Primal Health Research: Four Essays

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Full Text: Michel Odent, M.D. I. The Primal Period of Spiritual Heroes INTRODUCTION The definition of "Primal Health Research" is simple and straightforward. It is a framework that includes any study exploring the links between the primal period (from conception until the first birthday) and health and behavior later on in life. Despite an apparently precise definition, the limits of the framework are vague, as vague as the words "study" and "research". Those who have subscribed to our newsletter since its beginning in 1993 and those who use our data bank probably associate "Primal Health Research" with epidemiological or experimental studies published in scientific or medical journals. In this issue, I'll try to enlarge the concept and analyze the teachings of well-known legends. Legends are like living organisms: they are transmitted through a process of natural selection. When they carry valuable messages about human nature, they are more likely to disseminate and to survive over the milleniums. Today, many legends seem to be a way that human groups have kept old messages alive through the centuries, although they did not have all the keys to decode them. It is significant that, in the biography of ordinary people, details about their primal period are not usually mentioned. Most biographies only indicate their subject's date of birth, and then jump from social background to childhood and education. In the case of spiritual heroes, the primal period is also a part of the legend. Let's comment on the word "legend". When considering the lives of legendary people, we place ourselves outside the fields of history, of religion, or of theology. Our subject is the vision of our heroes as it has been passed down over the centuries, not only by the scriptures and the various churches, but also by painters, poets, musicians and other media. Let me now illustrate the primal periods and childhood environments of several legendary characters. Aphrodite was miraculously conceived when Cronus severed the testicles of his father Uranus and threw them into the sea. Aphrodite was born from the foam of the waves-outside of the human community. The conception of Buddha was also miraculous and unreal. After 20 years of sterility, Maya had a strange dream in which she saw a white elephant entering into her womb through the right side of her chest, and she became pregnant. Buddha was born outside the human community as well, in the Lumbini Garden, while his mother Maya, who was travelling, had a rest among Ashoka blossoms. "In delight she reached her right arm out to pluck a branch and so Buddha was born ... and Heaven and Earth rejoiced." The life of Buddha as a baby was an accumulation of extraordinary and significant events. At his name-giving ceremony, when he was five days old, experts interpreting bodily marks confirmed his exceptional future so that the child was given the name Siddhartha (one whose aim is accomplished). His mother, Queen Maya, died two days later. This implies that Buddha had several mothers during his primal period and was probably breastfed by Maya's sister, who not only was the second consort of the king, but also gave birth to a baby boy at about the same time. It is likely that Maya's friend Lotus, who also had a baby born soon after Buddha, was also his wet nurse. A significant incident occurred when Buddha was still a toddler. One day during the plowing festival, he was supposed to be with his nurses in a tent under a jumbu tree, but was in fact left unattended because the nurses wanted to have some fun amongst themselves. The toddler was probably terrified. He was found absorbed in a trance, seated cross-legged in the posture of a yogi. Long after, in the Great Discourse to Saccaka, Buddha mentioned attaining the first jhana (i.e., trance) under the jumbu tree. He himself suggested a link between the state of trance he had found as a toddler and attaining Enlightenment more than thirty years later. The primal period of Moses was also unique. He was born at a time when the Egyptians had ordered that all Hebrew newborn boys should be drowned, so his mother hid him for three months and then set him afloat in a reed basket on the Nile. The baby

was found by the pharaoh's daughter while bathing, and he was raised at the Egyptian court. From this episode of the legend, one can conclude that Moses was a highly beloved baby and that his parents did all they possibly could for his survival. We can imagine that Moses spent the very beginning of his life with his highly protective birth parents, and that later Moses had several other mothers during his primal period. When Moses was a toddler, an apparently minor event occurred which took on literally vital proportions in the context of the Egyptian court. Moses was playing with Pharaoh and innocently took hold of his crown and placed it on his own head. Consternation and horror swept the palace. Was this an omen that the young Hebrew would one day destroy the Pharaoh and his evil dynasty and take his place? The onlookers became paralyzed and dumb with fear. The atmosphere was tense. Finally, a test was devised. Two bowls were brought, one filled with chunks of shiny gold and the other with pieces of burning coal, and were placed in front of Moses. Were he to take a piece of the gold this would indicate that he would one day usurp the throne and should therefore be killed immediately. Were he to take one of the red hot embers, he would be declared innocent. In the legend, Moses moved his hand towards the bowl containing the gold and was just about to take some of the precious metal when, feeling the mounting suspense, he moved his hand away to the bowl containing the fiery coal. Of course he burnt his fingers and put them to his mouth so that his lips also were burnt. The atmosphere resulted in a terrified youngster who behaved in a trance-like state. Historians of medicine studied this episode in depth in order to interpret Moses' probable stammer and probable left-handedness.1 Today, there is evidence that stammers may be caused by emotional stress combined with mental conflicts occurring at the same time. The legend of Jesus contains countless details about his primal period. Jesus' conception-involving the Holy Spirit and announced by the Angel Gabriel-was miraculous. It occurred outside the realm of space and time reality. This conception was a blessing. "Rejoice, highly favored one ... blessed are you among women ..." The birth of Jesus in a stable, among mammals, is a well-known episode of the legend. Certain details were passed down in particular by the protogospel of James, suggesting that Mary had complete privacy when giving birth, as Joseph had left the stable in search of a midwife. When he came back with a midwife, Jesus had already been born.2,3 It was only when a dazzling light had faded that the midwife realized that she was facing an incredible scene. Jesus had already found his mother's breast! According to Jacob Lorber, in his book about the childhood of Jesus, the midwife said, "Who has ever seen a hardly born baby catching his mother's breast? This is an obvious sign that when he becomes a man, this child will judge the world according to Love and not according to the Law!" The primal period of Muhammad is also special. Muhammad was born after the death of his father. This seems critical. The night when Amina gave birth to Muhammad, the sky was illuminated by such a bright light that she could see even the souks in Damas. After his birth, Muhammad was separated from his mother and breastfed by a wet nurse from a nomadic tribe before spending some time in the desert. The decision to give the baby to a wet nurse was probably taken by the authoritarian paternal grandfather who was the head of the prestigious Hashem clan and prominent in Mecca politics. There are intriguing similarities between these legends. The primal period of such heroes can be described as extraordinary. This phase of their lives was influenced by the fact that they had a certain relationship with political leaders. Buddha was the son of King Suddhodana and Queen Maya. Moses was raised in the Pharaoh's palace. Jesus was "of the seed of David" and Muhammad was under the care of his paternal grandfather, a leading man in Mecca. We might add that Aphrodite had a powerful father, since Uranus was the personification of Heaven. Ecstatic states are often mentioned or suggested during the primal period of these heroes. The conceptions of Buddha and Jesus were miraculous, orgasmic, out of space and time. The dazzling lights that accompanied the birth of Jesus and Muhammad are also metaphors for ecstatic states. It is significant that both Maya and Mary gave birth in complete privacy-outside the human community. Having privacy, "not being observed," is a necessary condition for a woman in labor to reach an orgasmic state. Privacy ensures that a woman will have little to no external stimulation to interrupt the production of oxytocin, the hormone present in orgasmic states. The importance of the message is perceived when recalling that all cultures tend to socialize birth. All cultures transmit beliefs and

rituals that disturb the physiological processes and distract the mother at the time of the first contact with the newborn baby (for example, there is a cross cultural belief that colostrum is harmful). There are also striking similarities between the trance-like states reached by Buddha and Moses when they were toddlers. Both incidents happened to boys without the protection of their biological mother. It is noticeable that Buddha, Moses and Muhammad were deprived of their biological mother after their births. All these similarities were ignored before the age of "Primal Health Research". In the current scientific context it appears that our health, our behaviors and our capacity to love are to a great extent determined during the primal period. Twentieth-century scientific data is able to provide keys to perhaps decode old messages. REFERENCES 1. Garfinkel H. A. (1995). Why did Moses stammer? And was Moses left-handed? J. Royal Soc. Med., 88, 256-257. 2. Evangelicum Jacobi Minori. XK.2, quoted in Jesus by Jean Paul Roux (1989). Paris: Fayard, p. 100. 3. Jacob Lorber. L'enfance de Jesus (Chap.16). Paris: Editions Helies. II. The Long Term Consequences of How We Are Born If I were asked to explain what the terms "crisis" and "critical period" mean, I would take birth as an example. The period surrounding birth represents a short period of time when our capacities to adapt are more suddenly and intensely challenged than ever. It appears "critical" for many reasons. We'll focus on two perspectives: (1) With birth, the gas exchange by the placenta is replaced by the gas exchange via the lungs. In other words, babies must breathe and rely on their lungs. These changes lead to an increase of roughly ten-fold in the blood flow of the pulmonary arteries and a corresponding decrease in the vascular resistance of the lungs. The transient lack of oxygen may be longer among some babies than others. (2) Data from multiple scientific perspectives confirm that the period surrounding birth is important for the development of the capacity to love-data offered by ethologists, scientists who study the behavioral effects of hormones involved in childbirth, and scientists who study the redistribution of brain receptors, etc. For many cultural and medical reasons, there is a great diversity of situations regarding the first contact between the mother and baby. All cultures do not disturb this first contact in the same way and to the same degree. If we keep in mind these two aspects of birth as a crisis, one can anticipate two types of long term consequences of how we are born. This anticipation is confirmed by an overview of the Primal Health research data bank. ADAPTABILITY TO OXYGEN DEPRIVATION: FROM A PRIMAL HEALTH PERSPECTIVE This issue, from a primal health research perspective is represented in our data bank by one important study. A team of Swiss researchers reviewed the records of all children admitted to the neonatal-care unit of the Lausanne University Hospital for Children between 1972 and 1979.1 They identified 15 subjects born near term who had been in a persistent state of hypoxemia (low level of oxygen in the blood) even during ventilation with oxygen. This was interpreted as a sign of pulmonary hypertension during the first week of life. Ten of them (three women and seven men) agreed to participate in a study when they were in their twenties (mean age 21). They were compared with ten healthy young volunteers (four women and six men) who were part of the same age-group born in Lausanne, and who had experienced no complications at birth. Some weeks after a "baseline examination" at an altitude of 580 meters (atmospheric pressure of 710 mm Hg), the participants ascended in groups of two to four from an altitude of 1130 m to an altitude of 4559 m (atmospheric pressure of 440 mg Hg) within a period of 22 hours. They were then transported by cable car to an altitude of 3200 m and climbed for an hour and a half to an altitude of 3611 m where they stayed overnight. On the next day, they climbed four and a half hours to the high-altitude research laboratory at Capanna Regina Margherita. The laboratory tests clearly demonstrated that the mean increase in pulmonary-artery pressure at high altitude was significantly greater (P=0.01) in the participants who had had pulmonary hypertension during the week following their birth. These findings suggest that a transient insult to the pulmonary circulation leaves a persistent imprint which, when activated in adult life, predisposes to a pathological response. CAPACITY TO LOVE: FROM A PRIMAL HEALTH RESEARCH PERSPECTIVE From an overview of our data bank, it appears that when researchers explored the background of people who have expressed some sort of impaired capacity to love-either love of oneself or love of others-they always detected risk factors in the period surrounding birth. Furthermore, when such correlations have

been highlighted, it was always related to an important current sociological concern. Violent Criminality Juvenile violent criminality is undoubtedly topical. It can be regarded as a form of an impaired capacity to love others. Adrian Raine and his team from the University of California in Los Angeles followed 4,269 male subjects born in the same hospital in Copenhagen.2 They found that the main risk factor for being a violent criminal at age 18 was the association of birth complications, together with early birth separation from or rejection by the mother. Early maternal separation-rejection by itself was not a risk factor. Self-destructive Behaviors Teenage suicide (previously almost unknown) is another important issue specific to our time. Lee Salk and colleagues, researched the backgrounds of 52 adolescent suicide victims who died before their 20th birthday, and compared them with 104 controls.3 They found that one of the main risk factors for committing suicide during adolescence was resuscitation at birth. Bertil Jacobson of Sweden studied in particular how people commit suicide. In his first study, he looked at birth record data gathered for 412 forensic cases comprising suicide victims and compared them with 2,901 controls.4 He found that suicides involving asphyxiation were closely associated with asphyxiation at birth; suicides by violent mechanical means were associated with mechanical birth trauma. In his last study, Jacobson confirmed that men (but not women) who had traumatic births are five times more at risk of committing suicide by violent means than others.5 Jacobson explored the background of 242 adults who committed suicide by using a firearm or by jumping from a height, or by jumping in front of a train, or by hanging, or by laceration, etc. comparing them with 403 siblings born during the same period and at the same group of hospitals. Many possible confounding factors were considered. The differences between men and women disappeared if their mothers had used pain killers of the opiate family when in labor. It seems that the long term side effects of pain killers such as morphine or different sorts of synthetic morphine are different. They include drug addiction. Jacobson also studied drug addiction. He and Karin Nyberg looked at the background of 200 opiate addicts born in Stockholm from 1945 to 1966 and took non-addicted siblings as controls.6 They found that if a mother had been given certain painkillers during labor, her child was statistically at an increased risk of becoming drug-addicted in adolescence. Autism and other aspects of the "autistic spectrum" can also be presented as the expression of an impaired capacity to love. Autistic children and autistic adults do not socialize. As teenagers, they cannot manage dating. As adults they do not have children. My interest in autism started in 1982 when I met Niko Tinbergen, one of the founders of ethology, who shared the Nobel prize with Konrad Lorenz and Karl Von Frisch in 1973. As an ethologist familiar with the observation of animal behavior, he studied in particular the non-verbal behavior of autistic children. As a "field ethologist" he studied the children in their home environment. Not only could he offer detailed descriptions of his observations, but at the same time, he listed factors which predispose to autism or which can exaggerate the symptoms. Tinbergen found certain factors evident in the period surrounding birth: "deep forceps" deliver, birth under anesthesia, resuscitation at birth and induction of labor. When I met him, he was exploring possible links between difficulty in establishing eye-to-eye contact and the absence of eye-to-eye contact between mother and baby at birth. His data were not presented in statistical language and he had no control groups. However, the work of Tinbergen (and his wife) represents the first attempt to explore autism from a Primal Health research perspective. It is probably because I met Niko Tinbergen that I read with special attention, in June 1991, a report by Ryoko Hattori, a psychiatrist from Kumamoto, Japan.7 Mrs. Hattori evaluated the risks of becoming autistic according to the place of birth. She found that children born in a certain hospital were significantly more at risk of becoming autistic. In that particular hospital, the routine was to induce labor a week before the expected date of delivery and to use a complex mixture of sedatives, anesthesia agents and analgesics during labor. Interest in such studies is enhanced at a time when we know more about the hormonal profile of autistic children and the particularities of their brain structures. Oxytocin, in particular, appears to be a promising avenue of research. Let us recall once more that oxytocin-which is instrumental in contracting the uterus for the birth of the baby and the delivery of the placenta-is also an altruistic hormone, a "hormone of love". It seems that the oxytocin levels are comparatively low in autistic children,8 and there have been attempts to treat some

of them with oxytocin. I assume that one day the way autistic children release oxytocin will be explored. It seems that oxytocin is more effective when released rhythmically with a fast succession of pulsations. It is not utopie any more to measure the rhythmicity-the pulsatility-of oxytocin release. CONCLUSIONS The results of the main studies which have detected links between how people are born and different forms of an impaired capacity to love, have been published in very authoritative medical journals. However, they are comparatively unknown and are not taken into account in most subsequent articles. This is a common characteristic between them. For example, a large review article in the British Medical Journal about autism did not mention any of these studies exploring correlations with the primal period.9 One can also wonder why most of these studies are not repeated by a greater number of researchers. Can research be politically incorrect? The period surrounding birth appears "critical" for many other reasons. It is also the time when the germ free fetus enters the world of microbes, when the baby must suddenly adapt to differences of temperatures and the time when the young human being starts experiencing gravity. This indicates what further research should be done. REFERENCES 1. Sartori, C., Allemann, Y., Trueb, L., et al. (1999). Augmented vasoreactivity in adult life associated with perinatal vascular insult. Lancet, 353, 2205-2207. 2. Raine, A., Brennan, P., &Medink, S. A. (1994). Birth complications combined with early maternal rejection at age 1 year predispose to violent crime at 18 years. Arch. Gen. Psychiatry, 51, 984-988. 3. Salk, L., Lipsitt, L. P., et al. (1985). Relationship of maternal and perinatal conditions to eventual adolescent suicide. Lancet, 1, No. 8429 (March 16), 624-627. 4. Jacobson, B., Eklund, G., Hamberger, L., Linnarsson, D., Sedvall, G., &Velverius, M. (1987). 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Gaps in Primal Health Research INTRODUCTION To date, the "Primal Health Research data bank" contains hundreds of references and abstracts. At first sight "Primal Health Research" is in progress. In fact, when considering the number of papers that are published every day in the scientific and medical literature, it appears that most epidemiologists are strangers to this framework. They do not have the "Primal Health Research Reflex". When studying behaviors or states of health in adolescence or adulthood, they rarely try to know what happened to the mother when she was pregnant, how she gave birth or how the baby was fed. When studying events that can occur during the primal period, for example an obstetrical intervention, they only consider the short-term consequences. This is remarkable in the age of computers, a time when it is easier than ever to explore correlations between different phases of our life. If American, Western European, Japanese, and Australian researchers were as curious and productive as the Swedish in this field, our data bank would explode! Our data bank can be considered a tool that facilitates a new awareness. The concept of primal health research stimulates curiosity. It inspires many questions. I am familiar with these questions. They are either expressed orally, for example at the end of a lecture, or by e-mail. I must confess that one of my most common answers is: "This is an interesting question. Unfortunately, there is still a gap in primal health research regarding this issue". Frequently asked questions One of the most frequently asked questions is about the long term consequences of being born by caesarean section, particularly elective caesarean. What do the caesarean born people have in common when adults? Such questions are of paramount importance at the age of elective caesarean on demand, particularly in certain Latin American cities where the rates of C-sections are above 50%. There are many anecdotes confirming that when doctors discuss the topical issue of C-section on demand-that is without any medical indication-they only think of the possible short-term consequences. Those who support such

attitudes underline that today a planned C-section is a very safe operation and they focus on the risks for the perineum, which are particular to vaginal birth. Those who do not support such attitudes walk into the trap of being stuck in sterile discussions by sharing the same short-term perspectives. They never think that the way we are born may have long term consequences. They never try to enlarge the topic by stressing that, where human beings are concerned, we must also think in term of civilisation. What is the future of a civilisation born by caesarean? In spite of the paramount importance of this frequently asked question, there is a lack of available hard data. Our data bank only mentions two relevant studies (key word "caesarean delivery"). Both studies are by the same Finnish team about the risk of having asthma in relation to caesarean birth. The most recent one, dated April 2001, is about 1,953 subjects born in 1966. At the age of 31 years, those born by caesarean had a risk of being diagnosed as having asthma multiplied by 3.23. This study did not separate emergency operations and planned operations, but one can assume that in 1966 most caesareans were performed during labour. The same key word leads to another study, which is not very useful in the context of the year 2001. It is about 97 subjects born by caesarean in 1952-54 after a long labour. These subjects had an average low IQ later on in life. Fifty years ago, most caesarean sections were performed in extreme situations as a last resource, so that such findings cannot inform our understanding of the effects of operations performed in a modern context. Another frequently asked question is about the possible long-term effects of being born after induction of labour. In fact there are similarities with the issue of elective caesarean, so far as both induction and elective caesarean imply that the fetus and the maternal body do not play any role in the initiation of labour. In certain cities the rates of induced labour are in the region of 20%. Among the rare studies in our data bank found via the key word "labour induction" are those by Niko Tinbergen and Rioko Hattori about autism. A paper by E.A. Friedman and colleagues is more specifically about induced labour, but the follow-up of the children was short (between 23 and 56 months). It is noticeable that the results of this study suggest that the use of oxytocin in order to initiate labour is associated with more developmental and neurological abnormalities than the use of prostaglandins. The common sense and the intuition of many women indicate the need for further research addressing the issue of long-term consequences. Such studies would be feasible in places, such as several British cities, where the rates of induction were high in the mid 1970s. Dyslexia is topical. However the key word "dyslexia" leads to only one entry. It is a Norwegian study looking at school performances at age 8 to 9 in relation to routine ultrasonography in utero. Six-hundred-and-three children had specific tests for dyslexia. According to this study routine exposure to ultra sound during fetal life does not influence the risk of being dyslexic. Many other possible risk factors for dyslexia might be taken into consideration. It is noticeable that neither "attention deficit disorder" nor "hyperactivity" are included in our list of key words, whereas lay people are highly curious about these conditions, which are apparently more and more common. If lay people could participate in the establishment of research protocols, attention deficit disorders would jump at the top of the list of current preoccupations. I received a message by a French jurist who is constantly close to prisoners and who is teaching criminology in a university. When exploring our data bank she suddenly realised that there are probably risk factors for becoming a violent criminal in the primal period. There are such a small number of studies from a primal health research perspective that she had never heard of them. It is significant that, at a time when many forms of violence are increasing, nobody wants to explore a possible link with the evolution of obstetrics these past 30 years. The most intriguing gaps are about early multiple vaccinations. It is impossible to find a prospective randomised controlled study about the long-term effects on health of different combinations of vaccinations during the primal period. The case of centenarians illustrates the widespread, even cultural, lack of interest for the root of health. Every day journalists interview healthy centenarians and try to unveil their secrets. The questions (and answers) never deviate from certain aspects of lifestyle such as nutrition and patterns of diet, sleeping patterns, physical activity, level of education, socio-economic status, consumption of alcohol and cigarettes, the purity of the air where people live, the ability to manage stress, the number of children they had and at what age (most centenarians are women) etc. Now and

then there are allusions to genetic factors via details about the longevity of the parents and other members of the family. The questions are not basically different when the approach is more scientific. The best example of scientific study is the New England Centenarian Study, which began in 1994 in the Boston area. It is clear that nobody wants to know about the primal period, that is, the time when our basic adaptive systems are in a phase of development and have not yet reached their maturity.1 Common sense indicates that any event occurring during this phase of development should have long-term consequences. Where does this lack of interest for the primal period come from? What a waste of money and what a waste of time and expertise in health research! THE SCIENTIFICATION OF FORGIVENESS To date the capacity to forgive is the only aspect of the capacity to love that scientists are able measure. This would make easy studies from a Primal Health Research perspective. Yet, instead of wondering how the capacity to forgive develops, researchers prefer to address usual questions about the value of therapeutic intervention in order to help people to forgive, or to look at forgiveness as a psychotherapeutic goal, or to look at forgiveness in relation to other personality traits. I use this opportunity to offer to subscribers one of the additional chapters included in the forthcoming second edition of my book "The Scientification of Love". Chapter 16 of the new edition is called "The Scientification of Forgiveness". The other additions provide data that are familiar to the subscribers of our newsletter, because they were included in the essays about "antenatal scare", "pre-eclampsia" and "from fetal vulnerability to adult adaptability." The capacity to forgive is in itself a subject that deserves to be studied in depth. We all have the experience of situations when our capacity to forgive has been put to the test and, on the other hand, of situations when we wanted to be forgiven. However (after emphasizing the weaknesses of the studies about centenarians) I include this chapter first as a way to analyze again a common scenario in modern research: researchers have at their disposal a precious "material", but they waste it because they do not yet have the "Primal Health Research Reflex". How can we facilitate the development of this "reflex"? Why have most academic researchers not yet realized that human life starts at conception? CHAPTER 16 The capacity to forgive may be presented as a facet of the capacity to love. Forgiveness has been held as an important virtue by most societies throughout history and around the world. This facet of the capacity to love is of paramount importance at a time when Humanity must invent new strategies for survival. The necessary dialogue between Humanity and Mother Earth remains impossible as long as old conflicts between ethnic groups and nations are not overcome. Developing the capacity to forgive is the prerequisite to enter a new phase in the history of our species. A new phenomenon The scientific study of forgiveness developed during the very last years of the twentieth century. There was a landmark in October 1997. At that time the John Templeton Foundation invited more than forty scholars to participate in a conference in Holland, Michigan, in order to initiate forgiveness research and to establish a grant programme.2 This landmark was made possible thanks to preliminary steps dated 1992. Two teams then independently placed at the disposal of researchers psychometric instruments for measuring forgiveness. The Enright Forgiveness Inventory (EFI) is a 60-item scale. It has a scoring range of 60-360, with higher scores indicating greater forgiveness. The tests developed by Mauger are unique in that they attempt to measure forgiveness as a trait rather than as a response to an isolated interpersonal offence. They have a special interest in the framework of our study of the scientification of love because they distinguish the capacity to forgive others and the capacity to forgive oneself: "FOO scale" measures "forgiveness of others" while "FOS scale" measures "forgiveness of self."3 These measures are included as subscales of a larger personality inventory, the "Behavioral Assessment System" (BAS). Until now researchers have mostly used the Enright inventory. The published studies of the capacity to forgive can be classified in three groups according to their objectives. Some tried to test the efficacy of a therapeutic intervention. Others studied forgiveness as a psychotherapeutic goal. Others examined the relation of forgiveness to other personality traits such as anxiety, depression, religiosity and social desirability. Each group can be illustrated by an example of a published study. Examples A study by C. Coyle and R. Enright belongs to the first group. The objective was to test the efficacy of a therapy within a sample of men who identified themselves as being hurt by their female partner's decision to

have an abortion.4 The average time span between the abortion and study participation was six years. One group was randomly assigned to participate without any delay in a personalised specific psychotherapy that included a series of twelve 90-minute sessions. The other group was on a waiting list during twelve weeks. Before and after the therapy, the participants completed a series of tests, including the Enright Forgiveness Inventory; the other tests were the state anger scale, the state anxiety scale, a perinatal grief scale and a self-forgiveness scale. According to this study an intervention designed to promote forgiveness has therapeutic benefits in excess of what could be expected through the passage of time and repeated testing alone. A study by J. Hebl and R. Enright belongs to the second group. Women participating in this study were over 65 (mean age 74 and a half). They had reported a specific, painful forgiveness issue and were not currently grieving over a major loss.5 Some of them were randomly assigned to group therapies focusing on the concept of forgiveness. Others participated in free discussions on non-specific subjects. In both cases the sessions were an hour long and repeated during 8 weeks. Before and after the series, all participants completed tests measuring anxiety, depression and self esteem. At the end of the series they were tested with a simplified 30-item version of the Enright Forgiveness Inventory. They also completed a 16-item test called "willingness-to-forgive scale". Both the experimental and the control groups appear to have been therapeutic for participants. However, the experimental group appears to have met its goal of increasing forgiveness in its participants. Forgiveness, in turn, was associated with greater mental health within the entire sample. A study by M. J. Subkoviak and colleagues belongs to the third group. The objective was to study the relation of forgiveness to anxiety, depression, religiosity and social desirability.6 Three-hundred-ninety-four college students (204 females and 190 males) formed half the sample. Their mean age was 22. The other half consisted of their same-gender parents (mean age 50). Participants were asked to recall the most recent experience of being hurt deeply and unfairly by someone. They then completed the Enright Forgiveness Inventory. They also completed other tests assessing their anxiety, their sociability and their religious practice. Forgiveness was associated with lower anxiety scores, a relationship that was especially strong for students experiencing deep hurt. No significant correlations with depression were found. The student group appeared to find forgiveness more difficult than the parent group. Although there was no relationship between forgiveness and the seven-item religiosity measure, persons who were affiliated with a religion showed slightly higher levels of forgiveness than those who were not affiliated. THE FUTURE: How THE CAPACITY TO PARDON DEVELOPS It is noticeable that the capacity to forgive is the only facet of the capacity to love that researchers have tried to measure. It is also noticeable that until now researchers have not raised the fundamental question: "How does the capacity to pardon develop?" The Primal Health Research perspective offers new avenues for research. It should be possible today to explore the capacity to love in relation to what the birth was like, to what happened to the mother when she was pregnant, to the mode of infant feeding, etc. Both Primal Health Research and Scientification of Love are at an early phase of development. REFERENCES 1. Odent, M., (1986). Primal health. London: Century-Hutchinson. 2. Worthington, E. (Ed.) (1998). Dimensions of forgiveness. Templeton Foundation Press. 3. Mauger, P. A., Perry, J. E., Freeman, T., et al. (1992). The measurement of forgiveness: Preliminary research. Journal of Psychology and Christianity, 11, 170-80. 4. Coyle, C. T., &Enright, R. D. (1997). Forgiveness intervention with post-abortion men. Journal of Consulting and Clinical Psychology, 65, 1042-1045. 5. Hebl, J. H., &Enright, R. D. (1993). Forgiveness as a psychotherapeutic goal with elderly females. Psychotherapy, 30, 658-667. 6. Subkoviak, M. J., Enright, R. D., Wu, C., et al. (1995). Measuring interpersonal forgiveness in late adolescence and middle adulthood. Journal of Adolescence, 18, 641-655. 7. Reichlin, S. (1993). Neuroendocrine-immune interaction. New England Journal Medicine, 329(17), 1246-1253. IV. How Effective is the Accordion Method? Evaluating our Preconceptional Programme The development of our preconceptional programme ('accordion method') is now entering its sixth phase. Our new objectives cannot be understood without a reminder of the previous phases. PHASE ONE: KEEPING IN MIND OLD PREOCCUPATIONS In the early 1990s the preconceptional programmes were often limited to the prescription of supplements of folic acid (400

micrograms a day via enriched breakfast cereals or tablets), in order to reduce the risks of abnormalities of the neural tube such as spina bifida, anencephaly and encephalocele. These prescriptions were based on the results of studies published in prestigious medical journals1,2 and encouraged by huge public health campaigns. In the mind of many people folic acid was almost synonymous of preconceptional preparation. It was usual to associate these prescriptions with recommendations regarding smoking and alcohol consumption. More sophisticated programmes were taking into account around the dangers of mineral imbalances and deficiencies (zinc, magnesium, manganese, selenium, etc.) and the dangers of heavy metals (lead, aluminium, cadmium, mercury). Zinc, vitamins C and B, garlic were among the most common prescriptions, associated with dietary recommendations (eating organic, etc). PHASE TWO: NEW PREOCCUPATIONS In the late 1990s we could gather a sufficient amount of data to realise that one of the main threats for the health of the unborn generations is intrauterine pollution by fat-soluble man-made molecules. It would be difficult to give a comprehensive list of intrauterine pollutants. Let us just recall the name of some well-known families: dioxins (a family of 219 different toxic chlorinated chemicals), PCBs (more than 200 related compounds), APES (non ionic detergents), furans, PCDDs, trans fatty acids (introduced in the human diet via the processing of oils). Today we all have in our body hundreds of such molecules. They accumulate over the years in the adipose tissues and they have a long life. The prerequisite to realise the importance of the phenomenon is to establish links between a great diversity of recent data that are scattered in the scientific literature. Data regarding neurological and intellectual development were originally provided by researchers who wanted to evaluate the long-term effects of human milk pollution. Milk pollution is easily detected and therefore well documented. For example, according to a WHO survey, the daily estimated intake of dioxins and PCBs by breastfed infants in 1993-1994 was 170pg per kg body weight at 2 months, and 39pg at 10 months. The tolerable daily intake according to WHO is 10pg (the tolerable levels are based on lifetime exposure). Since in formula milk lipids are replaced by lipids of vegetable origin with a negligible content of PCBs and dioxins, the first question was: Do the well-known benefits of breastfeeding outweigh the theoretical risks associated with PCBs and dioxin exposure? A series of Dutch studies compared breastfed infants (at least 6 months) and formula fed infants. Results of 7 months, 18 months and 42 months follow-up assessments were published.3,4,5 No negative effects of exposure to PCBs and dioxin through breastmilk could be detected. After taking into account many associated factors, it appeared that the focus should be on intrauterine pollution. The negative effects of intrauterine pollution were detectable in all studies. Similar conclusions can be drawn from an American study of the intellectual functions of 11-year-old children. The authors recruited originally 212 babies born to mothers who had eaten Lake Michigan fish contaminated with PCBs.6 Concentrations of PCBs in maternal serum and milk at delivery were slightly higher than in the general population. Prenatal exposure was evaluated by measuring concentrations in umbilical-cord serum and by taking into account maternal serum and milk concentrations. When the children were 11 years of age, a battery of IQ and achievement tests was administered. Prenatal exposure to PCBs was associated with lower IQ scores after controlling for potential confounding variables such as socio-economic status. The strongest effects were related to memory and attention. The most highly exposed children were three times as likely to have low average scores and twice as likely to be at least two years behind in reading comprehension. Although larger quantities of PCBs are transferred by breastfeeding than in utero, there were only deficits in association with transplacental exposure. Dentists from Finland studying how polychlorinated chemicals interfere with tooth development also came to the conclusion that it is intrauterine pollution that really matters. They noticed that many children had poorly developed molars, discoloured and soft. The normal hard enamel coating was missing, making the teeth subject to decay. They took into account the effects of an accidental exposure to dioxins in Taiwan.7 Children whose mothers were exposed while pregnant showed tooth problems similar to those of Finnish children. Taking this as a clue, they combined animal experiments8 and clinical studies9 to reach the conclusion that mineralization defects of the permanent first molars were the best available indicator of dioxin exposure during fetal life. Reports in different countries indicate that the increasing

rates of disorders of the male genital tract are related to intrauterine pollution. More and more boys have undescended testicles.10,11 Hypospadias (the most common abnormality of the penis) is also more frequent. A recent analysis in the United States showed that the rate of hypospadias had nearly doubled in all 4 regions of the United States from 1970 to 1993.12 During the same period, testicular cancer rates have also increased.13 Today it is commonly accepted that most cancers of the testicles are the long-term effects of developmental defects during fetal life. The spectacular fall of the average sperm counts since the middle of this century represents the most intriguing sign of the increased vulnerability of the male genital tract.14,15 The only plausible interpretation is that all the synthetic polychlorinated chemicals that we accumulate over the years in our adipose tissues are hormonal disrupters. More precisely they mimic oestrogens Therefore they interfere with the development of the testis at the very beginning of intrauterine life. Not only is the male genital tract in danger, furthermore the rate of survival of male fetuses is dramatically decreasing. This is demonstrated by a study of the vital statistics in Japan that evaluated the dramatic increase of the male/female ratio of miscarriages.16 The numbers of fetal deaths in Japan were counted after 12 weeks of gestation, when it is possible to identify the sex of most fetuses. The male/female ratio of miscarriages between 12-15 weeks gestation increased from 2.52 in 1966, to 3.10 in 1976, to 6.19 in 1986, to 10.01 in 1996! The vulnerability of male fetuses to new environmental factors was already suspected after the publication of reports indicating that the proportion of males at birth has declined significantly in the past 3 decades.17 The male proportion among newborns in Denmark18 and the Netherlands19 have both declined in a parallel manner from the 1950s to the 1990s. There were similar trends in Canada20 and the USA21 for the period 1970 to 1990. For Canada, during this period, there was a loss of 2.2 male births per 1000 live births. In the USA, there was a decrease of 1.0 male birth per 1000 live births. It has been observed that in some Latin American countries22 the male proportion has also declined since the 1970s. Similar trends have been reported in Finland23 and in Italy.24 The current increasing death rate of male fetuses is obviously related to prenatal pollution. This interpretation is supported by the reports following the 1976 industrial accident at Seveso (Italy) which produced the highest documented community exposures to TCDD (one of the most toxic dioxins). Between 1977 and 1984, 48 girls but only 26 boys were born to parents exposed to TCDD.25 Trans fatty acids represent a particular group of fat-soluble pollutants. Today they are abundant in such foods as cakes, biscuits, French fries, fast foods, etc. A German team demonstrated that they cross the placenta and have adverse effects on fetal growth.26 An American team found a correlation between the maternal intake of trans fatty acids and the risk of pre-eclampsia, a maternal disease that can have long term consequences for the child. PHASE THREE: THE EMERGING CONCEPT OF MALE MEDIATED DEVELOPMENTAL TOXICITY In 1999 this concept appeared for the first time in a main stream medical journal. According to a study from Montreal published in the Lancet, when a man is more exposed than most men to polychlorinated chemicals, his children are at increased risk of acute lymphoblastic leukaemia, which is the most common form of cancer in childhood.27 Soon after we learned from another study in the Lancet the results of an enquiry regarding the population accidentally exposed to high concentrations of dioxins in Seveso, Italy, in 1976. It was revealed that fathers exposed when they were younger than 19 sired significantly more girls than boys (sex ratio 0.38). We are probably at the dawn of a new era of research inspired by this emerging concept. A study looked at the reproductive effects of paternal exposure to chlorophenate wood preservatives in the sawmill industry.28 The authors identified 19,675 children (born between 1952 and 1988) of 9,512 fathers who had worked at least one year in British Columbia sawmills where dioxin contaminated chlorophenates had been used. The controls were matched for year of birth and gender. The children of male sawmill workers were at increased risk for developing congenital anomalies of the eyes, particularly congenital cataracts; elevated risks for developing anencephaly or spina bifida and congenital anomalies of genital organs were shown according to specific windows of exposure. Animal experiments had been instrumental in introducing and developing the concept. There have been countless studies of alterations in offspring of experimental animals following paternal exposures to miscellaneous chemicals. The effects

include decreased litter size and weight, increased stillbirth and neonatal death, birth defects, tumours, and behavioural abnormalities-some of these effects being transmitted to the second and third generations. A review article of such experimental studies came to the conclusion that paternal exposures may contribute to the incidence of a great variety of disorders in humans.29 PHASE FOUR: TOWARDS NEW STRATEGDSS This list of preliminary warnings will probably lengthen in the near future. Meanwhile preconceptional programmes must adapt to these new preoccupations. Any new strategy must take into account that most new synthetic industrial chemicals accumulate and persist in the adipose tissues (of women and men), even after their environmental levels have fallen. There may be a very long time lag between exposure and effect. The only rational approach one can offer is based on lipid mobilisation: the primary objective should be to renew the stored fats. Fasting30,31,32 and physical activity33 are two mechanisms that tend to mobilise stored lipids and fat soluble chemicals. When there are more free fatty acids in the blood and therefore more fat soluble chemicals, the human body must rely on extra hepatic and extra renal means of excretion: human livers are incapable of detoxifying chemicals to which they have not been exposed during millions of years of evolution, and the kidneys cannot eliminate fat soluble substances. The human body must rely on sweat and intestinal excretion. Fat soluble contaminants such as dioxins diffuse across the intestinal wall and are attracted by the fat contained in the intestinal lumen. Our preconceptional programme ('accordion method') takes all these facts into account. It is based on a series of short repeated semi-fasting sessions. The principle is to lose weight and to mobilize fatty acids during each session and to recover immediately one's previous weight between two sessions ('accordion'). The duration of each session is about 2 or 3 days. During such a session there is no other food available than a specially designed cocktail made from a mixture of maple syrup, palm tree syrup and lemon juice. Cayenne pepper is added after dilution (a way to slightly increase the body temperature). The cocktail can be consumed at any time without any restriction. Its mineral content is exceptionally rich. The ratio of zinc to manganese to iron is ideal (in the region of 5:2:1). The ratio of calcium to magnesium is around 2.5 to 1 and the ratio of potassium to sodium around 10 to 1. The lemon juice represents the main source of natural vitamin C. During a session steam baths, saunas and exercise are combined. Physical activity is adapted to individual lifestyles. Women must make sure that they cannot become pregnant before, during or immediately after a session, when they have more pollutants in their blood. For obvious reasons the point is not to reach a complete renewal of the stored fat. It is to minimise the possible effects of pollution on the offspring, should a conception occur. PHASE FIVE: EVALUATING THE FEASIBILITY OF THE PROGRAMME After establishing such a strategy, we had first to evaluate the feasibility of the programme. We first tested group sessions. We had friendly and interesting weekends. The participants were gathered on Saturday and Sunday. The conversations about all topics that are interesting for parents-to-be were interrupted by steam baths, saunas and fast walks on the local hill. On Friday the participants had already reduced their calories intakes by relying on vegetable soups and fruits. On Monday the return to the usual food intake was gradual. The participants were educated as to how to repeat the sessions at home at a rhythm of about once a month. During such sessions we collected interesting preliminary observations. At the beginning of the second day everyone was invited to talk about himself or herself. Many participants mentioned headache and lack of concentration. Most of them also mentioned that they had a good night sleep after the first day and that they did not feel hungry at all. The tongues appeared whiter than at the beginning of the first day. At the end of the session it was euphoria that was reported. Several participants thought that more pepper had been introduced in the cocktail, compared with the previous day: this was a sign of a more acute sense of taste-smell. There were obvious signs of weight loss. For example, a woman noticed that she could easily take off her ring. We had at our disposal a Japanese measuring device that evaluates the proportion of body fat. Before the session the extreme numbers were 22% and 35%. At the end of the session the fat loss was between 1 and 3 units. Furthermore we tested the acceptability of laxative tea bags containing Senna. Although these group sessions were useful in evaluating the feasibility of the programme, we had to replace them by personalized consultations. The group sessions

were difficult to organize because very few couples could participate together and in general only women were coming. We must add that many couples seem to need to talk about their particular case. Furthermore when the man is involved from the very beginning, there is a reinforced shared motivation. PHASE SIX: EVALUATING THE EFFICACY OF THE PROGRAMME The time has come to evaluate the efficacy of the programme. This will be possible thanks to the co-operation of Dr Vyvyan Howard, a well-known expert in fetal and infant toxico-pathology. The first step of the project will be to recruit twenty women aged 20 to 30. We assume that the results will be more easily interpreted if all the participants belong to the same age group and the same sex. Such recruitment should be possible on the net, via specialised agencies that have at their disposal mail lists classified according to such criteria as age. For each participant the programme will include five sessions over a period of five months. The programme will be preceded and followed by a lipid biopsy. A lipid biopsy is about as invasive as taking a blood sample. In the fatty cells it will be possible to compare the amount of fat soluble chemicals, particularly polychlorinated chemicals, before and after the series of sessions. REFERENCES 1. MRC Vitamin Study Research Group. (1991). Prevention of neural tube defect. Lancet, 338, 131-37. 2. Czeizel, A.E. (1992). Dudas I. Prevention of the first occurrence of neural tube defects by periconceptional vitamin supplementation. New England Journal of Medicine, 327, 1832-35. 3. Huisman, M., Koopman-Esseboom, C., et al. (1995). Neurological condition in 18-month-old children perinatally exposed to polychlorinated biphenyls and dioxins. Early Human Development, 43, 165-76. 4. Koopman-Esseboom, C., Weisglas-Kuperus, N., et al. (1996). Effects of polychlorinated biphenyl/Dioxin exposure and feeding type on infants mental health and psychomotor development. Pediatrics, 97, 700-06. 5. Patandin, S., Lanting, C.I., et al. (1999). Effects of environmental exposure to polychlorinated biphenyl/dioxins on cognitive abilities in Dutch children at 42 months. Journal of Pediatrics, 734(1), 7-9. 6. Jacobson, J.L., &Jacobson, S.W. (1996). Intellectual impairment in children exposed to polychlorinated biphenyls in utero. New England Journal of Medicine, 335(11): 783-9. 7. Alaluusua, S., Lukinmaa, P.L., et al. (1996). Polychlorinated dibenzo-p-dioxins and dibenzofurans via mother's milk may cause developmental defects in the child's teeth. Environ Toxicol Pharmacol, 1, 193-97. 8. Alaluusua, S., Lukinmaa, P.L., et al. (1993). Exposure to 2,3,7,8-tetrachlorodibenzopara-dioxin leads to defective dentin formation and pulpal perforation in rat incisor tooth. Toxicology, 8, 1-13. 9. Alaluusua, S., Lukinmaa, P.L., et al. (1999). Developing teeth as biomarker of dioxin exposure. Lancet (16 Jan), 353, 206 (research letter). 10. Jackson, M.B. (1988). John Radcliffe Hospital cryptorchidism research group. The epidemiology of cryptorchidism. Horm Res, 30, 153-56. 11. Garcia-Rodriguez, J., Garcia-Martin, M., et al. (1996). Exposure to pesticides and cryptorchidism: geographical evidence of a possible association. Environ Health Perspect, 104, 394-99. 12. Paulozzi, L.J., Erickson, D., &Jackson, R.J. (1997). Hypospadias trends in two US surveillance systems. Pediatrics, 100: 831. 13. Forman, D., &Moller, H. (1994). Testicular cancer. Cancer Surv, 19-20, 323-41. 14. Sharpe, R.M., &Skakkebaek, N.E. (1993). Are estrogens involved in falling sperm counts and disorders of the male reproductive tract? Lancet, 341, 1392-95. 15. Auger, J., Kunstmann, J.M., Czyglik, F., &Jouannet, P. (1995). Decline in semen quality among fertile men in Paris during the past 20 years. New England Journal of Medicine, 332, 281-5. 16. Mizuno, R. (2000). The male/female ratio of fetal deaths and births in Japan. Lancet, 356, 738-39. 17. Davis, D.L., Gottlieb, M.B., &Stampnitzky, J.R. (1998). Reduced ratio of male to female births in several industrial countries. A sentinel health indicator? JAMA, 279, 1018-1023. 18. Moller, H. (1996). Change in male - female ratio among newborn infants in Denmark. Lancet, 348, 828-29. 19. van der Pal-de Bruin, K.M. (1997). Change in male-female ratio among newborn babies in Netherlands, Lancet, 349, 62. 20. Allan, B.B., Brant, R., Seidel, J.E., &Jarrel, J.F. (1997). Declining sex ratios in Canada. Canadian Medical Association Journal, 156, 37-41. 21. Marcus, M., Kiely, J., McGeehin, M., &Sinks, T. (1998). Changing sex ratio in the United States, 1969-1995. Fertil Steril, 70(2): 270-3. 22. Feitosa, M.F., &Krieger, H. (1992). Demography of the human sex ratio in some Latin American countries, 1967-1986. Hum BM, 64, 523-530. 23. Vartiainen, T., Kartovaara, L., &Tuomisto, J. (1999). Environmental chemicals and changes in sex ratio: analysis over 250 years in Finland. Environ Health Perspect, 107, 813-5. 24. Astolfi, P., &Zonta, L.A. (1999). Human

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