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The Theoretical Foundation of Logic

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In this paper an alternative definition of numbers is produced and then a new logic is produced.

If we do not know what numbers is we cannot have any solid logic. But still we do not have any satisfactory definition of numbers and therefore we do not have any solid logic.

The introduction of a new principle – The Principle of Relations[1] – numbers and logic and its theoretical foundation is challenged and a new logic will be possible.

First we must express explicitly the postulates, which will lie behind the analysis of the number 1 and 0, established logics and a new logic:

1. "All"consists of the world today, the world of the past and the world of tomorrow.
- 1.1 Everything that ever existed, exists or will exist is a part of "All".
- 1.2. All is dynamic – All is "alive".
- 1.3. All **= X.**

2. One world exists today.
- 2.1. The world is a part of "All".
- 2.2. Anything that does not exist today is not part of this world.
- 2.3. The world is dynamic – the world is "alive".

3. Any world is differentiated into component parts, each one of which stands in relation to another.
- 3.1. It all hangs together.
- 3.2. Nothing exists in isolation.
- 3.3. It all hangs together through a relation **- R.**
  - 3.3.1 Since it all hangs together, nothing is in isolation.
  - 3.3.2 The relation is superior to the parts**, a, b, c …**
- 3.4. If the relation is superior, there will be no cause and effect between the parts.
- 3.5. The relation makes the parts´ existence possible.
  - 3.5.1 Without relation the part will die and disappear.
- 3.6. The concept of relation explains the concept of system.
- 3.7. All systems are arranged in a logical hierarchy. If a superior system collapses, then all subordinate systems will collapse.
- 3.8. All systems of relations, at a certain time, constitute the world.
  - 3.8.1Everything happens only one time. Nothing that happens will happen again. The unique disappears and will never come again.
  - 3.8.2 Everything which is will become something new.

4. Everything that exists is physically concrete.
- 4.1. Meaningful concepts are concretely interrelated.
- 4.2. Abstract concepts must be able to be derived from concrete concepts.
- 4.3. The sentence expresses the thought in a way which is perceptible for the senses.
- 4.4. There are no meaningful concepts without concrete meanings.
- 4.5. The contents of thoughts are concrete.
- 4.6. That which is concrete either exists or does not at a certain point of time.
- 4.7. The combination of article 3 and articles 4.1 – 4.6 means that the world is alive.

5. Thoughts about concrete facts are meaningful propositions at a certain point of time.

These five postulates describe reality, and the concepts 'the real', 'the physical', and 'the concrete' are synonyms.
Based on the postulates we can now formulate the formula **X = aRb**. Let us call it The Principle of Relations.
Now, let us find out the meaning of numbers based on the principle of relations.

The number 1

Based on articles 3.8.1 and 3.8.2 of the postulates, ***a*** and***b*** change, which means that the content of ***a*** and ***b*** are different from time t_1 to time t_2.

1. a = a at t_1 and this is called = a_1;
2. so a_1 is valid at t_1 ;
3. then a_2 is valid at t_2 = a_2; etc.
4. $a_1 \neq a_2$;
5. $b_1 \neq b_2$;
6. $\triangle = a_1 - a_2$;
7. $\triangle$ a = R;
8. $\triangle t = t_1 - t_2$
9. Within a certain time $t_1 - t_2$, the content changes by $a_1 - a_2$ = content of R.
10. If a = a at t_1, then $a_1 = a_1$,
11. thus 1 = 1 at t_1, then $1_1 = 1_1$
12. if $a_2 = a_2$, thus $1_2 = 1_2$
13. if $a_1 \neq a_2$, thus $1_1 \neq 1_2$
14. Consequently ***a*** and***1*** are not static entities.
15. Thus 1+1=2 and a + b = ab are false, except at t_1; however t_1 exists before t_2, which is always the fact, i.e. what is true at t_1 is not true at t_2.
16. Instead we have to realize that at t_1 1+1=2, but at t_2 1+1 ≠2
17. This perspective gives a new interpretation to the definition of the natural number *n*, which so far has been defined as the set whose members each have *n* elements, which is a fallacy by circularity and therefore an impossible definition.
18. Conclusion 1: We do not know if the nature of the Universe is based on numbers.
19. Conclusion 2: Science, natural sciences and mathematics, based on the number 1, are not valid.

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The number 0

Up until now the definition of the number 0, zero, represents nothing; it is the symbol for emptiness, i.e. it represents the absence of any quality and its quantity.

But, since R exists, there is no empty space, whether in the cosmos or between particles, i.e. R is present with its contents all over space all the time.

Then, the number 0 does not exist and it is not valid.

The same conclusion can be found in this article in Tractatus[2]:

"4.128 The logical forms are anumerical. Therefore there are in logic no pre-eminent numbers, and therefore there is no philosophical monism or dualism, etc."

When Frege came to his conclusion, he first dealt with the concepts unit, thing and object; and if they are identical. "Why do we ascribe identity to objects that are to be numbered? And is it only ascribed to them, or are they really identical? In any case, no two objects are *ever* completely identical."[3]

This is the question of unity and diversity, i.e. are numbers based on unity or diversity.

The answer, based on the definition of number 1 above, is that the symbol of any number, e.g. 3 will *not* look like this 1+1+1.
The symbol 3 has to be shown like this 1´+1´´+1´´´.

However, if the existence of arithmetic should consist, this is impossible, according to Frege.[4]

How, then, can we deal with science based on the definition made in this paper?

We must invent a new logic, since the foundations of arithmetic are weak, i.e. the Principle of Relations.

Consequences for logicsbased on the postulates

Now we have to discuss how the theory of relations affects established logic and mathematics, since it is on them that most theories, so far, have been dependent, both within physics and philosophy.
Let us call it The Paradigm of Logic and Mathematics – $P_{L.}$
P_L is based on these statements:

1. There are atomic facts and elementary propositions.
2. Values are true or false.

P_L is based on a few concepts:

1. Conjunction
2. Disjunction
3. Negation
4. Implication
5. Quantifier symbols ∀ and ∃
6. Tautology
7. Truth function
8. Truth values

The Principle of Relations, $P_{R,}$ is based on these statements:

1. There cannot be any fixed atomic facts and elementary proposition, based on postulate 3.8.2.
2. There are no values which are true or false, only true or false at a certain point of time, based on postulate 3.8.1.

P_R influence on P_L makes all of its concepts invalid.

1. Based on article 3 of the postulates, the basic concepts of logic, such as conjunction, disjunction, implication, negation and plus are not valid. The logic is not valid due to the principle of relation, since the nature of Nature is "alive" and is constantly/continuously changing, based on the postulate 4.7.
2. Nature is not based on the logic of conjunction, negation and implication; it is based on the logic of relations.
3. One example of P_L is Wittgenstein's logic. Wittgenstein uses $\left[\overline{p}, \overline{\xi}, N(\overline{\xi})\right]$ for all sentences, where

- $\overline{p}$ means all atomic propositions,
- $\overline{\xi}$ means any subset of propositions, and
- $N(\overline{\xi})$ means the negation of all propositions making up $\overline{\xi}$.

Elegant to look at, but not valid due to $P_{R,}$ and the same can apply to the truth table below, where p and q stand for propositions, T stands for True and F stands for False and ^ stands for conjunction, but the truth table is not valid:

p	q	p ^ q
T	T	T
T	F	F
F	T	F
F	F	F

The model of truth is based on, not least, these three articles in Tractatus:
"1.2 The world divides into facts.

1.21 Any one can either be the case or not be the case, and everything else remains the same.

4.42 With regard to the agreement and disagreement of a proposition with the truth-possibilities of *n* elementary propositions there are
$Kn = \sum_{v=0}^{n} \binom{n}{v} = Ln$possibilities."
As shown in postulate 3.8.1 and 3.8.2 this conclusion is not possible.

It is interesting to compare the X = aRb by these articles of Tractatus:

"4.27 With regard to the existence of *n* atomic facts there are $K_n = \sum_{v=0}^{n} \binom{n}{v}$possibilities.It is possible for all combinations of atomic facts to exist, and the others not to exist."

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5.511 How can the all-embracing logic which mirrors the world use such special catches and manipulations? Only because all these are connected into an infinitely fine network, to the great mirror."

Even if Wittgenstein completely changed his view later on, it still stands for how most logic is used. (However, in the Philosophical Investigations, Wittgenstein focuses on the specific and particular instead of the common, general and universal. This relates/is close to the idea of the Principle of Relations.)

Propositions according to Frege, Russell and Wittgenstein

The ultimate philosophical foundation and its postulates are not basic enough in each of Frege´s, Russell´s and Wittgenstein´s views of number and proposition.

Based on aRb their views of number and proposition are not valid, i.e. there is similarity in the most important parts, even if they, all three, disagree in some parts.
They argue only superficially, but with the exception of numbers, where Wittgenstein had the same understanding as the one of the Principle of Relations.

When it comes to proposition they are identical in their views, i.e. a proposition is true or false. This is not the position of the Principle of Relations.

Frege´s truth table, which has similarity with the one of Wittgenstein, can be seen below[5]:

(*P* → (*Q* → *R*)) → ((*P* → *Q*) → (*P* → *R*))												
✗	✓	✗	✓	✗	✓	✗	✓	✗	✓	✗	✓	✗
✗	✓	✗	✓	✓	✓	✗	✓	✗	✓	✗	✓	✓
✗	✓	✓	✗	✗	✓	✗	✓	✓	✓	✗	✓	✗
✗	✓	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓
✓	✓	✗	✓	✗	✓	✓	✗	✗	✓	✓	✗	✗
✓	✓	✗	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓
✓	✗	✓	✗	✗	✓	✓	✓	✓	✗	✓	✗	✗
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	2	3	4	5	6	7	8	9	10	11	12	13

In the truth table the possible allowances are (✗) for false and (✓) for true, to *P*, *Q*, and *R*.

Russell defines propositions to be true or false.[6]In Russell´s paper 1910 "On the nature of truth and falsehood", he wrote: "*propositions . . . are the entities that I consider true or false*. These, I shall argue, having being, but not existence; they are the objects of thoughts, but are in no way dependent on being thought of; they are complex, and their complexity may be apprehended, but cannot be made, by the mind which apprehends them . . . "
(My italics)

"Anything implied by a true elementary proposition is true"[7], shows again how frequently the concept true is used.

As always when a philosopher makes any statement, it will be followed by, more or less, not understandable argumentation.

However, that propositions are true or false is the conclusion, where we will stop.

Now we can see the similarity between all these three philosophers, Frege, Russell and Wittgenstein, when it comes to *truth and false*, i.e. they all have the same opinion that true and false are essential concepts in their logic.

To make it all really clear the standpoint of the Principle of Relations, I present it again:
1) There cannot be any fixed atomic facts and elementary proposition, based on postulate 3.8.2.
2) There are no values which are true or false, only true or false at a certain point of time, based on postulate 3.8.1.

Since we cannot use the logic of Frege, Russell and Wittgenstein, we need to invent a new logic, i.e. the logic of the principle of relations.

This is the most important task for philosophy, to invent new logic understanding the world and its reality.
If we define number 0 and 1 differently, we will have different understandings of reality. If we define numbers based on the principle of relations, we will have many new applications.

The logic of relations

The concept of relation relates to reality by showing that there are relations in terms of flow of packages between all parts in the Universe, aRb, where:
1) a, b, c … are any system, subsystem, unit or part in any field of the Universe, e.g. suns, planets, moons, galaxies, quarks, leptons, hadrons, mesons, baryons, nuclei, atoms, molecules, cells and species.
2) The relation R is a flow (wave) of packages, $p_{1\text{-}n}$, between a, b, c … in any field of the Universe.

Based on the postulate - Nothing exists in isolation, i.e. everything exists in relations –in combination with 1and 2 above,the principle is

X=aRb

Between all systems and between all parts of any system, S, there is a continuous flow of packages$\mathbf{p_{1\text{-}n}}$, i.e. $\mathbf{R = p_{1\text{-}n}}$. The formula will be this

$$\mathbf{S = ap_{1\text{-}n}b}$$

Manifestations of the flow of packages are gravitation, energy, interaction, dark energy, dark matter and force.

Based on X = aRb and S = $ap_{1\text{-}n}$bany system is and can be described as complex flows. We might call them wave functions, since a wave function is a flow of masses.

A wave consists of masses which stand in relation with systems. From system ***a*** the wave of masses moves to system ***b***. This is valid for all masses in the Universe, e.g.

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galaxies, planets, suns, moons, atoms and elementary particles.

To simplify, the concept *relation* is based on this postulate: *Nothing exists in isolation, i.e. everything exists in relations.* The postulate is valid for all objects and all beings, i.e. it is on the most fundamental level, before we even think of science and humans; it is valid for scientific objects as well as for human sciences.After endless of observations of beings and objects, throughout my life, I found no exceptions. And, then, the postulate is *a posteriori*, since it is based on observations of reality, more or less conscious.
Based on the postulates, the fundamental concepts and the fundamental equations behind the laws of relations are the following:

Basic concepts:

1. X = Everything
2. U = Universe
3. U_S = Systems in U
4. X = all quantities in U, such as E (Energy), F (Forces), G (Gravitation), I (Interaction) …
5. X = E, F, G, I …
6. W = World
7. S = System
8. S_{1-n} = Systems

A system´s content is less than U and X, sinceU and X consist of many systems, S.
A system can be the earth, the atom, the galaxy, the sun, the moon, organized elementary particles, cells, humans, to mention some.

9. P = Part
10. p = package

Packages are contents, which are different in different systems. P, parts, can be the elements of any S, such as the sun or an atom. The difference between S and P can sometimes be subtle.

11. R = Relation. A relation is a flow of packages between systems.
12. R_S = systems of relations
13. NW = Network
14. NWU = Network in Universe
15. t = time

Since time doesnot exist in U, but is invented by humans, it means the difference in an object, the difference which now is measured in human time, but we will measure it in the change of the object.

16. T = Temperature

Temperature doesnot exist in U, since it is a consequence of the speed and frequency of the packages and of which content the packages consist; so the higher speed and frequency, the higher the temperature and vice versa.

17. RE is the Relations Equations.

Basic equations:

1. X = aRb

X = aRb is the overall principle and U = aRb is the case of the Universe. N = aRb is the case for Nature.
U and N constitute X, i.e. the entire world.

2. $X = \sum W_{1-n}$
3. $U = \sum S_{1-n}$

Σ means the summation after equals, with the symbol =

4. $W = S_{1-n}$
5. $W = \sum S^{\infty-1}$

This means there are finite systems in the world. W can be summarized by all S at a certain time-period, $t_1 - t_n$.

6. $S = (\sum P_{1-n})_{1-n}$
7. $S = \sum P^{\infty-1}$
8. S = f(aRb) (f means function) or
9. $S = (aRb)^{\infty-1}$

In any system there are finite parts in finite relations.

10. $R_S = (\sum p_{1-n} = p_1 + p_2 + p_3 \ldots p_n)^{\infty-1}$

In all relations there are flows of packages, dependent on the system the packages are different from system to system. The equation is:

11. $S = ap_{1-n}b$
12. T = f(R)

Temperature is a function of R, i.e. it is by the speed and intensity of the packages that temperature will change and not vice versa.

13. t = f(R)

Time is a function of R, i.e. time doesnot exists in itself, but is integrated in R.
Both time and temperature are not known in the Universe, they are both human inventions.

14. $S_1 = (a_1R_1b_1)R_2(a_2R_3b_2)$ …

S is a complex of relations between all parts and elements in the system, i.e.the a, b, and c are complicated systems, that send and/or receive flows of packages, i.e. p_{1-n}

15. $R = \sum p_{1-n} = p_1 + p_2 + p_3 \ldots p_n$

The big challenge is now to identify all the *p* in all relations.

16. $(a_1R_1b_1)R_3\ (a_2R_2b_2)$ …
17. $S = (aR_1b)R_2(aR_3b)$ …

And

18. $S = \sum (a_1R_1b_1)R_3(a_2R_2b_2)\ldots^{n-1}$
19. R_1 is the relations within the Earth; R_2 is the relations between R_1 and $R_{3-n\ \ldots}$ Or
20. $(a_{1-n}R_{1-n}\ b_{1-n})R^{\infty-1}(c_{1-n}R_{1-n}d_{\ 1-n})$ …

A summary of all equations

1. X = aRb
2. $X = \sum W_{1-n}$
3. $N = \sum W_{1-n}$
4. $W = S_{1-n}$
5. $W = \sum S^{\infty-1}$
6. $S = (\sum P_{1-n})_{1-n}$
7. $S = \sum P^{\infty-1}$
8. S = f(aRb) or
9. $S = (aRb)^{\infty-1}$
10. S = aRb
11. SU_{1-n} = Systems of Universe
12. R_S= Systems of Relations = $(\sum p_{1-n} = p_1 + p_2 + p_3 \ldots p_n)^{\infty-1}$
13. $S = ap_{1-n}b$
14. T = f(R)
15. t = f(R)
16. $t_{1-n} = f(R_{1-n})$
17. If no R, no time.
18. $S_1 = (a_1R_1b_1)R_2(a_3R_3b_3)$ …
19. $X = \sum_{A-Z} = A + B + C + \ldots Z$
20. $R = \sum p_{1-n} = p_1 + p_2 + p_3 \ldots p_n$
21. a, b, c …are complicated systems, S, that send and/or receive flows of packages, i.e. p_{1-n}

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22. P, Parts, can be the elements of any S, such as the sun or an atom.
23. S can be the Earth, the atom, the galaxy, the Sun, the Moon, to mention some.
24. W can be the summary of all S at a certain time-period, $t_1 - t_n$.
25. $(a_1R_1b_1)R_3\ (a_2R_2b_2)$
26. $S = (aR_1b)R_2(aR_3b)$ …
27. $X = \sum (a_1R_1b_1)R_3(a_2R_2b_2)^{\infty\text{-}1}$
28. $R_1$is the relations within the Milky Way; R_2 is the relations between R_1 and $R_{3\text{-}n}$ …
29. $(a_{1\text{-}n}R_{1\text{-}n}\ b_{1\text{-}n})R^{\infty\text{-}1}(c_{1\text{-}n}R_{1\text{-}n}d_{\ 1\text{-}n})$ …
30. $X = S_URS_ERS_ARS\gamma RS_{e\text{-}}RS_g$
31. R→G
32. R→E
33. R→F
34. R→Φ
35. R→hv
36. R→Ψ(t,x)
37. $R \rightarrow mc^2$
38. $R \rightarrow Gm_1xm_2/r^2$
39. $R \rightarrow G\mu\upsilon 8\pi T\mu\upsilon$
40. R → NU
41. R → L
42. L = hf
43. R = hf
44. RE is the Relations Equations.

Applications of the Principle

X is all and is equal to N, which has all possible contents in the entire universe. The paradigm´s equations:

$$S = (aRb)^{\infty} \quad (1)$$

The system S constitutes of finite relations between a, b, c …

$$R = \sum p_{1\text{-}n} = p_1 + p_2 + p_3 \ldots p_n \quad (2)$$

R is the flow of packages, with different content in different systems

$$R_S = (\sum p_{1\text{-}n} = p_1 + p_2 + p_3 \ldots p_n)^{\infty} \quad (3)$$

R_S is a system of relations

$$S = (a_{1\text{-}n}R_{1\text{-}n}\ b_{1\text{-}n})R\infty(c_{1\text{-}n}R_{1\text{-}n}d_{\ 1\text{-}n}) \ldots (4)$$

To identify all relations in all systems is a complex work

$$X = S_URS_ERS_ARS_HRS_B \quad (5)$$

X is the Nature, consisting of relations between the Universe, U, the Earth, E, the Atom, A, the Human, H, and the Brain, B, to mention some systems in Nature.

$$R \rightarrow G;\ R \rightarrow m_1xm_2/r^2 \text{ and } R \rightarrow G\mu\upsilon 8\pi T\mu\upsilon \quad (6)$$

What manifests as gravitation is the flow of packages.

$$R \rightarrow E \quad (7)$$

What manifests as energy is the flow of packages.

$$R \rightarrow F \quad (8)$$

What manifests as forces is the flow of packages.

$$R \rightarrow \Psi(t,x) \quad (9)$$

What manifests as quanta is the flow of packages.

$$R \rightarrow L \quad (10)$$

What manifests as light is the flow of packages.

$$N \rightarrow SP \text{ and } SP^{\infty} = (aRb)^{\infty} \quad (11)$$

What manifests as species, SP, is the flow of packages from Nature, N.

$$S_H = (aRb)^{\infty} = S_iR_1S_mR_2S_c\ R_3S_lR_4S_rR_5S_dR_6S_uR_7S_{re}R_8S_nR_9S_e\ R_{10}S_s \quad (12)$$

The system of the human body, $S_{H,}$ is a complex of relations between different parts, e.g. Themuscular system, S_m and the nervous system, $S_{n.}$ Now we can reflect how a molecule or cell can be transplanted to damage flow in the body, e.g. intermodal pathway in the heart and the kidney filtration mechanism, in order to cure AV-block III and repair the filtration mechanism in the kidney, which will be shown later.

Within philosophy we must go all the way from fundamental concepts to concrete parts and facts of reality to fully understand it all. Normally in philosophy and science small parts is dealt with, and then within any given and well-defined scientific system. Now we must find out how things and beings hang together, then we can deal with one part at the time. This is very important, since to limit is to restrict our knowledge.

At this time the task of philosophyis to create concepts that can unite the theories of relativity and quantum, new interpretations of Gravitation, Black Holes (which might be an illusion), ATP Synthase (which also might be an illusion) and a new ideology (since all existing are based on a society long time ago), to just mention some challenges.*The task of philosophy is to understand reality by creating logics*.

Notes

1) The theory was first published by Cambridge Scholars Publishing: *The Principle of Relations*. 2018. The theory has been developed in the book *The Theoretical Foundation of Physical Reality*, authorHOUSE, 2020.
2) Ludwig Wittgenstein: Tractatus Logico-Philosophicus. Routledge, 2005.
3) The Foundations of Arithmetic, by Gottlob Frege. 1980, page 44.
4) Ibid. pages 57-58.
5) In the article “Frege´s theorem in propositional logic” as shown in Wikipedia.
6) In Russell´s paper 1910 “On the nature of truth and falsehood”.
7) Principia Mathematica. Volume One. Alfred Whitehead and Bertrand Russel. Page 98, Primitive Propositions. 1910.

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