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THE SPEECH OF THE EMBRYO

A phenomenology of embryonic existence

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This text is based upon
De spraak van het embryo,
Een fenomenologie van het embryonale bestaan
From: Liber amicorum Steven de Batselier,
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What I see is just the covering.
The most important is invisible....
From: *The Little Prince* by A. de Saint-Exupéry

Introduction

After my study in medicine I was trained as an anatomist and embryologist. In the beginning I was intrigued by the forms and metamorphoses of the embryonic body. Gradually I became involved in discussions about the moral status of the embryo regarding new techniques designed to manipulate conception and the embryo itself. I began to reflect on questions regarding soul and body, mind and matter in respect to the facts and features of the developing embryo. Whát are we actually **doing** as a human being when we are an embryo? In 1985 I met people like Professor Steven de Batselier, a psychotherapist lecturing in the department of criminology at the University of Leuven in Belgium. He acquainted me with the ideas and concepts of several prenatal psychologists like Maarten Lietaert Peerbolte, Robert Laing and Nandor Fodor. These psychotherapists mention in their work terms such as *prenatal experience*, *fetal psyche*, *shock of conception* and *prenatal psychology*. They extend the reach of human experience and consciousness beyond the boundaries usually set by contemporary medical biology. For not only the medical biologist but nearly every *good-natured* person nowadays is convinced that the nervous system in general and the human brain in particular has been proven to be the core of the human mind and human conscience, as well as the human psyche or *soul*. Many people consider it as a fact that the human mind and human consciousness are produced by of the brain. Some simply state: *Like glands secrete hormones, the human brains secrete behavior and personality*. In a typically Cartesian way of thinking the brain and the function of the central nervous system are considered to be the origin, the *cause* of human behavior and the psyche. This philosophy has reduced *psyche*, *soul*, *mind* and *spirit* to pure physiological processes. The prevailing view is that soul or psyche (belonging to the Cartesian realm of *res cogitans*) in the paradigm of natural science now could be considered as nothing but a matter of brain action and therefore belongs to the realm of *res extensa.* On the other hand one could also state, paraphrasing the philosopher DelaMettrie, that *man does not **have** a spirit, but **is** a spiritual being* and that all the medical research on the function of the brain does not **prove** that mind, spirit or soul are localized within the brain or cortex. Thus, I myself began to consider the philosophical possibility that a functioning brain is a necessary condition but an incomplete condition for the source of the psyche and mind.

Emerging literature on the embryo and embryonic existence presently challenges the Cartesian dualistic view of mind and body. How could an embryo possess mind or soul if it does not even show the shape of an actively functioning brain or if the nervous system in this phase of human existence is nothing but a long tube with brain vesicles that are the precursors of future nerves? For most people therefore, the embryo has become a kind of half existence, a phase where man is not complete yet or is not entirely there. According to the principle of *brain death* the embryo is considered as *mindless*, which very often is interpreted as *not human* or *not yet human* in the current moral and ethical debate.

So for me, as an embryologist, being exposed to the thoughts of people like De Batselier and Lietaert Peerbolte was a direct confrontation with the paradigm or thinking in traditional medical biology. How do those thinkers consider that an embryo functions in the sense of psyche, experience, and behavior? How should an embryologist judge a statement like the one from Laing: "Could it be that we pass through transformations or variations of our first prenatal experiences during later cycles of life, even before a special developed nervous system comes in our body? Can it be true that the patterns in our prenatal experiences serve as a kind of template for patterns later forming the tissue of our complex postnatal life of behavior and soul?" [1] How could or should an embryo function in psychological respect when there is nothing more present than a very simple or *primitive* nervous system being developed? If soul life and behavior are restricted or limited to a functioning nervous system, how could it be possible for an embryo to have such experiences or exhibit conscious behavior?

FIGURE 1 Embryo about 28 days old, 4,2 mm, Carnegie 10307. Front view.

A possible key to this dilemma was given to me in the definition of **behavior**. The biologist *Weiss* states: "Biological systems are behaving themselves". In this way Weiss is proposing a broader definition of behavior than is simply expressed in terms like handling, doing, performing. I may also read behavior in living organisms from its form and shape, from its *Gestalt*, from its continuously changing morphological appearance. An organism is shown to us as a unity of shape, function and environment, continuously changing **in time**. The rose in the vase is not *the* rose. I have to include time into my image of the rose: out of seed to plant, to knob and flower, to withering, etc. Far before it comes to acting outwardly, to performing so to speak, the organism already shows behavior in a morphological sense; it exhibits behavior by means of its forms, bodily organization and its shape. In this way a birch or an oak tree exhibit behavior. They behave themselves as a birch or an oak in the shape of their appearance. To perceive and to **understand** the organism I could describe its behavior in

[1] Is it possible for we cells, before and after specially neural tissue arises, to reproduce in later phases of the life cycle transforms, or variations, of our first experiences? May our prenatal experiential patterns function as templates for some of our patterns woven into the complex knit of postnatal design?". *Robert Laing* in: *Facts of Life*.

the widest sense of the word. Form, shape, and appearance is a fundamental way that the organism expresses its essence of being. Describing and studying the shape of appearance gives me insight about the nature or essence of the living being or organism as it expresses itself by these behaviors of growth and shape. It might help me to **apprehend** the birch and the oak tree. Apprehension however is not the same as **explaining** the organism. The latter brings me to the forms and shapes as causes, the former considers such factors as conditions. Explaining as causal interpretation for instance is the main aim of contemporary embryology: How might we explain the causes regarding the shape and the appearance of the embryo? Explaining however does not at all mean understanding. For example, being an anatomist I can explain how the hand makes a fist, which muscles contract, which joints participate, which control mechanisms in the nervous system are active, etc. However to understand the fist as behavior, as gesture, I have to use another method of description and describe the fist in the context of human acting. How many meanings is a fist able to contain? The fist of restrained anger, the fist of triumph, of pain, of shame, of powerlessness. Replacing myself assertively into the gesture of this form of *fist*, it may be possible to trace the meaning and sense of that gesture. The reductionistic fist of anatomy and physiology is always lacking this. It only shows muscles, joints and nervous activity and so forth.

So gradually it became clear to me that an embryology that could be connected or could cope with the mentioned views and ideas about the existence of something like a *prenatal psyche* had to be an *embryology of behavior* in the way Weiss means. Here I try to sketch the contours of such an approach.

The body as an instrument of the soul?

The questions that were raised in the introduction of this article appear to be linked with the question: What is human behavior? Which definition are we giving to behavior? This question could rather be the key issue for the answer of the question: What are we actually **doing** being an embryo? How are our performances and actions constituted in this phase of our life? What can we say about it from a scientific (embryological) point of view? Is this about human **acting**? What does it mean in our biography, in our unfolding as a human organism to advance (grow) in this phase of life?

As stated before the regular descriptions and definitions of human behavior are based upon a reductionistic image of man and nature. In this view our nervous system in general and our brain in particular is the last *asylum* for what is called the human soul or mind. Within the frame of thinking of modern biological science no other domain (*locality)* and origin (*causality*) can be considered beyond this complex organ, just inside our skull. If the question is to explain human behavior in terms of brain function we may have too large of an expectation of the neurobiological research. The nineties of the last century were declared as *the decade of the brain*. However this is not at all very modern or new. For centuries we have been walking in the footsteps of philosophers like Descartes trying to find out the *by what* and *where in the body* as to processes like our balance, our thinking, our acting and our psyche.
Locality and *causality* are pre-eminent *Cartesian* notions. But is *mind* to be located at all? Or is it something that arises spontaneously, that happens so to speak? Those who are convinced of the mind or psyche being *somewhere between the ears* always claimed to be justified by the still undeniable results of experimental drugs, medical operations and the other experimental testing.

Any change in the physiology of this brain, whether it is a pathological process or a subtle influence by means of psychotropic drugs or neurophysiological testing, may lead to disturbances of or changes in behavior, in the psyche or in the personality of the person involved.
Who dares to deny nowadays that this behavior, this psyche or this personality of the test subject *is to be found* there, somewhere *between the ears* very quickly? Nowadays *behavior-genes* are discovered by molecular biologists. These genes are also considered to play a determining role in human behavior and misbehavior. In some scientific circles there are rumors of something like: *neurogenetic determinism*. This is another example of typical *Cartesian* thinking: genes and brains determine human behavior. Behavior has been reduced to the *lower* level of a genetic and neurobiological substrate.

The value of such experiments and testing however does not **prove** that we understand (are able to interpret) the underlying mechanisms or conditions correctly! The distinguishing feature is that all of this is only true within the contemporary scientific paradigm (a *frame of mind*). The concept of causes that are somewhere situated in the material substrate of the body fits in our culture specific image of man and nature. It all could however be interpreted in a different way. The same findings of our neurobiological experiments, such as pathologic disorders or lesions could be interpreted and understood just as well if one considers brains and genes as **necessary but not sufficient conditions** for behavior, for psyche etc. Reductionistic explanations risk **confusing the condition or context of the phenomenon with the phenomenon itself!** We will pose completely different questions and find other answers if we take the footsteps of biologists like Weiss and start form the point of view that the body as a whole is *language*, *expression*, *behavior* and that in man as a psycho-somatic unity the soma (body) is an expression of psyche just as well. Like it has been stated by the philosopher DelaMettrie: "The animal has no soul, it **is** soul". Mind and conscience are processes, functions. They **are** not (located) somewhere, they **happen** (arise spontaneously).

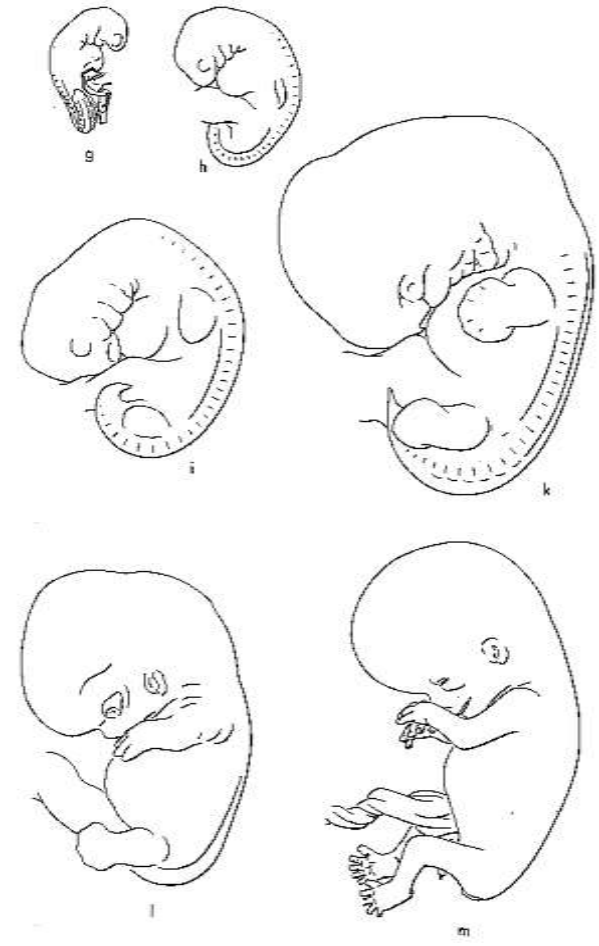

FIGURE 2. Embryonic stages of the human embryo. In series: age of 26 days (g), about 4 weeks (h), about 5 weeks (i), about 6 weeks (k), about 7 weeks (l) and 3 months (m). From: The human embryo, E. Blechschmidt, Stuttgart 1963.

Embryonic behavior

The question is: Does an embryo exhibit behavior? The subject of this article apparently seems to be a nonsense question within a reductionistic paradigm. Even more so it is an unwanted question. For within this view the answer to the question should be negative "That is not possible yet". It is at least until the fifth month of human prenatal existence before any serious anatomical substrate that could be considered as a brain exists or could be demonstrated to function by means of physiological phenomena like *electrical brain activity*. Muscle contractions and movements are present then but are interpreted as simple involuntary reflexes. Later on one might observe patterns of motion, preliminary actions or motor behavior. Earlier in time, during the embryonic phase (which is in fact the phase of human development this article is dealing with) even fewer phenomena may be observed that could be associated with the view that *behavior is a kind of product of the brain or nervous system*. By that time the embryo even lacks structures or body parts that could be identified as arms and legs, muscles and joints. The *Anlage* (plan) of the nervous system still is nothing more than a simple structured tube with outgrowing branches that represent futures nerves. Much, very much, if not all bodily parts that could be considered as the bare minimum for behavior are not yet present or are in a very *immature* state.

At first sight an embryo seems to be in a phase of life and development in which one cannot regard the possibility of it exhibiting behavior. Many people nowadays consider embryonic existence as purely a matter of biological growth, differentiating and metabolizing cells and tissues. Functioning or existing psychologically is out of order. The biomedical view perfectly fits with the concept that a human embryo be interpreted as *not-yet-human* or *not-yet-completely-human*. It is not surprising or unexpected that this view of the human embryo is so widespread nowadays. For it has been science (natural science) that during the last decades has brought to light numerous facts about the human embryo at an astonishing speed. Until its discovery by scientists the embryo lived a rather secret and unknown life. Very few facts were known and were based upon accidental findings of embryos that came to light because of miscarriages and abortions. Since the embryo has been discovered and brought into the spotlight of science, it was not only the predictable fate of the embryo was to be studied and described through the reductionistic glasses of official embryologists but also that it was **interpreted** as to its essence and being within the regular frame of thinking and scientific paradigm. Therefore the humanity or humaneness of the embryo was more and more considered as a matter of additional value. The scientific embryo seems to be a matter of nothing but genes, cells, tissues and biological and biochemical processes. Humanity, human values, even human behavior could not be detected by means of the methods of description applied by such embryologists. Because of that the moral status of the embryo has become a play thing of ethical interpretation. Based upon various criteria boundaries were set regarding the humaneness of an embryo. Some state that at least the first construction of something like a nervous system should be morphologically present to respect an embryo as human life (third week). Other people want this organ to show at least the minimum of cortical activity (fifth month), others do not even hesitate to disavow humaneness to the prenate before it is born, so only after it is able to exist physiologically independent from the maternal organism.

What is an embryo actually **doing**? That was the starting question of this article. In an attempt to

try to get an answer to this intriguing question, first another question has to be raised. What actually **happens** in an embryo? A very common misunderstanding that has to be elucidated first, is that an embryo is **not** a matter of sequential construction, meant in the sense of being built up from elements and (body) parts. The widespread idea and concept (actually a misconception) is that it all starts with one cell (the fertilized egg cell) and that through a countless number of cell divisions still more and more cells appear. These cells in their turn grow to be structures and organs and that in this way a human being is built up from body parts and elements. At the end man may be considered as the sum of bodily components: cells, tissues, organs specifically resulting among others in a brain. Implicitly it is conceptualized that when the latter organ starts to function, eventually personality and psyche are brought forward or produced by the body: a human personality results as a **consequence** of the body.

But this interpretation of the processes that take place in the embryo is not the only one, it could be conceptualized in a different way. The essential process that happens in the organism of the embryo is *differentiation.* It may be stated that the whole of the organism is primary: the embryo may be considered as a continuous whole or complete self organized being that seems to *fall apart* into its bodily constituents and organs. The actual embryo is maintaining order or centering this process. Any time during the embryonic development one may observe that groups of cells subdivide into two populations of cells that differ in traits and properties from the cells they originate from. So a kind of tree of cells, tissues and organs can be described which originate **out of** each other and gradually come to a distinction between each other by differences in properties. That is why this process that is so typical for embryonic development is called *differentiation* (i.e. the origin of differences). But the interpretation of those processes and events may lead to a completely different understanding of what is actually happening in an embryo than the idea that an organism, an embryo is the summation, result, or a consequence of its parts and organs. Organs and parts should be considered secondary, **the whole, the organism itself is primary**. One may never observe that something is added to the organism like in a mechanical construction. At every moment the human embryo may be seen as one entity that so to speak is maintaining a unity. A metamorphosing diversity is continuously differentiating and appearing **within** that wholeness. The German embryologist Erich Blechschmidt († 1990) stated this very clearly: "For every living organism as well as for the human embryo the Law of Conservation of Individuality is valid (1)[2]. He meant that the ***shape of its appearance*** might change over the course of time but that the essential **being** itself remains unchanged, present and active within these outer shapes and form (see FIGURE 2). So a fertilized human egg (cell) is not just *a cell*, it represents an organism: it is a complete manifestation of the human organism at that very moment, under the circumstances and environmental conditions that exist one day after conception. Through all those outer changes in shape and form, the human organism, the human being continually manifests itself as the wholeness it **is** during the **whole** embryonic period.

Like every living being the human embryo is in **every** phase of development a coherent whole, a unity of form, shape and function interacting with its environment. It is always itself. In other words: as an embryologist I am able to explain every appearance or manifestation, each stage of this being from the fact that she contains a human genome (resulting from the fusion of two human

[2] Numbers between brackets at the end of a sentence refer to the index with literature at the end of the article.

gametes) (i), and from the natural history of this being at a particular stage (ii) and from the influences of and interactions with the environment that contribute to that stage (iii). This means that scientifically speaking at every stage the human embryo, in spite of the homology in form and shape with other mammalian embryos, is a **human** manifestation (FIGURE 1 en 2). Its shape and form are uniquely **human**, no more no less. Given the afore mentioned conditions this is the way that a human being looks like when it is for example, some four weeks old (FIGURE 1). In the **point of view considered here** there is not any argument why I should regard any previous phase *less valuable* or as *not-yet-human*. In fact we know that and is actually evident for everyone. I never met someone who showed me (proudly) a photograph of himself (or even, as a modern variant, a picture of prenatal ultrasound) and said to me: "Look! That was not me yet!" Like every living being we also are appearances in time.

In all those processes of embryonic development DNA or genes do **not** play *the* causal or determining role that they are often thought to play in the simplistic minds of many biologists. That is a mistake, a misunderstanding. The *genome* (i.e. the totality of genetic codes in the DNA of an organism) is ruled, regulated and *determined* continuously as a process **in time** by the context and environment of that genome i..e. by the position of the cell within the whole of the embryo, by the phase in which the embryo is at that time, by the activity of the cytoplasm and so on. To consider the DNA as a kind of *motor* or *drive* behind the embryonic development is pure nonsense in respect to the principles of developmental biology. "Gene agieren nie, sie reagieren" (1): genes never **act**, they react. They play the role of a kind of maintenance and conservation principle within a continuously changing context or environment. To elucidate this, the next image may help. Genes may be considered as the clay of necessary condition for the modeling hands to do their modeling work. Neither the clay, nor the hands on their own will come to the shape that is aimed or meant by the shaping mind of the artist. Clay will never become a statue by itself, or by the modeling hands gesticulating in the air without meeting or encountering the resistance of the clay. A process of interaction and encounter between both principles is *conditio sine qua non*. In such a way genes represent a necessary factor of resistance against which environmental factors work shaping and differentiating and vice versa. Neither genes nor environment are *cause*, they both are **necessary but by themselves not sufficient conditions** (2). Differentiation also goes from outside to inside as well, not just from inside (the parts) to outside (the whole).

But explaining the embryo is not what this article is aiming at. Here we are trying to perceive and **understand** the human embryo in terms of its being or becoming human. We are *searching* for human behavior. To gain such understanding it is necessary to state that *understanding (perceiving) the embryo* means *understanding the whole, the entity*. Knowledge of or insight into the (body) parts, be it cells or organs, does not teach us anything about the posed question: What is an embryo actually doing? As stated before: understanding (perceiving) an embryo is different than explaining an embryo. Explaining – i.e. searching for causes of the shape, form and *Gestalt* of an embryo – brings one to the (body) parts, the cells, the cellular biochemical processes and to the DNA. That is the road of regular biology. It reduces the whole, the entity, the organism to its parts and then considers the parts as primary. Understanding (perception) on the other hand leads to the whole, to the manifestation of the organism as a whole. It is the entity of the whole that behaves. When one looks at an oak tree, one knows that is different from a birch tree. How? The oak does not talk or write about himself. Or …? Here we meet again the problem of definition that we dealt with in this article earlier. Why not state that the oak and the birch express

themselves differently, behave in a different way and speak a different language. When we do not apply the reductionistic definition of *behavior* – which is *performing an act by means of a locomotor apparatus controlled by a nervous system* – then organisms exhibit behavior in their bodily forms and shape, in their *Gestalt*. Then they gesticulate and perform expressively. This gives the opportunity to understand their expression, their behavior. They behave in a continuously **changing** way in the course of **time**, which is typical and essential for living beings! From conception till birth, from birth till death, the human biography is an organic entity, a wholeness. **All** the appearances and the expressions of a human organism are to be understood and interpreted as human behavior in the definition of the biologist Weiss, when he states "Biological systems are behaving themselves.

"Das Seelische übt sich voraus"

So an embryo functions, not in the usual sense of a body that ***has*** a function (or organs that ***have*** a function) but in the sense of forms that ***are*** (a) function. This notion represents an important key to the questions we are dealing with in this article and requires further explanation. In the view on human embryonic life that is developed here it is possible to overcome (to say it in a philosophical way) the *duality* of form and function (or, maybe more exact, of form and mechanism). Every time one may observe that in living nature, in living organisms form and function (mechanism) cope and fit perfectly. The relationship between those two is intimate, intricate, like a so-called *chicken-and-egg-what-is-first-relation*. The anatomist or morphologist, who is the expert regarding forms and shapes so to speak, might state that *because an organ is built and constructed in this or that way, it functions, it works in such and such a manner*. The physiologist in the other hand, who considers himself as an expert on functions and mechanisms in living beings, could reply to the former statement by saying that *an organ that has to work in this or that manner, has to be constructed or has to look in such or so way*. Who is *right*? What is primary, what is secondary? Form (shape) or function (mechanism)? It is difficult to *decide* or to let one or the other prevail. Mostly people consider form and function (mechanism) as a kind of *duality*: either you consider form or you consider function. Yet the two are linked and involved with each other inseparably.

It is the embryo that may throw new light on this controversy regarding form and function. The embryo continuously changes its apparent shape as a steady metamorphosis of form. Changing form is all a matter of motion. Here however we are dealing with a special kind of movement, a particular kind of *behavior*. Here is an example to elucidate this idea. When I grasp a glass of water with my arm and hand, I perform an action by means of my arm and hand. My arm is an anatomical-physiological substrate, a form that is applied and utilized in the function or action of grasping a glass of water. An embryo of about four or five weeks does not yet posses such an arm or hand in anatomical respect, but during succeeding weeks of embryonic development we may observe an arm growing out. Parts and elements of what is meant to be in becoming an arm appear discernible. The developing arm exhibits a growth movement, or growing gesture. At the end of this long period of development an arm is the *result*, a structure, a form, perfectly fitted to bring glasses of water to your mouth. Globally speaking one might state that at the end of a long-lasting **process** of transmutation and transformation there appears as a *result*, an arm, a very special **form**. The form arises forward out of a motion as the stilled or *frozen* end phase of a process of a growth movement. The way in which such an arm is *achieved* or accomplished also determines the shapes and form of that structure and therefore the eventual function (or potential

function). The nature of the process of the growth movement is an important determining (shaping) condition for the later function.

The movement of gesture and growth is related to the later gesture that is functionally possible. In this regard an arm and hand may be considered as *performing* a motion of grasping during growth. If one considers on the contrary, the gesture of growth that is performed by a developing leg and foot, then one might observe a completely different growth movement, a different functional gesture. It resembles in some aspects an arm but in other aspects differs very much from the arm and hand, e.g. growing out in a more stretching and extending gesture while the arm exhibits more a gesture of flexion and grasping. The conclusion of the considerations presented here could be that an embryo does not yet, like a full grown or adult organism, have (possess) a form that functions, but that the embryo still *functions in forms*. In the adult and other full grown organisms we usually consider form and function as rather dualistic and separate, though strongly related and linked principles. In the embryonic organism those two are **one** and unified. The embryo functions holistically in growing and changing forms and shapes. It is process in motion. The embryo performs or exhibits gestures and motions; it performs actions by its growing and changing Being (or, Becoming). This means: an embryo exhibits (growing) behavior (3).

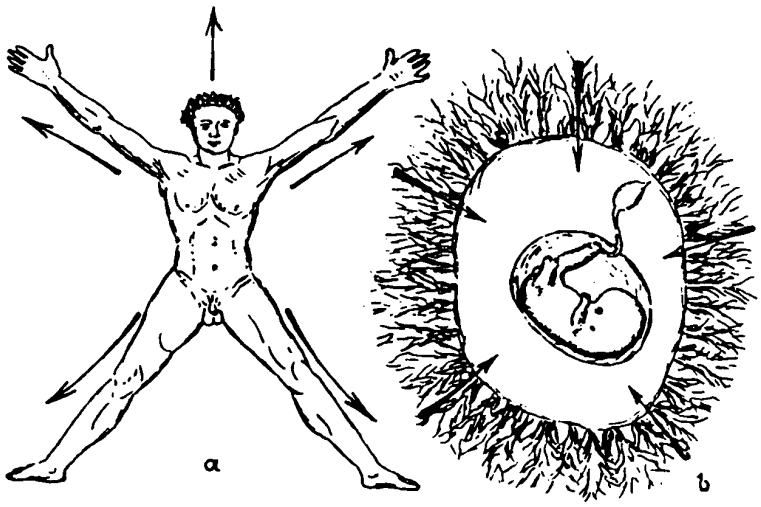

FIGURE 3
Revolution of the orientations of being between an adult (a) en an embryo (b).
From: Dynamische Morphologie, O.J. Hartmann, Frankfurt/M., 1959.

One might consider a next step. Within the embryonic way of life form and function are still related and linked together firmly. And in the adult organism where form stills, does function appear or is it released (liberated) on another higher level? When the morphological process has come more or less to an end, then the arm can start to function in a physiological respect. Consider for example that since the form and function of an arm are tuned so perfectly and harmoniously, it may be due to the phenomenon that the function of the arm as an instrument for grasping has been *pre-exercised* embryonically while growing out. This is **physiological function as a *released* growth gesture**. The embryologist Erich Blechschmidt even takes a step further and applies this principle of releasing function from the growing structure to the level of psychological gestures and functions. He therefore comes to the surprising conclusion "Das Seelische übt sich voraus" (“Soul is being pre-exercised”) (1). Bodily functions, physiological functions, psychological functions are *pre-exercised* as growth gestures and growing movements in the embryo. In this respect a human

being has already breathed *long* before he has taken his first breath after birth. The dynamics – in the sense of the **gesture** of morphological development – with which lungs, thorax and diaphragm are developing and unfolding, may be considered and interpreted as a type of breathing because they are breathing movements. The breathing of an embryo is not yet breathing air *in a physiologic way*, but it represents a more fundamental breathing *in a morphological way*, *in form* so to speak. Considered in this way, an embryo *looks*, *grasps*, *walks*. It also stays on its feet and holds its own. The gesture and action of stretching and standing upright is already being performed or pre-exercised by the human embryo in the fifth till tenth week of prenatal development as a gesture of its growth. This *standing during growth* is a necessary condition for developing a body, a being that later on is able to stand and go upright physiologically and even psychologically. To go back to the central issue of this article, we may state that embryonic gestures and actions of growth are performances. **They are performances as actions in growth.** So we return to the statement made earlier: the embryo functions, behaves in forms and shapes. The language of forms and the language of the body is in the case of a human embryo is a type of human language and human behavior!

Centripetal existence

If one considers embryonic existence in the terms proposed here, it could be a consequence that we have to consider the direction and the orientation of embryonic existence in a completely new perspective. Usually embryonic existence is considered as a biological process that *produces* or results in human behavior. We think so to speak *from inside to outside*, from *center to the periphery*, in other words: *centrifugally*. There is a fertilized egg cell at the beginning, which next grows up to be a human individual; man is a product of the process. In this concept the human *mind* or *soul* are also produced by this event or process. Mind is a consequence of the body and body formation. The mental processes of the human individual are added to the general non-individual processes of the preceding phases. Also in this notion the embryo deserves something like a general non-individual human status: in the embryonic phase there is no talk yet of individuality or personal existence.

In the view represented in this article the dynamics of embryonic existence are characterized by the orientation form *outside to inside*, i.e. *centripetally*. What this means is that in the bodily appearance of the embryo a human being *impresses* (or imprints) itself. In figure 3 the revolution of the orientation of being between an embryo and an adult human is represented. As an adult human we **ex**press ourselves by means of our body: the world is our aim and the body is the instrument for this purpose. The embryo on the other hand still ***impresses*** itself into a bodily organization. Embryonic existence therefore is a kind of silent, mute and introverted existence. The idea that an embryo is not yet *doing* anything and is not acting yet, is a great misunderstanding and devaluation. The action, the performance is directed towards itself, inward. It represents human action and human behavior. In this view embryonic performing also represents the expression of a human being and its soul as primary. A human being is a being that is manifesting itself in the first order by means of growth gestures and form movements, afterwards by means of (*released*) physiological processes (behavior) and later on by means of psychological behavior and gestures. Human behavior is all expression.

In the meantime it seems we are far away from the usual reductionistic view. In the course of

thinking followed here, we have to come to quite a different conclusion. I am aware of the fact that the difference with the *official* embryology is not so much represented by alternative conclusions but also by an alternative point of view, which is a paradigm shift, affording an opportunity to reflect on embryonic existence. Another and different light is shed upon embryonic functioning in this way. If man is a being of mind **and** body, then embryonic existence is the manifestation of a spiritual Being as well. During embryonic existence a human being is expressing himself (herself). The soul or spirit is primary, the body is secondary, at least in the sense of the dualistic point of view in which spirit (soul) and body are in opposition to one another. But one could also consider it in a more *monistic* way, paraphrasing the philosopher DelaMettrie: "The embryo is not **getting** a soul, it **is** soul as well". A human being is coming into appearance. To understand what is expressing (one could say ím-pressing) itself then, it is necessary to consider the growth gestures and *Gestalt* as serious (human) behavior and to describe them as such. This might teach us something about a human Being.

We now might expand on the image of clay and hands mentioned before. As stated, neither the clay nor the hands can come to form on their own. The form and the shape can only come into appearance in the interaction between both conditions. In this way the human embryo is not **caused** by the genome and environmental factors, it comes into appearance (to manifestation) thanks to these both conditions. Like every organism the human embryo is neither solely the product of a genetic program (*nature*) nor is it exclusively determined by environmental factors (*nurture*) alone. Organisms at the very least arise from the interaction between those two necessary but on their own insufficient conditions. In the metaphor of the clay modeling artist, there is also the reality of the modeling artist who has in his mind an idea, a concept of what is going to be modeled or produced. When the process is successful and the conditions of the clay and modeling hands permit, then the appearance in the clay of what is meant and conceptualized within the mind of the maker, the artist will occur. This idea might also be applied to a living being, to an organism. In this view the organism is considered as a structure of transcendental nature, *invisible* just like the ideas and thoughts in the mind of the modeling artist. It is similar to the *nature* and *nurture* argument: each on its own necessary but not sufficient for the organism to come into appearance. Thus a kind of third dimension is thinkable: the essence of transcendental structure existing **in time** which is not produced by the clay modeling process, but manifests as a result of this process. In this respect a human being is coming *to earth*: step-by-step it shapes its *phenotype* (shape of appearance) and gives in the fullness of time (one might also state continuous and *never-ending*) shape to the biological and other conditions it encounters. A spiritual plan is coming into appearance. It takes a complete biography to do so. That makes an embryo really interesting. Then one might discover a human embryology that is able to describe *incarnation* by describing perceptible facts of embryonic development. By *incarnation* is meant here no more or less than a *centripetal* view on human existence: originating from a *Yonder*, an *Out there* coming to a *Here*. It may be clear that this view or *seeing* is quite different from the usual way of observation in natural science. A more extended thesis is required to provide a base for this other way of *seeing* with an accountable methodology. This certainly is possible. Here it suffices to refer to *phenomenological* approaches as practiced by thinkers and scientist as Goethe, Husserl, Weiss et al (6). I would like to end this article with an example of the kind of insight one might gain via the phenomenological approach in which embryonic existence is considered as human (growth) behavior.

In that very moment...

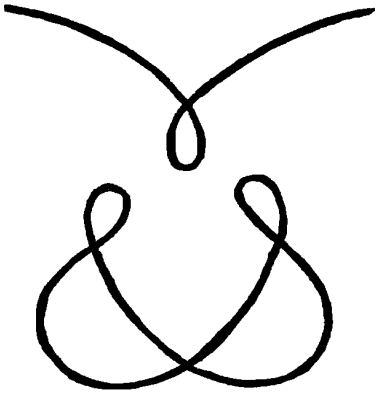

Figure 4 Icon on a birth announcement

For most people human conception is a beginning, a starting moment. It is thought that fertilization is achieved by the fusion of the two nuclei of the involved gametes, next growing out to …. In this notion of growing out the notion of beginning is involved. It starts with conception, the rest is a consequence. This has been discussed here in extenso. In this view children are the result of conception; they are made and can be made from the process. The whole modern artificial reproduction technology is the indirect consequence of this view and seems to confirm it. How might the process of conception, however, be considered in the centripetal view presented here? It would require at least an article twice as long to describe the processes and dynamics of the human fertilization process in a phenomenological way (4,5). For a few hours an immense polarity is created between sperm cells and the egg cell resulting in a delicate and labile attraction-complex. In that situation the usual biological relationships between cell and nucleus are reversed inside out and in fact unusual, non-biological dimensions are created. Sperm cells and the egg cell create a situation that could be described as the complete reverse of the usual biological relationships of the living cell. A situation in which everything might happen, but nothing is determined. In that equilibrium, in those very labile moments the dynamic of making seems not to be the rule, rather it is the dynamic of creative meeting and encounter. If the phenomena of this interactive happening are experienced carefully in its gesture and dynamic – which in fact is the principle of phenomenology – the image and experience of a receptive conception is prevailing. Not only a horizontal conception – i.e. the one on the physical, material level of reality of cells, nuclei, biology, of fusion of two gametes – as a central issue happens here, but also a vertical connection or encounter between yond and here, between spirit and matter occurs. The conception that we successfully imitate and manipulate in the artificial reproduction technology is not the actual conception: the events on the biological level are (maybe it is boring, but here it is again) the necessary but not sufficient conditions for a conception on another level. Even in vitro a baby is never made. Conception is a moment, with a theme of linking and connecting. What has been joined in conception will be untied and dissolved in the moment of dying (decomposition). When someone has passed away, do we say: What remains is the dead body as a remnant, deserted by soul? Conception is an event, an act in reverse: what is separated before is joined, comes together. If this connection or joining succeeds, the actual conception (the fusion of gametes and so on) is rather a consequence than a cause. During a conception a Third Person becomes possible and comes into appearance, not because of, the physical substrate of two other people (see FIGURE 4). In this view man is not re-producing himself in his/her offspring in the sense of replicating or reproducing himself. A human being is not reproducible, at least when one considers biography as the one and only valid entity of being human (2). We in fact do not reproduce ourselves in our children. "In the very moment that I was you and you were me" (as the poet said), the Other may find the opportunity and conditions to come down, to bind. Not because of conception but thanks to it.

From 'yond' to 'here'

Connection in the vertical direction is the main theme during conception and in the dynamic and orientation of the whole prenatal development. That specific orientation, that *direction of existence* represents the essential gesture of development and being born. Even more literally an orientation from *beyond* to *here*, from periphery to center may be seen in the embryo. I will explain this here. At the end of the first week of embryonic development the entity of the embryo, which at that moment is represented by a small sphere-shaped organism consisting of a few genetically identical cells, is divided. It differentiates into two populations of cells, into a duality. During the first days of development the fertilized egg (zygote) is gradually divided into more and more cells by a process of subdivision (not by growth). The embryo is divided, split up into a number of smaller cells as if the embryo falls apart into cells. Around the sixth day after conception the embryo is a small vesicle *fallen apart* into an outer mantle (the *trophoblast*) consisting of some hundred cells with some fluid within and into a center or *nucleus* consisting of a small number of cells (8 to 12) that represents the plan (the *Anlage*) of the latter so-called *actual* or *proper* embryo and which is called the *embryoblast*. From that moment on a human organism consists of a *peripheral body* (*mantle body*) – the wall of the vesicle, the *trophoblast* that will grow out to the later placenta and membranes – and a *central body* called the *proper* embryo, the body that will become our *actual* body at birth.

Of course those two bodies will change and metamorphose thoroughly but the duality that apparently is essential and marks our prenatal existence, stays present and is discernible during our whole prenatal life. Whether the embryo is one week old - and the *outer* is called *trophoblast* and the *inner embryoblast* - or two weeks old – when features and names have changed into *ectocyst* and *entocyst* - or some weeks old - now *amniotic sac* and *embryo* - or some months old - *membranes* and *fetus* - always there is that duality. Do the processes in the embryo go from outside to inside? For example in the second and third week from this *outer body* a stream of blood and nourishment has to be developed in order to assure the existence of the *central body*. The first appearance of a heart represents the center of this whole entity at that moment. If not, the *center* will get loose of its periphery and might die resulting in a miscarriage. A dangerous threshold has to be taken between the second and third week: the embryo comes from a more peripheral existence (*yond*) to an existence in the center (*here*). It so to speak comes more *to earth*. It is incarnating deeper into the body. Is the whole of embryonic development a process of incarnation, an en-velopment? This duality in prenatal existence, this *two-bodiness* has to be taken seriously. Our *envelopments* (the *peripheral body*, the membranes and placenta) are not supplements or appendices like regular embryologists and gynecologists apparently want us to believe! The dynamics of the embryo show us that the *central body* is coming forth out of the *peripheral body*. It emancipates from it in a process of gaining independency (autonomy). Then at birth a kind of untying process takes place and a human being comes to appearance by a kind of dying process, dying *out of his self*. The whole prenatal development process also bears the signature of *coming to earth*, of emancipating from a peripheral (spiritual?) dimension. Is it not meaningful that in the German language birth is called *Entbindung* (translated as de-composition). What was linked and connected is being untied and dissolved. Being de-livered like in the event of dying? Like on the deathbed soul and body are separated, being born could be described as a process of dying from ones own context. (See the text on page 16).

A TALE ABOUT AN UNIMAGINABLE EXISTENCE

Imagine you are (still) a fetus. *Thinking* that the world is like you, know and experience him at that time. How else could you imagine? You just awoke in this world, in this reality. You awoke by opening and discovering your senses, you are still dreaming and slowly, step-by-step you are becoming aware of things, of the world around you. Your experience does not reach beyond a warm mantle of water. Dim warmth enfolds you, you know yourself carried in a rolling, softly giving cover. Consciousness does not go beyond that. There is darkness, now and then a softly shining light. Vaguely soft rumors are heard. Voices and a murmuring sound of a heart. It is there, all around you. Things do not have names yet: there are no notions yet. You might think: "This is ít, this is the world, reality, so what will my existence be like." How could you know better?

And you become attached to this world. With complete surrender you build roots of confidence and being in this world, in this living mantle of membranes and placenta. That is your safety and surety. That is where you find breath and nourishment, in here you exist, in here you root. A solid and safe base, *ground* under your feet. "Look at me, hanging on life-long cords" as the poet says. Imagine you are (still) a fetus and might think: "This is the way it is, this is the way it should be. This is life, existence; this is my reality, my world."

And then ....! Then comes a moment that the ground of membranes and covers under your feet start to shake, start to fail, to give way! Once reliable and safe connections shift. Blood vessels are torn, breath is nearly taken away! That confident bag that carried you starts to (re)move you. You are driven out, out of your paradise, your foundations are faltering. The water that carried you all that time, that protected, fed and covered you, flows away. You are driven out! Out? To where? Is there an *outside*? There is no such thing as *outside*, there is no *there*, there is no other way of living, of being! It is UNIMAGINABLE that you could go on without that well-known world in which you awoke, that carried you and that you trusted! You are in pain, in distress, you are dying …!

But then....! The UNIMAGINABLE happens! At the end of a narrow, dark tunnel you live! It is possible! Air singes your lungs, but you can breathe. It is an unknown way of life. There is light and hard sounds, but also warm hands and arms that carry and comfort you. You also can eat and be fed: there is a warm breast where you can come home again.

Is it not the same kind of notion that hinders us to look over the frontier of our death now? How UNIMAGINABLE it is that we could survive without all this that represents our world, our current reality? This body, so familiar and a trusted house, all life long. This world in which I am safe and sure of my being alive. Could there be a *somewhere else*, a *somehow else*? An existence *out there*? It cannot exist, it is unimaginable.

Imagine you are fetus again, in this reality, in this world! That one day you might be born through a tunnel into another way of being, living on at the *other side*? The unimaginable as a possibility? And who knows, is someone waiting for you in that other world, are they aware of you there during pregnancy?

Being born: dying out of the coherence and wholeness of our prenatal existence, coming from a *there* to a *here*. Dying: going away from *here*, being born in a *there*, on *the other side*? Being born and dying, two sides, two aspects of a similar, of the same motion?

JvdW

Conclusion

Daddy, where do I come from? For most people this seems to be a nonsense question in a decade in which everyone is indoctrinated with the dogma and articles of faith from modern natural science. Many children will get the answer that they *come from* daddy's sperm or from *mommy's belly*. Nowadays we make and even manufacture babies and many people are convinced that their thinking is scientifically proper and objective when they state things in this way. This article outlines, more or less, an embryology that justifies naming embryonic and prenatal existence as Being and Becoming human. It is an embryology that is rooted into and is based upon *objective* facts and phenomena as well as its natural scientific counterpart but that might surpass it. It is an embryology that offers a view on **human** performance in that mute and silent existence where we still write our biography in biological sentences and conditions. It is where the unique entity, person or *entelechie* that we all as human beings are, is not out of the game (or *is not present yet*) but wrestles himself, herself to light through biological performances as well as conditions of cells, genes and so on. It is an embryology that eventually has to answer the question where did I come from asked by nearly every child to his or her parents: "Well, you came from heaven, my child. I did not make you, nor did your mother do so. You are yourself; you belong to no one else. Go your way and become yourself. At the end you will finish and complete the road you journeyed upon and that includes your biological existence. Go then, till the last moment, to the meaning behind the last sentence that will make the world and us clearly see **who** actually the person, the one who was here was. Then people may read from your biography: Ecce Homo. *Look, it was this human amongst us*.

Jaap van der Wal November 1997
(August 2003)

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Jaap van der Wal. J.C. van der Wal, MD PhD. Born: 17-02-1947. Completed medical study in 1973. Worked after that as associate professor in anatomy and embryology at various universities in Holland. Graduated in 1998 on a thesis about proprioception. Particular interests: embryonic development – evolution – genetics – philosophy of science. Major inspiration as to image of man is the anthroposophy of Rudolf Steiner. Tries to bridge between natural science and spirituality by means of the phenomenological approach of Goethe. Nowadays connected to the University Maastricht, Holland.

CONCEPTION

I wish to give us a child.
Not just nothing but a sum
of two kinds of genes,
or just an accident
in a sea of time.

But .....
a wonder,
suspended in the safe blue
ocean of your lap.

Become,
Created,
in that very one moment,
that I was you
and you were me
and we found and met
the Other.

JvdW