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# Liaisons Among Symbols

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## Abstract

*Biologic processes can be depicted as circular algorithms on a limited number of distinct elements. The concept deviates from the Sumerian tradition of using an unlimited number of identical units in a linear, noncircular fashion. We have uncovered relations between distinguishable elements that are constructed by using two natural numbers a, b (a, b ≤ 16, a ≤ b) that make up together one "Akkadian" unit. We propose to use the* ***etalon collection*** *of 136 units, each of which is a pair of a,b. (The collection consists of numeric values: {(1,1), (1,2), (1,3),…,(2,2), (2,3),…., (15,16), (16,16).}). We order and reorder the etalon collection by sorting and resorting it, paying attention to the* ***cycles*** *that appear during a resort, and to the certitude of* ***coincidences*** *appearing as a consequence of several cycles running parallel (like wheels of a Las Vegas machine). Reader is strongly advised to conduct a simple exercise of self-education, by ordering 12 books on their table, first in a sequence author – title, from which the reorder into the sequence title – author is the source of the self-education. Ordering and sorting are abilities that children learn sooner than at the age of 6 years, before the child learns the Sumerian concepts of what is a unit. The ability to recognize sorting procedures generating circular references has not been educated along with the ability to recognize multitudes made up of identical units. The terms 'place', 'value', 'movement', 'time', 'coincidence', 'potential', 'information', etc. are experienced anew, while doing the self-educating experiment with 12 books, based on the insights coming from deictic procedures, as one moves one's books from their old place to their new place, ejecting other books in the process. We look at the books in transit. Elements that are in transit generate one distinct, their own logical class. There are rules pertaining to order and reorder, and to observe such, the best introduction is to use 12 random objects that are classified in 2 aspects. Because the entry to the thought system of circular order engages brain areas hitherto not trained, and because the basic concepts shift from "limitless, linear, unidentifiable" to "limited size, periodic/cyclic/circular, individuals", the explanation of the discovery faces didactic difficulties. Reader is invited to overcome traditional eye-blinders and habitual blind spots, and to learn the particular techniques of periodic counting. The algorithms work in tandem with their well-known Sumerian counterparts and allow deep insights into Nature's organizational principles.*

**Keywords:** Biologic Counting, Cycles, Information

## 1. Introduction

This essay is the work of a psychologist, directed at mathematicians. (One might draw parallels to Kafka's "Report to an Academy".) There are some significant differences in the underlying world view of the two sciences. Most prominent among the epistemological deviations are the different approaches to 'being exactly defined', 'truth', 'individuality', 'logically consistent'.

## 2. Paradigm Differences

Let me go through the following main aspects:

### 2.1. Non-Defined Entities

Mathematics has an inner reluctance to deal with anything that is not exactly defined. This is the case e.g. with the idea of **"multidimensional partitions"**. The concept refers to elements belonging concurrently to diverse subgroups within the same assembly (e.g. students having diverse results in different tests: $n_1$ students have Mark $q$ in Physics, $n_2$ students have Mark $j$ in Music, $n_3$ students have Mark $k$ in Sports, etc., and $\sum n_i \geq n$). Psychology is, in contrast, very much interested in mental constructs that are unclear regarding their inner quintessence. We deal with concepts like 'intelligence', 'patriotism', 'empathy', etc., without being able to tell what the kernel of the concept exactly consists of. We just measure the diverse realizations of a hypothetical construct and relate the results to other results of measurements.

There is consensus in the trade, that about an assembly of a limited number of participants, only a limited number of different sentences can be said. Because of this axiom, it is evident that by using an assembly of $n$ probands, with $n$ limited to a relatively small, finite number, typically a few dozen, one can validate only $f(n)$ tests on that assembly. It is similarly evident that there can be no more, nor less test results validated on an assembly of n probands than there are ways for the $n$ probands to be grouped. If we had more test results than there are groups of individuals, we would have invented reality in some cases; if

we had less test results than there were groups possible among the probands, we would have overlooked parts of reality. The numbers of all different pictures about all possible different states of an assembly will agree to each other, of which follows that the upper limit for the number of different statements about a limited assembly of individuals is a quadratic one, both factors being necessarily identical, $f(n)$.
We have found the upper limit of the number of different multidimensional partitions to be

$$n? = exp( (ln(part(n)))^2 ) \quad (1)$$

where *part*(*n*) refers to the number of partitions of *n*, [1].

What exactly multidimensional partitions are, is still left undefined. What we know, is up to *how many* of these there are. We shall contrast this upper limit against its pair. The pair we match *n?* with is *n!*, the upper limit for the number of different linear collections that can be realized on n different individual elements.

## 2.2. Groups and Sequences

Human neurology uses different perceptional mechanisms to perceive similarities afore a background of diversities as contrasted to perceiving differences before a background of similarities. As we observe differences in the foreground, similarities remain in the background. Establishing smaller - equal - bigger relations between two objects, we leave the similarities of the places in the background, out of which we choose some to represent the relations observed in the foreground. Sequencing happens by observing the differences between the objects in the foreground and assigning to them elements of the background, which are similar among each other. (It is our decision, which of the places we name *1st*, *2nd*, *etc*.). As we observe similarities among objects in the foreground, we leave those that are not such as the members of a group we assemble, in the background. (E.g. we gather all those of our students who have Mark *j* in whichever subject.) The subgroup consists of individuals that are similar to each other in a given aspect: these are in the foreground of our interest. The foreground contrasts to the background, which is made up of all the others, who are different and most probably diverse. Grouping happens by assembling in the foreground elements that share a symbol to the same degree; the diversity among the other symbols remains in the background. As it happens, the two methods of gaining information: once investigating what is similar before a background of diversity, once investigating what is different before a background of similarity, do not work quite exactly together in tandem. There is an ever so slight *slippage* between the two descriptions of one and the same state of the world.

## 2.3. Are Parts Fitting Exactly and Seamlessly, or is there an Inner Crack

The fact is that our neurology uses the slight differences that appear as we contrast the ways of reading an assembly of *n* objects that belong to different groups and have identifying symbols. It is the human spectator's decision, whether they read into a perceived picture the results of their ability to recognize *linear sequences* or rather they perceive commutative symbols, which are contemporary for all those elements which share the symbol, creating *groups*.

*Example: Let us imagine the inventory of a doll aficionado, who has about a grand dozen of play dolls. The dolls can be distinguished by weight, size, style of clothing, colors of clothing, colors of hairs/eyes/skin. The collector has given individual names to the dolls (or uses the numeric entry of the inventory referring to purchase of each doll). In this way the collector can always enumerate the dolls linearly, by using the differences between the dolls in the foreground and picking an identifying symbol from among all potential identifying symbols, which are in the background, all alike, until two will be chosen to represent the two compared. The symbols are like places: the places as such are all similar before being assigned an object that identifies its place.The collector can at any time establish groups of dolls which have a common property (red clothes, blue eyes, middle size, etc.) A doll can and will belong to several groups. Here the similarity of elements is in the foreground, the individuality of the dolls in other aspects (its place, weight, etc.) is of no relevance, dissolves in a background that is full of differences and diversities.* From a psychologist's view, sentences that detail the common among elements (discussing groups relations) state an equivalence among elements and have the form of 'a = b', while sentences that detail rankings (sequences) have a form of 'a <,> b', describing the relations between two arguments. The observation is that there are differences in the numbers of different sentences that can be said about an assembly, if one counts sentences that state '=' as opposed to sentences that state '≠' when describing relations among members of a limited assembly of related individuals. To clarify the complicated relations between sequences and contemporary collections (groups), the picture showing the two upper limits, n?, n! in OEIS/A242615 is reproduced here:

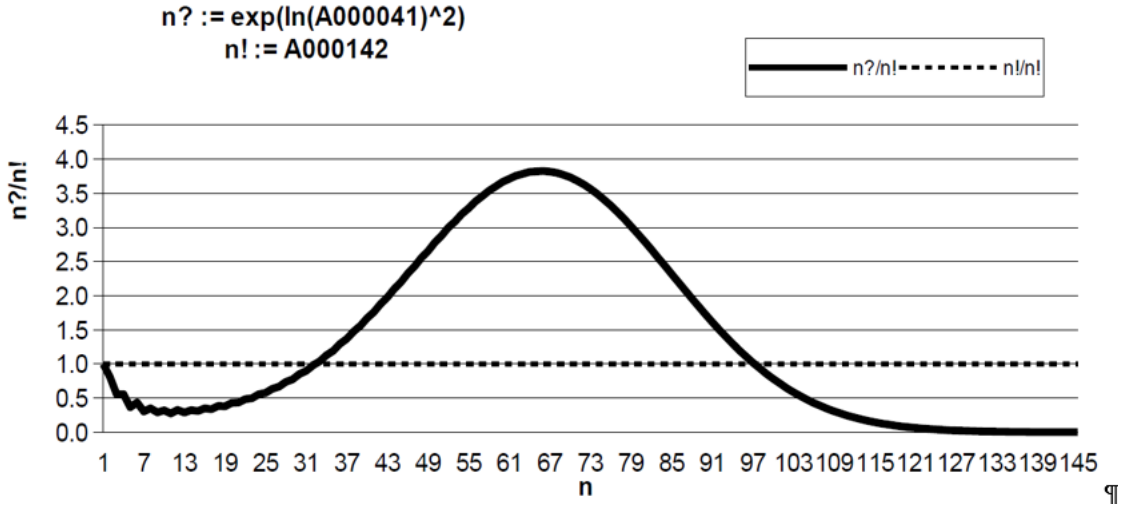



**Figure 1:** www.oeis.org/A242615

There is an inner crack observable within the counting system. The relative mis-calibration of the number of sentences that state '=' relative to the number of sentences that state '≠' with regard to one and the same assembly is **exceedingly small**. Correcting the artefact shown by the observation of the mutual discrepancies can help to improve the exactitude of the counting system by a factor of roughly $10^{-92}$ *%.* The main question for psychology is, whether <u>either</u> our neurology does something mysteriously complicated, a masterwork of Nature, a riddle of neurology embedded in the puzzle of biology, by creating a difference on something that is exact, a whole of which the parts fit seamlessly, <u>or rather</u> our neurology is using the simplest, axiomatic strategy to deal with the fact that differences and similarities number differently many in dependence of how intertwined they are. In the <u>first case</u>, we maintain and assert the Sumerian concept of uniform units that fit seamlessly as they make up a whole. The innovative methods Nature uses by contrasting individuals to groupies (in the background: places to amounts) appear mysterious because there are no individuals in the Sumerian system, therefore one cannot generate the contrast between individuals and groupies. In the <u>second case</u>, one has to accept that leading figures of our culture, starting with the Sumerians, including Euclid, Descartes and Newton *et al*, have over-idealized the concept of similarity and uniformity, falsely believing that using uniform units excessively and exclusively, basically building a world view on '=', will allow understanding the phenomena of the interaction of '=' with '≠', which determine the proceedings we know under the general name of 'organic chemistry', 'biology', 'life', 'intelligence'. We should follow Pythagoras' assertion that the system of natural numbers determines intervals, octaves, harmonies and so forth, supporting the idea that ordering principles that govern Nature are the same ones that are recognizable as ordering principles that are observable when studying the relations of natural numbers among themselves [2]. The proposal is to change the basic assumptions about the Whole and the Cause and Unity into such that the Whole has a slight inner crack, causing the parts to be complicated to assemble [3]. The manifold bias observed by the applied sciences would not be regarded as mysterious bugs of the system, but rather recognized being a **feature of the counting system**. Before the background of our expected relations, relative to our counting system, Nature appears to be controversial and mysterious. The idea is to change our concept of Nature and use the inbuilt incongruence as a natural unit. Pythagoras said that Nature is organized along the same principles which organize the system of the symbol set, specifically the system of the natural numbers. We now find a system of relations among the natural numbers which disagrees with the system of relations among the mental concepts about the natural numbers in the brain of humans. Either the system of relations among natural numbers is false, or our imagination about the system of relations among the symbols is false. In psychology, one learns to adapt the imaginations to the facts.

## 3. Periodic Processes

Wittgenstein proposes that even in the case we would be able to understand the language of lions, we would yet not be able to converse with lions, because their view of the world and their system of contexts, in which their words have a meaning, are too much different to our system of thoughts [4]. The implicit assumption, that the lions have a world view that is adapted and optimized for their habitat, remains unsaid because self-evident. Lions and humans are both integrated in and adapted to their respective habitats; the world view that an organism can consistently maintain has to be in accordance with such factors that are supportive of its continued life. There are communications, caused by situations, which are common to both lions and humans. The common properties in the habitats of lions and humans appear as common axioms and fundamental grammatical rules in the languages of both lions and humans. The inner organization of symbols humans use should reflect the basic truisms that establish the properties of the habitat of humans. The Sumerian system of linear progression along ever more heaps of identical units do not reflect the periodic nature of our habitat. On the surface of Earth, we are subject to at least three periodic processes: the ebb/tide, day/night and seasonal changes are objective facts imposed on our habitat by Moon, Earth, Sun. The proposal is to use as the **fundamental relation** among parts that make up a whole the **periodic nature** of the changes that affect an assembly.

## 4. Etalon Collection

To have a rhetorical tool, on which one can demonstrate the thoughts expressed here (in the hope of constructing a tool, on which to explore the principles Nature uses while managing the relations among parts and wholes), we have constructed assemblies of pairs of natural numbers. Of these cohorts of (*a,b*) we have chosen **Cohort 16** to serve as the etalon collection. It consists of *136* members: *{(1,1), (1,2), (2,2), (1,3), (2,3), (3,3), (1,4),….(16,16)}*. The self-educating exercise of Reader has used 12 books with 2 aspects. With the books, one has seen how cycles come into existence using random input. With the etalon collection, we redo the exercise in a systematic fashion. Reader is strongly encouraged to generate the alternative nominal sequence of the collection Cohort 16, which runs like {(1,1), (1,2), (1,3), …,(1,16), (2,2), (2,3),…,(16,16)} and manually reorder the elements, establishing the 12 cycles of the reorder $[\mathbf{ab} \leftrightarrow \mathbf{ba}]_{C16}$. The reason for selecting *16* different variants of (*a,b*) each to serve as the etalon collection is discussed at some length in the technical literature *Update on a* + *b* = *c* [5]. There is a hypothesis connecting Eddington's fine structure constant to an extent of mutual discongruence among the readings of A242615 which reaches a critical limit near ~ *136*.

We sort and order the etalon collection on *9* primary aspects (*a, b, a+b, b-2a, b-a, 2b-3a, a-2b, 17-(a+b), 2a-3b)*, of which we generate *72 sorting orders* by using each of the primary aspects with each different primary aspect as first (outer, senior) and second (inner, junior) sorting argument. We create *72*71/2* resorts and establish the properties of *46.260* cycles that appear in the course of these reorderings.

## 5. Concepts of Order

A sentence that details order is a composite of two statements relating to an object's properties and to its place among its peers. One of the composites states that object X has properties {*a*}, which allows it to be on any of places {*p*}. The other composite says than on places {*p*} objects with properties {*a*} can stay. The Sumerian approach to this problem simplifies it into 1. Objects do not have properties, 2. Places do not have properties. The 12 books exercise was helpful by delivering deictic definitions: <*this*> book does have properties which distinguish it to all other books, and: <*this*> place is different to other places, because it is a discrete distance (steps) away from a self-chosen Zero. Armed with deictic definitions about properties of objects and places in a sequence, we create simple, linear orders, planar places based on linear ranks, and spatial positions based on the interplay of symbols in 3 planes. The results observable by using the etalon collection suggest that we reconsider our common language concept of order. By generating all possible variants of being ordered, we see that the idea of a global order necessarily includes the idea of local disorders. We propose the idea that the whole totality of the Sumerian (Wittgenstein, Shannon, etc.) system of references would profit from an update that acknowledges, allows for, and works with an inbuilt crack within the system of references among symbols. Linear orders run into contradictions (see in the example above the position of element *(1,3)*). The linear contradictions can be consolidated by a geometric interpretation of the two different ranks in two different sorting orders, by creating a plane of which the axes are the two sorting orders. There the coordinates *x, y* of a planar place are equivalent to two ranks on the two axes.

## 6. Information is the Extent of Being Otherwise

Information always appears in two variants. Information measures the differences between two related entities, where based on both entities: A, B, a sentence can be created of the form: <seeing that (A, B) are values given, it is possible to generate expected values for B based on A, and expected values for A based on values of B>.

*Example: imagine the health descriptor "body mass index" to be based on two values: A kg and B m. The formula runs: A kg / B2 m = Body Mass Index. Height and weight can be translated into each other as expected values and observed values.*

The idea of being proportionate, adequate, corresponding, matching, commensurate, etc. for the values of two extents that are in a relation to each other gives rise to the deictic definition of information, colloquially formulated above.

We can name one of the two measurements "expected" and the other one "observed". We can establish how many kg mass we expect, given a length of a body, and also, how long a body we expect to be, observing the mass of it. The two results are conceptually equivalent, even if they are numerically different.

The meaning of a value of BMI is dependent on the underlying relation we assume to exist between A and B. In the example, one uses historical tables, established by empiric methods, that delimit which relations we consider "underweight", "healthy", "overweight". In the example, the parameters of an existing body determine which of the results is a correct pointer for a relation we assume to exist among weight and length parameters of a human body.

In the Sumerian context, one regards the thumb rule *Q (kg/m2) ~ 25 ± 10%* as not connected to the symbol system at all, but rather an external, observed, empiric reality, which has nothing to do with the symbol system. In the Sumerian concept of symbols, these are all uniform, and being indiscriminate, there can be no discussion about which relation the units possess among themselves, *ab ovo*, innate, immanent, as such, by their nature, due to the setup of the symbol system.In the Pythagorean context (Akkadian understanding of numbers), there exists a harmony in nature which expresses itself in the results we observe by applying the BMI measurements. The principle of two values possessing a dual relationship of (*observed* ↔ *expected*) is a fact, an axiom in the Pythagorean system of symbols. The Akkadians and Pythagoras did not have the technical apparatus to pursue the thought that natural numbers have relations among each other which go beyond the practical definitions created by the Sumerians.

## 7. The Natural Unit for Information is the Extent of Inner Discongruence

Using the factually existing numeric extent of discongruence pictured in A242615 as a basis, it is possible to arrive at numeric constants that reveal the form, structure and extent of local discongruences between the number of sentences referring to states that are '=' versus the number of sentences that refer to states that are '≠'. The theoretical construct 'information' to mean the fact, and its consequences and forms, of the crack between two parts that do not fit quite exactly, appears to be fitting and makes the concept easy to explain. The Whole is set up of several, diverse parts. These parts do not fit always exactly. There is an assumed inner dichotomy between how the parts are similar and how the parts are diverse among and within each other. This incongruence is a built-in feature of the symbol system. The theoretical total of all kinds of incongruences among parts of a whole is proposed to be understood under the general term 'information'. In short, the extent in which two parts are relatively deviating to each other is the content of information.

The natural numbers offer us a practical definition for the concept. Let us visualize the two sequences **ab** and **ba** of the etalon collection. We have chosen *Cycles 3, 6* to serve as two logical things, the differences of which we observe. Information is an inbuilt feature of the symbol system, and one could use any two of the contents of the symbol system to use as material for a deictic definition of 'diverse'. The breach of taboos is implicit: once we have two elements that have properties on which we can recognize them to be different, and speak understandably about the existence and extent of their diversity, in that moment we have left Sumerian orthodoxy. As soon as we have created a logical universe populated by individuals, we can conduct procedures known from sociometry, economics, biology, etc. which can now be expressed as based in natural numbers, following the roots back to (*a,b*).

Cycles answer well to the requirements of being both comparable and different. The members of a cycle are sequenced among each other, yet they can be seen as commutative, as they share the common symbol of belonging to that cycle (group). The real action devolves from the offset differences in the coincidences among members of different cycles of the same reorder (in advanced stages of the model: offset differences among cycles running parallel, irrespective of the reorder). The mental picture of the central concept of this essay is a Las Vegas machine and the coincidences on it that are contemporary among its cycles. These are, in the case of natural numbers, predictable. The numerical tables of a tautomat appear to be comparable to a hybrid of sudokus with the ultimate Rubik's cube. The tables of a tautomat are larger and more complex than the trigonometric tables.

The proposed **Definition for a Unit of Information** uses two of the cycles of the reorder **ab** ↔ **ba** of Cohort 16.

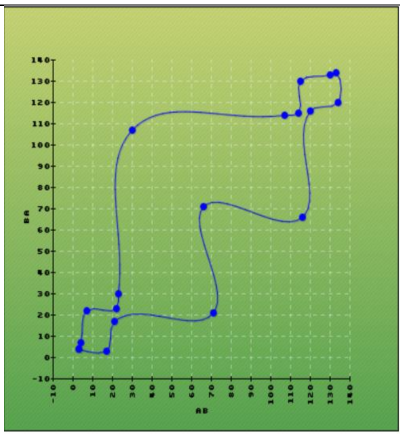
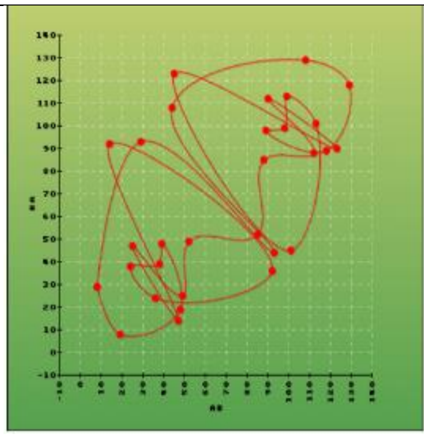
| *Cycle 3* | *Cycle 6* |
|---|---|
|  |  |
| *Carry a* = $\sum a_i$ , *Carry b* = $\sum b_i$ , *Run* = $\sum$ *dist ( (a,b)*$_j$*,(a,b)*$_k$*)* | |
| ***Information = (Carry b – Carry a) / (Run + 1)*** | |

**Figure 2:** *cycles 3, 6 of* **[ab ↔ ba]**$_{C16}$

The definition by these two cycles is arbitrary in selecting *these two cycles* to use as Unit. The general principle is to use the discongruence immanent between constituents of a whole, relating to the spatial and the quantitative-qualitative properties of two elements which in tandem yield a measure for the **order** within the assembly. The spatial component refers to units in the background that are similar among each other (creating sequences); the amount component refers to units in the background that are different to each other (creating groups by such elements that are similar)

## 8. The Geometry Created by Cycles

Among the cycles to be found in the etalon collection, there are some which we call standard cycles (space-measuring, space-generating cycles). There are 10 reorders that fulfil following criteria:

| | |
|---|---|
| Number of cycles in reorder: | *46* |
| Of these, the lengths are: | *45 * 3 + 1* |
| Cycles of length 3 are all: | $\sum a = 18, \sum b = 33$ |
| Values of the central elements: | *a = 6, b = 11* |

These are the reorders:

I. Creating Euclid space Left

*x axis*: ***b* - 2*a*, *a***; *y axis*: ***a* – 2*b*, *b* – 2*a***; *z axis*: ***a*+*b*, *a***

II. Creating Euclid space Right

*x axis*: ***b* - 2*a*, *a* - 2*b***; *y axis:* ***a* – 2*b*, *b***; *z axis*: ***a*+*b*, *b***

III. Creating Two Transcending Planes (electro-magnetic fields)

Plane M: Axis 1: ***a*, *a* - 2*b***, Axis 2: ***b* – *a*, *a***

Plane E: Axis 1: ***a*, *b*;** Axis 2: ***b*-*a*, *b* – 2*a***.

We find in both Euclid spaces one **central element** each, with three identical coordinates within the spaces, different to each other. The two transcendent planes have central elements with identical coordinates.

## 9. Central Tautology, 3 Phases, DNA

We use the central tautology of **two ranks in sequences equal one planar place on a plane of which the axes are the two sequences**. Of such planes Euclid spaces can be constructed. The interplay between the two Euclid spaces gives rise to the logical construct of a Newton space which appears to consist of the two Euclid spaces, although the Newton space is in fact the result of approximations of the exact values of the two Euclid spaces.

The Newton space neglects the inner, junior argument of the sorting orders of the axes it merges, and has the axes:

*x axis:* ***b* - 2*a***; *y axis*: ***a* – 2*b***; *z axis*: ***a* + *b***

A coordinate in a Newton space points out *3* places on *3* planes. On each plane, we have the problem that the coordinate originating from the Newton space does not exist as such on the two underlying planes of the Euclid geometry which have common senior searching arguments. For each place on a plane of the Newton geometry, there are *4* alternatives that designate a place in the Euclid geometry.

*Example:*

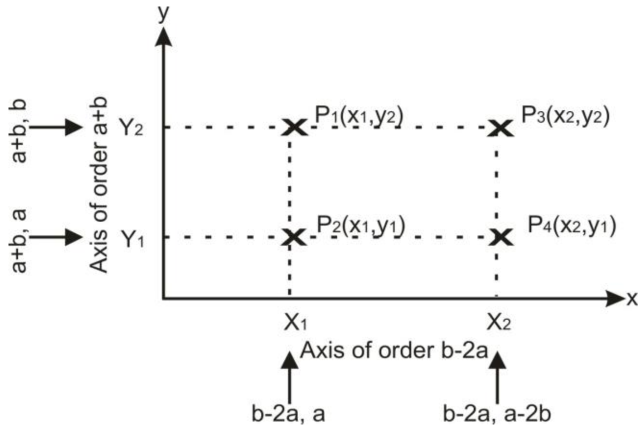



**Figure 3**: *4 alternatives*

The two Euclid subspaces have differing geometries. As the standard cycles turn, in the underlying Euclid spaces, they connect different subspaces. There are rules, which subsequent subspace can follow which. The proposition is, that Nature uses a Shannon-type distinction on the sequence of subspaces that follow each other. The three successive phonemes of the word of the DNA {(A, B, C, D), (A, B, C, D), (A, B, C, D)} are then reduced to two pairs of alternatives, e.g. {{(A,C), (B,D)}, {(A,C), (B,D)}, {(A,C), (B,D)}}. This is what applied science reports.

## 10. Inner Relations Among Symbols: The Liaison System of Values

We read the sentence $a + b = c$ in the form of $2 (a + b)$ by redistributing the extent of c to the elements in a two-step process: *1.* $c = \sum \text{cycles}_i$, *2. Cycle i with k members* $= \sum (a + b)_{1..k}$ Each cycle is credited with the proportionate part of the amount moved altogether; each member of a cycle is credited with the proportionate part of the amount moved by the cycle. This establishes for each element the value of the symbol of the lien that binds the element with the other members of the cycle. The values of the liens create together a system of liaisons.The procedure establishes an economic aspect (numeric value) to the alternatives that an element belongs or belongs not to a group (here: cycle). Each element's data depository includes the **lien** values that bind the element to those cycles the element is a member of. To belong to different cycles has different costs and benefits, reflected by the lien values being different. This has a governing role in the decision, which reorders are taking place. In sociology, one speaks of strata and permeability. The liaison system opens inroads into understanding semantic relations among symbols. *The procedure is comparable to describing a person by means of the catalog, of which associations the person is a member of, and how much the dues toward the membership in each association cost, relative to which benefits the person receives from the membership in that association. The lien value is identical for all members of a cycle, being an average over* $\sum (a,b)$*, divided by – in the present version – k, the number of members in the cycle. The liaison system is counted on deviations to the most usual value. This is a step towards establishing a counting system which is based on probabilities. The Akkadians had a different perspective on merchandise, not how big, many, like the Sumerians, but rather how usual resp. extraordinary.*

## 11. Context and Meaning

The algorithms based on cycles and liaison values allow conceptualizing a system of family relatives of an occurrence. (The occurrence's general form is *amount(s) w is on place(s) r.)* The individual statements about an occurrence are sentences about order, as the statements refer to properties of a thing in relation to the position of the thing among its peers. Choosing the peers against whom the amount or place of an element is discussed is creating a context around the elements positional and other values. The alternatives are numeric values, as the costs and benefits of joining, remaining in or leaving group are reflected in the respective lien parameters. In human usage of the term 'context' one means that some of the liens are to be considered relevant, because these are those which predict that reorder **αβ ↔ γδ** is what is taking place.

The meaning is proposed to be defined as the relation of the context to any or both of the central elements.

*Example: in a game of soccer a pass is an occurrence. Its information content are the differences between sender and receiver (speed, distance, exactitude, etc.). The context are the alternatives, be it how the ball was kicked, be it to whom, be it how trivial, etc.) The meaning orients the pass in a spatial landscape, relating to the position of the pass to at least one pair of goalposts.*

The denotation of the fact is the time-stamped protocol of the fact with all its contexts. The denotation of a fact loses the meaning of the fact without its context. Facts as such have no meaning aside from the fact of being related in a given fashion to central facts.

## 12. Predictability of Cycles, Intelligence, Gestalt

Reorders that are periodic can be expected and predicted. Evolution prefers organisms that are able to prepare for what comes next. The ability to predict the subsequent states created by a periodic change is a fundamental ability of anything that lives. Not being adapted and not being prepared for what is predictably coming in a system of occurrences, an order, makes the maintenance of circular procedures in a periodically changing environment difficult to impossible.

The *homunculus* of our days will appear as two, later three, four and more cooperating finite automats each attempting to maximize its understanding of order. Each of the basic machines is a tautomat. A tautomat is a finite automat that is a catalog of occurrences. The occurrences have three levels:

Level of facts — amount $q$ is on place $w$

Level of cycles — Cycle $r$ is in completion state of $x$ %

Level of order — Reorders **αβ ↔ γδ**, **τε ↔ μκ** are taking place.

On each level, a measure of probability can be established. These appear numerically unrelated but are semantically interrelated. To recognize semantic relations among elements that appear in periodic cycles needs no intellectual effort. This is why simple animals, even proto-flora, can adapt to changing environments. The changes are a fact, and the semantic relations among the facts that are a realization of the changes, are facts as well. The comparison among two alternatives that will not both occur in the future (intelligence) can be pictured by digital means. Observing a history of coincidences of occurrences allows convictions about which cycles of which reorder one sees. These again give rise to predictions regarding which future shall follow in which sequence. The predicted parts of cycles are the universe of data, of which we choose those that fit best with our observations. We know and can enumerate exactly, which steps are yet to come, according to our data gained so far.

*If all cycles of an ongoing process would be assembled in a ball in the center of a context, the unfinished business – occurrences that are certain, but which have in the moment no scene presence on the stage – would look like force lines as known from observations of magnetism, or flares in the form of half-arcs erupting from the Sun. These are pictures of the mental construct 'anticipation', which refers to the parts of cycles that are not yet the case.* Of course, if an animal decides that it will filter out circular processes, happening on a limited number of diverse elements, from its mental inventory, insisting on a linear way of thinking about the world, that animal will not be able to discuss why some choices are intelligent and some not. This because the anticipated parts of periodic – circular processes have not been constructed in the mental lexicon of the animal. Even if our intellect is reluctant to deal with the anticipated parts of reality, our neurology does utilize the factually existing logical universe of anticipated parts of cycles, which Nature produces in our nervous system. The cliché and archetypical schemata show that animals have mastered using the anticipated world as a background to the observed world. The schemata are a compilation of the most usual semantic relations of parts of a whole. The traditional explanation of a Gestalt being more than the sum of its parts can gain a solid footing in the anticipated world. A gestalt includes ideal (most average, most usual) proportions and patterns in all of the aspects of the anticipated object. This summation includes those also which are mutually exclusive. An object that is ideal all around cannot exist. If we add up the parts of this ultra-ideal, we come up with more than the sum of all parts of any realizable object.

## 13. Sustainable States, The Ideal State is a Collection of Optimal States

The state of the assembly is a coincidence among such members of diverse cycles which are contemporary. The Las Vegas machine has so many windows as there are cycles of which members can be concurrent. What we call state of the assembly is a cross-section in a temporal sense, like one picture of a film. The sequences of the momentary states of the assembly make up each one process (circular sequences of coincidences among members of cycles). Only such circular processes can exist, of which the constituent cycles have members that are contemporary. The variety in forms can be explained by offset differences of the wheels of the Las Vegas machine. The circular process is based on the underlying cycles being sustainable (a stable variant of a Las Vegas machine).

In a different interpretation of the patterns being created by movements of the elements due to periodic changes, reorders compete among each other to achieve that order which fits the facts of elements being on certain places, in an optimal fashion, where 'optimal' has as many interpretations as there are reorders competing. What is optimal is a property of the reorder.

The picture of about a dozen principles managing a conflict, in which each of the principles tries to arrange an order that fits it the best, looks like a picture of a Hindu or ancient Hellenic heaven. Conflicts and compromises are unavoidable, but these are not bugs, but features of the basic setup. Each ordering principle has the same legitimacy to try to order the elements, *chacun á son gout.* The actual realization of the competing hegemonic efforts will be dependent on the actual values of the participants and their semantic relations among each other. Each of the ordering principles tries to build up the system such, that its relations are realized optimally among the elements (there is an expected –

observed vector of relations for each element's possible places). Monopolistic hegemonial relations are not sustainable (but for local exceptions), as the relations optimized for order **αβ** will become intolerable for orders **γδ** *etc.*

*The sociocultural implication of these findings is that monocausal, mono-perspective order concepts are less consistent depictions of Nature than explanation models that root in a collective of interrelated First Principles. (Monotheistic religions are more deviating, in their depictions of Nature, to the system of relations that natural numbers show, than those of polytheistic, animalist religions.)*

There can exist no one, single ordering principle, nor can exist one, exclusive strategy to achieve "the" one ideal state. The ideal state is a mental construct, based on anticipations of a collection of optimal states. The mental construct does exist in Nature, as neurological phenomena prove. Our neurology would not be prepared to recognize patterns (schemata, archetypes) if there were no such thing among the signals which perception gains. The logical ideal exists as a logical fact, its inability to come into realization *as such* is an implication of the idea itself, placed in its context. The general picture is that of an everlasting rivalry of variants of one and the same truth. This truth presents itself to us in the system of semantic relations observable on an etalon collection of logical symbols that undergo periodic changes.

## 14. Summary, Closing Remarks

This person is thankful for the opportunity to present findings that show pairs of natural numbers being semantically related to each other. The shortcomings in style and didactic of the present essay are not only due to limits of one's abilities. Demosthenes and Pythagoras *in duetto* could not have presented the ideas gaining a better reception, because even that ensemble would be confronted with the fate of Mendel. The numeric facts and relations have been recognized, much earlier than the semantic context was ready into which to place the numeric patterns. Mendel lacked, among others, the words chromosome, triplet, DNA, etc. to understandably explain what he means and why this matter is important and should be investigated deeply. In our case, concepts and words are not yet established that are necessary to imagine the complete mechanism of the inter-regulation of sequences and momentary states. Establishing a system of coherent concepts that agree to the patterns which pairs of natural numbers show when placed in a habitat of periodic changes, this is not in the remit of a psychologist. We can only point out some patterns one can observe when one orders simple logical symbols in all possible ways. This is what Mendel did. Scientists in his days were limited in understanding him, for a lack of mental constructs and for not believing that patterns of numbers have to do with how Nature manages the genetic transfer of properties.

The idea was presented, that

• There is a slight inner crack within the symbol system
• It is caused by the complicated relationship between *how similar, how diverse, how many*
• Which goes back to different numbers of sentences that state '=' vs '≠' about the world
• Neurology uses different methods for counting **I**. *diversities* before a background of *similarities*, and **II**. *similarities* before a background of diversities
• The number of distinct logical sentences that can be said about a collection of a limited size $n$ is also limited (has an upper limit $f(n)$)
• The upper limits for the number of sentences Type **I**. and for the number of sentences Type **II**. are pictured in *oeis.org/A242615*
• Their relation is **I**. *{=, >, =, <, =, >, >>}* **II**. for $n$ *{1, 11, 32, 66, 97, 135, 140}*
• Their $f^{-1}(n)$ point to different fractions of $n$, above ~ *136 – 137*, to different $n$ values
• This immanent basic natural discongruence within the symbol system shall be understood as a natural unit; we propose to call it 'information'
• We operationalize the idea of information on cycles that are generated when a cohort of pairs of $(a,b)$ is reordered
• We use as etalon collection **Cohort 16**, with $a,b \leq 16$, $a \leq b$, $n = 136$
• The central tautology of the model is **2 R = 1 P**, two ranks in linear sequences are equivalent to one place on a plane of which the two axes are the sorting sequences
• We find 10 so-called standard reorders, cycles *(45 * 3 + 1), 45 *(* $\sum a = 18$, $\sum b = 33$*),*
• Of these, we construct two 3D Euclid spaces which are transcended by two planes
• In both Euclid spaces we find 1 central element, the 2 planes share one central element. The logical coordinates of the central elements are 6, 11.
• The syntax of the DNA appears to be recognizable in the successive distinctions between left or right Euclid space being referred to in a common Newton space
• We propose to assign the idea 'observable reality' to such coincidences among members of cycles that run parallel during periodic changes which are contemporary
• There exists a system of comparable values for the membership in a group. Liaisons are semantic relations that connect elements in manifold ways.

Hopefully, some of these ideas speak to Reader. Please consider thinking through the mathematical implications of the idea presented in this essay, even if the style of the presentation doesn't meet the level of communications among mathematicians. The skeleton of the idea is solidly rooted in natural numbers. The procedures conducted are permitted and consistent.

## References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