

The neurosystemically based Autonomy of the Human Being in their Thoughts and Actions

Core element of a radically new view of humanity

by

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Abstract

According to paleogenetic analyses, the earliest Homo sapiens groups began to separate from each other in Africa around 150,000 years ago, for decades. Since then, none of their brains could be structurally altered in the same way due to a lack of selection. The result is monstrous: The following breathtaking development of culture and civilization of mankind, its incessant higher development of cognitive levels, indeed its constant acceleration, was brought about by means of a cerebrum that has always remained the same; phenotypes of individually high aptitude do not change this. In addition, the human brain does not differ architecturally and neurophysiologically from the chimpanzee brain in any substantial way; only the proportion of the non-specific association cortex has increased in humans up to an immense 80 %. The analysis of its intracortical processes of cognitive optimization suggests the following hypothesis: The complex process of an exponentially increasing number of neuronal patterns must have generated a contrary system of neuronal autonomy by leaps and bounds from the states of order of procedural self-regulation. It is only through this additional neural system that the thinking potential for unlimited creative development is unlocked. - A leap in autonomy compared to the animal thus constitutes the hitherto misunderstood nature of man.

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Three theses, that justify this radically new view of man

Thesis one on the inexhaustibility of a primarily systemic human cognitive potential

The extreme brain growth of Homo erectus up to 200,000 years ago *ended* with archaic Homo sapiens[1]. However, evolutionary anthropology cannot currently provide a decisive criterion that would essentially distinguish Homo erectus from archaic Homo sapiens - not just anatomically. The genetic code hides behind base sequences that are not understood in their complex function, which is essentially - i.e. cerebrally - what makes a person human. *When* more or less exactly Homo erectus became "wise" is, however, much less important than finding out *how* this "wisdom" and thus the essence of man is gained - and what characterizes them. We must assume that being 'wise' cannot consist in a precisely determined level of cognitive performance. For man is not only capable of learning more and more quantitatively, but is also capable of recognizing successively higher qualitative levels: for example, the spherical shape of the earth, then the evolution of species, then the equivalence of mass and energy, then the fundamental indeterminacy of the elementary quantum of action, and so on.

At least it helps to clarify *when* the new quality "Homo sapiens" must be spoken of: Around 150,000 years ago, the first *genetically complete* humans already separated from each other in Africa *for decades of thousands of years*. [2] This is an average value from the genetic analyses for the mitochondrial Eve, the Y-chromosomal Adam, as well as for the segregation of the first human populations (around 150,000 years ago) and the ancestors of the Aborigines still within Africa (100 to 130,000 years ago). [3] - From then on at the latest, Homo sapiens remains essentially unchanged Homo sapiens.

We therefore hold firm:

A The human genome has not been able to change substantially since human populations were separated from each other in Africa 150,000 years ago; after all, there was no longer any selection among all human populations. [4]

This applies in particular to the brain, which is common to all humans because it is essentially unchangeable (what is still to be explained).

C Corticalization in Homo erectus over two million years has increased the size of the neocortex and the association cortex from 40 to an enormous 80 % of the cerebrum.

D All of humanity's cultural and civilizational development has therefore always been accomplished with the same structural brain. The human brain, which is

capable of self-development, contradicts every animal brain structure in this respect, because it has always been evolutionarily adapted.

Conclusion: In contrast to every animal brain, the human brain is apparently able to cope with higher levels of cognition indefinitely with the structurally identical brain.

Second conclusion: Thus, no substantial further development of the neurophysiological structures can be responsible for this, but this unique cognitive potential must be due to an exquisite *process* of the human brain.

A well-known, simple fact confirms these conclusions:

Sometimes it was only over 100,000 years later that *dispersed populations met again* (see the Aboriginal ancestors in 1770 to James Cook or the San people[5] in southern Africa to colonialist Europeans, etc.), who *were able to understand and exchange ideas with each other* despite extremely divergent cultural development. For this reason, any leaps in the quality of their brains in the meantime, which would be genetically determined, can be ruled out. Otherwise, differently structured brains would have resulted in different human races.

Why populations can still evolve in the other organs - see adaptation to high altitudes, lactose tolerance, resistance to malaria or HIV, etc. - but the brain obviously *no longer evolves*, becomes clear from the following fact: Only the human brain is still capable of making any number of cognitive leaps that are denied to any computer, no matter how large its capacity (which will also be explained); it therefore already accomplishes what genetic adaptation previously accomplished in organ evolution - only far more efficiently and faster. No animal brain is able to increase its cognitive levels as unimaginably like the human brain (from harvesting a plant to replicating photosynthesis, which is even more efficient). Even less so a computer: it is impossible for a computer model that has become "wise" to create all future innovative algorithms and software developments itself. Inconceivably, only the human brain is capable of doing just that.

With the end of brain growth, therefore, an extraordinary brain must have emerged. This radical qualitative leap in the human brain makes it possible - without substantial change - to generate immeasurable cognitive performance solely by means of complex neural processes:

thus, the most diverse cultural manifestation of early man over 100,000 years up to the Neolithic Revolution;

as well as all the cultural forms of primitive peoples that still exist today;

as well as the entire development of civilization from the first advanced civilizations to the current globalization in all its mental facets - individually and socially;

in other words: even the most abstruse and subtle, indefinite and definite conglomerate of thoughts, of which the entire human literature provides only a faint imitation.

All cognitive performances that have ever taken place - no matter how disparate - were in fact created with a structurally unchanged brain. This requires a process that allows for arbitrary leaps in cognition. The enlarged association cortex allows every human being - regardless of the epoch - to continue intracortical processing of what has been practically experienced: but only on the basis of a fixed sensory apparatus; nevertheless, all past and future knowledge can be reproduced. - Consequently, it can *no* longer be a matter of a *purely gradually* optimized animal brain, because that never gets beyond a characteristic level of cognition - a *system leap* must have taken place.

These facts provide the following indications for further analysis:

The human brain cannot have changed substantially by genetic means for at least 150,000 years. All people - however much they may differ phenotypically - must be characterized by the same brain *in principle*; all people of all ethnicities prove to be equal in their limitless creative development of any higher level of cognition. This unlimited cognitive potential can only be achieved by a system leap in a brain that has remained architecturally the same, expressed in a characteristic process.

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Let me summarize: The phenomenological starting point was the hitherto unsatisfactorily answered question of the level of human intelligence. It had to be shown:

Humans are not characterized by any fixed level of intelligence, i.e. cognitive performance, that is genetically predetermined - as by the infamous intelligence quotient of around 100 points; this merely captures the variable, individual *talent*. The opposite is true: the unique intelligence that separates man from every animal consists in the mere *potential* of his *autonomy-capable* brain - which is explained in thesis three - to be able to develop his cognitive abilities to ever higher levels - provided that suitable historical framework conditions are in place. (I will leave aside here how historically specific framework conditions *trigger* human cognitive potential differently: Just think of the problem of the extremely long era of hunter-gatherers up to the emergence of agriculture around 12,000 years ago and its slow progress in technology - compared to the scientific and technological revolutions of the last 200 years).

Thesis two concerning a complex, therefore cognitively evolving cerebrum

To get to the bottom of the extraordinary nature of this leap towards an inexhaustible cognitive potential, it makes sense to take a closer look at corticalization in the precursor Homo erectus:

Corticalization began to accelerate in the genus Homo when the upright gait was largely 'completed' in the australopithecines and continued for almost two million years - especially in Homo erectus: from about 2.1 million years ago (in Homo habilis) to about 200,000 years ago, during which time the cerebrum volume roughly doubled[6] - Apparently, this was a selective advantage for Homo erectus over the other species of the genus Homo. (I will not go into the popular question of what caused the rapid growth of the cerebrum - while a single, exact cause is often wrongly assumed - because the answer would have to be difficult and would contribute nothing to the matter at hand.)

Despite these almost two million years of brain growth in Homo erectus, only four technological, i.e. *cognitive stages* can be identified: *First*, from chopper to hand axe (2.1 to 1.7 million years ago); *secondly*, from the natural fear of fire to the passive use of fire (in the same period); *thirdly*, from the passive use of fire to the artificial ignition of fire (1.7 million to 790,000 years ago, i.e. a seemingly endless period of almost a million years); *fourthly*, from simply throwing stones and wooden sticks to artificially making javelins (2.1 million to about 500,000 years ago)[7].

Strikingly, the shape of the hand axe remained almost the same over one and a half million years and no other stone tool was added.[8] Since the human brain does *not differ significantly* from the ape brain anatomically and architecturally, but also neurophysiologically[9] - only in the differentiation of the special structures - there remains a single, *considerable* difference:[10]

The human cerebrum - inherited from Homo erectus - has an *unspecific* association cortex that is about *twice as large* as the ape brain; in humans it takes up to – mind you - 80 % of the total volume compared to up to 40 % in apes.[11] If we *confront* the accelerated growth of the Homo erectus brain with the modest development of cognition over almost 2 million years, we can gain *two general* insights:

Firstly, the cognitive advances of Homo erectus must have been implicit consequences of the *genetically determined growth* of the cerebrum. This is because the *leaps in cognition* occurred at too great an interval - a few hundred thousand years in each case - to be due to the conscious accumulation of small steps of experience.

More efficient tools had not yet been developed through social learning - such as the differentiated special tools of the Middle Stone Age, scrapers, scrapers, burins, etc. -, although the flakes were always available as basic material. (This refutes the Lamarckian theory of anthropogenesis of Professors Tomasello, Suddendorf and Laland - refutes an alleged “biological mechanism for cultural transmission”, refutes the thesis of recognition through “practice, practice, practice” in *Homo erectus* - and incidentally explains the astonishing durability of the hand axe).

Homo erectus was therefore still subject to a *mutation-selection process* (of its brain above all) and was still an animal. He *did not* achieve his cognitive progress *independently*, but owed it to an *evolutionary* brain optimization. How did this come about? Genome analysis of the brain has so far revealed that several mutations have been found, all of which merely contributed to prolonging *neuron growth* in the embryonic phase, thus favoring the increase in the number of neurons; namely very densely packed and uniform neurons of the association cortex, which are not specialized for any primary sensory functions. So far, there is hardly any evidence of *specific* neurophysiological *changes*[12].

Secondly, the following suspicion arises: The leap in quality that is noticeable with the end of cerebral growth in archaic *Homo sapiens* may have something to do with this *exponential* increase in the *number of neurons* in the enormously enlarged association cortex and its *non-specific* character; it may stem primarily from these interpolation processes of increased, uniform neurons that swell exponentially. The higher levels of cognition do not result from additional, specific structures, but are evolved intracortically and above all processually by means of the densely packed association cortex.

This would fit in with the four widely separated technological stages in *Homo erectus*. Why? Each stage required more components, especially of the outside world, to be related in a forward-looking way. The more components make up a complex system, the higher the cognitive evolutionary process and the greater the number of neurons available for pattern selection. - Of course, this suspicion can only be substantiated once the way in which the neuronal system of the brain processes in *general* and the association cortex *in particular* is understood – namely *complex*.

It must therefore be made *clear* once and for all: The functioning of the human brain is often compared with that of a computer. This fundamentally wrong comparison arises from a fatal retransference from the computer to the brain, because the *system-specific* processes of the human cerebrum have been *wrongly* analyzed: it alone enables non-computer creativity, i.e. the production of incalculable and unpredictable quality forms of cognition.

The structure of a neuron and its many thousand-fold, above all probabilistic, i.e. *ambiguous* connections with many other neurons makes it clear that the processes of many neurons - and their patterns to represent quality characteristics - are *non-linear*; they represent the *unpredictable* processes of a complex system. The states of order of neuronal patterns, which manifest themselves as cognitive performances, must therefore first be found in a self-regulating, self-organizing and, in the case of higher performances, above all processually evolving way - and are therefore unpredictable. Mathematically, these cognitive performances that have become stable can be understood as attractors[13] of neuronal patterns.

Cognitive performance - especially of the huge association cortex - can therefore by no means be calculated formally and logically as in a computer according to predetermined algorithms and circuit diagrams on the basis of clear information and exact connections. (To represent the airy, fluctuating, even erratic meanings of fragmentary thinking, formal-logical links would be far too rigid, too unambiguous.) Rather, by strengthening or weakening more suitable versus less effective neuronal patterns, their cognitive performance is optimized intracortically [14]; *most* higher cognitions are *evolved interactively in a trial-and-error process* - and therefore remain *unconscious*. (For my part, this is a general conclusion based on the specific properties of neurons and their ambiguous connections: They process *non-linearly*, branch their patterns, go through *chaos phases*, culminate in attractor-like *states of order*).

It is true: The brain stem, the thalamus, the basal ganglia and an early cortex *are already* pretracked and fed back for *simple* cognitive functions - such as undifferentiated sensory perceptions, reflexes and instinctual reactions. However, with the differentiation of the neocortex for highly specialized, sensory perceptions, *very differentiated components* of perception must be *synchronized* and *integrated* again in order to simultaneously develop all perceptions to a higher cognitive level by means of memory in a learning and *anticipatory* manner - even through creative *chaos phases*[15]. This cannot happen through the *primary* cortex or the connectome, but only *intracortically* and *coordinating* (i.e. non-specifically) by means of the(*secondary, tertiary, etc.*) association cortex and its interaction processes, which select advantageous pattern attractors[15].

It should be noted that these processes of evolving pattern attractors are not selection processes of neuron positioning in the embryonic phase; nor are they processes of selection of more active versus less active neurons in long-lasting learning processes, so-called neuronal plasticity.[17] These two cases of neuronal selection are far too cumbersome to explain the speed at which nonlinear evolutionary stages of unconscious thought are accomplished. All higher forms of cognition involve the *processual* selection of fleeting synaptic patterns, which can also change through bifurcations into the unpredictable stable state of order of a creative pattern attractor. (Since we are not yet able to follow more comprehensive

processes of pattern evolution at the micrometer level, this is also a - in my opinion - highly plausible hypothesis based on the known individual facts).

The larger the non-specific association cortex, the more interacting factors in solving a task can be evolved purely intracortically in such complex processes. Solutions that are found in biological evolution organ-specific and over a long period of time through trial and error are found cognitively in the shortest possible time by means of an enlarged association cortex in the smallest possible space through selection and thus the evolution of synaptic patterns - i.e. through their preferential strengthening or weakening. Because these are highly complex neural processes that evolve optimized variants as stable states of order under many fluctuating patterns, the higher cognitive performances also fluctuate and vary and are by no means clearly predictable (see variable solutions for cognitive tasks, uncertainties, radical new approaches, etc.).

What is still missing as a general result: The outstanding cognitive performance of humans is not directly based on peculiar brain structures that are unique to humans - if one does not want to take the enormous enlargement of the association cortex for this. Rather: The exceptional nature of human cognitive potential stems from the neurosynaptic processes themselves - namely from their exquisite system character, which is constituted independently by these mass processes themselves.

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To summarize: Architecturally, structurally and neurophysiologically, the human brain does not differ significantly from the brain of apes - except for a comparatively larger than average non-specific association cortex. Increasingly higher cognitive performance must be found with it intracortically in the trial-error procedure of varying neural patterns; thus by no means only additionally through empiricism. Nevertheless, the human brain is capable of creating one incalculable cognitive leap after another in the development of culture and civilization without any further substantial change - even at an accelerated rate, as has been the case since the Renaissance.

The key to the apparently unfathomable cognitive potential of humans must therefore lie in the primarily purely quantitative increase in the association cortex and in its complex - not complicated - process character. The characteristics of the structure of the neurons and their processing as well as the unspecific character of the association cortex and its intracortical processes make it irrefutably clear:

A cerebrum processes in a complex way - not primarily in a complicated and formal-logical way. All fashionable comparisons with electronic computers are on the wrong track, because the brain and computer process in fundamentally *diametrically opposed* ways: The brain finds higher, cognitive order from below by

trial and error among varying neuronal patterns - the computer calculates higher, logical order from above from disordered fixed data. The brain evolves unpredictably creative things through states of chaos - the computer calculates hidden, i.e. pre-existing patterns from disorder. *Unlimited, original self-development* is denied to any electronic computer, no matter how powerful; this is always linked to qualitatively limited maximum services.

The developmental potential of the creative human brain can only be explained by its chaotically branching neural processes, which must evolve higher cognition each time in an original and primarily processual way.

Thesis three on the emergence of a system of neuronal autonomy

Having arrived at this point, the *decisive* question arises: According to our general knowledge of nature, can a specific system expand infinitely without *qualitatively* changing the system? Can the intracortically processing and unspecific association cortex - and thus the interactions and the complexity of its neuronal patterns - increase infinitely without changing the system of order generation from below? Highly complex self-organization processes of neuronal patterns result in attractors of patterns, but remain unconscious, so that we *know nothing about* these cognitive processes. Can such pattern attractors increase arbitrarily with the swelling number of order-forming processes or is there a critical tipping point[18]?

The science of complex systems has recognized this: Condensed hydrogen clouds set in motion the fusion process in stars, the results of which are unpredictable; the boundless increase in cyanobacteria in the world's oceans creates an oxygen atmosphere whose consequences are incalculable, the prerequisite for dynamic life on land; the unnoticed increase in the self-domestication of animals and plants alongside longer-lasting communities of wild predators leads to unpredictable agriculture; increasing division of labor in rural village communities creates a previously unimaginable market, commodity production and state formation through increasing product exchange; overproduction, especially of consumer goods, depletes the earth's resources in incomprehensible ways, even endangering humanity; and most recently: Unchecked CO²-production is likely to cause the global climate to tip - unthinkable for previous generations.

We must assume the *same* for the *exponentially increased* pattern formation in the human brain: Increasingly higher cognitive performance is based on stable and fixed states of order - guaranteed by neuronal pattern attractors - which must inevitably *evolve*: The greater the capacity of the enormously grown association cortex, the more high cognitive performance is possible, the more stable pattern attractors have to be evolved.

This swelling process also has a *tipping point*, namely when the *permanent* quantity of stable, permanent pattern attractors has become so large that it *covers* or *shields* the process of self-regulation of neuronal patterns, which has so far remained unconscious because it is constantly interacting. - In this way, an additional neural system - a small, primary part of all perception - arises in Homo sapiens alongside the non-linear one of the unconscious; this neural system records all relatively unambiguous and therefore logically formed ordering patterns, which, moreover, can only form linear connections; these can now be *controlled autonomously*, i.e. solely in the *imagination*, by a partial ego *from above*, because they can no longer interact due to their uniqueness. This superimposed neural system of a few stable pattern attractors has a compressive effect like a reflective mirror of an otherwise indescribable outside world. This is the only reason why we experience even simple perception as peculiarly *conscious* - so that we *also know about it*. (How exactly the number of stable and permanent states of order, which grows exponentially with the association cortex, establishes an additional autonomous neural system remains an open question as long as the corresponding neural processes cannot be followed in the necessary resolution).

This autonomous capacity for imagination, itself interacting with the unconsciously evolving neural patterns, suddenly makes possible an autonomous development of cognition that is not dependent on any particular action - despite a brain that always remains the same (far beyond its plasticity): For the first time, it controls and corrects the latent creative cognitive evolution from above. Unpredictable, cognitive leaps of creativity are thus rooted in the micro-evolution of complex neural processes - not in the linear thinking of the conscious mind. The autonomy of consciousness, however, only brings this creativity to full effect by being able to critically examine it from above and direct it precisely. (This mere potential for autonomy of thought is perceived by some as absolute freedom of will, because the systemically conditioned degree of freedom has radically expanded compared to the animal. Nevertheless, in practice it is subject to enormous restrictions and relativizations.)

It is true that in conscious thinking slow, because autonomous, processes of imagination are possible, which allow radically abstracted causal logic, pure reason and the like. Autonomously gained, ideally absolutized reason of a partial ego is thus able for the first time to specifically identify and therefore correct creative achievements of complex pattern evolution. However, this is merely a cognitive potential, the realization of which is historically dependent on changing favorable framework conditions (such as climate, geology, cultural exchange, etc.). It is these external and internal framework conditions that - for historical reasons - always limit a neurosystemically absolute freedom of thought to a tiny degree of freedom. - However, this is enough to enable unlimited creative development in a cooperative and testing manner.

This is demonstrated by the extremely leisurely beginning, but continuously increasing *development of cognition* in humanity, which still has no limit today - see most recently Crisp/Cas9, Higgs particle detection, ChatGPT, etc. - while the cerebrum remains essentially unchanged: 300,000 years ago sluggishly differentiating Middle Stone Age stone culture (scratches, scrapers, burins etc. in Jebel Irhoud, Morocco)[19]; then 120,000 years ago the first grave goods (in Qafzeh, Israel)[20]; 92,000 years ago pierced shells and harpoon hooks (in Katanda, Congo)[21]; 79,000 years ago the first ornamental engravings (six crosses within a diamond on ochre, in South Africa)[22]; around 47,000 years ago, earliest rock paintings (in Australia)[23]; 44,000 years ago, first musical instruments (in Western Europe)[24]; 35,000 years ago, figurines (in Central Europe)[25]; around 25,000 years ago bows and arrows[25]; around 18,000 years ago the spear-thrower[27]; 12,000 years ago monumental cult sites (in Turkey, Göbekli Tepe)[28]; almost simultaneously the emergence of agriculture[29] and 5,500 years ago the first advanced civilizations, etc.

(Neanderthals and Denisovan species, on the other hand, *did not develop nearly* as creatively in the at least 250,000 years of their existence and were therefore biologically selected[30]).

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Let me summarize: The ability of humans to develop an increasingly rich language, mathematics and writing in their history, as well as four elementary forms of thinking (generalizing, abstracting, analyzing, comparing and their opposites), is by no means based on genetic mutations of the specificity of brain structures; the latter have remained substantially unchanged since the emergence of man. Rather, the extreme enlargement of the cerebrum - in particular of the stable pattern evolving association cortex - has led to an exquisite, non-animal *process* that has overridden further, substantial evolution of the genome through selection. In addition to the basic neural system that humans share with animals, there is a higher neural system that operates in the opposite direction to the animal neural system: linear controlling instead of non-linear self-regulating. This higher neural system puts a *small part of* the human *ego* into a state of *neuronal autonomy*. We call this system state of dominant control ability “conscious”; which means that we are only relatively free, merely in the imagination - that is: from above - about equally autonomous elements of knowledge, because we can know about them.

Man's partial autonomy of thought not only makes possible a permanent, *mutation-independent* development of his cognitive abilities, but above all also allows him to make *specific creative leaps in cognition* - which are denied to all mathematics and logic *without man* (which is implicitly confirmed by Kurt Gödel's "incompleteness theorems"). However, by accomplishing its own further

development, because the brain of every human being is able to evolve creativity on purpose, humanity makes the final leap out of evolution in order to follow its own creative path.

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Three far-reaching consequences for human science

According to these research results, I see the absolute necessity for *three major paradigm* shifts in evolutionary anthropology and brain research:

First new paradigm: The unreflected traditional dogma of a genetically determined, specific level of human intelligence does not stand up to the facts. - Since their emergence at least 150,000 years ago, humans have increased their cognitive abilities to ever higher levels. For this reason, since the emergence of civilization, all people have had to go through ever longer and ever more advanced stages of training - indeed, lifelong further training is becoming increasingly indispensable. This by no means only comprises new and increased individual facts, but the means and methods of recognition and understanding are becoming increasingly sophisticated in terms of quality. Accordingly, the level of cognition is increasing - from genetics to proteomics, from atomic to elementary particle physics, from computer science to AI research, and so on. And more and more people are benefiting from higher, cognitive education. Apparently, all people tend to be able to master similarly high levels of cognition - according to their specific talents, of course.

All these educational stages are mastered by a brain that is always the same; it therefore has the pure, *systemic potential* to help shape every cognitive leap – with the help of a community - with the appropriate training. This requires us to abandon the previous dogma that each specific, higher cognitive performance requires a correspondingly different neurophysiological structure. This untenable idea has prevented us from recognizing and understanding the historically proven, unlimited, indeed accelerated development of cognition in humanity, which every educated person at all times is able to comprehend.

Second new paradigm: Brain research in particular, but also evolutionary anthropology, must abandon the naïve dogma that the brain processes like a computer or a more complicated electronic device. - (Behind this lies the even more fundamental illusion that nature functions *according* to the eternal laws of mathematics and logic. The latter are highly effective, but purely abstract-ideal, i.e. reductionist tools of conscious thinking in order to cope with objective chance and objective chaos, which ultimately trigger system leaps.) Causal logic and formal logic only capture with absolute precision permanently stable states of order - i.e. extreme

cases of reality - which is due to the nature of conscious thought: Interactions are permanently dominated by neuronal attractors. Relatively permanent order structures of matter also occur relatively rarely, including in the brain; rare even among the mere 5% of rest mass dominated matter in the cosmos. Without exception, all macrocosms, including the brain, ultimately consist of complex systems because the merely assumed initial conditions are fundamentally ambiguous. In special cases (such as planetary systems, mechanics or even simple brains), causal-logical models are sufficient to describe them. As soon as the ambiguity of the components involved - in the brain, this applies to synapses, neurons and their probabilistic patterns - results in a *complex and therefore non-linear, even chaotically processing system*, exact mathematical calculability and predictability are no longer possible in the long term.

High cognitive performance must therefore be wrested from a complex system of disorder - and this is only possible, as in biological evolution, through self-regulation, building on this through self-organization up to the *micro-evolution* of quality leaps through trial and error, i.e. *procedural selection of pattern variants*. These non-linear, erratic neural processes can only be accomplished by a specifically undefined association cortex, which *evolves patterns intracortically, i.e. self-referentially* - and is not exorbitantly enlarged in humans for nothing.

Third new paradigm: Not only brain research and evolutionary anthropology - science in general must overcome the dogma that higher levels of development of matter, as in the evolution of species, would arise purely gradually through known and calculable steps. Dead and living systems of complexity cannot possibly grow infinitely without even small steps reaching a quality limit that can only be crossed by finding an unpredictable and incalculable original system. The Homo erectus brain also underwent a corresponding 'trial and error' process until the uniformly growing association cortex raised the overall system to a higher level. In order for the human brain to make the evolutionary leap to a system of mere cognitive potential, its processes had to reach this tipping point: A second neural system, that of neuronal autonomy, evolved from the self-regulating neural system of the animal; this stands in contrast to the self-regulating basic system, namely controlling it in order to form an interactively competing unit that is therefore capable of innovation.

This autonomy system grew out of the order-forming processes of the old, self-organizing neural system, but placed itself over the old one in a dominant controlling role. The complex interaction of these two opposing neural systems, which are perceived as unconscious (without knowledge) versus conscious (with knowledge), allows for an inexhaustible, sometimes creative development of cognition. Higher cognition, let alone a leap in cognition, is gained through non-linear, branching, i.e. evolving processes of neuronal patterns that are fleeting and unpredictable in nature - but reasonably controlled; higher cognition is by no

means a mechanical or logical result of a predetermined, neurophysiological structure such as a reflex arc.

The *uniqueness of the human being* is thus demonstrated *firstly*, in its *potential* for unlimited *higher development* of cognition with *always the same* brain;

this is made possible - *secondly* - by an additional neural system of *relative autonomy*, which was established *by leaps* and bounds, in particular by means of a vastly expanded association cortex;

which - *thirdly* - *checks* the spontaneous *creativity* of the self-regulated, near-chaos neural system of the base by means of a partial ego that has become autonomous and directs it towards goals *far in advance*.

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The quintessence of this analysis must be: Humans therefore *do not possess a genetically determined level of cognition*, as is persistently claimed. Instead, he has a neurosystemic potential for an unlimited higher development of his cognitive abilities, whereby partial autonomy of thought is absolutely necessary - one could also say: relative freedom of thought - misunderstood: Consciousness. For it alone is able for the first time to recognize the creative in nature and in thinking - which in principle cannot be achieved by mere logic - as such, but also to test it logically.

Man is therefore no longer an animal, because his specialized organs no longer need to be genetically adapted - after all, he himself adapts all natural substances and energies to his needs and goals far more quickly and purposefully by means of his brain, which is always the same. This is why the human brain can and does no longer need to evolve - it already ensures everything that genetic evolution previously provided in an undirected way, and much more: but now by increasing cognitive performance without limits.

Humanity has long since *left* biological evolution behind and is *solely responsible* for its further civilizational development, *and therefore also fully responsible* for it. - Humans are the first species to be able to recognize and understand their own development and that of nature, from which they come, far in advance and to plan and direct it towards general goals. – There is no nature that can be preserved forever, just as man is only a transitory stage.

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Notes

- [1] Earliest Homo sapiens from Jebel Irhoud a good 300,000 years old, brain volume approx. 1400 ccm; brain growth subsequently increased to 1450 ccm, but reduced to an average of 1350 ccm over a further 100,000 years.
Simon Neubauer, Jean-Jacques Hublin, Philipp Gunz: The evolution of modern human brain shape. *Science Advances*; 24 January, 2018 (according to: <https://www.mpg.-en/11882963/homo-sapiens-brain-evolution>)
Archaic Homo sapiens from Omo (Ethiopia), approx. 215,000 years old, brain volume over 1400 cc.
Céline M. Vidal et al.: *Age of the oldest known Homo sapiens from eastern Africa*. In: *Nature*. Vol. 601, 2022, pp. 579-583, doi:10.1038/s41586-021-04275-8.
Homo sapiens idaltu, 160,000 years old, brain volume 1450 ccm.
https://newsarchive.berkeley.edu/news/media/releases/2003/06/11_idaltu.shtml
- [2] See: Spencer Wells: *The Journey of Man. A Genetic Odyssey*. Penguin, London 2003, p. 33)
"Black Africans showed the greatest genetic variability in their mtDNA sequences - assuming a constant mutation rate, they had had the longest time to evolve. In other words, the origin of Homo sapiens in Africa could also be confirmed using genetic methods. Subsequent studies have confirmed this result, although the date of the first split in the family tree has been corrected to 150,000 years ago."
(quoted from: https://de.wikipedia.org/wiki/Ausbreitung_des_Menschen#cite_note-23)
- [3] Source: https://de.wikipedia.org/wiki/Adam_des_Y-Chromosoms
"Unlike mitochondrial DNA, the DNA sequences of the Y chromosome differ only slightly from person to person. If one wanted to generate a family tree only by comparing sequences, as with the mitochondrial Eve, very long sequences would be required." "In 2013, another study was finally published in *Science*, according to which the mitochondrial Eve lived between 99,000 and 148,000 years ago and the 'Adam of the Y chromosome' between 120,000 and 156,000 years ago."
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"A uranium-thorium dating published in 2020 finally narrowed the age down to 299,000 ± 25,000 years." "The brain volume is 1280 cm³ and thus at the lower limit of the volume of anatomically modern humans ..."

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