

Twin Concept of Fine Structure Constant as the 'Self Number-Archetype' in Perspective of the Pauli-Jung Correspondence

Part II: Cognition, Imagination and Background Process

Péter Várlaki*, Imre J. Rudas**

* Budapest University of Technology and Economics
Bertalan L. u. 2, H-1111 Budapest, Hungary
Széchenyi István University, Egyetem tér 1, H-9026 Győr, Hungary
varlaki@kme.bme.hu

** Budapest Tech, Bécsi út 96/B, H-1034 Budapest, Hungary, rudas@bmf.hu

Abstract: The paper – similarly to our earlier publications since 1993 – is trying to 'synchronize' early quantum physics, the Kalmanian representation theory, Jungian analytic psychology, and certain aesthetical categories. The number '137', the so-called inverse Fine Structure Constant (FSC), is placed at the centre of this heuristic and epistemological experiment, along with the scientific cooperation of Pauli and Jung. A new possibilistic twin concept of "controlling-observing equations" is proposed for the reinterpretation of the FSC and other Number Archetypes on the basis of the Hermeneutic and symbolic languages found in the W. Pauli and C. G. Jung "Correspondence". The second part of the paper deals with the new ways of cognition and imagination related to the "Background Control Theory" which can be identified mainly in the Pauli-Jung collaboration anticipating the new system and control approach of R. E. Kalman. Furthermore, we summarize this unusual attempt and give an extensive bibliography for further reading.

Keywords: Control Theory, fine structure constant, Number archetype, W. Pauli and C. G. Jung correspondence

Introduction

Wolfgang Pauli underlines (in a letter to Fierz) that one of the most important "general world problem" is closely related to the "idea of reality" [25]:

"When the layman says "reality" he usually thinks that he is speaking about something which is a self-evident known; while for me working on the elaboration

of a new idea of reality seems to be precisely the most important and extremely difficult task of our time. It is this, too, which is what I mean "physics inside of religion", since either one would certainly be "one-sided", but rather I mean the placing of both of them within a whole. I would like to make an attempt to give a name to that which the new idea of reality brings to my mind: the idea of the reality of the symbol. On the one hand a symbol is a product of human effort, on the other hand it is a sign for an objective order in the cosmos of which man is only a part. It contains something of the old concept of God as well as something of the old concept of matter. (An example from physics: 'the atom'. The primary qualities of filling space have been lost. If it were not a symbol how could it be "both wave and particle"?) The symbol is symmetrical with respect to 'this side' and the "beyond", that is to say, dual in the sense of your suggested view of the process of perception; it has a relationship to 'observing' and to 'comprehending', it can be mathematical or also even more primitively picture-like. The symbol is like a god which also demands from man that he have a back effect on him (the God symbol). It seems to me that only in this manner does the this side obtain any sense ..."

According to Pauli's concept, in order to know "the new reality", i.e. to realize the extremely difficult task of our time, to try to build up a fresh idea of reality, we discuss the new cognitive and imaginative approach of the so-called four symbolic languages which were born of the fruitful cooperation of two Great Minds. These symbolic or background languages, generated by hypothetical background processes, can correspond with the ontical layers of our world.

According to Lindorff: "*Jung, Pauli said, was impressed with the concept of a neutral language that bridged the two disciplines, even coming to see it as the goal of the whole development. Jung had also agreed that the future of his psychology lay not primarily in therapy but rather in a unified understanding of nature and humankind's place within it. Pauli believed the material on synchronicity was Jung's "spiritual testament". Because it took both psychology and physics into consideration, it was a view of natural philosophy that extended into the future*" [26]

The ruptures among them can be bridged, hopefully, by the introduced background system and control (symbolic) language. This properly neutral language, in our conviction, is deeply related to the number archetypes, which are themselves another important outcome of the joint thinking and imagination of Pauli and Jung.

We try to show in addition to Pauli's well known statements on "twin mythologema" or "twin psychologema" that his imaginations is also strongly related to the twin images concerning the hidden presence of number archetype 137 as well. The central archetype of the Self or the totality of the Ego/Self relationship are frequently characterized by Jung with eternal divine twins as the sign of Gemini or Dioscuri i.e. Castor and Pollux.



Figure 1
C. G. Jung and W. E. Pauli

1 Background System and Control Theory

The Kalmanian view of systems and their models [21, 22], in addition to the usual dichotomic reality and description/model “attitude”, use a tripartite paradigm. This means that besides the (in itself unknowable) “reality” – which is characterized by a certain kind of measurement data – the theory postulates hypothesized *system classes* (using a neutral language of conception), and furthermore constitutes, as a third entity, the model classes related to the former classes of systems. With “*Application*” using the *System Identification* it is completed into a *quaternary paradigm*, similarly to the quaternary paradigm of hermeneutics (*subtilitas intelligendi, explicandi, relevandi et applicandi*).

In what follows, our intention is to demonstrate the “background” forms of mathematical system theory both in Pauli’s dreams and in the writings of Pauli and Jung, with a special emphasis on the controlling/regulating principle. As Jung intuitively hypostatizes the self-regulating psyche, and stresses the regulating principles, one can therefore perceive a kind of background *geometric system theory* with the adoption of the significant concept of ‘projection’. Pauli instead emphasizes the role of iso-, and homomorphic relations, algebraic groups and automorphisms; that is, he intuitively formulates the cognitive basis of background *algebraic system theory*. Pauli writes,

“As a consequence of the rationalistic attitude of scientists since the eighteenth century, the background processes that accompany the development of the natural sciences, although present, as always and of decisive effect, remained to a large extent unheeded, that is to say, confined to the unconscious. On the other hand, in the Middle Ages down to the beginning of modern times, we have no natural sci-

ence in the present-day sense, but merely the pre-scientific stage, just mentioned, of a magical-symbolical description of nature. This, of course, is also to be found in alchemy, the psychological significance of which has been the subject of intensive investigation by C. G. Jung. My attention was therefore directed especially to the seventeenth century, when, as the fruit of a great intellectual effort, a truly scientific way of thinking, quite new at the time, grew out of the nourishing soil of a magical-animistic conception of nature.

I was well aware, as a pupil of Sommerfeld's, how these Pythagorean elements appearing in Kepler retrain their vitality even today. That ancient spiritual 'dynamics' of number is still active, which was formerly expressed in the ancient doctrine of the Pythagoreans that numbers are the origin of all things and as harmonies represent unity in multiplicity." [33]

Pauli postulates a transcendental background, an “informational cosmos” (symbolically returning to the “concept” of *Anima Mundi* – see e.g. [27, 46]), which is the (probabilistic-possibilistic) basis of both physics and psychology, or the subject of both theological and mythological¹ ways of cognition, in which the physical, mental, and spiritual layers create a unity on the basis of a transcendental informational and control language, cf. [29]. This “background” (from which the white noise “steps out”) is called *Pleromatics* by the authors (after the Greek word *πλήρωμα*), and “contains” only symmetry structures and related abstract fields of random variables, or fields of contingency without any direct information about the space-time continuum. (See Chapter 3 in the first part of the paper)

Pauli's theory on background cognitive processes is clearly introduced in his famous study on archetypal influences in Kepler's scientific discoveries:

“Their agreement with the ‘primordial images’ or archetypes introduced into modern psychology by C. G. Jung and functioning as ‘instincts of imagination’ is very extensive. When modern psychology brings proof to show that all understanding is a long-drawn-out process initiated by processes in the unconscious long before the content of consciousness can be rationally formulated, it has directed attention again to the preconscious, archaic level of cognition. On this level the place of clear concepts is taken by images with strong emotional content, not thought out but beheld, as it were, while being painted.” [37]

Thus, the human recognition concerning the above processes – according to Pauli – formulates dynamical control systems of “informational type” where one can not preclude the possibility of transcendent “personal connections” of dynamic systems.

¹ In addition to the friendly relations (and joint book) between Jung and Kerényi, Pauli also knew very well the great Hungarian mythologist, mentioning him for example, in one of his last dream interpretations. (Although Carl Kerényi is strongly involved in the Pauli–Jung “correspondence”, we can not discuss it here, because of the limited nature of the paper.)

“Furthermore, although I have no objection to the existence of relatively constant psychic contents that survive the personal ego, it must always be borne in mind that we have no way of knowing what these contents are actually like ‘as such’. All we can observe is their effect on other living people, whose spiritual level and whose personal unconscious crucially influence the way these contents actually manifest themselves.” [29]

These can be discussed as a relatively natural and artificial competence in the form of mythological, theological, psychological and biological recognition. The presence of regulating (control) systems can be shown in all of them on the level of both natural and artificial competence. This can be traced on the level of natural competence in mythology and theosophy as the directing dynamics of the pleromatic world, e.g., in the sephirotic system of the Cabbala. A good example of artificial competence regarding this is Paul RICOEUR’s control-theoretical hypothesis regarding the magical–mythological ideas, and the hermeneutics of meaning “in the hidden time” for the Jewish–Christian religious ideas [41].

Natural competence in psychology, just like artificial competence, appears in less reflected experiments, as well. The concept of the archetype considered as regulator can be seen in Jung’s hermeneutics, tightly connected with the concept of the self-regulating psyche.² Quoting Pauli:

“The concept ‘archetype’ in Jung’s psychology, and of its transformation from the original meaning of ‘primordial image’ to that of an un-representable (unanschauliches) structural element of the unconscious, a regulator, which organizes representations (Vorstellungen). Personally I see in this the first indications of the recognition of ordering principles, which are neutral in respect of the distinction psychical-physical, but which, in contrast with the concrete psycho-physical unified language of ancient alchemy are ideal and abstract, that is, of their very nature irrepresentable (unanschaulich). Thus, the great difficulties and paradoxes in the problem of observation appear clearly. These changes in the ideas of the unconscious show that while still far from having been definitively worked out from the logical side, they are the expression of a line of research in course of development.” [37]

In physics, artificial competence appears in the control-theoretical and informational control interpretation of Schrödinger equations; at the same time, it can be discovered in Pauli’s dreams, reflections and conscious works corresponding to background.

Pauli’s aim was to establish connection with those cognitive and emotional unconscious processes bearing a transcendental-type and a personality, perhaps which

² “One of the most important characteristic of Jung’s is that the “psyche is a Self-regulating system in which one-sided attitudes of conscious mind are compensated by emphasis on the opposite (compensating) tendency mainly through medium of dreams.” (1954. 03. 26.) [29]

are in tight connection with the evolution of natural and artificial competence of mankind in these fields in a constant interaction. Towards this aim, new in its own reflection, an idea of central importance began to appear which can easily be observed in the modern scientific concept in the Jung–Pauli relation.

According to Jung and Pauli, using their joint approach, we may consider the central number archetype to be '137' especially in tight relation with the *interpretation* of the number '137', and in connection with the mathematical system theory, as well as the use of the control-theoretical paradigm.

In Pauli's view it is the number '137', the value of fine structure constant, which surpasses the present quantum theory. As Pauli's former assistant Professor Charles P. ENZ formulated, it takes us beyond physics, and, leaving the separate observers behind, transforms the thinking and feeling scientist confronted with formerly unconscious processes into the role of the active observer taking part.

"My feeling is that the common ground shared by physics and psychology does not lie in the parallelism of the formation of concepts, but rather in "that ancient spiritual 'dynamics'" of numbers that you point out on p. 295. The archetypal numinosity of number expresses itself on the one hand in Pythagorean, Gnostic, and Cabbalistic (Gematria!) speculation, and on the other hand, in the arithmetical method of the mantic procedures..."[37]

"Even mathematicians cannot agree among themselves as to whether numbers have been discovered or invented, a fact that finds its counterpart in the modern dilemma of whether the archetype is acquired or is innate. (In my view, both are true.) 'In the Olympian host, Number eternally reigns' is a valuable acknowledgment from mathematicians as to the numinosity of number." [37]

Pauli explains several times in his letters and essays that there are at least three different types of mediator "*symbolic languages*" of cognition, corresponding to usual (e.g. scientific discovery) and unusual (e.g. active imagination, dreams) means of knowledge transmission: [29]

- theological/metaphysical (or mythological) symbolic language;
- physical/symbolic language (concerning the background physics); and
- symbolic language of the psyche or analytical psychology.

Besides these, he postulates a fourth symbolic mediator or symbolic language that is based on *number archetypes*, but he considers this language "unknown" so far. These four languages can be linked to Jung's and Pauli's four ontical layers: spiritual, psychical, material, and transcendent.

In addition to the competence and language of the three fields mentioned (1/ mythological, theological, 2/ psychological and 3/ physical symbolic or background language or "theory"), the fourth is in our opinion not a future new "neutral" symbolic language connected to the number archetype, but an artistic compe-

tence (and language) in the widest sense: the *aesthetical category*.³ This fourth neutral language appears in the focus as a fifth one, with the number archetype, '137', and maybe with the paradigm and symbolic language of the background system and control theory.⁴ This scheme corresponds to the four functions of the conscious, where according to Jung there is a transcendent function unifying the other four. In his answer on the four symbolic or background languages, Jung wrote that,

"Your explanation of the consciousness quaternio is interesting and, I would say, correct. This is also where the 'origin' and primordial home of the number is probably to be found. At any rate where it begins to make its presence felt." [29]

However, it is well known that into the centre of the consciousness quaternion Jung places the transcendent function (see [17]). As is also known, he defines it as a par excellence controlling (regulating) "factor". Jung writes "in the normal man the Transcendent Function operates entirely in the unconscious, which tends to continually re-establish the equilibrium", according to his well known concept of the self-regulating psyche. This controlling transcendent function, which continually re-establishes the equilibrium, is naturally the "*Quinta Essentia*", "*the centre interpreted into the quaternity as the quinta essentia.*" (Letters I 1939 03.22. [18]) Considering his later strongly-emphasised probabilistic approach for the explanation of synchronicity using the random concept of the acausal controlling-ordering archetype, we can find a basic view of an acausal or synchronistic Background stochastic control system theory.⁵ [29]

³ An interesting experiment to create a heuristic Background Language of Hermeneutics was carried out for the analysis of Poetics and Synchronicity by G. Bonyhai. The same author tried to compose a much more general one, entitled "Value-language". His early, basic study (1964) bears strong resemblance to the epistemological 'frame idea' of the Kalman's Realization Theory of Dynamic Control Systems and their Identification. [5, 7]

⁴ A complementary alternative interpretation of the Control Background Language is the also hypothetical Background Language of Communication (Information and Coding) Theory. In this case, the structure of the "synchronistic systems", i.e. meaning-correspondences, seems to be isomorphic (homomorphic) one to the models of (Background) Mathematical Communication Theory. There are naturally senders, receivers, messages, codes, contexts etc. Then, all the other parts of the whole phenomena can be considered meaning-forming objectification (e.g. signals), and – with their sophisticated transformational processes – they can ensure the understanding of the contents of the meaning and value communications. In the hypothetical background language, the number archetypes and the archetypal symbols can be treated as "words" together, with ordering transformative systems. They contain sets of equivalent relations according to the Pauli central concept of the isomorphy and automorphy. This approach can be considered a preliminary, tentative form of Chomsky's Generative Language Theory applying deterministic stochastic and fuzzy abstract automates.

⁵ "*When he speaks of 'reality', the layman usually means something obvious and well known, whereas I think that the important and extremely difficult task of our time is to try to build up a fresh idea of reality*". Concerning this problem of synchronicity: "*A*

Pauli, partly independently, also intuitively grasped the significance of the perspective mathematical system and control theory. In one of his important letters to M. FIERZ (January 1948) he wrote:

“The ordering and regulating (controlling) must be placed beyond the difference between psychical and physical known as Plato ideas are something of the concepts and also something of natural forces.” [25]

K. V. LAURIKAINEN summarized Pauli's ordering and regulating concepts in the following way:

“Pauli understood this ordering and regulating as the common source for science and religion. With the aid of intuition, we can come in contact with it in the depths of the psyche, but we can come to studying the logical orders and changes in nature.”

In another place, Laurikainen discussed the Pauli approach to the concept of synchronicity:

“The idea of synchronicity [...] is the idea that non-causal (acausal) events would be controlled by some kind of regular correspondence.” [25]

The probabilistic or stochastic extension of the above acausal controlling principle of the concept of the archetype is excellently summarized by Lindorff:

“Jung had suggested broadening the concept of synchronicity to include acasual coincidences in which the psyche plays no part. This meant extending the concept of orderedness (or archetype) to the micro world of physics, where the order of random events on the atomic level appears to be noncausal. Jung's inclination to extend the range of synchronicity was opposed by Pauli, who saw events at the atomic level as a precursor of synchronicity and discouraged Jung from putting the two on an equal footing. Jung defended his position, insisting that synchronicity should be associated with any coincidence that is “not thinkable by causation”, even if it is not psychic. Pauli met the impasse by offering a creative solution, pointing out that between physics and psychology there is a distinction in terms of large and small numbers, as well as the concepts of meaning and archetype, which separate psychic phenomena from quantum effects in physics. The way out involved broadening the concept of the archetype to include probability.” After the dispute they met personally, and according to Fierz, ...the meeting bore fruit. Jung agreed with Pauli that a new version of archetype was called for, one that involved the introduction of probability.” [26]

The three communicating background languages proposed by Pauli together with his neutral language hypotheses were discussed in detail in the Jung–Pauli correspondence [29], on the basis of the allegory of the golden rings in LESSING's

remnant of the unity of the archetypal reality of the unus mundus from which it emerges” [25]

drama *Wise Nathan*. In the drama, Nathan compares the three golden rings with Judaism, Christianity, and Islam, while the fourth golden ring was a symbol of Divinity. Our expansion into the $4 + 1$ languages can be proved with the astrological and hermeneutical model of CARDANUS, the creator and inventor of probability theory, the modern dream hermeneutics, the *Cardan-axle*, and many other inventions.

Cardanus introduced four *archetypical religions* using an astrological allegory with the planet of Mercury in the centre [8]. The fourth religion was the idolatry identified with the orbit of Venus. The astrological identifications of the above three religions are well-known, with Judaism symbolized by Saturn, Christianity by Jupiter, and finally Islam by the planet Mars. These religious approaches are treated by the conjunction between the specific planet and Mercury. In the Zodiac (in addition to the redemptory Mercurius concept of alchemy) Mercury is the planet of the Gemini and of the Virgin. Perhaps it is a rather interesting correspondence with the Messiah Twins born in *Mother Tamar*. At the same time, the Twins (for example, Castor and Pollux) played a significant role in the interpretations of Pauli's dreams and imaginings.

The connection with the languages is also simple because of the relatively "more-concretistic" character of Islam, together with its creative approach to the "more rationalistic" sciences in the medieval ages, because of the theological and metaphysical approach of Judaism, and because the Christian attitude to human rights and the eternal individual soul of the Man. These characteristics are in good „correspondence" with the three languages. The fourth planet, Venus, is in fact an appropriate symbol for aesthetic value, especially of beauty, where the personification of beauty is the Goddess Venus (Aphrodite). And finally, Mercury, as we can see from the dreams of Pauli, together with the anima and taking into consideration the mythologema and psychologema of the eternal Twins, would be proper symbol, a primordial image, for the idea of the optimal background dynamical systems and the twin concept of FSC as well [8, 16].

Consequently, Pauli and Jung recognized that the three or four languages correspond to the ontical layers. Therefore, the background language of the given ontical plane can not be understood by the application on another ontical plane. It is the evident epistemological reason for why Pauli proposed the creation of a neutral background language which could communicate among the different background languages. According to his thinking, this neutral background language would be valid for all ontical layers. Amplifying the three languages into a quaternion, we postulated the background system and control language as a central neutral background or symbolic language satisfying the necessary criteria. Consequently, because the ontical layers can not be considered as their own mutual modifications, the "controlling category" (System and Control background language) in these ontical layers can be thought of as modifications of a general system and control category. With the help of this general category we can bridge the different ontical ruptures, of course only to a certain degree.

In the case of synchronicity, the phenomena in the different four ontical layers can be interpreted by a central meaning system according to the world view of the undetached observer. Then, practically, we may limit ourselves to apply a controlling value-system which can hopefully be identified. We can find a similar approach in Thomas Mann's *Origin of Doctor Faustus*. Here on the basis of synchronicities, according to the spiritual conditions and the Creative Subject, the author interprets the relationships between the creation of his opus and historical reality. In this instance, the relationships of the spiritual, the psychical, the physical (life) and the transcendent planes can be caught by the meaningful interpretations of the synchronistic events.

Bonyhai investigates in his study, the *Poetical Method of Thomas Mann*, how can relate a neutral value system according to the synchronicities in the given context between the creative subject and the historical reality, taking into consideration the given spiritual conditions. He proved that the relationships among the different layers can be analyzed by the concept of the value systems in the different ontical spheres which can at the same time preserve their own autonomy. [6, 7]

Because the value system category is valid for all different (four) ontical spheres, the relationships among the background or symbolic languages can be ensured by the application of a neutral value language.[7] The above approach can also be applied to James Joyce's *Ulysses*. Jung's interpretation of *Ulysses* intuitively uses this approach with the hypothesis of the connection between the synchronicities, spiritual conditions, the creative subject, the opus and the historical reality. [17]

2 New Ways of Cognition using Imagination

In one of his later works, in 1957, Jung supposed that the era of traditional art had closed because modern art had completely diverged from the archetypal source of great art.

"The pleasingness of the artistic product is replaced by chill abstractions of the most subjective, nature which brusquely slams the door on the naive and romantic delight in the senses and on the obligatory love for the object. This tells us, in plain and universal language, that the prophetic spirit of art has turned away from the old object-relationship towards the – for the time being – dark chaos of subjectivisms. Certainly art, so far as we can judge of it, has not yet discovered in this darkness what it is that could hold all men together and give expression to their psychic wholeness. Since reflection seems to be needed for this purpose, it may be that such discoveries are reserved for other fields of endeavour.

Great art till now has always derived its fruitfulness from myth, from the unconscious process of symbolization, which continues through the ages and, as the primordial manifestation of the human spirit, will continue to be the root of all

creation in the future. The development of modern art with its seemingly nihilistic trend towards disintegration must be understood as the symptom and the symbol of a mood of universal destruction and renewal that has set its mark on our age.” [16].

Similarly, in 1954 Pauli had the same impression of contemporary philosophy:

“For my impression is that the philosophy of the contemporary philosopher specialist is not really produced with and for the intellect, but comes across as a complex and involved emotional attitude [...] I regard it as a regression into the undifferentiated.” [29]

Without delving into the validity of their judgments, we find the question arises: What are the substitutive and constructive new endeavours which have the attribute of reflection. In addition to his correspondence with Jung, Fierz and von Franz, Pauli introduces the idea of *background processes* in his famous Kepler studies in a book jointly written with Jung (*Naturerklärung und Psyche* [20]). The essence of this idea for the alchemists is that the creative (partly cognitive, partly emotional) background processes, together with the structure of magico-animistic knowledge, form the entire primordial pattern of the science.

“Furthermore, my feeling is that the purely psychological interpretation only apprehends half of the matter. The other half is the revealing of the archetypal basis of the terms actually applied in modern physics. What the final method of observation must see in the production of ‘background physics’ [Hintergrundphysik] through the unconscious of modern man is a directing of objective toward a future description of nature that uniformly comprises physics and psyche, a form of description that, at the moment, we are experiencing only in a pre-scientific phase. To achieve such a uniform description of nature, it appears to be essential to have recourse to the archetypal background of the scientific terms and concepts.” [29]

He showed that this cognitive and emotional character of background processes was observable in Kepler’s main work, creating truly new forms of scientific thinking. At the end of his study, Pauli emphasizes the significance of this feature of scientific creation.

“Just because in our times the possibility of such symbolism has become an alien idea, it may be considered especially interesting to examine another age to which the concepts of what is now called classical scientific mechanics were foreign, but which permits us to prove the existence of a symbol that had, simultaneously, a religious and a scientific function.” [20]



Figure 2

Alchemical figure on the “Twins”, the Captain (Ego) and King (Self) in the sea journey as a symbol of cognition, imagination and individuation process with the two (Twin) eagles flying in opposite direction. An illustration for Pauli’s “Great Vision”. [15]

In our times, the background processes are also associated with the development of scientific knowledge, causing a decisive influence on them. However, from the 18th Century, the background processes mentioned above cannot be observed directly, i.e. they are confined to the unconsciousness. In his correspondence, Pauli also deals with these problems, hoping that in the future a new kind of the cognition will demand both scientific approaches and the symbolic nature of the so called creative background processes. This could be recognition of a new form of knowledge, when the subject of creative cognition is a scientific mediator and me-

dium, and at the same time, he is confronted with the directions and autonomy of the creative background processes. Furthermore, as a scholar applying the prospective productive form and efficient methods of a future (hypothetically efficient) artificial intelligence can survey, and then analyze the possible largest fields of the contemporary human knowledge. Supposedly, he will also relate to the above factual knowledge with the symbolic potential of unconsciousness using the direction and dynamics of the creative background processes.

Therefore, in Karl Popper's so-called *First World*, the acting scholar mediator/medium perceives intuitively the actual unconscious patterns of the extended *Second World*; at the same time, he applies the methods of artificial intelligence. Thus, he will be able to achieve the suitable data and appropriate pattern of the knowledge of the *Third World* [39, 40]. The conscious intellect of the new scholar can obtain help from the future artificial intelligence. Similarly, the 'mediumship' of the new scholar artist (Cabbalo-Alchemistic artist) can gain yet still unknown support from the unconscious background processes. Naturally, it is true only in the case of active cooperation of the unconscious ('*deo concendente*'). In the case of Pauli, who can be considered as a prototype of this new scholar-artist (with his intellect and mediumship), the artificial intelligence was replaced by the extended knowledge of the professors of his 'beloved Polytechnic' (ETH), together with the professors of the University of Zurich.

"What is particularly praiseworthy is the caution with which Pauli applies Jung's 'amplification method'. One cannot help admiring his courage, honesty, and attention to detail. When it came to work of this nature, Pauli was in a very fortunate position in Zurich, for at the university and the ETH he could call on a number of highly qualified advisers from all branches of science. This was a major factor in Pauli feeling so much at home there; he loved 'his Polytechnic' dearly and was happy to return after the war." [29]

The amplifying application of the potential knowledge of the unconscious was able to be realized through the hypothetical principles of spiritualistic communication according to the ideas William JAMES, James HYSLOP and others (see e.g. Pauli on the concept of physical and psychical 'fields' of W. James [37]). The best example of this possible future development is Pauli himself. The so-called *Pauli-effect*, is not a legend but pure fact, as evidenced by relatively frequent occurrences of such. At the same time, this is a good example for wholeness, and for the close relationship between psychical and physical processes; because even the split of conscious-unconscious psychic state of Pauli 'destroys synchronistically' the laboratory measurement systems. In the future, these phenomena may act as a reference for the artificial amplification of the psychical and physical relationship. Thus, the symmetry structure of the three worlds and their interfaces can be considered a complete one, *at least according to our disputable speculations*.

Pauli, in some of his important dreams, encounters the motive and task of his "new professorship". It seems to be a great challenge for him how to balance his

actual professorship (i.e., the one dealing with the description of physical world) with the explanation, presentation and teaching of the observed patterns and orders originating within the world of his dreams, visions and active imagination. Pauli frequently writes about this double challenge in his correspondence with Jung, von Franz and Fierz [12, 25, 29].

These interpretations and visions finally lead him to a new approach towards *scientific cognition and "imagination"*. Eventually, traditional scientific approaches, methods and attitudes must be made complete with new endeavours which can take into account the manifestations (in dreams, imagination, etc.) of originally unconscious background processes. At the same time, it is also necessary to interpret the meanings and patterns – occurring parallel – in hypothetical synchronistic events. In his well-known studies in *Dialectica* [37], he compares the two kinds of the cognition present in the western thought and knowledge. The first type of these are the rational or materialistic cognitive approaches; see for example in the Greek "scientific" and cultural history, the role of *Democritus* and the other thinkers of the atomistic world view. The second type in the Greek thinking would be that of the *Pythagorean* and *Platonist* schools.⁶

The two approaches he defines concern the above two cognitive directions. The first he calls "rational critical", the other "mystic irrational" which searches "redeeming experience" of the oneness. Similarly, he gives a detailed comparative analysis of the works and discoveries of the new natural scientist and of the meditations and books of famous alchemists at both the end of the Middle Age and the beginning of the modern age. He strongly emphasizes that in the last three centuries the approaches and cognitive innovations based on imagination and inside psychological observations were played down and lost their significance compared to the cognition and knowledge of the rational scientific development. [20]

"At the present time, a point has again been reached at which the rationalist outlook has passed its zenith, and is found to be too narrow" – too narrow to accept the existence of irrationalities which, if not understood, can find evil ways of expression. He continued: "I believe that there is no other course for anyone for whom narrow rationalism has not its force of conviction, and for whom also the magic of a mystical attitude ... is not effective enough, than to expose himself in one way or another to these accentuated contrasts and their conflicts. It is precisely by this means that the scientist can more or less consciously tread a path of inner salvation."

⁶ *"It is obviously out of the question for modern man to revert to the archaistic point of view which paid for its unity and completeness by naive ignorance of nature. His strong desire for a greater unification of his world view, however, impels him to recognize the significance of the pre-scientific stage of knowledge for the development of scientific ideas."* [20]

Nowadays, this means that the conjecture, refutation and proof of rational scientific activity [26, 29] will be supported and completed by the analogous results found in the dreams and visual impressions of the “new professor” or the “new scholar”. Between these opposed (polar) endeavours of creative cognition, a third one would communicate, recreating an achievable stability. This method would be the active imagination (to use Jung’s term) and its hermeneutical interpretation using the structural and dynamic analogies taken from systems and control science.

Similarly, the potential observed hypothetical synchronistic phenomena could also be the subject of a unifying hermeneutical interpretation. It can give rise to continuous “correspondence” between the new scholar and the hypothetical creative cognitive background processes. The symbolic personification of these background processes is a sophisticated question. Pauli, similar to Jung, hesitated between the acceptance of super ESP (extra sensory perception) and the survivalist hypotheses. Pauli believed that parapsychology should be brought within the domain of science, where statistical (scientific) methods for evaluating ESP or survivalist hypothesis, for example, could lead to a new understanding of reality, the outcome of which was and is unforeseeable [26].



Figure 3

Pauli is lecturing at the ETH

According to Jung and Pauli, the question whether the actual cognitive processes are initialized by creative unconscious background processes or by productive conscious scientific thinking and innovations can most likely never be answered (because of the inability to distinguish these entities, from the point of view of the observer). That is, however, unless through contracting the practical experience,

one were either to rob the background archetype process of its autonomy or degrade the conscious scientific investigation to a mere mechanistic activity (i.e., to a mere machine). We find ourselves most in agreement with the both psychological and cognitive knowledge experience, if we concede to the background process's definite measure of independence and to the conscious scientific investigation of the degree of creative freedom proportionate to its scope. They then give rise to a reciprocal action between two relatively autonomous actors, when describing and explaining creative cognitive processes to present sometimes the one and sometimes the other factors as the acting subject. Maybe the above new unifying approach could be the purpose and content of the new professorship [16, 26]

3 The Twin Motives with the Historical Background of the New Professorship of Pauli

As we know, the mythical view of this “new scholar” concept, firstly appeared, as a “primordial image”, in the great opus of the proto-cabbala, namely, in the *Book of Bahir* (Illumination). [60, 63] This book has been evaluated by SCHOLEM as an entirely new, almost revolutionary psychological approach, and at the same time, he calls it a crossroads in the spiritual history of mankind. Scholem writes:

*“The BAHIR can not be compared with any other midrashic works or with any of the cabbalistic writings that were subsequently composed. It stands, so to speak, at the **crossroads**. What kind of juncture is it?”* [60]

These words and the question are perfectly valid for Pauli's Opus and Personality as well⁷. In the final paragraphs (§196–§200) of this book, the main topic is the new creative activity of the just man (*caddik*), based upon a prophetic example of King David. [63] The concise story and the hermeneutical allegory can be formulated in the following way: A just man creates a Golem who physically lives as a human, and who understands languages but can not answer the intended questions. The reason for this is that the Man is little less than God because of his original

⁷ „Pauli and Jung were men who thought outside the box” writes Miller in his excellent book of **popularization** of Pauli (to cooperation with Jung) and 137 as the inverse fine structure constant [4]. Miller continues. “In 2000 the magazine *Physics World* asked scientists to vote for the top-ten physicists of the twentieth century. Pauli did not receive a single vote and was not even mentioned. Yet, beside his three major discoveries, his discussions with and suggestions to Heisenberg (who, of course, was high on the list) were invaluable to Heisenberg in achieving his breakthroughs (see footnote 5 in the first part of the paper!), as were Pauli's critical evaluations of the work of others. Pauli was involved in some of the greatest advances in twentieth-century physics, but, as we have seen, he couldn't be bothered to step forward and claim the credit. He was more interested in pressing on with his work, in pushing forward the borders of science” [4]

sin. Finally, however, King David was able to overcome evil (“evil will not sojourn with You”, Psalm 5.5), i.e., in the medieval Christian interpretation, the Messiah, Christ, hooks the Leviathan.

In this case, the prototype of the “new professor”, the mystical Just Man (the Righteous) as King David, was the Prophet. He, with his imagination and ability to interpret the Holy Script (archetypal world), according to The Book Bahir, could unify God with his Bride who, usually, is Wisdom (Sophia). Following the story, here, eternal Wisdom is personified by Tamar, the Mother of the eternal Messiah Twins. At the same time, she is the daughter of King David. Separating time abstractly into the past and future, the mystical symbolic rebirth can be realized.



Figure 4

Bust of Wolfgang Pauli at the entrance of the old building of Institute for Advanced Study (Princeton University)

According to the *Book of Bahir* the Tamar mythologema (together with King David) would compensate for Adam’s and Eve’s original sin, committed with the help of the serpent, which estranged human cognition and imagination from the creative archetypal world of God. The creation of the Golem is a suitable symbol of the evolution of the large artificial superstructures of mankind, e.g., those of science and technology. Hopefully, this can be “souled”, humanized gradually by the modern just man, the new professor (“prophet”). It can be realized to a degree proportional to the decrease of original sin, which is actually the diminishing gap between the unconscious creative background archetypal processes and the conscious, productive, rational scientific innovations.

In very interesting study, written in a letter to von Franz (about his dreams and active imaginings), Pauli identified himself and the essence of his life symbolically with King David, using in his explanation the double stars (shields) of David. The number of geometrical elements in the star of David is 36 (18 lines, 12 points and 6 triangles with a hexagonal center of unity). The double star of David has the numeric characteristics of 72, with the double centers. In the *Book of Bahir* this number, 72, is the number of Tamar, and in this case, naturally, the double centers can be interpreted as the Messiah Twins of Tamar. This series of symbols can be also found in Pauli's initial dreams, – dreamt in 1932, which Jung published in 1935. The Pauli imagination is related to the number 6 and number $12=2\times 6$. The latter is the symbol of the seal of the World, the letter of 'vav' (וַו) in the *Book of Bahir*. At the same time, it can be considered as the Seal of Judah, which was given to Tamar. Naturally, this is a prerequisite of the redemption of mankind – according to the Tamar's mythologema.

Applying the usual recursive, interpretative, automorphic or isomorphic “retransformations” cultivated by Pauli and Jung from the inside point of view, the center of the star of the King David as a hexagon can be represented by the number of geometric elements, which is 13 (vav=13).

In the case of the 2 stars, it adds up to 26. It is the well known number of the name of God ('YHWH' יהוה=26). It is forbidden to pronounce It, and in reading and speaking it is substituted by the word 'Adonai', whose symbolic number is 65 (אדני=65). Altogether, it is again **137**. The symbolic seal of Tamar, the Hebrew letter of 'vav', וַו (playing an important role in a later dream of Pauli as the letters of V and W), if we are spelling, according to its Bahir's „definition” (using the Aleph), has the number 137 (וַו אלפ=137).

Conclusion

In the second part of the paper, after the discussion the significance of the four “background or symbolic languages” and the (central) neutral language (as an example), we attempted to show the future possibilities of the new cognitive-imaginative endeavors of Pauli's search for the unity. As we discussed, in his endeavor he is standing at a crossroads, which can not be compared with the preceding and succeeding kinds of the human endeavors. What kind of juncture is it? Perhaps we may answer this question and finish our conclusion with the words of David Lindorff [26]:

“It may be said that Pauli found a new voice and began to give it expression. Now it is only in our hearts and imagination that the voice of the new professor can continue to be brought to life. A challenge remains. Will the collective character of Pauli's dreams, which expresses a need for all time someday, be acknowledged, or will rationalistic naiveté simply dismiss it as evidence of Pauli's psychological needs?”

Appendix – On Understanding Synchronicity and Symmetry

A1. Synchronicity and First Manifestations of Pauli's Preoccupations

Coming back to the original thought, already in his school years, Pauli was fascinated by RYDBERG's famous Formulae about the length of the periods in the periodical table. In his famous book *Atombau und Spektrallinien* [51], Sommerfeld called this 'two-p-square' equation a Cabbalistic formula (the Hebrew name of Cabbala is 137). Pauli writes on Rydberg

"A further progress in the order of the periodic system was made by Rydberg in his paper Elektron, der erste Grundstoff of 1906. Here (p. 11) he said for the first time that the 3 numbers 2, 8, 18 for the periods in the system of the elements are represented by $2 \cdot 1^2$, $2 \cdot 2^2$, $2 \cdot 3^2$. There was still some uncertainty about the number of the rare earths, which Rydberg assumed to be 36 instead of 32. His atomic numbers were still too high but not as high as in his earlier papers."

It is also interesting to mention in connection with Rydberg that he expected the period-length to be 36 instead of 32. Therefore, the curious young Pauli very early became acquainted with ambivalence, and at the same time with the identity of 32 and 36 (this is perceptible, e.g. in the dream of World Clock).

The ambivalence of pair 32-36 together with unity is always a reference to '137', according to Pauli: *"The initial stage is a dyadic archetype whose proton corresponds to the same one and whose electron correspond to the other one. Through reflection of the unconscious a quaternary is produced."* [35]

Numbers 36 and 32 play decisive role in Bahir, namely, that the 36 Deans (Dekan) (the 36 hidden just men) walk on the 32 ways of Wisdom. This is in Hebrew written as 'LVLB' and pronounced as 'Lulav' (=36-32 – לוּלַב), which is the shoot on the Date Palm i.e. 'Tamar'. Therefore we see again a reference to Tamar, to the twins, or to the doublets that were primordial – as Pauli himself stated in his Nobel Lecture [41] – in the formulation of the Exclusion Principle. Thus, the starting points of the Nobel Lecture were Sommerfeld's interpretation and Rydberg's cabalistic numbers, and logically, the closing statements emphasized the significance of the fine structure constant itself.

"From the view of logic my report on 'the Exclusion principle and quantum mechanics' has no conclusion. I believe that it will only be possible to write the conclusion if a theory will be established which will determine the value of the fine structure constant and will thus explain the atomistic of electric fields actually occurring in nature." [32]

In the preceding paragraphs we have shown that the properly given and explained formulae of fine structure constant '137' (see Eq. 1) can lead far beyond physics in the narrow sense. Therefore, the young (19-20 years old) Pauli – without any

previous knowledge (!) – was enormously and of course unconsciously effected by the Cabbala, especially by the number archetypes of the proto-cabbalistic Bahir. These synchronicities concerning number '137' were in close correlation with his conscious physical aims. (This is also evidenced by his dreams relating to Sommerfeld.)

These associations do not decrease the spontaneous character of Pauli's dreams analyzed by Jung in *Psychologie und Alchemy* [15]; moreover, they emphasize the presence of a strong synchronistic influence, a prematurely constellated archetype, to use Pauli's and Jung's common term. Therefore, both at the beginning and at the end⁸ of Pauli's career there emerged the Cabbala, the Jewish traditions, and the number '137'. "*According Quispel, Pauli, searching for a meaning to his life while confronting his death, came to reassert his Jewish tradition.*" [29]

A2. Pauli's Dream-Observation for the Improvement of the Measured Value of FSC

Now, let us consider an hypothetical synchronistic anticipation which happened in the course of the Pauli-Jung "correspondentia". Before the discussion of the example, it is worth mentioning a detail from Jung's letter to Pauli on synchronicity and number archetypes.

"Thanks to its 'dynamis', the number as archetype is capable of making mythical statements. If it is permitted to express itself at all, then it will produce "psychic statements". In the eyes of the psychologist, these are among the indispensable characteristics of a number, even if the mathematician merely views them as a means of counting. One might compare them to the diamond, which on the one hand has great technical and industrial significance but has much greater value to the connoisseur because of its beauty. The numinosity of a number has less to do with its mathematical applicability and more with your "inevitable" statements, which have to cope with all the resistance that is offered to anything to do with the unconscious.

In psychology, we let the archetypes amplify themselves or we even observe the amplification process in dreams. The same experiment is possible with numbers. Here we also have common ground, where physics and psychology meet (synchronicity!), for on the one hand, a number is an indispensable characteristic of natural things, and on the other hand, it is also undeniably numinous – i.e., psychic." [29]

⁸ Pauli's "final meeting" with the number '137' can be considered as an astonishing "subjective case" and example of synchronicity. "*It was a mystery how Pauli was taken to his death, for on being carried into hospital, the physicist was told that he would be put into room 137. According to one version of story, learning his room number, Pauli said: 'I will never get out of here', and it really happened so (he died shortly after).*" [26]

On the basis of an interpretation of the fourth dream of the so-called conjunction dream-series [26, 29] (see later) we may assume the hypothesis of the improvement of FSC estimate through the “estimation” of the Rydberg constant. The first dream (15/07/1954) of the series relates to his visit to Sweden, in Lund, where he presented lecture in Johannes Rydberg’s Centenary (1–5/07/1954). In the second dream of this series, the main question relates to the name of John or Johannes.

In the third dream⁹ the number 206 connects with Jung and 306 with himself. So, a simple twin symmetry or asymmetry can be identified concerning to the points of view (Jung–Pauli 206–306, Pauli–Jung, 306–206). The sum number of the first and third dreams are 32 and 36. The product of 206 and 906 is 63036. The picture of this number is the mirror-image of 2×36 in centre with the circle (crown). As we have seen above the “date number” (18/08/1954) is also 36. In the Latin Crown of the Holy Crown of Hungary the $2 \times 36 = 72$ white pearls ($72 = \text{חסד}$) and $2 \times 32 = 64$ red stones ($64 = \text{דין}$) as well as the cross as $X (1 = \aleph) = 137^{\text{th}}$ is in perfect identity with the later cabbalistic symbols [45]. The total number of symmetry is $1024 = 32 \times 32$, i.e. it is an allusion to the World Clock dream and a compromising equilibrium (the average) to the number archetype 256. As we have seen, this number archetype, $16 \times 16 = 256$, is related to the Divine Chariot in the Vision of Ezekiel. It reveals at the same time the Wheel, i.e. ofen (AVFN), whose number is 137. The ofen, אופן is the archetype of the Crown (atarah, עטרה). Thus the number archetype of the crown is always 137.¹⁰ Now let us see the complete text of the dream:

“I am traveling on trolley #5 to a large house, it is the ETH in a new building. In front of the trolley station I come to a footpath that winds slowly upward in a serpentine way and finally comes to the house. I locate my office in the house, and there on a table are two letters. The one signed by Pullman [then president of the ETH] states: ‘Ferry-dues settlemen’t. The bill is very long with many + and - percents. The total sum is 568 Swiss francs that are due. The second letter is in an envelope, and on it is stated: ‘philosophical singing club’. I open it and find beautiful red cherries within, some of which I eat.”

The date of dream is the (205th) birthday of Johann Wolfgang Goethe (the next day is the day of the martyrdom of St John the Baptist; Pauli’s departure to the Rydberg’s Centenary happened directly after the birthday of St John the Baptist,

⁹ *“I am [again] in Sweden, where I find an important letter,. I have a poor recollection of the beginning of the letter. But then the letter begins to say that something in me is essentially different from C. G. Jung. The difference is, namely, that with me, the number 206 has transformed itself into 306, but with Jung [it has] not. I see repeatedly before me how 206 over and over becomes 306. The letter is signed ‘Aucker’.” [29]*

¹⁰ Dan writes on the “Fragment of Eleazar”: “Yufiel (the angel priest, the number of his name $137 = \text{יפיאל}$) is then identified with the Crown (‘atarah, עטרה) on the head of the Creator, a crown which is comprised of the holy name of forty-two characters, and which was revealed to Ezekiel in the chariot (through the ofen, אופן = 137).” [62] According to this concept the number 137 means always the Crown.

the 24th of June). Perhaps, as a meaningful coincidence, i.e. synchronicity, the Goethe's given names connect Rydberg (Johannes) with Pauli (Wolfgang). The hill, the 'berg' in Hebrew (רֶבֶּר) has the number **205**. According to Pauli's preferred germanic etymological interpretations (see 8th dream of this series), the use of the old English 'rid' or 'ryd' in Rydberg can be understood as a (horse-)path. Thus, the footpath rising upward in the serpentine of the 'berg' can be interpreted as a hint to the name of Rydberg. The hill, the mountain, is a fitting symbol of constancy, and the spiral form of the serpentine is a suitable illustration of the approximation of a "constant". Taking into account the overwhelming number of occurrences of the name Johannes in the dreams and their contexts, we can conclude a hidden presence of the problem and value of the Rydberg constant. Therefore, looking backward at the numbers of the dream and its context, we can identify the numbers 5, 6, 8, 5, 2, 5 in series (not considering the zero). In the early fifties, the known best estimate for the Rydberg constant was $109737,311 \text{ cm}^{-1}$. Thus, it seems to be logical to substitute the last, at that time also uncertain "1", for the above series of numbers. And thus we obtain the actual, exceptionally precise value of the Rydberg constant: 109737,31568525. At the same time using e. g. the actual value of the Compton wavelength we can obtain a present proposable value of the FSC. There is another perhaps even more convincing interpretation. The number of 568 in Jung's answering letter is interpreted as $10 + 9 = 19$ ($= 10 = 1$). The sum of the numbers of the date (28/08 1954) is **37**.

The actual constellated number archetype (related strongly also to Rydberg), as we have seen, is **137**. The series of all contained and mentioned numbers are 137 37 205 5 568 19. From this series of numbers, we can build up the actual precise estimate of the Rydberg Constant ($137,37,205,5,568,19 = 109737.31568252$).¹¹

The mythologema of the Ferry in the dream (interpreted in this by Jung), the backward-forward movement between our Reality and the "Otherworld" (whose number archetype for Pauli is **137**) could mean the representation of 568 as $284+284$. 284 is the number of the Hebrew word atarah (=284) which in Greek is Stephanos and in Latin Corona. In the Cabbala, the archetype of the atara (crown), as we have seen above, is the AVFN (אִוֶּפֶן) from the vision of Ezekiel. As we have mentioned above the number of the word AVFN naturally 137. It is very interesting that the system of Holy Crown of Hungary as a double crown $10+9$ (two atarah) in both Greek and Latin applies many times the number 137 [45]. It is also surprising that the value of the Rydberg constant in 1952 symmetrically contains the double 137 and the "sum" of $10+9$ as well. Consequently, this structure of numbers unconsciously, could be a motive, on the basis of the symbolic iso-

¹¹ In this case it can be seen that the ex ante condition of synchronicity is the presence of the number-archetype 137 and the ex post one is the potential number interpretation of Jung according to the dreams of Pauli related to the given synchronicities. Thus, the numbers of synchronicity (beside the number 137) partly belong to the (interpretations of) the given day (37,205), partly to the dream manifestation (5,568) and one belongs to the number interpretation of Jung (19).

morphy between the double 137 and 284, for the improvement of the value of FSC through the reevaluation of the Rydberg constant. Thus, the dream is a valid answer to the question of Johannes Rydberg's cabbalistic "number-sensitivity", which so deeply fascinated the young Pauli. (The "total number" of the date of the initial dream related to Rydberg is also 32!). Finally, the dream can be considered a complementary and compensating activity of the dreamer to Pauli's own famous 'Pauli effect', i.e. it may be considered as Pauli's heroic endeavor to best the detectors and the measurement equipment too, seeking the symbolical "unity" and wholeness of the Man and his World.¹²

A3. Synchronicities and the World Clock Dream

(1) The Dream of World Clock in the final (both in English and German) version of Jung's Collected Works (Psychology and Alchemy) [15, 17] is associated with a footnote numbered '137'. This is a replacement of the asterisk (character '*', in Latin 'asteriscus'), which – beyond emphasizing some meaning – symbolically denotes the crown. (Both the celestial star as a physical body, the linguistic symbol, the Orthodox liturgical object of the Eucharist, and the Holy Crown of Hungary equally correspond to the asterisk.)

The content of footnote No. 137 is about augmentation, and the expanded version can be found in Jung's book *Psychology and Alchemy* [14]. Therefore the opus of alchemy expands, and – through religion – is connected naturally to the meaning of redemption and eternal life.

(2) Pauli's death in room No. 137 of the Red Cross Hospital in Zurich represents the same idea: the number '137' mediates between physical existence, the psychic experience of death and resurrection, and spiritual eternity.

Lindorff writes in detail about Pauli's death and the number 137: "*Wolfgang Pauli died on December 15, 1958 in his hospital room, after, according to his wife, enduring two weeks of extreme suffering. Aniela Jaffé quoted Frau Pauli as saying that her husband's last words were, 'Now, I would like still to speak only to one person: Jung'.*"

"The end of Pauli's life was capped by a synchronicity that embraced a reference to Jewish mysticism (the number of the Hebrew word cabala is 137) as well as a constant in physics at the heart of quantum theory. This can be interpreted as symbolizing 'the third thing' that rose above the conjunction. If we stay with Jung's ideas about synchronicity, it follows that Pauli must have been emotionally

¹² Considering in the dream and its interpretation the hypothetical presence of the mythological, psychological, physical and hermeneutical background "cognitive processes" based upon, in the centre, the number archetypes.

engaged with the unconscious at a deep level. [...] We might assume that Pauli encountered the place where the opposites cease to exist, the unus mundus."

"The synchronicity that surfaced in his hospital room can be seen as exposing Pauli to the redeeming third, raising him above conflict, a conflict that had moved him throughout his life to seek wholeness for himself and to envision that wholeness for the world at large. Perhaps Pauli ultimately attained the redemption that he so earnestly sought for so long.

It may be said that Pauli found a new voice and began to give it expression. Now, it is only in our hearts and imagination that the voice of the 'new professor' can continue to be brought to life."[26]

(3) Jung, commenting twice on the Dream of World Clock, mentions that the dream has a possibly cabbalistic character, in addition to its obvious connections with alchemy. Then in *Psychology and Alchemy* [15] there are numerous examples from (mostly Christian) cabbalistic writings.

On the other hand, Jung emphasizes that the dreamer (Pauli) has a highly biased intellectual modality (in 1932), and does not possess any (deeper) knowledge of mythology, mystics, or religions. It is important for Jung to emphasize the spontaneous formation of those dreams that are connected to alchemic and cabbalistic motifs.

However, as was demonstrated earlier in this paper, the number archetype had a decisive effect on Pauli in his student years, and especially, in connection with the co-occurrence of word 'Cabbala' and the number '137'.

Moreover, the well-known conversation¹³ between Victor WEISSKOPF, a leading physicist and a former assistant to Pauli and to Gershom SCHOLEM, one of the most eminent scholars of Jewish mysticism, also clearly implies the direct connection between the number '137' and the Cabbala. It is also an interesting synchronicity that after World War II, Jung was the one who invited Scholem from his Palestinian isolation to the Eranos Lectures, and therefore introduced him into the European scientific community. Pauli wrote in a letter to Scholem the following:

"I read your book 'Major Trends in Jewish Mysticism' several years ago, and since then I have taken the opportunity to cite it, especially concerning the ideas of Isaac Luria, in my paper on Kepler (see Naturerklarungen in Psyche, especially p. 149, Rascher Verlag, Zurich 1952).

¹³ When Scholem met Weisskopf, he asked about the prominent unsolved problems in physics. Weisskopf said, "Well, there's this number, 137..." And Scholem's eyes lit up! He said, "Did you know that one hundred thirty-seven is the number associated with the Cabala?" (We want to clarify that this means that the Hebrew letters of 'Kabbalah' sums up to 137.)

As you can see from this work, among others, I sit on the ground between the two seats of Orthodoxy and rationalism, but stronger still, I consider this to be the only fair and rational position. I find that the Rationalist authors, (and should not be surprised if I was attacked by this group because of my Kepler paper), also totally misunderstand the mental processes, because they partly judge everything from the point of view of pure psychology consciousness and they partly hold on to a world view which has been superseded by modern physics long ago – on the other hand, I think that I am sensitive to where a psychological mental phenomenon begins for the Orthodox, which I would call ‘wavering’. (It seems that in Jewish and Christian orthodoxy, this is not essentially different.) I think I also detect this wavering in Luria quite clearly (see the cited passage in my article). Also, I have some doubts whether Jewish mysticism is really fundamentally different from the non-Jewish – I am interested in mysticism in general.”[23]

Semantic quaternio is determined by the connection of the four men, Jung, Scholem, Pauli and Weisskopf, who know each other well. One can often meet such semantic quaternion with Pauli’s and Jung’s dream interpretation (for example Pauli, Bohr, Einstein and Jung). [29]

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