costs, probabilities, efficiencies, tendencies, products, capabilities, *e/vc*].

Similarly, different permutations of the order of **use**—*or* of types of use—of things may differ as to [probability, feasibility, incidence, outcome, interest, value, *e/vc*].

Constructing and using various types of ideonomic formulas is so important throughout ideonomy that •"A Library of Canonical Ideonomic Formulas For Treating †" should surely be a pan-divisional organon.

Obviously the task of actually bringing all of the organons alluded to here into existence will be immense. For example, if the original set of sixty organons are to be re-created within each of ideonomy's Divisions—and 250 such Divisions are recognized—then the invention of 15,000 organons is demanded!

Yet if, say, one-hundred [professional or amateur] ideonomists simultaneously collaborate to produce those organons, and each constructs a new organon every three days, on average, then all 15,000 organons will exist after only fifteen months.

So if one assumes that some sort of ideonomic community exists, and that the community is sufficiently responsible to cooperate on certain necessary tasks, then the chore being envisaged is really not that great after all. And once having been created—as the core of ideonomy—those 15,000 organons would exist for eternity and be infinitely reusable.

Of course it has to be emphasized that a far larger task awaits being done than simply that of the *creation* of such tools of thought. For if the ideonomic organons merely existed, there would be no guarantee that they would be used [appropriately, efficiently, and synergistically].

The entire vast web of [natural and practical] [aspects of and relationships among] all organons needs to be [theoretically and experimentally] worked out, and it must be recorded in a [useful and elegant] form. All of this knowledge, along with the organons themselves, must be made available to everyone at all times via a single worldwide computer network managed by a special operating system.

This all-organon computer utility must incorporate: •accumulated systematic [observations and advice] on the [nature, use, and possibilities] of each organon; •[critical evaluations and suggestions for future improvement] of same; •suggestions for [how, when, and why] to use organons, both in general and in connection with specific [subjects, phenomena, concepts, and tasks]; •descriptions of [connections, pointful <synchronous and sequential combinations>, and redundancies] of all possible sets of organons; •illustrative examples of the organons at work; •indexes of the [content, features, and interrelations] of the organons; •and [multifarious, ingenious, and powerful] [hierarchical menus, decision trees, *N*-dimensional spaces, semantic networks, artificial neural networks, artificial intelligence programs, *etc*] for [finding things, moving about, and building things] in this mass of [organons and related <knowledge, wisdom, and thoughts>].

Fig. 61121,
"The 60 Pan-Divisional Organs Illustrated For the Division PATHS AND ODOLOGY"
(Examples of [Items In E/V Types of] Each of the 60 Organons):

1. **"Advice On Treating †":**
   1) First find a path's [origin and terminus];
   2) Decompose a path into its parts;
   3) Check to see if a path is [a cause, an effect, or 'the thing itself'];
   4) Try to determine to what extent a path is [objective, concrete, and definite] or instead [subjective, abstract, and projective];
   5) Certify the *prima facie* singularity (non-multiplicity) of a path;
   6) Start by getting [a picture of the whole path or a gestalt of the path's <overall or basic> nature].
2. **"Alternative Treatments of †":**
   1) Depict the **uniformities** of a path;
   2) Depict the path's **internal irregularities**;
   3) Depict how the path **resembles** other paths;
   4) Depict how the path **differs** from others (is anomalous);
   5) Simulate other courses the path might have taken instead;
   6) Treat the path's **causes**;
   7) Treat the path's **effects**.
3. **"Analogs To †":**
   1) Course of events;
   2) Travel;
   3) Flow;
   4) Spread;
   5) Edge;
   6) Series.
4. "† and Ideonomy's *Other* Interests":
5. "[Bases, Sub-Principles, and Corollaries] of Principles Pertinent To †":
6. "[Basic and Recurring] Decisions In Treating †"
7. "Beyond †"
8. "Causes of †"
9. "Comparative Relevance of the Division † To Diverse Matters"
10. "Complex †"
11. "[Connections and Analogies] Between †"
12. "Consequences of †"
13. "Definitions of Terms Relevant To †"

"IDEA CHEMISTRY"

The phrase "idea chemistry" is a useful and happy metaphor for giving people some insight into what ideonomy is, or into what it might perhaps be like in the future (for its ultimate preferred form remains moot at the present time, when the subject is incipient).

But in addition to being a metaphor for all of ideonomy, idea chemistry (or ideochemistry) is the name given to an entire branch of ideonomic methodology. Admittedly it is a speculative branch. The techniques imagined have not as yet been made use of by myself in ideonomy; I have not tried them out in practice, developed or systematized their possible range of methodological possibilities, or even allowed their theory to mature in my mind. Some kindred methods are being created, tested, and used by other persons; but usually these methods are not intrinsically ideonomic, and only in rare instances have they been employed to manipulate ideas or in ways suggestive of ideonomy.

Yet I have seen in intuitive flashes, and increasingly through more formal and explicit insight, that a more or less exact analog of chemistry exists, or can be developed, in the realm of ideas; and here I am speaking of both pure and applied chemistry. In fact, I am certain that ideochemistry is destined to become a quite special and powerful branch of my subject. And not only my subject: ideochemical theory and method will in all probability play a major role in the future life and development of artificial intelligence, cognitive science, mathematics, and other fields.

It is with me a characteristic phenomenon that I will have sudden inspirations in which I will glimpse as in an aerial view and with a strangely photographic precision some nonexistent and unheralded intellectual territory, or in which there will race through my mind in the manner of panoramic memory—in the course of seconds or minutes—a staggering procession of chained and branching and anastomosed and vergent novel ideas.

However, such transports across the ideocosm, such manic explosions, superfetations, and chaos of ideas, such Panlogistic exponential dovetailings, create a problem: in their rush, crystallinity, mass, menagerie, tortuosity, unseenness, and violent competition within the finite ecological space of my mind, they exceed by orders of magnitude my feeble powers of analysis and the sheer capacity of my memory.

Afterwards I am often left with little more than an intuitive impression, an alteration of mental perspective, and perhaps a small conscious collection of new truths or inexplicable inventions.

It is all evidence for my view that time, at least subjectively, is profoundly nonlinear.

The most obvious benefit of these inspirations is that, just as a supernova explosion will leave in its wake that celestial lighthouse that is a pulsar, their devise is often a conceptual lodestar that subsequently guides and encourages the slower and much dimmer part of my mind.

Thus I have adhered to the possibility of there being created an ideochemistry even as, from the press and diversity of the Ideonomy Project, I have had to defer more careful study of the concept and the actual attempt to fashion such methodology.

But now, steered by the lodestar of my original vision, I am going to try to define and explain the "ideochemistry" of my intuition. The reader is forewarned that my remarks will necessarily be preliminary and may often be wrong or misleading. The picture created will not only be crude and partial, but obscure, full of inappropriate emphases, and rather ersatz. The wrong words will be used and they will be used to say the wrong things; no insight into the actual range of possibilities will be conveyed; the things belonging to ordinary chemistry that will be referred to—in order to anticipate and suggest, by the agencies of analogy and association of ideas, what the basic techniques, procedures, and concepts of ideochemistry will be like—may not be the best things for that purpose and such parallels as are drawn may be misconstructed; and my obvious lack of any direct experience with ideochemistry (other than perhaps in my head) will deprive my discussion of the sort of animation, richness, authority, and simplicity that are needed to produce real enthusiasm, understanding, and belief. Moreover and ironically, by the time I finish this first sketch of ideochemistry, I may find that the development of my ideas in the course of writing it has led me to seriously disagree with it. The initial possibilities thrown out may simply be stepping-stones leading to more correct ideas. The resultant improvements to the reader's understanding can be safeguarded under such circumstances by the reader himself; he need only remember that upon finishing this dubious section of the book he is to rip it out and dispose of it immediately.

Insert here space.

Because a molecule has bonds, the atoms of which it is made could be thought of as nodes with arms able to form links in a space and thereby give rise to digraphs.

By analogy, single ideas could be thought of as atom-like nodes with force field-like arms able to form bond-like links in a quasi-physical abstract space and thereby give rise to molecule-like digraphs (resembling complex ideas).

Something very similar to this occurs in certain of those neural networks that are currently being explored on computers.

In this case a person first constructs the neural network by deciding which ideas are to be modeled (in their interactions), which are to be given explicit interrelationships (link-like interconnections) in advance, what the strength (and positive or negative sign) of particular interrelationships are to be, whether various relationships are to be symmetric or asymmetric, whether the set of ideas are to be organized a priori—or are to be allowed to self-organize—into any sorts (or sets of sets of sets...) of partitions, subsets, or metastructures (such as hierarchies), whether the various ideas are to have different energy levels, etc.

The relations imposed on the ideas here may all be ones of the mutual natural or conceived cause-effect dependence, ownership, containment, rights, chronology, analogy, morphology, relevance, combinability, or whatever, of the ideas, or on the contrary they may be heterogeneous (a matter of many of these things at once).

The neural network constructed may or may not include a subset of a priori inspecific ideas (=neurons=nodes=atoms) or relationships (=connections=links=bonds).

Perhaps in a more chemistry-like case, the atoms and molecules, or their equivalents, would be freer to dissociate and move about as wholes or holons than what we now see in neural networks.

In the language of the new field of genetic algorithms, which is so profoundly related to ideochemistry, one would say that, not only could trivial "mutations" (changes of digits or connections) occur, but entire "genes" and "chromosomes" (ideas and idea-complexes; or atomic and molecular ideas) would be free to "recombine". For example, different digraph trees that had previously evolved would be free to interact and combine with one another as wholes or via big pieces of themselves, and not just via exchanges of their simplest (atomic) elements or a requirement that the trees, individually or jointly, be broken up first into their least parts.

Let me now visualize a very different form of ideochemistry.

Imagine that the atom-like single ideas are always able to have free rays (unbonded force-fields, if you will, or merely potential connections that are nevertheless prespecialized).

These unlinked rays might represent the characterization of the atomic ideas (or molecular ideas) from which they extend in any of various metric or nonmetric conceptual (ideonomic) dimensions; either the rays would represent (presumably but not necessarily single) oriented vectors in a space of N dimensions containing the ideas, or else the rays would be multiple, with each specific to its own characteristic dimension in the space.

Such ideic atoms can then be imagined as constantly in motion in the space (possibly even in a hierarchy or other metastructure of spaces of spaces) and as free to combine with one another, through their valences or rules, in the reversible or irreversible construction of one or more classes of structures (or molecules and materials): such as clusters, chains, mathematical or logical progressions or series, rings, radiations, trees, lattices, networks, knots and plexures, vergences, spheroids, surfaces, fractals, attractors, static and dynamic circuitries, polytopes such as crystals, quasicrystals, helixes, egagropilas, cylinders, catenoids and other minimal surfaces and their foams, etc.

Also they could give rise to and exploit all types of textures, order taxons, processes, laws, etc.

Their tendencies might be programmed with certain laws or parameters, such as some requirement that they always find or build things out of minimal paths or brachistochrones.

The ideic atoms, molecules, and matter might be given properties in the computer representation that would be analogous to the self- and group-vibrations and -rotations of their primary analogs in the physical world. The ideic entities could then form systems of internal and external states and interactions that would potentially be capable of exhibiting all of the spectroscopic and behavioral complexity of their real-world (or physical) counterparts.

An all-important question is whether local combinatorial relevance of ideas is also equivalent to distal, collective, or global relevance of ideas, for if the answer is yes, then they might be expected to automatically grow into larger and larger sets of ideas with emergent, self-organizing, evolutionary, coevolutionary, and even more complex properties. Whereas if the answer is no, then on the contrary they might be expected to remain essentially local or granular in their ideonomic organization and to produce only finite and rather trivial ideas.

And one thing with an important bearing on this question is the separate question as to what the algebraic laws of ideas might be, or at least the algebraic laws governing the behavior of ideas in the sort of ideochemical simulations that are here being imagined (or groped toward).

Let it also be said that the rules governing the spontaneous or automatic organization of ideas in a 1-dimensional manifold (or in strings) are not necessarily the same as those governing the behavior and organization of ideas in a manifold of 2 dimensions; indeed, they may vary in all dimensionalities of manifold.

Of course the recent discoveries of mathematicians that the properties of 3- and especially 4-dimensional manifolds are extraordinarily bizarre and special, by comparison with every other dimensionality of manifold, may well imply that the behavior, patterns, laws, and possibilities of ideas will likewise prove to be extraordinarily special and bizarre in 4- and 3-dimensional manifolds.

→ See notes to greatly extend chapter!

INTRODUCTION
Technology
\Methodology

IDEA BANKS

Data banks have long been with us. Basically they are organized and usually massive collections of data that are centrally located and accessible to great numbers of individuals via computer—or other advanced telecommunicational—networks. They may be public, private, or both. The information they offer may be of a specialized or general nature. It may be numerical, verbal, imaginal, etc. In a sense the data bank is simply an electronic library, but it differs from a library of books or paper in that its knowledge is simultaneously accessible in any number of different ways or forms, and can be gotten at instantaneously from anywhere on Earth.

Idea banks would be computer networks analogous to data banks but dealing instead, or in addition, with ideas.

An idea bank would already possess a minimum of ideas and of ideonomic structure at the time when it was actually placed in operation or into normal use. Identical copies of the idea bank in this start-up condition might be marketed, perhaps as "subnetwork software" enabling individuals or groups to initiate lesser-order networks within existing telecommunicational and computer networks.

Pieces of general ideonomy software such as "ThoughtLab" (which is described in the chapter "Ideonomic Computer Software") could by themselves serve as the basis or nucleus for such an idea bank subnetwork.

Many data banks are already acquiring features that cause them to resemble idea banks, and certainly in the future the techniques of idea banks will come to be grafted on to virtually all data banks. Actually by the medium future few pieces of software will operate independently, because by then technology and methodology will have arisen that will cause the totality of the Earth's software to be mutually imitative, assimilative, and cooperative. Whatever the exact form in which new products and services will then be marketed or introduced, the process will unquestionably differ from that with which we ourselves are familiar in simply representing a modification of or accretionary addition to a vastly greater and largely unaltered whole of profoundly interconnected, interdependent, and interactive computer programs, languages, memories, techniques, resources, and processors.

Idea banks will in turn incorporate data banks, and, moreover, their use and development will inevitably produce at least as great a quantity of data as will those conventional or nonideonomic uses of the computer with which we are already acquainted.

The simplest type of idea bank might be little more than a static repository of ideas consultable in the same way that the data stored in a data bank is. Perhaps it would be equivalent to an electronic dictionary or encyclopedia of ideas. The ideas would not even have to be of universal character, but rather could be those thought to be most relevant to some field, phenomenon, or problem.

A higher type of idea bank could be truly ideonomic in being equipped with organons and other devices for actively furthering the user's thought.

Yet a higher kind of idea bank could be designed to progressively grow and evolve as a direct result of its use, or by its nearly organic interaction with its set of users over time and their mutual interaction through, or in myriad ways defined and controlled by, the bank. It is in this case that the reason for calling the system an idea bank becomes especially clear, for the ideas that were invested in it would contribute

to the exponential development of one another's meaning, manipulability, diversity, and utility in the manner of compound interest.

Still a higher form of idea bank would presumably be one operating and evolving with the help of or wholly on the basis of mechanical intelligence (AI).

At the time of writing (1988) there are already in existence pieces of software that exemplify the simplest sense of idea bank that was suggested above, or that make available to the computerist a general dictionary and thesaurus. Of course what are provided in these cases are reference books of a conventional nature that define, explain, and illustrate what are properly not so much 'universal or ideonomic' ideas as common words, things, and concepts.

Moreover, these computerized dictionaries, thesauruses, and encyclopedias that are now available in our stores realize only the tiniest part of the potential of the computer for doing what books per se are almost incapable of doing, or for cross-referencing or otherwise interconnecting words, passages, concepts, definitions, explanations, examples, themes, and topics massively and multifariously in N dimensions (where N exceeds three and may exceed a thousand). Of course ideonomy represents much more than just this kind of structure, but the more such structure something like a book or computer program exhibits, the more ideonomic it will often tend to be.

Computer software suggestive of the second sense of the idea bank concept might also be said to exist, at least in a minimal way. General software for helping one to think, or to create and organize ideas, is available under the names "MaxThink" and "Think Tank"; or so I am told, for I myself have never used this software. But these are merely tools to serve thought and are not properly idea banks. Primitive idea banks in the second sense may actually exist, but, if so, they are not known to me.

Limited or specialized idea banks in the third and fourth senses may also exist, but again none are known to me. Of course existing computer networks may have a natural tendency to develop in the course of time into idea banks in both these senses (that is, to do so even without the explicit guidance or coexistence of ideonomy), but the process would presumably be an order of magnitude slower if unassisted by ideonomy directly (or allowed to proceed 'stupidly').

The general development of computer software has been profoundly retarded by the lineal (or unidimensional) way in which software has forced the user of the computer to organize and work with data. But a revolution is now underway that was triggered by Theodor H. Nelson's invention of hypertext and its mass-marketing (as "HyperCard" software) by Apple Computer. Software of this type allows one to arrange data, ideas, and functions in chains, networks, hierarchies, and other meta-structures.

What is of particular interest is that in the year following the appearance of Apple's HyperCard there was a spontaneous and explosive mass creation and 'publishing' of "stacks of cards" by users of that software, which had been provided gratis to all purchasers of Apple computers. A stack is a computer program in the context of HyperCard, and resembles a series of file cards. But stacks can be reused in many ways or have value or interest to many different people, not only as collections but as transcendent schemata of data, ideas, and relationships.

This event probably furnished an indication of the sort of explosive interest, effort, and development that can also be expected to occur when idea banks are introduced, and that may enormously accelerate the growth and maturation of ideonomy itself. In fact in the case of idea banks the phenomenon should be orders of magnitude more impressive, and it is even difficult to place upper bounds on what is possible or might reasonably be expected.

The distinction between nonideonomic and ideonomic idea banks should be clarified.

A specialized idea bank might be established to enable people to progressively pool their ideas about how to use free time.

INTRO[illegible]

NATURE'S UNCONSCIOUS

Modern psychology is usually credited with having discovered the coexistence with the conscious mind of another level or type of mind, the subconscious mind or unconscious. This dual mind is conceived of as possessing its own, often inscrutable set of purposes, motives, beliefs, expressions, thoughts, perceptions, values, ideas, or the like. It is often supposed that the so-called conscious mind cannot be understood, or understood deeply or fully, without some explicit or implicit reference to this additional stratum of human psychology.

It is not yet clear how large, complex, or fundamental this—still somewhat hypothetical—unconscious mind is or may be. Yet the notion of the unconscious mind is probably the dominant concept in twentieth-century psychology.

Analogs of the unconscious mind of psychology may be found in other sciences. Some of these analogs have been more or less demonstrated to exist; others are purely theoretical; and yet others, still unformulated and unexpressed.

Modern physics has more or less abandoned that analog of classical physics, the ether. But various other analogs have taken its place: the relativistic structure of spacetime, for example, or the Dirac vacuum of quantum mechanics, or higher-dimensional models of space, or the superspace of John Archibald Wheeler that would encompass in its transcendental fabric all possible universes and physics.

These more fundamental substrata of physical reality may play a central or dual role in familiar phenomena that presently lies beyond our ken, and hence might be spoken of as the unconscious of modern physics or physicists. Some physicists have indeed begun to think along these lines.

For a century the unity of biology has been prescribed by the concept—since confirmed—of hereditary factors, or of the collection of these factors that is known as the genotype. A century of effort has made this initially wholly unconscious biological substratum something ever more conscious, explicit, and understood.

More recently evidence has appeared for another and quite different form of heredity and biological control, termed lateral gene flow. Conventional heredity and evolution would be restricted to a forever branching tree of divergent lineages, of species and taxa drifting ever farther apart; to a tree barren of anastomoses. The new or supplementary theory of lateral gene flow, by contrast, postulates the periodic or constant exchange of hereditary elements between and among all species and all biological taxa.

That such an interflow occurs has been proven. The questions now are how great, rapid, efficient, and important it is, both in the absolute and in competition and cooperation with the orthodox lineal process.

It has also recently been suggested—by James Lovelock, Lynn Margolis, and others—that in various senses and degrees the totality of life on earth may constitute a single giant organism, or a biological system far more unified and self-determined than had hitherto been considered likely or even possible. This "Gaia Hypothesis" is separate from the theory of lateral gene flow, but it is also conceivable that to some extent each may be the basis of the other.

Yet another revolutionary biological concept would reconceive the very basis of life as being not a matter of organisms, genes, and molecules, really, but of computational information of a far more generalized self-reproductive and competitive character: the cellular automata of the mathematician, perhaps.

Each of these three great new ideas in biology may be taken to imply the existence in that science of something equivalent to the concept of the unconscious mind in psychology. They suggest an underlying sea of phenomena, and an unrecognized system of government, in the bios.

There are hints in modern mathematics of the existence of another analog of the psychological unconscious. The new and still controversial mathematical subfield of category theory would interlink all the divisions and parts of mathematics with one another, and leave mathematics much more unitary and elegant than it is today. Indeed, mathematics has a history of the unexpected discovery of often astonishing connections among its most distant and disparate parts.

A vast or infinite set of intimate interrelationships may exist in or as mathematics or define the future course of its development. If so, it could be spoken of as mathematicians' analog of the unconscious.

Geology may be a far more historical science than is currently realized. The simplest phenomena and events of the most primordial stages of the earth may have precipitated elaborate chains of consequences that ever since have played the dominant role in terrestrial geology, and perhaps differentiated it from the geology of other planets, and certainly excluded other geological possibilities that might otherwise have flourished instead.

This suggests that even in geology there may be an analog of the psychologists' unconscious. And in other sciences there could be yet other analogs.

The whole point of the preceding discussion was to introduce the idea that the new science of ideonomy is founded upon the discovery of a profound and at least equally important analog of the psychological unconscious.

The world of all possible ideas would appear to be underlain by a substratum either enormous or infinite in its unity, simplicity, power, and transcendence.

All ideas would seem to partake of the nature of all other ideas; all ideas would seem to be a function of one another and a transformation of one another. For example, all things would appear to have important analogies to one another. All analogies would appear to have analogies to all other analogies. Hierarchies of analogies, including analogies of ever higher order, would appear to exist. All systems of analogies would appear to have analogies inter se.

These infinite and infinitely complex networks of analogies appear to be unexpectedly specific and fundamental. They can be discovered, analyzed, and reduced to laws. The laws can be usefully applied.

This universal system of analogies among all things would not appear to be merely descriptive, or even merely predictive.

Somehow, in some as yet little understood way, it would appear to play as fundamental a role in governing nature as the universal system of numbers that is known as mathematics.

Of course analogies represent only one form of ideas, and one division of ideonomy. They have been used here to represent all forms of ideas and all of the divisions of ideonomy, or a great and unexpected truth in connection with them.

TAXONS

The Ideonomic Division
TAXONS AND TAXOLOGY

INTRODUCTION

A "taxon" refers in ideonomy to any classificatory group.

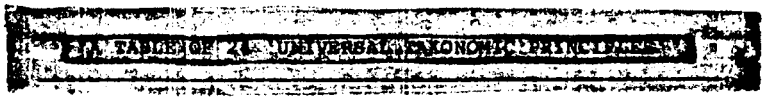
"Taxology" designates the science of all existing and possible sets, systems, processes, and results of classification, of any thing and in any subject. It can also be used to mean some particular classificatory set, system, process, or result. The more familiar term "taxonomy", on the other hand, is redefined to name that subfield of taxology which is specifically, only, and alone concerned with the laws of classification; although once again it can used to refer to a particular set of classificatory laws.

Other divisional terms will be introduced and defined in the relevant section of the present chapter.

A common mistake is the assumption that classification must by its very nature be trivial, even tautologous. This is simply not so.

The attempt to classify some set of phenomena, entities, or ideas can have great revelatory effect. Unsuspected problems can be brought to light, new categories of things can be suggested, fundamental laws can be implied, and recognized laws can have their validity circumscribed, diminished, or redefined.

There is a great range in the degree of taxologic endeavor, achievement, and completeness in various fields and in connection with different things and matters. Yet it can probably be said with confidence that in no instance has a classificatory enterprise attained absolute perfection or produced an ultimate and unquestionable scheme. Part of the reason for this assertion lies in man's constant discovery of hitherto unimagined forms of complexity, even with respect to what have been taken to be the very simplest aspects and elements of physico-mental reality. Here history suggests the need for the most extreme and invariant humility.



NOTA BENE: These are general principles serving to guide ideonomical treatment of taxonomy or classification. More specific taxonomical principles should be formulated and compiled in another, complementary ideonomical list. The present list is essentially philosophic in nature and purpose.

1. All classification both [involves and generates] 'virtual' NETWORKS that are by nature [anastomotic, recursive or 'self-operating', hierarchic, infinite-dimensional, topographically organized, topologically paradoxical, 'intrinsically dynamic, etc].
2. All classification leads on to OTHER classification, both optional and necessary.
3. All taxonomies involve more or less 'fundamental' classificatory DIMENSIONS, that are both fewer and greater in number than the total number of [taxa (types), vertical 'categories', genera, species, and/or individuals], classified or classifiable, of that taxonomy.
4. All taxonomies, of all things, are MUTUALLY RELEVANT [analogous, homologous, intertransformable, 'co-dimensional' (sharing of dimensions), 'covariant', etc].
5. All taxonomies will always involve an infinity of [ERRORS, fallacies, idola, oversimplifications, distortions, misrepresentations, presumptions, omissions, biases, abuses, artifices, fictions, overlaps, imprecisions, inadequacies, misattributions, imbalances, asymmetries, irrationalities, inconsistencies, 'use-costs', etc].
6. All things are CLASSIFIABLE.
7. All things can be classified in an INFINITY of ways.
8. All things MUST be classified in an infinity of ways - and by an infinity of [SYSTEMS and MEANS] - if they are to be [fully and truly] [classified and described].
9. ALL [perception, thought, and action] involves [either overt or covert, and infinite 'virtual'] 'classification', and classification over a [vast or infinite] hierarchy of [scales and abstract 'levels'].
10. Anything whatever has an infinitely complex [nature and appearance], and therefore an infinity of classifiable [attributes, elements, relationships].
11. Every act and element of classification has an infinity of [trivial or important] CONSEQUENCES.
12. Infinitely many 'META-DIMENSIONS' are needed to FULLY characterize any taxonomy.
13. No taxonomy will ever be ABSOLUTELY simple or simplest; INFINITELY [simpler, more fundamental, more absolute, and more powerful] taxonomies will always be possible, REGARDLESS of what is being classified.
14. Taxonomies and taxonomic science can become ever more [COMPREHENSIVE, all-purpose, universal].
15. Taxonomies can be devised for, or serve, an infinity of PURPOSES.
16. Taxonomies can be infinitely HIGH and/or WIDE ([vertically and/or horizontally] [differentiated and/or extended]); and/or short or narrow.
17. Taxonomies can become INFINITELY COMPLEX [algebraically, geometrically, topologically, etc].
18. Taxonomies CAN NOT ONLY BE DESCRIPTIVE BUT [heuristic, predictive, generative, creative, self-correcting, cognitive, self-evolving, regulatory, 'motorial', etc].
19. Taxonomies can have infinite [axiomatic, nomothetic, epistemological, axiological, noological, mathematical, symbolic, morphological, spectrological, analogical, linguistic, perceptual, metrological, holonomic, ideocartographic, ideonomical, etc] [bases, forms, or developments].
20. Taxonomies, representationally, can have ANY integral (or fractal) DIMENSIONALITY [from one to infinity or some transfinite number (e.g., D = 1, 2, 3, pi, 10^100)] and employ an infinity of alternative 'number lines' (only a handful of which are currently known).
21. Taxonomy is, among other things, [ANAMORPHIC, anadescriptive, exponential, self-referential, self-interactive, self-creating, and mysterious].
22. Taxonomy should be served by an infinity of PRINCIPLES, in addition to these.
23. Taxonomy's ultimate [nature and destiny] is VERGENT.
24. That which can and must be classified is INFINITELY [NUMEROUS, diverse, and far-ranging].

A TABLE OF 130 PRIMARY BASES OF CLASSIFICATION

NOTE: A given taxonomy may use or eschew one, many, or all of these bases.

1. Activity.
2. Age.
3. Agency, factor.
4. Alternatives, opposites, or antinomies.
5. Amount.
6. Analogy.
7. Anomalousness, abnormality, or deviation.
8. Assumptions.
9. Averages, norms, statistics, or normality.
10. Behavior.
11. Bifurcation or dichotomies.
12. Bounds or boundaries.
13. Capacities, ability, power, or achievement.
14. Case.
15. Cause.
16. Changes.
17. Coactivity, concausation, synergism, or cooperation.
18. Coincidences.
19. Combinations.
20. Complexity.
21. Composition, content, elements, or parts.
22. Concept.
23. Concomitants or accompaniments.
24. Condition.
25. Conflicts or contradictions.
26. Consignification or correlation.
27. Constraints.
28. Convenience or expedience.
29. Criteria or thresholds.
30. Criticism.
31. Degree.
32. Density.
33. Dependence - vs - Independence.
34. Description, appearance, aspects, features, or details.
35. Development or history.
36. Domain.
37. Effect.
38. Energy or force.
39. Environments, situations, or circumstances.
40. Equalities - vs - Inequalities.
41. Essence.
42. Event.
43. Evidence, clues, or signs.
44. Excellence [quality or goodness].
45. Exceptions.
46. Extremes [minima, maxima, qualitative extremes, or cet].
47. Fits or concinnity.
48. Form.
49. Goals.
50. Guess.
51. Harmonies, consistencies, or conformity.
52. Hierarchies.
53. Hypotheses about.
54. Idealization.
55. Illusions.
56. Instance.
57. Instrument readings.
58. Interactions.
59. Interest, information, or implications.
60. Interpretation.
61. Interrelationships or relation.
62. Laws.
63. Level.
64. Lifetime or duration.
65. Limitations or defects.
66. Location, distribution, occurrence, or region.
67. Main distinguishing or distinctive features; comparison, contrast, or difference.
68. Manner.
69. Mass.
70. Means.
71. Mechanism.
72. Membership [external or internal; inclusion or exclusion].
73. Mental association.
74. Mereology.
75. Mode.
76. Movement [velocity, structure of movement, or cet].
77. Nearness or distance.
78. Networks.
79. Optima.
80. Order, sequence, series, or progression.
81. Orientation.
82. Origin.
83. Pairs.
84. Paths or routes.
85. Perfection.
86. Permutations, transformations, modifications, or variations.
87. Persons [investigators or proponents].
88. Perspectives.
89. 'Phylogeny' or coderivation.
90. Plans for or re.
91. Possibilities or potentiality.
92. Predictions, expectations, futuribles, or futures.
93. Prevalence.
94. Priorities or scheduling.
95. Probabilities.
96. Problems.
97. Processes.
98. Progress.
99. Purpose.
100. Ranking.
101. Rate.
102. Realm.
103. Regime.
104. Regularities or periodicities.
105. Representatives.
106. Requirements, presuppositions, or needs.
107. Responses.
108. Role or function.
109. Rules.
110. Samples.
111. Scenarios.
112. Simplicity.
113. Size.
114. Solutions.
115. Stage.
116. Subdivision.
117. Substructure.
118. Symmetries - vs - Asymmetries.
119. System.
120. Tendencies, trends, liabilities, or habit.
121. Theme.
122. Theory.
123. Time or chronology.
124. Treatment.
125. Type.
126. Ultimates.
127. Unifiability or separability.
128. Units.
129. Utility, value, or importance.
130. Zone.

PRIMARY BASES OF CLASSIFICATION

What nameable bases of classification transcend all fields and apply to all things at once? Or what bases would most nearly approach to this ideal?

The whole notion that there can be extremely general or even universal bases of classification will surprise many scientists. From their point of view, if there are any bases at all for simultaneously classifying, say, the phenomena of botany, astronomy, physics, sociology, economics, mathematics, geology, and psychology, then they must be exceptional, trivial, coincidental, misleading, purely linguistic, or unfortunate.

For a variety of reasons the prevalence of this attitude is not surprising. Historically, there has been virtually no effort to discover interdisciplinary or pandisciplinary bases for, or systems of, classification. The central and almost exclusive object of the classifier has remained the discrimination—not the integration—of phenomena (and hence of the sciences as well). The Greek root of class is klasis, meaning fracture.

Items that appear on the accompanying organon, "130 Primary Bases of Classification", may be variously: similar, analogous, different, or opposite, overlapping, commensurable or incommensurable, related or unrelated, elementary or divisible, complementary or competitive, broad or narrow, clear or obscure, ambiguous or univocal, polysemous or monosemous, or—in their entirety—comprehensive or incomplete. Future ideonomists should investigate, and describe or rectify, these complex possibilities.

All of the bases should be defined and explained. Many should perhaps be renamed.

To the extent that all scientists, and people in general, rely more or less exclusively upon, or continuously reuse, a single universal scheme such as that offered here, the long-term effects are apt to be: improved interhuman communication and understanding, science and human knowledge that are more efficient and unified and less redundant, greater clarity and accessibility of all knowledge, reciprocal insights among different fields, more complete, rigorous, and fundamental classification of things, and an intellectual culture that is more 'ideonomic'.

The present organon has the capacity—by supplementing the traditional fixed and often rather meager and arbitrary bases of classification used by taxologists in various specialties—to challenge, invigorate, modify, extend, or even revolutionize the existing schemes of those fields.

Radically different or even disparate classificatory systems and schemes might be encouraged to develop and compete with one another, and this could bring to light their special virtues and vices. In economics the stifling effects of monopoly—and monopsony—are of course well known.

Let us proceed to discuss as many of the individual items of the organon as there is space for. Both obvious and esoteric or heterodox uses of the bases of classification will be suggested (in terms of the subjects or things to which they could apply).

(1) Classification on the basis of ACTIVITY.

Some of the things that have already been classified on the basis of activity are: chemicals (such as antibiotics or other drugs), volcanoes, industries, social groups or organizations, stars, persons, parts of molecules, and nuclei of the central nervous system.

But one could easily go on to other things that, to the best of one's knowledge, have not been classified to date on the basis of the quantitative or qualitative dimension of "activity", or of some subsense of activity, and yet—arguably or definitely—could or should be.

What exactly is, or should be understood as meant, by activity, at least insofar as it is to serve as a "basis of classification" in the present, finite and instrumentally—or by definition—exhaustive and internally irredundant, organon?

Activity could variously refer to: liveliness of (external or internal) motion, or of exhibition of or involvement in changes, processes, acts, events, work, phenomena, or behavior; potential or capacity therefor; actual or potential causation of (any or energetic) work, operations, effects, motions, changes, events, e/vc; multitudinous, multitudinous minute, overall, diverse, minimal, complex, manifest, invisible, specialized, simple, cumulative, e/vc motions, changes, actions, work, effects, events, e/vc; reactivity; or sensitivity.

Activity, then, might also be used to classify, i.a.:

Forests (conceivably there are different—unrecognized and unclassified—types of activities that go on in different forests; e.g. some forests may create soils, or soil components, that certain other forests then destroy by 'harvesting'—in a phytogeographic cycle);

Tastes (perhaps ultrafast and yet complex chemical reactions occur at taste buds or in the mouth that play an unsuspected and unclassified role in gustation);

Galaxies (perhaps, if we could only observe a sufficient swatch of their histories, we would find that within different galaxies there are astronomically slow galaxy-size events, or complex forms of spatiotemporal behavior, that differ significantly or even drastically from one galaxy to another or over the set of galaxies, and that these could be used to classify galaxies);

Soils (the range, complexity, and importance of the internal activities of the Earth's soils may be vastly greatly than now realized—soils might even play active roles in their own maintenance, growth, evolution, adjustment, or mutual succession—creating new opportunities for descriptive and classificatory pedology);

Paintings (when people look at paintings, parts or elements of same may induce complex dynamic, process-like, or even story-like activities within the brain, or within the brain's image of the painting, that may play an unsuspected role in the overall process of perception and enjoyment, and allow paintings to be classified psychophysically in a new or more complete way).

(2) Classification on the basis of AGE.

In ideonomy the word "age" is often, as it is here, used or meant in the very broadest sense, and it could variously signify: relative or absolute oldness, priority, duration (past, present, or future), agedness (manifest age), life-span or half-life, maturity, seniority, etc.

Thus odors could be classified by or re age in such senses as: their characteristic post-inhalational 'age' by the time they are initially or correctly detected by the olfactory receptors or brain, distinguished or identified, fully identified, or fully appreciated or responded to by the brain or (polysensory) consciousness; any literal age associated with or communicated by them (say as the smell of old food, an ancient building, or an oldster); relative or absolute point in ontogeny when they first become detectable or differentiated from other smells, or point in late life when

detection becomes difficult or impossible; age in infancy or later development when an or the average individual first encounters them in the environment; cladistic, phenetic, or chronometric point in biological evolution when advancing or diverging olfaction first developed a general or special ability to detect or recognize them, or came to perceive or classify them more or less as we modern men do.

Global soils would be interesting to classify for age: length of time that different soil types, subtypes, covers, horizons, mineral or chemical components, or individual particles have existed or may be expected to persist; age of paleosols; fraction of Earth's history over which types of soils have existed; or age of various soil deposits or types on the surface of Mars.

(3) Classification on the basis of AGENCY or FACTOR.

An agency is a person or thing through which power is exerted or an end is achieved; an instrumentality or means. A factor is something (as an element, circumstance, or influence) that contributes to the production of a result; a constituent or ingredient (in this sense).

One can distinguish this item on the organon from the items "cause" and "mechanism", but not from "means", which accordingly should be united with it. This blemish illustrates the very imperfect character of the many organons that appear in the present book, whose great ambition and haste of writing made it all but inevitable that there should be these flaws.

The world's languages differ in the set of simple and compound sounds they make use of in their spoken forms, and because the various sounds in turn rely upon different elements of the human vocal apparatus, one could classify the languages on the basis of discrete or relative phonological contributions of different parts of the anatomy functioning as agencies or factors.

(4) Classification on the basis of ALTERNATIVES, OPPOSITES, or ANTINOMIES.

Foods might be classified on the basis of these things. They will often be basically similar but of 'opposite' pH: two varieties of fruit may differ only in one being acid and the other alkaline; even the same variety may differ in this respect when grown in different soils. But how many other dimensions of 'taste' may exist whose actual or potential opposites could facilitate food classification? (Here taste is meant in the polysensory sense that includes not only gustation but smell, haptic texture, vision, and even the perception of temperature and sound.)

Then again, foods of identical pH might be differentially classified on the basis of countless alternative properties. Where there is a given type of taste there may be various alternative subtypes of it. Various fruits and vegetables that are botanically unrelated may nonetheless represent alternative occurrences of the same highly specific flavor.

(5) Classification on the basis of AMOUNT.

This is almost too obvious to mention.

Nations of the world have been variously classified on the basis of absolute or relative amount of people, annual rainfall, goods produced annually, tourists, suicides, telephones, college graduates, etc.

But cell types might be classified on the basis of amount of various or total chemical receptors on the plasmalemma; soils on the basis of amount of beneficial mycorrhizae; cultures on the basis of amount of jokes told prandially; or crystals on the basis of amount of lattice defects that typify them.

EXAMPLES OF CLASSIFIABLE THINGS

The following table can be used and reused throughout the chapter, and elsewhere whenever there is a need for various and sundry examples of things that might be or have been classified. Taxologic exercises can combine it with other organons in endless ideogenetic formulas.

"100 'CLASSIFIED OR CLASSIFIABLE THINGS'"

1. Animal behaviors.
2. Anomalies [in science].
3. Attitudes.
4. Blood types.
5. Bodily systems [major and minor].
6. Books.
7. Building materials.
8. Cars.
9. Cell types.
10. Chemicals.
11. Civilizations [à la Arnold Toynbee].
12. Clothes.
13. Clouds.
14. Colors.
15. Countries.
16. Crimes.
17. Crystals.
18. Curves (mathematical).
19. Definitions.
20. Diagnostic symptoms.
21. Digraphs (in graph theory).
22. Diseases.
23. Economic systems.
24. Elementary particles.
25. Emotions.
26. Engine types.
27. Equations.
28. Ethical systems.
29. Fabrics.
30. Faces [via the Bertillon system].
31. Fears.
32. Fonts.
33. Foods.
34. Forests.
35. Forms of mental illness.
36. Fruits.
37. Furniture.
38. Galaxies.
39. Games.
40. Geological periods.
41. Geospheres (earth's internal shells).
42. Groups of chemical elements.
43. Handwriting.
44. Houses.
45. Ideas.
46. Idola (fallacies).
47. Industries.
48. Jobs.
49. Jokes.
50. Kines (elements of body language).
51. Languages.
52. Laws.
53. Leaf forms.
54. Life stages.
55. Literary genres.
56. Machines.
57. Medicines.
58. Melodies.
59. Microphones.
60. Military rank.
61. Military units.
62. Mineral fabrics.
63. Minerals.
64. Muscles.
65. Musical compositions.
66. Musical instruments.
67. Myths.
68. Novels.
69. Odors.
70. Paintings.
71. Personalities.
72. Phases of matter.
73. Philosophical 'categories'.
74. Philosophies.
75. Planets.
76. Races (anthropological).
77. Religions.
78. Sciences.
79. Seashores.
80. Sentences.
81. Sets (mathematical).
82. Situations [life].
83. Sizes of geological particles (grains).
84. Soaps.
85. Soils.
86. Sounds.
87. Spaces (mathematical).
88. Sports.
89. Stomachs.
90. Tastes (gustatory).
91. Teeth.
92. Tissues.
93. Types of maps.
94. Types of noise (e.g., 1/f, $1/f^2$, etc).
95. Visual textures.
96. Volcanoes.
97. Weapons.
98. Weather fronts.
99. Words (e.g., à la words in a thesaurus).
100. Writing styles.

Now let us review the ways in which these things have been classified, and/or preview ways in which they may someday be classified, reclassified, or multiply classified.

Readers may have their own ideas.

Something else to watch for: analogous, catalogous, related, or even complementary ways (bases or systems) for classifying pairs or sets of different things listed in the table.

BASES AND SYSTEMS FOR CLASSIFYING SAME

Many of the bases, systems, and methods for classifying the tabulated things—that I will recall or propose—will be of a speculative nature or involve dubious assumptions or hypothetical raisons d'etre; even existing or accepted schemes may be flawed, misconstructed, invalid, misused, or rude.

For most of the classifiable things there will always be the implicit question as to which subsets, taxons, or aspects of the things are meant —or are to be understood as consciously or unconsciously included or excluded in the bases and systems whose application to the things is actually discussed.

And one would always like to know, not just examples—or even the total examples—of classificatory schemes and elements that may be—or are—applicable to the things, but which are the most applicable, or would be the most suitable, successful, comprehensive, absolute, and multipotent.

To what extent is our perception of the worth of different classificatory means bound up with man's contemporary ignorance, misconceptions, purposes, and perspectives?

Turning, then, to the entries of the table.

(1) ANIMAL BEHAVIORS.

Classification might exploit a ranking of their: intensity, simplicity -or-complexity, homogeneity-or-heterogeneity, constancy-or-variability, plasticity-or-inalterability, repetition (frequency), heritability, interspecific universality (pan-taxonicity); convergent, divergent, or parallel evolution in other organisms; distinguishability, differentiation, integration, specialization, generalization, duration of display, lability, autonomy-or-heteronomy, importance to the biont or species, fundamentality, idiosyncratic-or-necessary character, efficiency, productivity, dimensionality, complementarity, dominance in the life of the organism, rapidity, intelligence, precision-of-recurrence, energy requirements, spatial scope, probability-of-occurrence, etc.

Classification of animal behaviors might also be founded upon, reflect, or address their: group-theoretic interrelations, intertransformations, and structure; canonical essence, reflexivity, associativity, distributivity, transitivity, commutativity, mereology, evolutionary age-or-recency, modularity, hierarchicality, reversibility-or-irreversibility, flexibility, constraints, triggers, effects, synchroneity or synchronology, branching or anastomosis, competitiveness, contradictoriness, fungibility, genesis, scaling range, typology, laws, mechanisms, extrema, intergradation or intermediates, contexts, symmetries, imperfections, etc.

The different behaviors of animals have been classified by reference to such ethological categories, dimensions, or concepts as: defense, aggression, altruism, selfishness, courtship. food-getting, parentage, familiality, communality, symbiosis, domination, submission, imitation, autecologic or synecologic niche, filiality, communication, learning, habitation construction, exploration, operant or other conditioning, homeostasis, adience, abience (including escape and hiding), experimentation, instinct, tool-using, husbandry (e.g. seed planting), territoriality, warfare, eusociality, migration, taxes, etc.

PURPOSES OF TAXONOMY

NOTE: Purposes of a general and universal kind; both actual and possible ones. Lists of the purposes, uses, bases and types of taxonomy have a tendency to converge.

1. To facilitate (enable or improve) (orderly, efficient, quick, convenient, meaningful, natural, cognitive, social, progressive, mechanical, methodical, simple, universal, etc) storage and retrieval of things, data, or ideas.
2. To improve perception.
3. To aid memory, mnemonically.
4. To facilitate learning and teaching.
5. To facilitate and guide the evolution of theory.
6. To concentrate knowledge or meaning (by distinguishing and emphasizing what is relevant and irrelevant).
7. To clarify cause-effect relationships and all forms of interdependences.
8. To facilitate the development, specialization, and use of appropriate languages.
9. To assist with the discovery of simplicity within complexity, and of order and laws within noise and chaos.
10. To enable those testable predictions that are the real basis of scientific and scholarly progress.
11. To help science discover the hierarchies, networks, series, and other highly characteristic forms of order and information that are found everywhere in nature and are —or should be—the central concern of science, technology, art, and philosophy.
12. To help define the absolute structure of Possibility.
13. To help discover the most fundamental or useful relationships of things.
14. To show how things did, do, or might change or be changed—or how nature and the world varies or may vary.
15. To aid discovery and analysis of the analogies among things.
16. To help distinguish what is from what isn't.
17. To help distinguish the general from the particular or individual and thereby improve our knowledge and understanding of both.
18. To aid the expression and consummation of whatever mental patterns and possibilities man inherits from his genes.
19. To provide surface clues as to what things may be fundamentally different from other things, and as to the fundamental differences between things.
20. To put constraints on—or bound—the diversity, complexity, dimensionality, uniqueness, or independence of things.
21. To clarify the origin, history, evolution, nature, or laws of individuals by helping to reconstruct or understand the homologous or analogous origins, evolution, or history of aggregates, types, groups, systems, or totalities.
22. To enable the real purpose—or the full potentialities and proper goal—of taxonomy to be discovered.
23. To structure, interrelate, converge, synthesize, unify, or implicitly and uniquely specify all knowledge of a thing or of a particular class of 'objects'.
24. To enable the identification of things, or in a way that is: easy, quick, exact, complete, unique, effective, economical, reliable, self-checking, universal, meaningful, reproducible, sufficient/maximal, invariant, etc; say based on easily observed and described characteristics that are recognized or recognizable by all people and about which the maximal number of people can agree.

PURPOSES OF TAXOLOGY

What are the various and sundry reasons for classifying things in the first place, in general, or in certain instances? What does in fact—or could instead, or should—motivate the surveyor, the collector, the collator, the categorizer, the classifier, the colligater, and the systematist (whether layman or professional—conventional or exceptional)? Why have certain classifications been performed? Why have certain schemes or systems been constructed—or been modified, supplemented, or abandoned? What wants, needs, and ends have inspired and regulated the evolution, and prompted the fads, of classification historically?

The organon that we are about to discuss, "24 Purposes of Taxology" (vide), may have many uses and values. By identifying, or seeking to comprehend, all of the (related and unrelated) primary and secondary purposes of taxologic endeavor it affords a means of checking into the absolute and comparative achievement, or ambition, of systems and systematizers in particular fields or concerned with particular things. Insufficiencies, imbalances, idiosyncrasies, common technical problems and unshared solutions may be brought to light—as may exemplary failures and triumphs.

In subtle ways it may simply ferment new thought in the taxologic mind. Taxologists in various fields may find that they want to specialize to a greater—or lesser—degree than they have. Opportunities for the timely exploitation of new technologies may be suggested by the frank enumeration of ideal, irreducible or separable, subjacent, interjacent, or superjacent, transcendent, elementary, substitutable, exact, bald, and hitherto obfuscated, complex, combinable, progressive, and latent motivations, purposes, and goals of taxology.

To be intelligent, avoid certain pitfalls, and have style an endeavor must be conscious of its own nature, potentialities, results, tendenzen, and destiny.

By so boldly articulating the purposes of taxology, this organon may force those who classify, or use classifications, to critically reexamine existing taxologic structures, laws, categories, taxons, types, differentiae, methods, and principles in connection with the things they purport to order, define, and describe, and to discover as a consequence discrepancies, errors, delinquencies, insensibilities, foundational problems, and revolutionary possibilities that would otherwise remain unrevealed.

(1) TO FACILITATE (ENABLE OR IMPROVE) (ORDERLY, EFFICIENT, QUICK, CONVENIENT, MEANINGFUL, NATURAL, COGNITIVE, SOCIAL, PROGRESSIVE, MECHANICAL, METHODICAL, SIMPLE, UNIVERSAL, ETC) (STORAGE AND RETRIEVAL) OF (THINGS, DATA, OR IDEAS).

The emphasis here is not upon benefits to human memory (compare item #3) but rather to technological means, such as books, files, museum collections, and computers.

A taxologic system can impose an order upon materials or things that proceeds from the most to the least general, or from the least to the most general, or from the earliest (of origin) to the latest, or vice versa, etc.

As a result, fewer irrelevant items or characters may have to be checked or considered, and storage or retrieval can be made more efficient, quick, and convenient.

If blood types are arranged in blood groups that are more meaningful: say in the sense that the actual causes of differential antigenicity are specified, or the antigenic distance between different types can be deduced logically or estimated schematically: then this may make for their more natural storage and retrieval. The opposite might also hold to some extent: more natural representation may have a tendency to be more meaningful.

How we think is not clear, nor is the actual or potential contribution of classification to the process or power of thought. But it is a reasonable hypothesis that schemes that dramatize and systematize the interrelations of things will have the ability to enhance the role of human thinking in the process of storage and retrieval, especially if the classificatory arrangement and process are deliberately given a cognitive form.

Classification made public, or based upon public principles of classification, can make storage and retrieval more social or assist society's use of the latter.

Classificatory data and schemes are capable of addition and evolution and can therefore be progressive. By their very nature they can and do suggest further ways and means of improvement; whereas unclassified collections, or domains, are apt to be static.

Mechanical storage and retrieval is very difficult in the absence of classification; the more heavily, diversely, and meaningfully classified things are the more powerful can be the mechanical process of managing, transforming, and using stored or storable materials.

Various arrangements of materials can suggest tautologous and nontautologous methods for storing and retrieving them.

Certain classificatory descriptors can obviate a cognitive element in their storage and retrieval and make the entire process rather simple and straightforward.

Finally, classificatory systems can confer upon the storage and retrieval of things, data, and ideas a universal basis: a language, code, methodology, or mechanical system that is know to all, available to all, or perhaps applicable to all subjects, things, or tasks.

(2) TO IMPROVE PERCEPTION.

In each second of time something in excess of 10,000,000 sensory impulses are dispatched to the human brain by its peripheral sensory receptors as they record the events of the external world. As this stream of raw data reaches the brain it is analyzed and synthesized into sensa and percepts in a hierarchy of consciousness.

This entire process is of a classificatory nature, with the influent sensa being converted into diverse but complementary taxons at every level.

But classification, and hence perception, is capable of indefinite improvement. Such improvement has repeatedly occurred across the intellectual history of mankind, and it continues even today.

Without appropriate classification perception is blind. Objects, events, and things much more complex are seen but not recognized for what they are. Even the fine detail that is present may go unnoticed.

Before a meteorologist learned of the concept of the ubiquitous fractal geometry of nature, he might have studied the edges of clouds above him with the utmost care and yet have persistently overlooked the scale-invariance that is their most obvious or fundamental morphological feature.

When a scene is decomposed by the brain into its simpler system of families of canonical surfaces, objects, domains, textures, changes, contrasts, configurations, phenomena, states, hierarchies, series, networks, equations, transformational groups, etc, the resulting classificatory schematization enormously simplifies and facilitates the momentary and ongoing perception of its complex and otherwise impenetrable content.

Only when the diverse behavior of psychopathic individuals is classified into a family of syndromes can the diseases present in the different individuals be discriminated and perceived.

Mere awareness of a classificatory scheme, or of the classification of a thing, does not guarantee that perception will occur, much less that it will be efficient. Perception can be trained, however, to use classification and to use it with maximal skill, efficiency, insight, and reliance.

A TABLE OF 59 KINDS AND ASPECTS OF CLASSIFICATION

1. Algebraic - vs - Topological - vs - Geometric.
2. Broad, extensive - vs - Narrow, intensive.
3. Canonical.
4. Categoreal.
5. Comparative, differential.
6. 'Cosmological' (e.g., proceeding from and referring to the universe's very nature).
7. Dull - vs - Revelatory.
8. Dynamic, evolutionary, progressive.
9. Empirical - vs - Theoretical.
10. Esemplastic.
11. Expedient, useful, arbitrary, artificial, convenient, opportunistic.
12. Extrinsic, imposed, forced.
13. Familiar - vs - Novel, bizarre.
14. Final, ultimate, permanent, static.
15. Finite - vs - Infinite.
16. Firsthand - vs - Secondhand.
17. Flexible, manipulable, adjustable.
18. Heterodox, revolutionary, alternative.
19. Holistic.
20. Homogeneous - vs - Heterogeneous.
21. Hyperdimensional.
22. Intrinsic, natural, 'self-classificatory'.
23. Intuitive - vs - Formal, logical; Aesthetic; Deductive - vs - Inductive - vs - Abductive.
24. Linear - vs - Nonlinear.
25. Loose, minimal, approximate - vs - Precise.
26. Mathematical, quantitative, statistical.
27. Multivariate.
28. Necessary, transcendental, categorical, certain.
29. Nomothetic - vs - Idiographic.
30. Open - vs - Closed.
31. Orthodox, conventional.
32. Parametric.
33. Partial - vs - Total, global.
34. Perspectivistic.
35. Phenomenological - vs - Etiological - vs - Epistemological - vs - Morphological.
36. Popular - vs - Professional, serious, disciplined, rigorous.
37. Profound, major, great, big.
38. Proper, accepted - vs - Improper, dubious, controversial.
39. Qualitative - vs - Quantitative.
40. Random, accidental.
41. Reductive.
42. Referential - vs - Generative.
43. Relational, contextual, situational, environmental, circumstantial, associational.
44. Relative - vs - Absolute.
45. Restricted - vs - All-encompassing.
46. Selective - vs - Exhaustive, complete.
47. Sensory, experiential, perceptual.
48. Sharp - vs - Vague.
49. Simple - vs - Complex.
50. Specialized - vs - General, universal, comprehensive, all-comprehensive, enyclopedic.
51. Supreme.
52. Systematic.
53. Temporary, ad hoc, nonce.
54. Tentative, speculative, hypothetical, experimental.
55. Traditional - vs - Modern, scientific, revised.
56. Trivial, minor, small.
57. Typological.
58. Unidimensional - vs - Multidimensional.
59. Unique - vs - Multiple, replaceable.

OPPOSITE WAYS OF CLASSIFYING THINGS

NOTE: It is of interest that any given thing can be classified equally well by systems that are exactly opposite to one another.

1 By maximal similarity———By maximal dissimilarity.

2 By one or the fewest possible dimensions (variables)———By many or the greatest possible number of dimensions.

3 By sets of discrete traits———By continuous dimensions.

4 By one meta-dimension or the fewest possible meta-dimensions (of taxonomical dimensions)———By many or maximal meta-dimensions.

5 By total empirical appearance of bionts or species, idiographically———By dictatorial (prescriptive and proscriptive) laws, nomothetically.

6 Positively (ontologically), by phenes bionts and species have———Negatively (anontologically or privatively), by phenes they do not have.

7 Statically ("morphologically"), by instantaneous (immobile) form or appearance———Behaviorally (dynamically, "ethologically", or serially), by diachronic behavior.

8 Individually (automorphically or idiographically), by describing each biont or species ex nihilo or in isolation———Comparatively (heteromorphically, contrastively), by describing bionts or species in terms of (all) other bionts or species.

9 Evolutionarily (unilinearly, vectorially, monotonically, directionally, progressively, anamorphically, irreversibly, nonequilibrially, etc), by describing or classifying organisms according to their measure of advance toward some goal or in some dimension or by some formula or criterion (or any number of such) [or per contra, per their measure(s) of regression from some origin, state, and/or the like!]———Unevolvingly (statically, aprogressively, scalarly, anamorphically, Parmenideanly, reversibly, nonmonotonically, nonlinearly, stoichiometrically, symmetrically, cyclically ‹'rotationally' or 'vibrationally'›, and/or the like), sans some or any sort of 'progress', goal, measure, and/or the like.

10 Linearly———Nonlinearly.

11 Deterministically (as advancing, or being classified, via necessity)———Stochastically (as advancing, or being classified, via chance).

12 Finitely———Infinitely [the latter, incidentally, would give rise to many fascinating paradoxes and actually require changes of basic paradigms].

13 Phenetically———Cladistically.

14 Non-ecologically (by individual behavior, or else without regard to ecology)———Ecologically (wholly or in part, or by collective, reciprocal, cybernetic, coinfinite, or 'interdescriptive' behavior—or the like).

A TABLE OF 98 THINGS CLASSIFICATION MAY MAKE USE OF

1. Aftereffects.
2. Analysis.
3. Arrows.
4. Authority.
5. Boundaries.
6. Boxes.
7. Calculation.
8. Caricatures.
9. Charts.
10. Choices or options.
11. Chunks.
12. Clusters.
13. Codes.
14. Colors, lines, sensa, dots, blank spaces, textures, or pictographs.
15. Commentaries.
16. Computers.
17. Consensus.
18. Criticism.
19. Cross-references.
20. Curves, graphs, histograms, surfaces, or solids.
21. Data.
22. Definition.
23. Diagrams.
24. Doctrines.
25. Drawings or paintings.
26. Equations or formulas.
27. Evaluation.
28. Exaggeration.
29. Experience.
30. Experiment, tests, or investigation.
31. Explanation.
32. Extrema.
33. Filters'.
34. Footnotes.
35. Generalizations.
36. Hierarchies.
37. History.
38. Idealization.
39. Imagination.
40. Indexes.
41. Inspection.
42. Instruments or laboratory.
43. Interpolation.
44. Intersections.
45. Isopleths.
46. Letters or alphabets.
47. Lists.
48. Logics.
49. Maps.
50. Mathematics.
51. Matrices.
52. Measurement.
53. Measures.
54. Models or simulations.
55. Networks.
56. Number theory.
57. Numbers or quantities.
58. Omission.
59. Operators, operands, or operations.
60. Parameters.
61. Photographs.
62. Physical laws.
63. Polls.
64. Postulates or conjectures.
65. Principles or axioms.
66. Procedures, methods, techniques, or styles.
67. Proofs.
68. Random numbers or stochastics.
69. Reaction.
70. Reconstruction.
71. Records.
72. References.
73. Regression.
74. Rules.
75. Samples.
76. Scales.
77. Senses.
78. Series of specifications.
79. Sets or groups.
80. Simplifications.
81. Sorting.
82. Spaces, manifolds, or lattices.
83. Spectrums.
84. Standards.
85. Stories.
86. Studies or scholarship.
87. Summaries.
88. Surveys.
89. Symbols.
90. Synthesis.
91. Tables.
92. Themes.
93. Theories.
94. Traces.
95. Words.
96. Words or language.
97. Worldviews or philosophy.
98. Yeses or noes; pluses or minuses; or binaries.

VARIABLES OF 52 META-DIMENSIONS OF CLASSIFICATION

FOREWORD: These are dimensions that can be used to characterize - or to define ideal possibilities for - taxonomies. The set of all of these dimensions constitutes the manifold thereof.

1. Appropriateness.
2. Authenticity (correctness or validity), empiricality.
3. Balance, symmetry, unity.
4. Breadth (horizontal completeness or differentiation).
5. Capacity.
6. Clarity, self-explanatoriness, limpidity, comprehensibility.
7. Completeness, exhaustiveness, 'canonicalness'.
8. Complexity.
9. Conceptuality, meaningfulness, illuminative and informative power, intelligence, cogitability.
10. Consistency, regularity, 'homogeneity'.
11. 'Currency' (up-to-date-ness).
12. Degree.
13. 'Delicacy'.
14. Density.
15. Depth.
16. Descriptiveness (extent a taxonomy actually describes what it classifies).
17. Detail.
18. Discriminatingness (discriminatory power).
19. Elegance, gracefulness, beauty.
20. Expandibility, flexibility, adaptability, perfectibility.
21. Explantoriness.
22. Finality, perfection, ultimacy, eternality, transcendentality.
23. Fundamentality.
24. Height (vertical completeness or differentiation).
25. 'Holisticness', 'holonomicalness', 'monisticness'.
26. Ingenuity, sophistication.
27. Logicality.
28. Methodicalness, self-organization.
29. Multidimensionality - unidimensionality.
30. 'Multi-purposiveness', versatility.
31. Naturalness.
32. Necessity, absoluteness, 'lawfulness', irrefutability.
33. Omnitude (extent a taxonomy does the infinity of things a taxonomy should).
34. Pantologicalness (trans-disciplinariness).
35. 'Polynomy' (multiplicity of combined and synthesized laws and principles).
36. Polythematicness - monothematicness.
37. Practicality.
38. Precision, accuracy.
39. Predictiveness.
40. Quantitativeness.
41. 'Recursiveness'.
42. 'Richness, 'solidity'.
43. 'Sensitivity'.
44. Simplicity, compactness, elementariness, irredundancy.
45. Size (absolute).
46. Specificity, 'idiography', nonambiguity.
47. Sufficiency.
48. Unifyingness.
49. Uniqueness, supremacy.
50. Universality.
51. Utility, efficacy.
52. Verifiability.