Introduction

This paper presents

We present a logical tool that can well be used to contribute to a rational understanding of the functioning of theoretical genetics. The tool itself is a numerical Table, comparable to some tables of Triangulation or of other function values. It has been produced based on natural numbers in the range of 1 to 136. It can be easily constructed on the Reader's own PC.

Continues the work of

There have been dedicated efforts to solve the combinatorial problems attached to and governing theoretical genetics. Practical observation of the interplay (*this* person → *that* DNA, *this* DNA → *that* person, *each one specific* person ↔ *each one specific* DNA), put to use by criminology, immunology and paternity lawsuits e.g., is proof enough that a *bijective* or, at the least, *quasi-bijective* relation exists between the DNA and its organism. There certainly exists a rational link connecting the sequenced description of an organism contained in the DNA and the manifold properties of the three-dimensional organism. This approach was led – among others - by the Santa Fe Institute.

The present model restarts the work done by many. Combinatorics and number theory are put to use to interpret the numbers one reads off a table. The Table itself is the least part of the proposal implied in the model. Its use offers ways of formulating concepts about such logical terms as time, consequence, sequence, space and density, relevance and importance of concepts of order. The Table itself is but a demonstrating tool. The idea to be demonstrated by usage of the Table is that the sequence and the three-dimensional arrangement (the DNA and the organism) can be shown to be a logical tautology, the implications of each other. If the idea has been transmitted successfully, then this paper is in the tradition of many such works, which in effect say: "Well, what we used to consider a wonder is not a wonder at all. It is a simple series of counting steps, as can be demonstrated by means of the following exemplary calculation."

New approach

The novelty approach lies in combining attention to cuts and their position in an addition together with concepts of order. The order in which the collection is sorted determines to a large degree the positions each element can have. This allows unfolding a 3-dimensional picture from a 2-dimensional sequence that in turn roots in properties of natural numbers. The model yields a tool for a logical discussion of the interdependence of place, position and individual properties that one arrives at as results (consequences, corollaries, implications) of an order being in existence.

We discuss all possible ways for some extents to be. The extents we choose are in the range 1 to 16 and there are two of them, a and b. This gives us a data set of 136 cases. We discuss the *sequential place* of each case under diverse sorting orders.

The idea of the cuts is central to the procedure of sorting. A sort is a procedure resulting in the minimal number and extent of cuts. We introduce cuts as sorting criteria. The addition $a+b=c$ negates a cut, the subtraction $u=b-a$ creates a cut, as are more cuts created by the aspects of a,b which we create, like $k=b-2a$.

Methodics

Subject

We present an explanational tool which allows understanding the logical interdependence between the organism, its DNA and the organism again. We conceptualise a logically stable state of an assembly and compare the readings of properties of elements of this assembly among each other. We show that a reading in *two* dimensions is under some cases logically equivalent to a reading of an assembly arranged in a *three*-dimensional space.

We address the basic problem of theoretical genetics, namely how the information content of the DNA regulates the physiological processes in the cells. We translate this into the logical problem of matching each sequential state of an assembly to one commutative state of that same assembly. We visualise a collection of objects with symbols on them. It is one's own decision whether one reads the symbols off the assembly one-by-one or by the method of building groups. It can be shown that one arrives at differing results re the number of distinct logical states the assembly can be in, if one reads the symbols *sequentially*, as opposed to *commutatively*, off the same self collection of objects. This means that there is an inner inexactitude in the counting system. Genetics appears to utilise a very small contradiction of a combinatorial nature that is centred on the relative importance of a sequential position over a belonging-to, being a part of several groups. If the assembly numbers between 32 and 97 units, there are more properties of the assembly than places to put the properties in, outside the borders there are more sequential places than properties of the commutative group. We look more in detail into the seeming imbalance and work on preparing a demonstrational tool as a rhetorical help. If one can trace back the meaning of the term "time" or "order" to natural numbers, then there is a neutral and well applicable logical concept behind these, as natural numbers have a solid definition in rational science.

Techniques

We use an *accounting* approach to Theoretical Genetics. We assume a *Grand Total* over all possibilities for DNAs to be sequenced and the three-dimensional arrangements that can exist concurrently. To keep the results communicable, we restrict the discussion here to the basic case of $a+b=c$, where $a,b < 17$, additions with more than 2 summands being reducible into this. We shall arrive at a concept of a *stable place* in a Euclidean geometry. What properties each of the up to 118 *logical archetypes* that can occupy the places possess is dependent on each one's individual attributes, the common attribute being *that* they have a place or one of a few possible places.

We build an Addition Table for the additions between $1+1=2$ and $16+16=32$. We then read off additional properties of a and b. We subject the collection to all possible sorts and discuss the place of each element in the different sorts. We then compare the sorts and find that some are identical. Re-sorts among those sorts that are different introduce a dynamic concept in the usage of the Table. We propose lastly a stable Euclid space concept based on standard re-sortings. In this space logical archetypes are present. These we suggest can supply rational tokens for concepts of chemical elements. The idea of logical archetypes comes from the hypothesis of a permanent dynamic rivalry among ordering concepts. The basic dynamism expresses itself as a logical discussion about which reading of an addition is more stable in its consequences regarding its spatial coordinates: the addition or the subtractions within the addition. We take it traditionally for granted, that the important aspect of $a+b=$c are the cumulative sizes of a and b. We now read into $a+b=$c three logical objects among which two are together the same size as the third. We discuss the differences of sizes of the three objects and the orders the differences impose on each specific addition within the multitude of additions. Which of the readings of the addition prevails determines, which order is considered the basic, relative to which the others are in deviation. The alternative readings impose alternative orders. The re-ordering between two consecutive orders is used as the unit itself. The unit we use is comparable to a unit extent of transaction costs.

The Table we present is made up of natural numbers. This negates all concepts of chaotic processes. The accounting approach in the building and the reading of the Table encourages rather ideas of a "quantum" and of different kinds of units in different measurement surroundings. We use the deictic method of definition in the discussion of the meaning of the numbers contained in the Table.

Usefulness

One of the uses of the Table is that of a place-finder. We have all fragmentational states of a logical entity made up of three parts, in the basic, easy version: two summands, no summand > 16. We use now the cuts that distinguish 3+3 from 1+5. Ordered under the aspect of cuts, each individual addition receives a *sequential place* that is the result of the additions arguments a,b *and* that the aspect which imposes this place now is both *relevant* and *important*. Each of the fragmentational states of an assembly of the Table's characteristics *(a,b<17)* has a specific *place* within the interpretational logic of the Table. This allows detailed predictions about *where* a specific fragmentational state will take place within a unified and consolidated Euclid space, under the understanding that presently *such* an order is relevant and/or important.

Pure logic may find useful that the idea of “order” has been securely linked to the concept of natural numbers. Alternative readings co-exist and the concepts of “conflicting evaluations” and “priorities of evaluations” can be numerically weighted. The model allows advances in artificial intelligence by offering a compiler-evaluator usage of the Table where the task is to calculate, which of the order concepts’ importance had yielded the present state of the world, and what transaction costs arise if imposing an improved order according to a different concept of order.

Literature

This is a self-contained exercise in accounting. It uses no other presuppositions as the natural numbers 1 tru 16.

Theoretical genetics is understood to investigate how the logical equivalence between two parallel sequences and a three-dimensional organism can be better understood. The model presented here deals with the translation of the basic idea of logical matching between the organism and its DNA into accounting techniques that show an actual correspondence between sequences and three-dimensional assemblies. The correspondence is being demonstrated on the body of logical statements regarding *a* and *b*. The idea that place changes as consequences of reorderings of the data set can serve as a natural unit is, to the author’s knowledge, first approached here.

The observation that sequences and commutative mixtures do not agree in some of their combinatorial and numerical properties allowed the hypothesis that genetics uses the same packaging-unpackaging techniques as the memory (Javorszky, Biocybernetics: A Mathematical Model of the Memory, Wien, 1985; Javorszky: Interaction, J. Theor. Biol., 2000).

About Cuts

Relegated to background

The logical operation of addition is one of the first abstract, formal operations we learn at school. We learn to add before we learn to subtract, multiply, divide and so forth. The underlying concept of fusing extents and calculating the result by means of common units is fundamental to all that follows.

Types of cuts

We look at the cuts on the interval that separate the units within a summand and at the cut that separates the summands between each other.

Degrading and Promoting cuts

As the result of the addition $a+b=c$, one “between” cut was degraded into a “within” cut. We demoted the cut between *a* and *b* into a cut within *c*.

As we create $u=b-a$, we promote a cut within the units of *b* into a cut between *a* and $(b-a)$ in the addition $a+(b-a)=b$.

The model utilises the cuts as main ordering principles.

The place of the cuts

In each individual instance of $a+b=c$ we uniformly demote a “between” cut into a “within” cut. A further aspect we utilise is the *place* of the demoted cut. The place of the cut in the addition translates into a place of the addition among other additions.

Individual and Group

Focusing on One or on One among Many

We have listed in the Table every possible way for an extent to be concurrently in two parts. We no more look at the individual instance of $a+b=c$ in its individual merits, but rather *where* this instance would be in a two-dimensional sequence among the other instances of $a+b=c$. The data set contains 136 additions as its records and we look into the sequential place of a record after the last sort.

The Table, by its 136 records, implies that in its understanding the individual is a consequence of the group. The individual exists only among other individuals within the group.

We discuss Relations

The Table contains absolute sizes for *c* in the range 2 to 32. The absolute size of an addition is but one of the aspects that govern its positions among the other additions. The place an individual addition now occupies may be termed "right" or "deviating" in dependence of a decision by the user, whether to leave unchanged the presently observed order or impose a different order. If the observed sequential place of a specific instance of the logical statement $a+b=c$ is *i*, then the present order is any of O_k, while under the assumption of a different order $O_{.not.k}$ the sequential place *i* is in deviation to places *j,l,m,...* that would be the respectively correct place if order $O_{j,l,m,...}$ would be the case. The extent of the displacement is relative to an order being present which one utilises as the "right" order. We discuss the extents of relative displacements under the scenario that a reordering from order O_k into a different order $O_{.not.k}$ takes place.

The accounting unit is one movement with parameters "order from", "order into", "instance". One statement of transaction consists of at least 6 arguments, taking into account the corresponding balancing movement. An extent of dislocation is meaningful only in relation to two differing concepts of order. The collection of dislocations is the data set we shall concentrate on. An observed extent of dislocation will be put to use to measure the relative "nearness" of any two order concepts. The relative extent of the dislocation, compared to all dislocations, connects to the relative certainity that two specific orders are now in a from-to relation, compared to all certainities that a reorder does take place. The Table yields in this sense *relative* extents.

Properties of the Individual

We have built up the Table based on *a,b*. Each row in the Table is one specific instance of a pair *(a,b)*. The place attributes that belong to this pair are columns of the Table: each sorting order assigns one of the sequential numbers 1 to 136 to one of the pairs *(a,b)*. The property "under order O_k the sequential place for this instance of *(a,b)* is *i*" is a *static* individual property of the specific pair *(a,b)*.

The *dynamic* individual properties of any specific pair *(a,b)* appear as less individually delineated than in the static case. The movement arises out of a decision that a different order is the right order, therefore changes in the sequence will take place. The pair *(a,b)* changes place with at least one other instance of *(a,b)*, and the individuality of the transaction can only be established by comparing it with other transactions taking place concurrently, caused by the same logical decision.

The unit of accounting we propose is a standard extent of transaction "costs". Their uniformity is visible during some specific pairs of rearrangements of from-to orders: we shall discuss these later. The standard rearrangement makes *three-way* place changes necessary, connecting *three* pairs of *(a,b)* with each other.

Each row in the Table has then some individual characteristics, which it retains, and some standard characteristics, which appear only visible, if specific resorts take place: then, each instance of *(a,b)* is but one of *three* specific instances, which together make up one standard unit of transaction.

Distinctive Properties

The Table contains in columns 1 to 9 arguments referring to *(a,b)*. Columns – aspects – 1 and 2 are *a,b*, respectively. Aspects 3 to 9 are derived from *(a,b)*, like $c=a+b$, $u=b-a$, etc. Two of the aspects together impose a sorting order. Columns 10 to 81 are the sequential places connected to two of the aspects of *(a,b)* by means of a sort on $\alpha\beta$ where $\alpha\beta$ are any two of the aspects.

Each record – row – contains arguments relating to some aspects of *(a,b)*, and also arguments relating to *where* among the other records this record would stand, if any two of the aspects were constituting an order. One may distinguish the first 9 columns of the Table against the following 72 by thinking that the former relate to "material" aspects and the latter to "positional" attributes.

The aspects distinguish not uniformly. Two of the aspects together assign attributes that will provide for distinctness in quite small groups if not as an individual. Being bundled together with other instances to take part in a resort by being a part of a longer thread (chain) of place changes takes individuality away from the specific instance. The bundles – chains – incorporate the individualites of those that take part together in a transaction.

The logical sentence *a+b=c*

Three objects

We visualise *three* objects with the restriction that one of the objects is as {big, long, many, etc.} as the two other objects together.

Two Statements of Existence

It is sufficient to visualise *two* objects if one is prepared to accept results ariving from operations – comparisons – conducted on the two objects. The statement "*a* and *b* exist and have specific extents" does not by itself imply "*c* exists and equals *a+b*". We rather add "aspects of *a,b* exist and have the same logical importance and relevance as *a,b*".

Investigating the first 136 Additions

We look at additions *1+1=2* to *16+16=32*. Once one has well understood the relations of two natural numbers smaller than 17, one may venture farther. May future generations explore additions with 3 or more summands, the present Table steps cautiously. Its usefulness as a primitive tool may be found in that any addition can be seen as a collection of possible sequences of additions with two summands, and similarly that any extent can be thought to be a collection of summands smaller than 17.

To demonstrate the order concept on, the 136 smallest additions are sufficient. Rather than increasing the number of cases to look at, we expand the number of aspects we consider to be possibly relevant and important.

In the following discussion we shall always assume that $a \leq b$.

Additional Aspects of the Sentence

We now generate two derivatives of the addition *a+b=c*. To do so, we introduce 6 additional arguments.

U=b-a

The difference between the summands has traditionally been actively neglected in the philosophy of (behind) additions. We accept that, e.g. in 2+5=3+4, the general idea of an addition is to focus on the composite result. *U* has a quite useful role to play in the Table.

K=b-2a

The relation of the difference between the summands to the smaller of the summands is expressed by *u-a=(b-a)-a*, that is *k=b-2a*.

T=2b-3a

This is the first "shadow" of *a+b=c*. We add the difference between the summands and the difference between this and the smaller of the summands. *k+u=(b-2a)+(b-a),* that is: *t=2b-3a*.

Q=a-2b

For reasons of commutativity, we also build *–u=a-b.* The value of *–u* being of no particular interest, we use it only to compare it to *b*, arriving at *(a-b)-b*, that is *q=a-2b*.

W=2a-3b

The second "shadow" of *a+b=c* we arrive at by adding the negative difference between the summands *(-u=(a-b))* and the difference between this and the bigger of the summands. *–u+q=(a-b)+(a-2b),* that is *w=2a-3b*.

Four additions

We now have following additions:

A	*b*	*a+b*
b-2a	*b-a*	*2b-3a*
a-2b	*a-b*	*2a-3b*

Row 1: a + b = a + b

Row 2: b-2a + b-a = 2b -3a

Row 3: a-2b + a-b = 2a – 3b
Col. 3: a+b + 2b-3a =(-1) 2a - 3b = 3b-2a

S=17-{a+b|c}

Instead of the aspect *–u* we use the aspect *S=17-{a+b|c}*. We will not go in this paper into the consequences of loosening up the connection between values in the columns of one record. Yet, the aspect *S* is useful in visualising the extent of a linkage between *a* and *b*. If the pairs *(a,b)* were less stringently fixed to each other, that is, in a version of the Table where any *b* could pair with any *a*, there would exist a specific order where *S* could not distinguish at all, each of the values of *S* being *0*.

Generating the first 9 Columns of Table

We have now arrived at generating the Table. This is best done by following structured flow:

```
For i=1 to 16
    For j=i to 16
        Add blank record /* or: new row in matrix */
        A=i
        B=j
        C=a+b
        K=b-2a
        U=b-a
        T=2b-3a
        Q=a-2b
        S=17-(a+b)
        W=2a-3b
        Write values to record /* or: fill in cells in row */
    Next j
Next i
```

This should generate a data set of 136 records with 9 columns filled out.

Concepts of Order

Sorting and Ordering: minimising cuts

Sorting is a well-known procedure. We use the simple "*sort()"* function to order the data set.

The sort is achieved if the sum of differences between two elements in the sequence is minimised. The $\Sigma(\text{abs}(P_i - P_{i+1}))_{i:1,135}$, where P is the property of the record on which the data set is sorted, result is to be minimised.

In a different interpretation, during a sort one minimises the number of cuts. More exactly, one maximises the number of degradations of "between" type cuts into "within" type cuts. One creates sub-continuities of maximal length while sorting; minimises the number of summands.

Outside and Inside Attributes

We use *two* aspects to sort the data set on. We have 9 aspects, and each aspect is in use once as the first and once as the second sorting criterium. We arrive at 72 sorting orders, namely *ab,ac,ak,au,...,wt,wq,ws*. The *first* sorting aspect we may also call the *outside,* the *second* the *inside* ordering principle.

Unique and Nonunique Places

Some pairs of sorting aspects yield at times ties. This happens, if the two sorting aspects do not distinguish two or more records - pairs of *(a,b)* -, because the two aspects the sort is based on have common properties.

The observation that there are sorts that have categories in the sort that contain two or more records gains significance because it allows introducing a concept of "before" to logic.

We discuss a "meta-order" by pointing to a Subtable V of the Table. V is a result of a comparison of any two sorts on their identity. If sorting order $SQ_{\alpha\beta} = SQ_{\gamma\delta}$ then the corresponding value in V is .t.. V is a vector of length 72x72, there being 9 aspects therefore 72 sorting sequences.

The *position* of the .t. values within V is a trivial consequence of the sequence of comparisons of the SQs and of the sequence of the SQs and of the sequence of the “material” arguments *a* thru *w*. If the Table had been constructed in a different sequence of aspects, the .t. values would appear in a differing sequence in V.
The *number* of .t. values one would expect to remain identical. Intuition says that $SQ_{\alpha\beta} = SQ_{\gamma\delta}$ remains .t. or .f. whatever the sequence of αβγδ. This is not in all cases so. There are cases where the comparison of sequential numbers from two sorts will yield .t. if and only if there has been a pre-sort that ordered otherwise indistinguishable elements in the same sense.

The logical definition of time

An order appears to have been previously in existence if elements that are otherwise indistinguishable appear to be sorted on that order.
This reading of the Table focuses on a rather minor detail, namely whether the elements that in the current sort are in a tie had been ordered previously. It is, however a window into concepts of mechanics and of human interference and its consequences. If one has accelerated a mass – or turned a dynamo – one has altered something in the past, the consequences of which action are facts here in the present. Having changed the order properties of a logical apparition translates then in some changes in a present order system. The Table shows the realm of that what can be influenced to be but relatively modest compared to that what can not be influenced.
The two logical sentences “αβ is the main ordering principle” and “γδ is the main ordering principle” can contrast. Giving an impetus to a thing, accelerating something changes a property in a relatively modest way of the thing, but the changes can accumulate. The concept of things having a history-dependent property can well be modeled by using Subtable V’s changing number of .t.s.

Relevant and important

Any order is defined by the aspects *αβ* that have sorted in this order. Aspects *αβ* are *relevant* for the order. In the order AB it is *not relevant* whether $a+b\ \{=|\neq\}\ c$.
The *sequence* of the aspects *a..w* is *important*. We call the position of an aspect among the 9 aspects the *important* property of that aspect. The sequence of the generation of the arguments determines the sequence of the sort orders. This in turn determines the sequence of the comparisons of sort orders, that is the one-, resp. two-dimensional position of the .t. values in V.

Ordering the Table

The Table as we have presented it – built in the sequence a,b,c,k,u,t,q,s,w – is but one of its 9! possible equivalent alternatives, each a permutation of a sequence of 9 aspects. If a different aspect had been more important, a different realisation of the Table had been created.
At one time, the human spectator perceives one realisation of the Table. In this moment, this relative importance of aspects constitutes the order which the human spectator perceives (in Nature).
When changing the perceived order by e.g. warming, accelerating, magnetising, ionising, etc. a representation of the Table – a thing in Nature -, the human changes the importance of aspects, thereby either reordering the Table or generating an alternative Table.

Structures

Sequential Identities: Coresonance, Synchronicity

Among the 72 possible sorting orders of the Table, some are identical. We group the identical sorting orders in clusters. Those within a cluster share an order. If that order is in existence, members of the cluster are ordered identically.
We call the collection of .t. values in Vector V the *structure* of the Table. The structure consists of orders that assign sequential distances to elements identically. The structure evolves from alternatives being equivalent and contemporary.

Sequential Position of .t. Values, Super-Structures

Each Table we generate is but one alternative of all Tables that can be generated. Setting aside the trivial distinctions regarding the grammatics of translating the sequence of the aspects into a sequence of comparisons of sorting orders, there is an accounting link between the *importance* of aspects and the *structure* of the Table.

We put forward the hypothesis that there exist such parts of the structure that retain such properties of relative distances to each other and at least partly absolute distances to the ends of Vector V during rearrangements of the importance of aspects that a recognisable *super-structure* exists. A super-structure consists of such .t. values of Vector V that remain in position during a regeneration of the Table with differing relative importances of the aspects of $a+b=c$. This is e.g. the case with the diagonal, where the identity $SQ_{\alpha\beta}$= $SQ_{\alpha\beta}$ is of course always .t..

Number of .t. Values

The proportion of the direct implications of an order being the case to the indirect – or deducted – implications of that same fact can be modeled by the *number* of the .t. values; that is, by the degree of *structuredness* of the system of logical interdependences that is demonstrated on the Table.

The structure is that, what is unflexibly .t.. The general questions of natural philosophy being of the definition of order, concurrent order concepts and a possible hierarchy among ordering concepts, the Table is well suited to yield a skeleton for the terms of such a discussion.

The .t. values in Vector V mirror the fact that an *a priori* collecton of logical truths exists, constituting a web within and around which that what can be otherwise can be the case. If the past has been a specific one – one of a few of possible orders among all possible orders has been the case -, there is less room for things to be otherwise, as a greater proportion of .t. values in V means a smaller proportion that is subject to a possible reordering. The structure is contrasted here to the unstructured, to that what can be modified.

Changes

Place As Such, Place of Each Case

The order implicates a place for each case. If the order changes, the place of the case may or will change. E.g. in order AB the sequence of the cases is (1,1),(1,2),(1,3),... In order BA this modifies into (1,1),(1,2),(2,2),(1,3).... Place 3 in an ordered sequence is (1,3) if the order is AB and (2,2) if the order is BA. The place *of* (1,3) – the place now as an attribute of the specific pair of *(a,b)* – is 3 if the order is AB and 4 if the order is BA.

Threads

The term *thread* can be demonstrated on the place changes that follow from the change in order from AB to BA. The thread that involves (1,3) moving from place 3 to place 4 concurrently causes successive place changes of elements {3, 4, 7, 22, 23, 30, 107, 114, 115, 130, 133, 134, 120, 116, 66, 71, 21, 17}.

Properties of Threads

One may want to use analogies to the concept of *"goods in transit"* for properties of threads. There are several attributes that can be read off.

The *distance traveled* is the sum of absolute differences in sequential places in the course of a thread.

The *steps* of a thread are given by the number of elements that move together. A thread of step 1 means that the element remains in place.

The *carry* of the thread is the sum of the relevant attributes of the elements that move together.

Unitary Threads

We point out some specific of the transactions caused by a reordering. There are some pairs of orders in a from-to relationship which show a common form of threads.

We propose to use threads with the properties: 3 steps, A-carry 18 as *natural units of transaction*. All other transactions can then be related to this unitary transaction.

Space Concepts

Building common axes

The pairs of orders that yield unit transactions when reordering one into the other are: CT_QW, KW_CT, QW_KW; CW_QT, QT_ KC, KC_CW; AC_UW, AW_UC.

CT, QW, KW and CW, QT, KC have three common axes each and the two planes with axes AC, UW and AW, UC touch on them.

Two Euclid Spaces

We construct two Euclid spaces with 3 rectangular axes: CT, QW, KW and CW, QT, KC respectively. The axes C and W are common with the planes' axes C, W.

The visual image is that of a cube fixed with one corner on a plane, opposite another cube.

We can construct one – consolidated – Euclid space with common axes C,W,K.

Spatial Coordinates of Fragmentational States

The space concept with rectangular axes evolved from unitary transactions between order concepts. The most common axes C, W, K are *(a+b), (2a-3b), (b-2a)* respectively.

The indecision, which interpretation – which of the aspects - of *a+b=c* is ultimately the right one is pictured in the Table by the assumption that a reordering *always* takes place. The indecision about the importance of the aspects brings forth that there is a continuous reordering among aspects. This in turn implies that the transactions exist and can be classified and standardised. They may not be always relevant, but the space that the unit transactions' properties generate is an implication of the fact that several aspects of an addition exist and each of the interpretations is equally legitimate.

Having thought up a space created by transactions, now we regard the cases that are together in a thread. In the unitary transaction, 3 pairs of *(a,b)* change place. Each pair has a before and an after place in each of the 10 orders among which reorderings take place. This yields one 3-dimensional coordinate in each of the two Euclid spaces and two points' coordinates in the two planes. There being *three* pairs of *(a,b)* in a unit transaction, we have *twice three* points in the two Euclid spaces or *six* points in the consolidated Euclid space that represent one unit transaction. (This will appear to us as 12 points, as the two spaces are one only in accounting.)

The 3 pairs of *(a,b)* bundled together in a unit transaction are each one a bi-fragmentational state for a specific value of *c*. Each pair is also a fragment among 3 fragments with respect to the carry of the unitary thread. We thus have a clear accounting determination of places in two Euclid spaces – which can be merged into one – for each of the triplets of pairs that are an accounting link to specific fragmentational states.

Fits into surroundings under such order

The Table was constructed under the principle of "*if it is <such> it is <there>"*. This was later expanded into "*if it is in transit, a <such> moves <these distances>"*. We now turn this into "*if it moves <these distances> it can be a <$such_1$, $such_2$, $such_3$ ... > in transit*".

Which of the material arguments match which collections of dislocations is above all dependent on which order prevails. The Table implies a continual rivalry between order concepts.

Force of cut

The inner difference between the aspects appears to be connected to the cuts. What notation will describe elegantly the difference between *a+b, b-2a* and *2a-3b* with respect to cuts being created and neglected, demoted and promoted? May the Table contribute as a demonstrational tool to the discussions about the role of cuts as ordering principles on a logical collection!

One thesis says that the orders are distinguished among each other by some properties of cuts. The cuts are implications of orders and orders are implications of cuts. If order X is the case, then the cuts cut out a specific sub-segment in Euclid space. If order Y is the case, a different pattern of cuts applies and there may well be differences in the spatial implications relative to those under order X. If the collection is in order X it may well occupy less space than if it is in order Y. Space – as expressed in cubic millimetres – can be packaged into a different order.

Expanding and constructing space

Fragmentational states appear to attract and repulse each other according to the order they are under and the order they are changing into. They can or can not come in neighbourhood relations in dependence of the thread they are in and the spatial points the unitary threads connect.

A space-constructing change in order is seen as somehow soaking up space by creating logical boundaries between space segments that to us appear contiguous. In this understanding of Euclid space, the cuts between summands imply a higher level of logical boundary than the cuts within a summand.

A space-expanding change in order unpacks the folded discontinuities and expresses them in standard units of cuts, those between units within a summand.

Logical Archetypes

Geometrically possible cases

The 20*(44+1) threads with unit properties are an implication of the indecision with respect to the hierarchy of aspects. Although for convenience we use them in a separate Sub-Table, the transactions of unitary properties are an implication of the Table. So are the Euclid spaces generated by the continual reorderings among the orders.

The triangle based on three distances the participants of one standard transaction move in a Euclid space can or can not be geometrically represented.

We have found 118 cases where the lengths of the sides of the triangle make a geometrical notion of a triangle possible.

We propose to call these cases "logical archetypes" as they are implications of an order among instances of $a+b=c$. Although they have many properties common, the 118 geometrically possible logical archetypes each have some individual attributes, too.

Unit properties

Each pair of *(a,b)* has unit properties also in that sense that it is a part of a collection of 3 during specific reorderings. The carry properties, of the three-somes (triplets) making up a unit, agree.

Individual properties

Aside of the rearrangements in a standard fashion, in which respect the individual cases are 1/3rd of a standard, the cases are also subject to such reorderings that are non-standard.

Three of the cases bundled together behave in a standard fashion. Each of the triplets is distinguishable against the other 44 varieties of triplets of the same resort. Each of the 118 varieties of triplets that are geometrically possible – and therefore in a Euclid space realisable – has individual characteristics. Some of them cannot coexist for accounting (logical) reasons. This allows the concept of the *chemical elements* to be pictures of the *logical archetypes*.

The individual cases that make up a triplet have individual properties above and aside belonging with two others in a specific triplet. The threads connect each individual case differently in those reorderings that are not the standard variety.

Natural Order

The human nervous system is the best proof of the hypothesis that a natural order exists. If there were no clear rules, regarding the biochemical-electrical translation of some substances, which apply dependably on both ends of a nerve cell, no nervous activity could have evolved.

It appears that there are preferred transactions within one version of the Table and among the versions of the Table. The generalised order concept implies a continuous process of concurrent reorderings. Within one version of the Table we have shown that the indecision about which aspect of an addition is more relevant than other aspects brings forth, in a step-by-step process of accounting, two Euclid spaces connected by two planes.

The order concept has been translated into a space concept. The mass concept can well be approached by means of the threads that connect spatial coordinates and fragmentational states, specifically by the carry by way of the non-standard threads.

The interaction seen in genetics appears to be connected to the importance of the order aspects; that is, to the versions of the Table. These are distinguished among each other by the permutation of the arguments during the creation of the Table.

The Table is, and all of its varieties are, of course, an elaborate tautology, as all accounting tables are. May its use prove practical.