Appendix III: Glossary of Pan-Act Terms

A glossary of operationally-defined terms used in Pan-Acts modeling becomes increasingly needed for further communicating and testing of it. The task of compiling and refining such a glossary takes years and calls for the interaction of diverse *colleagues.* The present incomplete and imperfect set of definitions is an invitation for others to help revise and finish it. But as this Booklet of 64 Exhibits goes to press as a Xeroxed "preprint," rather than delay its printing for several years, it was decided to include this start on a glossary as a means of enlisting cooperative improvers of its present inadequacies. *So Voila!*

A

ACT = a single all-or-none item of action.

ACTANT = any thing-namable, therefore any element of the cosmos, viewed as an item of energy (measurable in erg-seconds) when organized or disorganized to any level in the Mass-Time Triangle.

ACTION = Energy x Time = ET = $ML^2T/T^2 = ML^2/T$, when corrected for level of organization by the Pan-Acts log Equation, a = ct.*

* Action is measurable in erg-seconds when modified in two ways, viz:

1) metric tons (10^6 grams), millimeters (10^{-1}cms) and "tersecs" (= sec/3) are taken as cgs units;

2) the level of organization in MTT is allowed for by the Pan-Acts Equation $A_t = C_n^t$ where A_t = total amount of action at Level t, i.e., number of primal actants or primons (each 10^{-77} tons) at Level t; C_n = Creation Rate = $10^{c'} \doteq 10^{11}$, c_i = $(\lg 10)^2$ = 11.0356 $\doteq$ Speed of Light

(C $\doteq$ 3 x 10^{10} cms/sec*)* in mm/sec/3 so $C_n \doteq 10^{11}$; t = time taken to evolve to Level t. t is measured ideally in C units from the electron's mass as statistical origin but practically approximated (until more exact definitions of units like α-meters can be worked out to eleven decimal places) by C_n units from the primon for more absolute cosmic scaling.

ACTON = the smallest actant, i.e., least massive, at a given level.

ACTUALITY = activities compounded across levels in MTT
= any situation where an actant interacts explicitly in the field of actants of other levels, usually lower levels. e.g., *a* driver in driving a car interacts with:

1) Symbols, Level Ai, as road signs and all his relevant verbal experience.
2) Society, Level A, as persons inside and outside his car;
3) Himself, Level B, as his own brain, learning skills, and memories;
4) His animal body, Level C, as his muscles, feet, etc.;
5) Matter, Level D, as the car, road and environ;
6) Radiant Energy, Level E, as a field of daylight, etc.;
7) Gravity, Level F, as the field of gravitational activity acting on him and his car;
8) Curved Space, Level G, as the space in which he moves;
9) Primity, Level H, as his unperceived and unknown but hypothesized interacting with the subspatial, randomly acting, infinitesimals of energy called "primons," each 10^{-77} ton.

ADDUCING = reasoning by adding and ordering alternatives: (A+B) > (B+A).

= analyzing a logical sum (= "A or B") into its addends.

= preferring among alternative, forming value judgments and ordering them.

= ranking one's options.

(See also: INDUCING, PRODUCING and DEDUCING)

ANTILOG = the actant, A, defined as a log, L and its base, B.

= $A = B^L$

e.g., in $_2N = 2^n$, 2 = the log base; n = the bits log or number of bits; $_2N$ = the antilog or here the Binary Numbers 1, 2, 4, 8, 16, etc

APEX = highest point in the Mass-Time Triangle. In the 9-level universe, the Apex is at the Now point, or current year in time; and the C^{2i} tons point in imaginary space. $C^{2i} = C^{(1+i)^2} = 10^{2c,i} \doteqdot 10^{22i} \doteqdot (22!)^i$.

ARRAY = an aligned set of cells in a matrix. i.e., a row or column, an ordered set.

AXIS = 3 major coordinates in Pan-Acts modeling, viz:

Action, A = number of actants = horizontal coordinates in MTT;

Organization, O_r = lg A = number of bits = vertical coordinates in MTT;

Timing, $T = \Sigma|O_r|$ = number of annual cycles in MTT = sagittal coordinates

B

BION = the acton, or smallest actant at the Life Level C in MTT = 10^{-22} tons.

BINARY NUMBERS = $_2N = 2^n$ = 1, 2, 4, 8, 16, etc.

= antilogs to the base 2.

BIT = a log to the base 2, n in 2^n.

= the number of all-or-none factors in a product.

= two possibilities <u>becoming</u> one outcome.

= a highly universal unit of organization regardless of content in any discipline.

= the unit of ordinate in MTT

In Pan-Acts modeling, bits are called:

Bits of information, if in the past with outcome known;

Bits of decision, if in the present with outcome in process;

Bits of uncertainty, if in the future with outcome unknown;

Bits of organization, if at anytime regardless of outcome;

Bits of complexity if in self-power form, $\lg n^n = n \lg n = H$.

BITBIT = 2 bits = 2^2 = 4.

= the log base for the Creatant constant $c_, = 4^{y,} = (2^{y,})^2 = h_,^2 = \log C_n$, i.e., the interlevel interval or cosmic quantum in MTT.

= the versatile combinatoric unit of interaction since:

2^2 = the number of repetitions of 2 as a factor;

2^2 = the number of combinations of 2 things if put into 2 cells;

2^2 = the number of permutations of 2 things taken 2 at a time.

4^n = the interdimensional formula for all formulas of Physics.

4^n = the Life formula for the number of inheritable patterns from the 4 DNA nucleotides in all plant and animal cells.

$4^n = (2^n)^2$ = the Binary Numbers squared

$-4 = (1 + i)^4$ = the Metalanguage constant = $4i^2$.

(See Table 8, p. 53, in EpiDoc 320 on the "Quantic Matrix" for Key constants as bitbits specifying six cosmic bench marks.)

C

C = SPEED OF LIGHT
  Log units = unit of logs to some unspecified base.
  C = SPEED OF LIGHT
    C_{ex} = exact speed, 2.997724562 cms/sec
    C_α = exact speed in α_m/sec; $\alpha_m = 2C/e^{8\pi}$
    C_β = exact speed in β_m/sec; $\beta = C/e^{4\pi}$
  Approximations and isotopes:
    $C_3 = 3 \times 10^{10}$ cms/sec

    $C_n = 10^c \doteq 10^{11}$ mm/tersec
    $C_L = 3 \times 10^c$
  Other postscripts identify other component units and consequent different numerical values for C.

$c_, $ = CREATANT RATE = $h_,^2$ = $(\lg 10)^2$ = 11.03520 = log C_n.

  = log C_n = $\log_{10}$ of the Creation Rate, C_n, of actants organized one level per eon (or log century) of time.
    = the interlevel interval in MTT, or quantum jump in the cosmic hierarchy of levels.

    Equivalents: $c_,= h_,= 2^{r_,}= 4^{y_,} = \pi \bar{\pi} \doteq u_u + 1$ (+2423 ppm).

CIRCLON = former name for a cyclon or curvon.
COHORT = a coeval set of actons
COMBIC = brief term for "combinatoric"
COMBINATORIC ALGEBRA = algebra of combinations, permutations and repetitions
COMBINATIONS = the number of combinations of n things if put into m cells or states is m^n. At maximum, when m = n, this becomes the self-fulfillment formula, n^n.
COMPLEXITY in Pan-Acts modeling = H = $\lg n^n$ = n lg n.
  = the number of bits in a self-power or fulfillment of an n-set.

CO-PI $\overset{def.}{=} \bar{\pi}$, C/π = 11.03520/3.14159 = 3.512613, $2\bar{\pi} \doteq 7$ +3603 ppm.

  i.e., $c_, = \bar{\pi} \pi$. So $\bar{\pi}$ converts the $c_,$-system of Key constants into the π -system, or polar

  coordinates.
CORRELATION = relation between 2 variables, -1 < r < +l, ranging from -1 to +1.
  correlation coefficient (Pearsonian) = r = $\dfrac{\Sigma xy}{N\sigma_x\sigma_y}$

  correlation coefficient (common elements) = r = $\dfrac{n_{xy}}{\sqrt{n_x \cdot n_y}}$

COSMIST = brief term for cosmologist.
  = cosmic scientist.
COSMOS = the universal set of all things-namable (called "actants").
  = the sum of all universes.
  = $U° = 1$ (the zero exponent denoting "the set of ---" whatever its base stands for).

COSMOSPHERE = the cosmos graphed as a sphere of concentric shells or levels. (See EpiDoc 301:3)

CREATION RATE = $C_n = 10^{c_i} \doteq 10^{11}$.

= the constant number of actons at any level organizing up to the next higher level in MTT per eon (or log century) of time.

CREATANT RATE = $c_i = h_i^2 = (\lg 10)^2 = 11.03520 = \log C_n = \log 10^{c_i}$

= the common log of the constant Creation Rate, C_n, or number of actons at any level organized up to the next higher level in MTT per eon (or log century) of time.

CRUX CONSTANT = $r_i = \sqrt{12} = 3.46410$.

= $\lg c_i + 17$ppm = the Creatant Rate re-expressed in bits = r_i

= any actant in standard measure as $A/\sigma_A = A/A/r_i = r_i$ = the "Stanact".

= the point where combinations equal permutations, i.e., $2^r = r! = r\Gamma(r)$.

= 2 "gams" = $2y_i = 2\sqrt{3}$.   -

CUBIT = h_i^3 = the cubed bits in ten since $2^{h^3} = 10^{h^2} = 10^{c_i} = C_n = 10^{11.03520}$ = the Creation Rate.

= the Creatant Rate in bits.

= 36.65816175.

= the cosmic quantum, or interlevel interval, expressed in bits.

$\doteq \pi^\pi + 5375$ ppm, i.e., $+\Delta = .53\%$.

$\doteq r^r/2 - 9243$ ppm, i.e., $+\Delta = .92\%$.

CURVITY = Level G of actants in the Mass-Time Triangle.

= a dynamic curved space.

= a set of points each moving in semicircles of π radians about any point as center with any ordered subset as radius.

= "cyclity" seems a possibly more appropriate term, coined to denote the nature of the acton of Level G as the properties of this hypothetical entity emerge with further semiotic research.

CURVON = the threshold actant at the Curvity Level G in MTT.

$\overset{def.}{=} 10^{-66}$ tons

= the smallest actant-element composing curved space.

   Earlier in Pan-Acts modeling the Level G acton was called an "Entropon" and still earlier a "fluxon" (from Newton's term for an infinitesimal of the calculus). As the properties of this hypothetical acton become clearer with semiotic research the term "cyclon" as threshold actant for the Cyclicity Level G may prove even more appropriate than "curvon."

CYCLON = the threshold actant, or acton--defined by a mass of 10^{-66} tons-- at the Cyclicity Level G in MTT. The "cyclon" was also called a "curvon" and still earlier an "entropon"--see EpiDoc 306:4 for details on this change of nomenclature as the modeling matured since 1960.

D

DECIT = a common log (to base 10, $\log_{10}$).
  e.g., the speed of light being 10^{11} mm/tersec may be said to be "11 decits of mm/tersec."

E

ELECTRON = the acton or threshold actant for the Matter Level D in MTT.
  = the smallest sub-atomic particle of rest mass, 9.107×10^{-28}g and charge of 4.802×10^{-10} statcoulomb and a spin of one half unit, i.e., of $\hbar/2 = h/4\pi$.
  An electron moving at a speed, v, has an associated DeBroglie wave length, λ, given by $\lambda = h/mv$, where h is Planck's constant and m is the electron's mass.
  The electron is taken in Pan-Acts modeling as the anchoring point or statistical origin for the Creatant line, $a = c, t$, or left side of the MTT from which every acton is expected to deviate by an integer multiple of c, , the Creatant $\doteqdot$ 11, as its difference from the electron's mass.
  Thus the electron's mass, m_e, and the speed of light, C ($\doteqdot 10^{11}$ mm/tersec - 692 ppm), are taken as the fundamental empirical constants for transforming and testing the fits of the whole Pan-Acts system of combinatoric syntax to empirical observation. As these fits improve with research (towards the ideal of 0 ppm discrepancy) man's symbolizing of the cosmos can be taken to describe and explain, to predict and control in it ever better.

ENERGY = ability to do work, measurable in ergs = g cm^2/sec^2 = $MV^2/T^2 =$
  In the past tense, energy spent is called "work;"
  In the present tense, spending energy is called "kinetic energy;"
  In the future tense, energy still unspent is called "potential energy;"
  In anytime, energy has the dimensions of ML^2T^{-2}, alike for any tense.

ENTROPIC CURVE = the Gompertz growth and decay curve defined by 2 log tiers as $y = e^{-2^{|t|}}$ or $q_t = q_0^{2^{|t|}}$ .This asymmetric S-shaped curve is formed by t successive squarings (i.e., self-products or pair-permutings) of the base 1/e or q_0. When rectified by taking logs twice appropriately, it is graphed as the sides of the Mass-Time Triangle, predicting the evolving and devolving of the successive cohorts of actants.

ENTROPON = the former name for the acton, or threshold actant of mass, 10^{-66} tons at Level G in MTT. Now called "a curvon," or element of curved space, which is measured by the unit cycle, 2π.

ENTROPY =
  (a) relates energy to absolute temperature in thermodynamics;
  (b) is associated with the probability of a given distribution of momentum among molecules;
  (c) expresses the degree to which the energy of a system has ceased to be available, i.e., has "run down" with "heat death" towards eventual complete randomness;
  (d) measures, as negentropy, in information theory, the uncertainty of our knowledge in the future tense, or the amount of our information in the past tense;
  (e) is measurable in bits, $H = n \lg n = \lg n^n$, of fulfillment, n, in any tense.

The left slope of the Mass-Time Triangle graphs negentropy (i.e., increasing organization or decreasing randomness with time) while the right hand slope of positive entropy measures decreasing organization or increasing disorganization, i.e., increasing randomness. The bottom Primity Level H in MTT shows completed positive entropy or perfect randomness (i.e., $p_G \doteq 1/10^{100} \doteq 0$) while the top imaginary Level Ai of Symbols shows maximal organization or zero randomness (i.e., $p_{Ai} = 1.0 = U^0 = a/ct$) for the cosmos as a unitary distribution, perfectly organized in the normal or binomial distribution as in $(p + q)^n = 1^n = 1$.

EON = a log century of time, so $T_u = 100^t = 100^8 = 10^{16}$ years = the evolutionary age of the present top cohort of actants as estimated by MTT for the 8-level real universe, Levels A - H.

One eon unit of time (in years) corresponds to one cubit of organization (in bits); and to one Creatant unit of Action (in tons or erg-sec equivalent) between any 2 adjacent levels in MTT.

EPICOSM = the earlier acronym name for what is now called the "Pan-Acts" model for the cosmos.

The acronym grew up from 2 roots:
(a) the constants e, π and i in the simplest form of Euler's equation: $e^{\pi i} = \text{cis } \pi = -1$;
(b) the Greek prefix "epi-" as "over and above" since the name "Epicosm Model" seemed over and above the cosmos as thing-named.

EQUABLE = equally able to operate or be operated on as homogeneous element in a set without subsets;
= randomness operationally defined as above;
= equal opportunity (= preferred synonym when applied to people).

In Pan-Acts modeling, "equable" represents one third of its basic assumptions, thus: The interactings of actants that organize cosmos is assumed to be:
(1) Equable (preferred term instead of "random"), implying Pan-Acts are elements of a homogeneous set, namely, the universal set (= U^0 = 1) of all things-namable called "cosmos" which is only seen as one set when all subset differences are neglected;
(2) Reiterant, i.e., interacting by combining, permuting, and/or repeating, thus organizing by the 4 basic operations of math, with their inverses, in math groups;
(3) Ceaseless, i.e., always existent, uncreated and indestructible implying conservation of energy or actants, and all creation as transformations or self-renewals.

ERGODIC PROCESS = a process proceeding to the same final state regardless of its early history, i.e., regardless of origin point or temporary abnormal factors if their intensity or duration becomes averaged back to the normal or most probable course.

EULER'S CONSTANT = .577215665 = ln y = C in VanNostrand's Scientific Encyclopedia notation.

$= \int_\infty^0 e^{-t} \ln t \, dt$

$= y_0 \doteq 1/y, - 233 \text{ ppm} = 1/\sqrt{3} - .023\%$ in Pan-Acts notation $y = e^C$

= 1.781072 (= $\sqrt{\pi}$ + 4862 ppm = 1.772453 + .48%).

The square root of 3, $\sqrt{3}$ (= 1.732050608), being a good approximation (i.e., within 233 parts per million or .02%) to the inverse Euler constant is standardized throughout Pan-Acts modeling and called "the gam" because it is the hypotenuse or interdimensional unit for any 3-dimensional unit space such as the Unital Cosmos, graphed in EpiDoc 302:1.

F

FACET = any one of the 4 corner scripts in Pan-Acts notation.
  = any one of the 4 rounds of reitering as in Row 2 of the Reiteratings Matrix operationally defining all syntax:
  i.e., Listing into SETS
      Adding into SUMS
      Multiplying into PRODUCTS
      Self-multiplying into POWERS
  with their inverses and compoundings.
  = a possible basis for Computer coding if developed in the future.
FAMILON = an early name, now displaced by "socion," for the acton, or threshold actant at the Society Level A in MTT.
  = the unit of societal multiplication, a pair of human mates, averaging within the class-interval of one metric ton, or 1000 kilograms, so C_n^0 = 1 ton.
FEEDBACK = influence or effects of a more mature cohort of actants on a less mature cohort within a specified series or cycle of acts.
  = Opposite of feedforward where the young influence their elders.
  Negative feedback = reducing deviations from a set course, i.e., from a standard or equilibrium state.
  Positive feedback = exaggerating such deviations
  Examples of negative feedback are:
      all education and transmitting a culture to the new generation, a thermostat mechanism to maintain a desired temperature in a room, an unfulfilled budget for period A influencing the setting of the budget for period B, conservative action in general.
FEED-FORWARDS = influence of a younger upon an older cohort in some serial activity.
  = the activity of budget planners upon budget administrators.
  = purposive behavior that departs from conserving the past.
  = in general, liberal or intentional action.

FIBONACCI CONSTANT = $\dfrac{1+\sqrt{5}}{2}$ = 1.618033989 = F.

  In a Fibonacci series each successive number is the sum of the two preceding numbers, e.g., 1, 1, 2, 3, 5, 8, 13, etc.

  $x = F - 1 = \dfrac{\sqrt{5}-1}{2}$ a = .618+ = the "golden section" of line-section a, such that

a/x = x/(a-x).
  e.g., spiral spacing of leaves around a stem in some plants.

FINE STRUCTURE CONSTANT, α = .00729735111; α^{-1} = 137.0360265. = ratio of angular momentum of spin to orbit.
= ratio of speed of electron in outer Bohr orbit to speed of light.

FULFILLMENT = n^n = the self-power = the maximal number of combinatoric patterns in an n-set whether by combination (= m^n) of n things put into m cells, or by permutation (=n^m) of n things taken m at a time, with repetition, or by repetition (= m^m) of m as a factor m times all when m at maximum becomes n.

FUNCTOR = any operation symbol, like(+ - x or /) = among symbols with matching operations among their referents, i.e., A x B denotes the product of the two letters and the specified appropriate product or interaction of whatever A and B stand for. See Ref. 11.

G

GAM = $\sqrt{3}$ = 1.732050808, the hypotenuse or interdimensional unit of a unit cube in 3-space such as the 3 cosmic axes of Action, Organization and timing (see EpiDoc 302)

GAMBIT = f (y,,2) = a Key function of a gam and a bit, such as:

$2y_, = r_, = \sqrt{12}$ = the Key Crux constant, a gam paired;

$y_,^2 = 3$ = a gam squared;

$2^{y_,}= h,$ = lg 10 = a gam normed or "bitsed" = the Key Root-Creatant constant;

$2^{y,y,} = 2^{2.58939904}$ = 6.01846 ≑ 6 + .307% = a gam fulfilled and bitsed.

The above represent the four Key processes with a gam, the unit of hypotenuse in the 3-axis space of Pan-Acts modeling.

For gambits measuring cosmic benchmarks, see EpiDoc 305.

GAUSSIAN CURVE = the normal curve, $y = e^{-x^2/2}$ in simplest terms of unit sigma and unit mid-ordinate.

GOMPERTZ GROWTH AND DECAY CURVE = $y = e^{-2^{|t|}}$ or $q_t = q_0^{2^{|t|}}$.= the Entropic curve of cosmic organizing and disorganizing by t successive squarings (i.e., self-products or pair-permutings) from level to level, thus explaining cosmic evolution and devolution in every cohort of actants.

GRAVON = the hypothesized acton, or threshold actant, at the Gravity Level F in MTT.
= 10^{-55} ton equivalent.

H

$h_,$ = the "Root – Creatant" = $\sqrt{c_,}$ = lg 10 = 3.321928096.

= the Key constant for the Material Stage III in MTT and in the Key Periodic Table, EpiDoc 404:4 and 304.

= 2^y, the "gam bitsed," i.e., root-3 exponentiated to the base 2.

= lg 10, the converter from common to bit logs, from man's cultural custom of counting by tens to nature's predominant practice of pairing.

HELIX = {(x,y,z) Ix = r cos t, y = r sin t, z = h/2π t} (h pitch) h,tθR , p. 327 Bartsch Handbook of
   Mathematical Formulas.
   = the curve of a coiled spring.
HIERARCHY = a ranking of levels.
   e.g., The cosmos of 9 levels can be subdivided into 2 parts either
   (a) as the lower 8 real levels called the "real universe" and the top or
   (b) Level Ai called the "imaginary" universe, or as the higher 8 ordered levels called the
      "ordered" or "spatial" universe and the bottom Level H called the "unordered" or
      "random" universe which seems "subspatial" or "prespatial."

I

IMAGINARY = i = $\sqrt{-1}$ = the non-real square root of a negative number existing only in human
   imagination or image making.
   i in Pan-Acts modeling denotes the name factor in any symbol when every symbol is
   factored into (a name) x (its thing-named).

IMAGINITY = a name for the top imaginary (i = $\sqrt{-1}$) or Symbols Level Ai in the Mass-Time
   Triangle. The ending of this name links it to the eight other like-ended names for the nine
   levels or cosmic hierarchy of nine universes--eight real universes and one imaginary (i.e.,
   symbolized in mental activity).
INTERACTING = combining, permuting and/or repeating of actants.
   = an intersect or product of the three forms of action among any two or more actants.
   = the interacting of actants that organizes or forms the cosmos.
INTERSECT = the subset of elements common to (or member of) any two or more sets.
   = a product among two or more sets.
   = a product among qualities, i.e., among qualitatively distinguishable pluralities of elements
     called "sets."
ISOTOPE of actant X = any actant like Actant X in definitive respects yet unlike X in some
   other respect(s). If the unlike respects can be specified it may form a specified isotope; if the
   source or nature of the unlikeness is unknown or only suspected it may be called a "hypo-
   isotope."

K

KEY CONSTANT = ^sK = any one of the five constants generating the cosmic Key Periodic
   Table and representing the Stages of a cohort cycle, namely:

   i = $\sqrt{-1}$

   r, = $\sqrt{12}$ = 3.46410 h,

   h, = lg 10 = 3.32193

   π = $\Gamma^2(1/2)$ = 3.14159 u2
   $y_,^2$ = $1/y_0^2$ = 3.00000

These constants can be generated by Key operations on the inter-axis unit, and in turn generate the Creatant Rate, c_i, by Key reiterant operations. (See EpiDoc 304.)

KEY OPERATION = the four reitering operations, namely:
  Listing into SETS, or
  Adding into SUMS, or
  Multiplying into PRODUCTS, or
  Self-multiplying into POWERS
  and their inverse or undoing operations.

KEY PROCESS = a product of one of the four Self-reitering operations, namely:
Self-sums	or Pairings:	$2n$
Self-products	or Squarings:	n^2
Min. Self-powers	or Normings:	2^n
Max. Self-powers	or Fulfillings:	n^n

L

LAW = a statement of regular recurrence under recurring conditions, graphable as recurring coils of the helix.
  The single helix formulates the single random stochastic process underlying curved space and the inorganic levels in MTT; while the double helix in DNA molecules formulates all inheritance possibilities in living cells and so underlies the organic levels in MTT.

LEVEL = any of the nine thresholds, or boundaries, between quantic jumps, or Creatant constant intervals, c_i, in organizing all cosmic action. Levels are geometrically graphed in MTT and algebraically defined by the Pan-Acts model, $U^0 = 1 = a/c_i t$, where t is the number of levels, c_i is the interlevel interval and a is the number of actants, or amount of action, at each Level t in turn.
  For specifications of the levels, see EpiDocs 301 and 302.

LOG BASE = B in $A = B^n$ where n is the log and A is the antilog. e and 10 are most usual log bases, though 2 is standardized in Pan-Acts modeling. 2 is the simplest base and most used in nature where t successive pair-permutings or squarings, $q_0^{2^t}$, seem to explain cosmic organizing and disorganizing, or the evolving-devolving of every cohort of actants.

LOGISTIC CURVE = the symmetric S-shaped growth curve of cumulative pair-interacts as in diffusing an item of news by phone.
  $= \Delta = kpq$ in discrete recursive form.
  $= y = \dfrac{k^1}{1 + e^{a+bi}}$; $b < 0$, in integrated form.

LOGIT = $\log_B B = 1$ = unit (i.e., unit-cycle) of a logarithm to any base, B.

M

MASS-TIME TRIANGLE (MTT) = a triangular graph of the cosmos as a triangle or nest of nine triangles with a common apex, according to the Pan-Acts model, $U^0 = 1 = a/c_i t$, where $U^0 =$

cosmos; a = actants at Level t; and c_t = Creatant Rate.

Each nested triangle represents a rectified normal distribution of actants at one level of hierarchic cosmic organization; its slope represents the constant Creatant Rate, c_t (= lg^2 10) its 3 vertices measure: the total unitary cosmos, U^0, at the apex; each level's acton or unit action in metric tons equivalent, at the left end of the base line; each level's total action or estimate of energy flowing-in-time at the right end.

Graphs of MTT are variously shown in EpiDocs 301:1; 305:4; 308:2; 312:3; 313:1,4; 315:3 and as a cube or sphere.

MATRIX = a set of elements ordered in m rows and n columns permitting mathematical operations and resulting properties.

= a set-product or intersect of 2 ordered sets.

Ordering and cross-classifying 2 or more sets of data or concepts into matrices is a highly systematizing, law-generating and fruitful form of analysis-synthesis in cosmic modeling as these 64 matrices exhibited here attest.

MAXTON = the maximal number of actons in any level measured in tons (i.e., erg-ton seconds) by the right hand end point of any level in MTT.

= estimate (and prediction for eventual testing) of total activity at any level.

"MID-PHOTON" = In empiric terms the "mid-photon" has a mass equivalent of 10^{-33} tons with a wavelength of 1 mm and frequency of C_{11} = 10^{11} mm per third of a second. (See EpiDoc 308:3 for details.)

In Pan-Acts axial terms, the mid-photon's Action is 10^{33} or 2^{33h} primons (1 primon = 10^{-77} tons or 10^{-71} erg-secs), its Organization is 33h bits of primons (= O_r. = lg A = lg 10^{33} = lg 233h = 33h bits); its Phase-number, t (EpiDoc 308:2) is 3, and its post-birth Age is 10^{12} years (= 1 trillion years), its Complexity, H (= AO_r = A lg A = 33h lg 33h) is lg $(33h)^{(33h)}$ or log 33^{33}.

MODEL (in Pan-Acts) = an operationally defined theory.

In general a model of something tries to make that something seen more clearly as a system of its detailed qualities, quantities and relations. Here the Pan-Acts modeling presents its theories and facts in triple forms: as geometric graphs, as algebraic formulas, equation and matrices, and as prose using verbs more than nouns so that the defining operations done can be redone or undone and so checked by the reader.

MOMENT (STATISTICAL) = the arithmetic mean, M of a power of the deviations, x = X - M.

The central discrete moments are:

the zeroth moment or total frequency = $\Sigma x^0/N$ = 1;

the first moment or mean $\Sigma x/N$ = 0;

the second moment or variance = V = σ^2 = $\Sigma x^2/N$

the second cross-product moment or co-variance = $\Sigma xy/N$

the covariance in σ units = the correlation = r_{xy} = $\Sigma xy/N\sigma_x\sigma_y$

the third moment, or Skewness = $\Sigma x^3/N$

the fourth moment or Kurtosis = $\Sigma z^4/N$; z = x/σ_x

N

NADIR = the lowest point in a cycle.

NIT = $\ln_e$ e = 1 = logarithm to the base e = 2.71828.

= unit or unit cycle of natural logs, ln = $\log_e$.

  Compare with the bit, or unit of bit-logs, lg = $\log_2$; the decit or unit of common logs, log = $\log_{10}$ and the logit or unit of logs to any base, B, i.e., $\log_B$.

NOMON = former name for the acton or threshold actant at the Symbol Level Ai in MTT. Replaced by "Symbolon," $S^0 = a + bi$.

NORMAL CURVE = the bell-shape of normal probability is defined by $y = \dfrac{N}{\sigma\sqrt{2\pi}} e^{x^2/2\sigma^2}$ where

$x = X - M$, $\sigma = \sqrt{\Sigma x^2/N}$, e = 2.71828, area = 1 = N, mid-ordinate = $y_0 = 1/\sqrt{2\pi}$ = .39842. In simpler form where σ and Ei and $N/\sqrt{2\pi}$ are taken as units, the formula is $y = e^{-x^2/2}$.

  The normal distribution is the limit of the binomial distribution, expanding $(p + q)^n$ for n large.

  Since by the Central Limit Theorem the distribution of sample means usually approximates a normal distribution and does so more exactly as the size of the sample increases, the actants at any of the nine levels being very large samples of the cosmic distribution are expected to be normally distributed and to appear as triangles when plotted in log coordinates from the apex as center.

NORMING = exponentiating n to the base 2.

  = "bitsing" or re-expressing n units as n bits.

  = forming norms or normal behavior among any large group of highly independent entities, whether persons or pennies, when interacting in an all-or-none act.

  = one of the 4 Key processes, measured by the minimal self-power, or power set, 2n.

0

ORDERED UNIVERSE = (in Pan-Acts modeling) the eight levels of the cosmos, including Levels Ai thru G but excluding the ninth or bottom Primon Level H as purely random or unordered.

ORGANIZATION in the cosmos is defined in Pan-Acts modeling as combinatoric interaction of actants, A (i.e., combining, permuting or repeating).

  Organization, Or, is measured in bits so $O_r \overset{def.}{=}$ lg A and is graphed as the ordinate in the Mass-Time Triangle. Its 9 class-intervals define the cosmic hierarchy of Energy-organized-by-time that is called "Action" in Pan-Acts modeling and throughout Physics (so A = ET = $ML^2 T^{-1}$ dimensionally). Each class-interval is:

(a) a quantum jump of $10^{11} \doteq C_n = 10^{11.3520} \equiv 10^{c,} \equiv 2^{h^3}$

(b) that is empirically observed at the four acton or threshold-of-level points, D' C' B' A'

(c) which induced the Pan-Acts Law of log-linear cosmic organization as a = c, t (or U^0 =

  1 = a/c, t in unital form—(See EpiDocs 302 and 308)

(d) which could then be tested by its fit to the further hypothesized or predicted five actons,

(e) of which 3 actons--for Photons, Gravons and Symbolons at Levels E, F and Ai--have become somewhat confirmed by later semiotic research,

(f) leaving "Cyclons" and "Primons" representing curved Time (or frequency of cycles, 2π, as inverse time at Level G) and pure randomness or completed positive entropy

(=$\sqrt{2\pi}$ • 1 = 2.50+ = the Root-cycle as the three-factored combinatoric unit) still entirely hypothetic.

*The Level G Acton--now christened "cyclon" in March 1975--has been called "Fluxon," "Entropon," "Curvon" at previous earlier stages of this semiotic inquiry into the unknown universes within the cosmos.

P

π = pi = 3.141592654 = ratio of semicircle to diameter.

= the constant measuring a reversed or negatived ordering (i.e., permuting) of any n elements arrayed as a radius, i.e., $\Gamma^2(1/2) = \pi$ = the Key constant for the Motional Stage IV in MTT.

PAN-ACTS = all acts = cosmos by definition of "cosmos" as the universal set (= U^0 = 1) of all things-namable (called "actants"). The "Pan-Acts Model," therefore, stands for the "Cosmos Model" if viewed as structured in a set of elements.

PERIODICITY = possessing periods or time intervals, called "eons" in Pan-Acts modeling.

Eons are measured by log centuries so at maximum when t = 9, 100^9 or 10^{18} estimates (by MTT readings) the duration of the first half life of the 9-level universe as one quintillion years.

An eon of time corresponds on the Timing Axis $T = \Sigma|O_r|$, to one Level of Organization on the "Org" Axis, $O_r = \lg A$, and to one "cubit" of Actants, A, on the Action (= A,) Axis, where A, ≡ A.

PERMUTING = rearranging in linear order.

Permuting is measured in transposition units wherein the ordered pair, AB, becomes the reverse ordering, BA, and more generally by the factorial n! = n(n-1)(n-2)...3 • 2 • 1 for integer n and by the gamma function, $\Gamma(n) = n!/n$, for any real number. n! = the number of permutations of n things taken n at a time if without repetitions, while n^n = that number if repetitions are allowed. n! is appropriate for sampling in small or finite populations, while n^n measuring fulfillment (of all combinatoric possibilities) is appropriate for large or infinite populations, as in modeling cosmic quantities.

Note that $\pi = \Gamma^2(1/2)$ = the constant, measuring a reversed or negatived ordering of any n elements, as π n. This reversed ordering can be graphed either as a line of n points each moved thru its semicircle to its new position, or as a vector rotated 180° which is n radians. These facts can account for converting a swarm of randomly moving primons or infinitesimals of energy into a semi-circling order that defines a dynamic curved space and the consequent interactions of gravity. (See EpiDoc 306 on the Permutive Gravity Hypothesis.)

In general, successive full pair-permutings or squarings (n^2) among n actants builds up the Gompertz growth and decay curves, $q_t = q_0^{2^{|t|}} = (((q_0^2)^2)^2)^{2^t}$ of negative and positive entropy which seems to explain the continual evolving and concurrent devolving or maintenance of cosmic hierarchic order in nine cohorts at nine levels and cosmic organization generally and perpetually.

PERSON = the threshold actant, or acton, of 10^{-11} tons of the Humanity Level B in MTT.
   = the fertilized human ovum or incipient whole person with hereditary characteristics or nature fixed but with environmental characteristics, or nurture undeveloped.
   = a "mini-person."

PHOTITY = the new technical name for the Radiant Energy Level E in MTT which is the upper half of the electro-magnetic spectrum, specified by Einstein's equation, $E = MC^2$, converting between radiant energy, or photons, and rest mass at the electron.

   The term "photity" (from its element the photon) was adopted in 1974 to avoid confusion (within Pan-Acts modeling) of the previous Radiant Energy Level E in MTT with energy in all other forms. Energy when organized by eons of intra-action becomes and maintains and seems to be the cosmos, composed of nine level of Actants, or namable items of Energy-acting-in-Time [so $A = ET = ML^2T^{-1}$ dimensionally].

   The Photity Level E is defined by the "mid-photon" which is one Speed of Light factor, C, below the Electron when that is taken as a zero reference point in the range of electromagnetic waves specified by $E/M = C^2$.

PLANCK'S CONSTANT, $h = 6.624 \times 10^{-27}$ erg-second = the elementary unit or quantum of action, or energy x time, as expressed by the Planck Law, $E = hv$ where E = energy in ergs and v is the frequency per second or inverse time of radiation.

   Note that the coefficient of Planck's constant nearly equals (within 2997 ppm or .29% Δ

OK) the 2h, = 2 lg 10 = 2 • 3.32193 where lg h = lglg 10 = $\sqrt{3}$ (-17 ppm).

POWER PARAMETER = m in $e^{\theta m}$ in EpiDoc 316:3.
   = an integer factor m = 0, 1, 2, 3, 4, 5 in an exponent such as to subdivide the log range of any entity taken as log base into 4 or sometimes 6 equal log intervals.
   e.g.: the statistical moments
         the dimensions of space
         the "quantic" in Dimensions of Society
         See EpiDoc 316:3 for Twelve Applications of the Power Parameter

POWER SET = 2^n = the set of all subsets among n elements
              = the antilog of n bits
              = the number of combinations of n things put into 2 cells
              = the number of combinations of n things taken 0 to n at a time
              = the number of permutations of 2 things taken n at a time
              = the area under the binomial curve and the normal curve if n is large
              = the Binary Numbers, N = 1, 2, 4, 8, 16, etc. as n = 0, 1, 2, 3, 4, etc.

PRIMON = the acton at the Primity Level H, defined by a mass of 10^{-77} ton equivalent ($\doteq 2^{-256}$).

Q

QUANTIC = the degree, or positive integral power, of a polynomial, as in: linear, quadratic, cubic, quartic and quintic equations.

R

r, = $\sqrt{12}$ = 3.46410, the standardized actant of whatever original size, called the "Stanact."
   = a Key constant formed by the Key operation of doubling $\sqrt{3}$, the gam (i.e., the

organizing constant or hypotenuse for any 3-dimensional unit system).

= the bits-log of the Creatant Rate, c, as r, = lg c (+17 ppm). = approximately the "Crux" point, r_3, where combinations equal permutations as $2^{r_3} = r_3! = r_3 rr_3 + 1242$ ppm.

RANDOM = unordered or equable (for more operationally-definable terms). A random set of elements is describable by such synonyms as having:

> interchangeable elements
> independent elements
> unordered elements
> equable elements
> homogeneous elements
> uncorrelated elements
> all alike elements
> indistinguishable elements
> no subsets of elements
> a terminal subclassifying of elements

Each element (i.e., item or "actant") in the cosmos (defined as the universal set of all things-namable) is viewed as potentially two-valued, i.e., as being potentially a member of not a member of a named set, X^0.

REAL NUMBERS = ordinary rational or irrational numbers, contrasted with imaginary numbers

RECTIFYING = transforming the equation for some curve into a straight line form.

e.g.: rectifying the normal curves into the Mass-Time isosceles triangle by taking logs twice, or by plotting both coordinates in log units from the apex as zero point.

RED SHIFT = the absorption lines in the spectra of light from distant galaxies, coming from all direction to Earthbound observers, is generally interpreted as a lengthening distance, L, in the speed of light formula, C = L/T, i.e., that the galaxies are all flying apart so that the celestial universe is rapidly expanding.

(For an alternative interpretation of a simpler and forever constant universe, see EpiDoc 310:3, the Antilog Time Hypothesis).

REITER$_m$ = repeat, combine, or permute.

= $m + m^n + n^m$ = (if m n at max) $3n^n$ among n things taken m at a time, allowing repetitions.

REITERANT = any actant that reiters, i.e., repeats, combines or permutes, regardless of grammatical variations like reiterer, reitering, reitered.

REITERATE = a compounded reiterant, a reitering of reiterings, as in the Reiteratings Matrix.

RELIABILITY = the correlation of a measuring with itself upon repetition is one form of testing its reliability.

REPLICATE = to repeat exactly an experiment (or controlled observing of a situation or process)

ROLE-ACT = a specialized act, or kind of behavior, that is customary and hence expected by society from any person in that specialized position. e.g., the role of a policeman, a mother, a president, a bully, etc.   -

= an official carrying out the duties of his office is role-acting.

= an interact by a person in a way expected of like persons in the past.

ROUNDS OF REITERING = Row 2 of the Reiteratings Matrix (q.v.).

S

SAGITTAL = the forwards or backwards dimension or direction relative to a person.

= situated in the median plane of the body.

= the third spatial dimension relative to a person along with the up-or-down or vertical dimension and the right-or-left or lateral dimension.

SCRIPTS = $_s^s(X)_s^s$ = (in Dodd's "Corner-script" notation) any four auxiliary symbols placed at the four corners of any base letter or symbol to stand for the four rounds of reitering, namely:

Listing into SETS = s   s = Self-multiplying into POWERS

X

Adding into SUMS = s   s = Multiplying into PRODUCTS

= a basis for coding all syntax for computers since these four rounds of reitering operations seem sufficient for operating with all words, numbers, or other symbols thruout mathematics, logic and language.

See EpiDoc 314:4 and 307:4; and Refs. 13, 14, K. for fuller specification and application of the corner scripts.

SEMANTICS = the relations between symbols and their referents = the intersects of words and their meanings.

= the study of names and things-named.

SEMIOTICS = the study of man x symbol x thing systems.

= relations among symbolers, symbols and things-symboled.

SET (OF ELEMENTS) = an aggregate of objects possessing a determinable property.

= a named plurality of items.

= a class of things.

SOCION = the threshold actant or smallest unit of Society Level A in MTT, weighing in the class-interval of one metric ton, i.e., between .2 and 2.0 tons.

= a pair of spouses.

= the nuclear family or reproductive unit of society.

SPATIAL UNIVERSE = the eight Levels Ai thru G omitting the random pre-spatial Level H in the MTT.

STANACT = an actant, A, expressed in standard measure, A/σ_A.

= r, = $\sqrt{12}$ = 3.46410 since $\sigma_A = A/r$, and $A/\sigma_A = A/A/r$, = r,.

STIRLING FORMULA is $n! \doteq n^n e^{-n} \sqrt{2\pi n}$

rearranged as: $n^n \doteq e^n$ ⟵ the combinative factor

$\Gamma(n)$ ⟵   the permutive factor

$\sqrt{n}$ ⟵   the repetitive factor

$/1\sqrt{2\pi}$ ⟵ the interactive unit

measures Fulfillment of all combinatoric possible patterns in an n-set, called a "Fulfillment cycle."

STOCHASTIC PROCESS = a set of changing subsets measured as proportions of unity, or, if expected to recur in the future, as probabilities, such that each total state at any date determines the next state.

e.g., the cosmos seems a vast stochastic process in that the actants at any level by pair-permuting or self-squaring determine the next or adjacent level. Cumulated squarings (and concurrent undoings) maintain the Gompertz growth and decay curve that explains and predicts the evolving and devolving of every cosmic cohort of actants as graphed in

MTT.

SUBMODEL = a subclass or case of a model or operationally defined theory.

e.g., the Helix, Normal, Entropic, or Self-power curves as rectifiable cases of the Pan-Acts Model, U^0 = a/ct = 1, specifying how "Actants interacts organize cosmos" in the past, present, future, or anytime tenses respectively.

SYMBOLON = the acton or smallest actant at the Symbolic Level Ai in MTT.

e.g., a single symbol such as a word when viewed as a complex number

SYMBOLS = S^0 = (a, b).

In Pan-Acts modeling at the Symbols Level Ai in MTT, every symbol, s^0 (= 1), g factored as a unit complex number a + bi, log bit logs, thus: $2^s = 2^a \cdot 2^{bi}$ = 2a+bi so its bit-log is lg $(2^s) = s^0$ = a + bi where the real element, a, stands for the thing-named or referent while the imaginary element, bi, stands for its name.

This bit of decision implies an individual speaker's choice when speaking each word to point out its referent (vs all else) intersecting with society's prior cultural choice to use this particular name for this referent (vs all other possible sounds usable as names). This convention to analyze every symbol as a complex number (a + bi) or ordered pair (a, b) is then coupled with the synthesizing invention of the zero exponent, S^0, to stand for "the set of" all qualitatively distinguishable instances (i.e., occurrences or usings) of that symbol. Then this analysis-resynthesis of all symbolizing, Level Ai in MTT, brings the symbol-mediated mental activity of mankind (which most clearly tends to give man dominance) into the domain of mathematics. Hereafter via the algebra of sets(= X^0) and of ordered pair sets (a,b) the category of Qualities and man's mental and spiritually namable phenomena can become--with semiotic* research--as exactly treated in the same mathematical equations and textbooks as the Quantitative category is treated today in the exact sciences aided by the zero digit and tens notation. It is here predicted for time to test, that the zero exponent can outdo for man's qualitative thinking and mental life in the future what the zero digit has done for man's quantitative thinking and scientific activity in the past thousand years.

*Semiotics studies man x symbol x thing systems.

SYSTEM = a set with subsets, supersets and co-sets with specified intersects and sequences.

T

TIME = a standardized sequence of n acts measured by a count of sidereal unit cycles, $(2\pi \cdot 1)n$, like days or years, and their multiples and fractions, like millennia or seconds.

TRANSACT = a human act recorded in full context ("full" meaning enough for the reader, if possible, to reproduce that act).

The 8-factor transact specifies it as a behavioral product, B_8, or intersect of an act (= A^0) by one or more persons (= P^0) for some value or desired end (= V^0), under temporal (= T^0), spatial (= L^0), material (= M^0), verbal (= W^0) and residual (= $C°$) conditions, so B_8 = $(A^0P^0V^0T^0L^0M^0W^0C^0)$ thus telling: What was done, by whom, why, when, where, with which material and verbal means and how else?

TRANSFACTOR = a factor in a transact.

U

UNITAL COSMOS = the universal set (= U^0 = 1) of all things-namable, called "actants" when

graphed as a unit cube (see EpiDoc 302) by taking the total of each axis (Action, A; its Organization, O_r = lg A; and Timing, T = Σ| lg A |) as its unit so that every actant is graphed as a proportion of that unity, or an absolute probability of recurrence under totally recurring conditions.

UNIVERSE = any unitary major subset of cosmic actants, i.e., any level of actants in MTT.

 e.g., the physical, biological, human or mental universes.

V

VALIDITY = correlation of a variable and a criterion.

 e.g., the correlation of a test of scholastic aptitude with the criterion of scholastic achievement.

VARIANCE = the second moment about the mean, $V = \Sigma x^2/N$.

 = the square of the standard deviation, $V = \sigma^2$.

Y

y, = $\sqrt{3}$ = 1.73205, called "the gam" in Pan-Acts modeling.

 = a Key constant approximating the inverse of Euler's constant, Y_0 = .5772156649 = 1/y, -233 ppm.

Z

ZERO EXPONENT = X° = a useful notation to denote "the set of" whatever its base stands for.

 It thus denotes any distinguishable and therefore namable entity (called an "actant") as a Quality whether or not it is further observed in two degrees (e.g., as present or absent), or in many degrees (e.g., ranks), or in multiple equal units (e.g., cardinal numbers) as some quantified quality.

 Thus the zero exponent (along with appropriate corner scripts) can help to develop a mathematics of qualities and so outdo the zero digit in man's thinking in the future.