Traducción de "Homo Sapiens: ¿una especie monógama?

HOMO SAPIENS: ARE WE A MONOGAMOUS SPECIES?

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ABSTRACT: In order for the process of hominization to continue, with its prolonged and extreme period of juvenile defencelessness, it was necessary, or at least convenient, for males to more actively participate in the care of females and offspring. This necessity, together with the abrupt loss of hominid sexual dimorphism starting with *Homo ergaster* (more than 1.5 million years ago) suggests to the authors that our ancestor's sexuality might have evolved around the same time from an earlier state of polygamy to monogamy. Taking into consideration our meagre dimorphism, small relative testicular size, and interest for living in partnerships, monogamy may still persist in modern *Homo sapiens.* This theory would allow for new perspectives regarding the complex suite of enigmatic emotions have plagued modern humans since our beginnings. .....

Many anthropologists believe that hominization, with its associated complete and prolonged period of juvenile dependency, could not have occurred without a concurrent family-oriented social structure as seen in modern humans. In fact, the majority believe this alone was sufficient to merit the necessary change in our social organization. Nevertheless, it is still a risky hypothesis: As Gellner (1) affirms, "Stating that a need creates its own means of satisfaction is a blatant teleology that is incompatible with modern science." In the real world things don't just happen because they are needed or because they would benefit someone, even if they benefit humanity as a whole. To accept that *Homo ergaster*, wiwth a significantly less sophisticated brain than our own, would be capable of resisting their ancestral condition of promiscuity and begin pair-bonding for the well-being of their offspring, their females or the species as a whole, deserves a similar level of credibility as Walt Disney's poetic fairy tales.

So what then? Let's look at the veiled opinion of Arsuaga and Martinez (2) related to the sexual behaviour of hominids: *"What determines the differences in sexual behaviour, and therefore social behaviour, in such closely related species? Genes.* "Occasionally species have mutations that result in physiological, morphological, anatomical and behavioural changes. Natural selection chooses the most appropriate and during a few thousand generations they become part of the species' inheritance. Our ancestor's sudden change in sexual dimorphism as seen in *Homo ergaster* (1.5 million years ago) supports the idea (or at least it fails to refute it) that monogamy could have begun in that species. In fact, the marked differences in body mass (approximately 40%) between males and females in earlier hominid species suggests social structures based on sexual competition, as would be expected with a polygamous social structure. The reduced sexual dimorphism seen in *H. ergaster*, to levels below 20%, would indicate this species' sexuality had evolved to be less competitive, such as would occur with pair-bonding. Another possibility would be a return to promiscuity; however, rather than an advantage to the survival of our offspring, this would represent a set-back according to Montserrat Colell Mimó, Professor of Psychobiology and Ethno-primatology at the Universidad de Barcelona, in her introduction to our book *Condenados a Amar*.

Could then an innate programming for pair-bonding have been established in the most recent species of hominids? Considering the new data, this possibility cannot be dismissed and opens new perspectives on the debate. If innate pair-bonding were the case, what would have happened to the driving force to pair-bond? It could have become weaker or corrupted (chickens raised in incubators can lose their instinct to incubate their own eggs). But this seems contrary to our scant dimorphism; the meagre size of our testicles (to avoid any resentment from our more sensitive readers, we admit that every rule has its exceptions and surely each of you are the exception; however, having established that, we must recognize that promiscuous species tend to express their sexual competition at the level of the spermatozoid. The males of such species, Chimpanzees included, tend to possess testicles with a much larger volume relative to their body size than human males); the universal nature of the family unit; the presence of those mysterious feelings that seem to have existed in us since time immemorial (romantic poetry started with the Egyptians and was passed along from the Romans and Greeks to modern times) which, with this new theory, would become simple mental reflections of an innate impulse, of course alien to our cognitive world; the chemical tempests that accompany these mysterious emotions; the habitual jealousy present in partnerships and the autonomy and irrationality of all these emotions, etc.

Since 90% of people live, or have lived for some time during their lives, in a romantic partnership, why hasn't this possibility been considered? There are several reasons.

To begin with, our species is too attached to its spirituality and intelligence (that which separates us from other animals), thus we tend to always attribute our most noble traits to these uniquely human characteristics (although some of these traits may not be completely related to spirituality and intelligence, such as: friendship, patriotism, motherly love, our desire to excel, etc.). We certainly would act no differently in the face of what may be our most cherished and exquisite emotion: love (although long-forgotten, ancestral emotions may still pulse within this human feeling). And therein lays its fragility. Even though most people have been in love at some time, the emotion has not been strong enough to tie them to a partner for their entire lives (except in the presence of a personal decision with active participation of their brain and willpower), nor so intense as to exclude sexual attraction for other people in their environment. These facts practically eliminated the belief in human monogamy a few decades ago, because we considered

pair-bonding in monogamous species strong enough to create "exclusive" relationships. Even more so when we consider the fact that for most of our lives we are not in love!

But circumstances have changed. We now know that "infidelity" is frequent in all monogamous species and that, along with 'life-long monogamy', there are other types of monogamy that last only as long as necessary to raise the young. Therefore, what we see around us is compatible with our species being monogamous, especially when we take into account our amazing cerebral development, which makes it impossible to expect total uniformity in our behaviour. Our biological impulses (whichever they may be) may push us in a certain direction, but they would be incapable of forcing us to act in a particular way. And that should force us to analyze things with greater detail and care.

If we do, we would quickly realize the arguments in favour of human promiscuity are not so convincing as they might seem; even though this belief is so universal it has become a matter of faith rather than just an opinion. It is true that our closest relative, the chimpanzee, is totally promiscuous. But it is equally clear that what happens with the chimpanzee does not necessarily have to be determinant in humans. Chimpanzees and humans diverged more than five million years ago and, although 98% of our DNA continues to be identical, the differences between us include such essential features as our larynx, feet, hips, hands, skin, brain, genitals, etc. There is nothing that would suggest sexual expression is not included within this 'etcetera', especially when we've already seen that our ancestral avatars of sexual dimorphism vary in this trait compared to chimpanzees.

Some also argue there is an apparent lack of amorous emotions among more "primitive" and therefore "natural" peoples, but this is not a proven fact either. In the first place, there is no unanimity for that opinion. Authors such as Fischer and Jankoviak have found amorous emotions in 87% of 168 cultures studied (3). In the second place, there is no merit to the assumption that their behaviour is any more exempt from cultural influences than our own (modern westernized humans). Truly, their lifestyle, stuck in the stone-age, makes us think of younger societies whose customs are not mediated by the brain. But this is a mirage given the fact that they have been evolving for as long as any human in our modern societies. And given their equal cerebral capacity, which nobody doubts, the backwardness of these societies must be attributed to a profound resistance to novelty, which is almost always sustained by a great respect for taboos. In other words, it is attributed to cultural norms. As Gellner states, "progress is only possible if change is possible."

Even if we accept the behaviour of these societies as more natural, we would have to accept that premise without reservation and with all of its consequences. Yet what we primarily see is the same thing we see in all other monogamous species: pair-bonding and infidelity. To defend, without additional facts, the position that their infidelity is spontaneous and their marriages forced does not seem very scientific. This is inherent in the way that many other examples have been analyzed! One of them, the Muria of Northern India, have some curious customs and are often presented as a paradigm of natural sexuality, lacking any affective connotations. They have communal dormitories where youth are initiated in sexual relationships when they reach puberty. But there are actually two types of dormitories. In the first dormitory, where they are initiated into sexual behaviour, free unions are allowed. Shortly thereafter they move into the second

dormitory where pair-bonding is so strictly prohibited that if two youth are found to have slept together for more than three nights they are severely punished! Nevertheless, there are those who feel authorized to hold up their customs as "proof" of what could be our 'natural' condition; ineffable.

And what should we think about restrictive societies such as the Arabs? Although there are authors who maintain that falling in love is also frequent in these societies and provokes adultery, abandonment and melancholic love songs; the possible extreme consequences do not seem to curb these phenomena. If we put corn or wheat in dry air-tight jars none of them will sprout, but most likely those seeds will conserve their potential to grow and will germinate when environmental conditions become adequate to do so. The same could happen in the case of these restrictive societies. In fact, considering the consequences, of this behaviour, it could be seen as proof that whoever established these behavioural norms was well aware of the violent nature of love. If not, we beg the reader review the norms a society should have that believes in the fatalism of love and wishes to keep it at a safe distance. You would see that they scarcely diverge from the norms of these societies.

We still need to analyze what happens in our 'westernized societies'. Some say that love is a cultural creation from the 12th century, but once again that is a risky statement. To support our doubts we have the ardent poems of certain Egyptian scrolls; Sappho's poetry (she committed suicide because of an unrequited love); Catullus; Tibullus; Propertius; the expressive synonym for love "the insanity of the Gods," which the Greeks used for the most notable cases; or the explosion of 'udri' love in 8th Century. Even now it's true that the bonds among partners are very lax and are often marked by periods of infidelity, but, as we've previously mentioned, this is the case in all monogamous species.

It's also true that even though there are periods when we've been in love, more frequent are the periods when we feel promiscuous, but this also happens in other monogamous species. Lorenz (4) refers to the case of a goose that became promiscuous after losing two consecutive mates – due to their deaths. Dissolution of partnerships is very frequent among humans, but fortunately due to less dire circumstances. It could even be true, as Reich states, that extreme promiscuity is a good antidote to guarantee that partnership bonds (falling in love) do not form. But once again, this appears to happen in other monogamous species. Carter (5, 6) refers to a species of voles in which affective pair-bonding occurs when a male vole copulates a few times with the same female. However, if a different female is placed in the male's cage daily, these bonds are not formed.

As we can see, the majority of the facts touted in favour of human promiscuity are not so convincing because they are present in other monogamous species. But let's not be deluded into thinking that the facts in favour of monogamy are indisputable; if they were we would have accepted them a long time ago. In fact, taking into consideration only our immediate surroundings, it seems impossible to reach a definitive conclusion. The phenomenon of 'falling in love' truly seems to exist, but it doesn't occur in excess (only 1.2 times per person according to surveys) and its associated emotions tend to fade away completely in a few years. So in order to form an opinion we have to dig deeper and rely on facts that are perhaps not as convincing as

we would have hoped for, but given the lack of something better, could tip the balance in favour of monogamy or promiscuity.

The first thing to consider is the simplicity of each theory. For centuries we've had to expend great effort to create complicated hypotheses (some quite original) to explain such phenomena as the universality of the family unit, the origin of amorous emotions, or the nature and cause of jealousy. This new theory of monogamy encompasses all of these easily into a single explanation (all else being equal, the simplest theory has always been considered the best in science) that is so simple as to be readily understood by anyone.

The second thing we should consider is the concordance of each theory with real observations in nature. For example, if we return for a moment to the immunity promiscuity may offer to 'falling in love,' we've already seen that something similar occurs in other monogamous species.

In comparison, Reich claims that simply placing barriers on our promiscuous nature can create something that a large part of humanity considers their most cherished feelings: 'falling in love.' Not only is this hypothesis not seen in nature, it seems impossible to us. Since when does nature reward those who violate its dictates? We may have all violated them at one time or another, but when we do we tend to experience quite the opposite of pleasurable emotions.

The third thing to consider is the instinctive aspects of 'falling in love,' which have been implicitly described by some of our best thinkers. Let's consider the words of Ortega y Gasset: *"The act of 'falling in love' is another stupid mechanism, always ready to easily and blindly explode, which love takes advantage of and rides away with, a good rider that it is. Let us not forget that without the service of innumerable inferior automatisms our more noble life experiences, those born from our spirit and so highly esteemed in our culture, would be impossible."*(7). Putting aside subtle discrepancies of nuance and terminology, in particular, what is the difference between this "automatic and stupid mechanism, always ready to easily and blindly explode," and a biological impulse or an instinct? Nothing!

Last, but not least, the most frequent expression of love... Every survey highlights a greater propensity to fall in love during our youth. With age the tendency weakens to such a degree that if we let that critical period pass us by, it becomes much more difficult to find a 'suitable' partner. And, compared to the gibberish produced by other theories in an attempt to explain this fact, this is exactly what we would expect if our interest for living in partnerships was the result of biological impulses. In fact, every biological impulse goes through periods of maximum expression and then tapers off. Even such necessary instincts as the desire to hunt and kill can suffer if a lion doesn't have the opportunity to express them during the appropriate period of its life. We've all seen movies about lion cubs raised in loving captivity to then face tremendous obstacles when reintegrating into what should be their natural lives. So it would only be reasonable to expect the same to happen with the instinct to pair-bond. Thus, even if that desire to live in a partnership continued to guide our lives, the individualized impulse (to fall in love) would lose its efficacy and its previous importance would be ceded primarily to our brain.

ARE WE CONDEMNED TO LOVE?

Are we genetically programmed from birth to fall in love?

It's possible. If that is the case, we would come into the world with 'an innate trigger mechanism' (comprised of a gene or a group of genes that operate in a coordinated fashion and in unison, known in genetics as an operon), ready to fire at an opportune moment and awaken in us a violent and compulsive attraction towards a particular person, which will bloom in our consciousness as the phenomena of 'falling in love.' In some species the couple must copulate a few times for these bonds to form, while in others the bonds may occur several months before the couple's first sexual relations. Given the human capacity to fantasize, we would expect the later to be our experience. We dared to name the gene responsible for triggering this process 'The Love Gene' in our first book (Luis Santiago Lario Herrero, M.a Luisa Lario Herrero and Santiago Lario Ladrón, *El gen del amor*, Barcelona, Ediciones del Bronce, 1996), because this gene would be responsible for the appearance of that special attraction that makes a particular person stand out above all others (for a certain time and with personal variations in the way we experience that preference).

We know this hypothesis will bruise the sensibilities of many lovers, but secretively it is really accepted by all of them: Who can explain the fact that when speaking of the origin of these emotions, they speak of the 'heart'? It's clear that the word heart is a metaphor for something distinct, and often in opposition to the brain. But the rest of our body, including our heart, is just biology and behaves completely according to the rules of biology. That's why when they refer symbolically to the heart, in reality they are alluding to that mishmash of passions, emotions, desires and feelings whose origin is unknown, yet obviously are independent and autonomous of the all-powerful brain.

Furthermore, as we claim in 'Condemned to Love' (Luis Santiago Lario Herrero and Santiago Lario Ladrón, *Condenados a amar*, Barcelona, El Cobre, 2002, p. 99): *"Knowledge is not at war with beauty. To stripe love of its mystery, divinity and poetry in order to explain it with reason is more mundane, but does not damage its charm. An aurora borealis, a sunset, or a rainbow, are no less beautiful simply because we understand the physics behind them. We can still be enchanted by a full moon or a star-filled night sky with the same passion as an ancient Cro-Magnon. At the most, where one saw spirits in the sky, we see suns whose light fades with the distance. But both can pray to the same God of creation. On the other hand, and in spite of the radical antagonism we might [at first] feel for this theory, it does not refute the special attributes of each individual experience of falling in love: quite the contrary. Our brain is a prism between these biological impulses and our behaviour. [...] Our instincts shine on it and are dispersed into spectra of shades that are as varied and personal as fingerprints, because they are influenced by the qualities that mould them in one way or another to give them their final form. [...] A difference that is supported by the multitude of cultures, characteristics, and we might say, "neuronal attractors." The spark is the same, but the fuels it ignites are very distinct: thus also each bonfire created is also unique. So we can continue to be proud of the delicate subtleties and singular beauty of our love and be almost assured that, in spite of the millions of human beings on the face of the earth, none could presume to experience love in an identical way."*

What makes it fire? We don't know. But nature is not stingy with these events and, as we would expect, they begin to act when our endocrine system begins the necessary changes leading to puberty (this explains the crushes of adolescence) and a suite of circumstances arise of an unknown character: Is it the result of our first experiences? A phylogenetic memory? Vestiges of remote courtship behaviours?

Whatever they may be, when this hypothetical gene appeared the humanoid brain was nowhere near as developed as it is today, and that is maybe why cognition is not a significant factor in the matters of love. Thus the mysterious irrationality of falling in love, which has earned itself the disdain of so many thinkers: "An inferior state of our spirit, a type of transitory idiocy" (Ortega y Gasset.). "It's probably the irremediable stupidity that makes amorous discourse so obscene" (Cristina Peña-Marín). And therefore our bewilderment in the face of these abrupt and surprising emotions – often alien to our will and intelligence – which have gained them such expressive nicknames as 'insanity of the Gods' (the Ancient Greeks), 'crazy love' (the French), or 'magic love' (which the Tubetute blame for adultery. And it's left our best thinkers a bit perplexed while they attempt to decipher that 'magic period', M. L. Lerer (9); that "mysterious, unclear, indecipherable, nearly labyrinthine attraction," E. Rojas (10); that feeling which is "by nature miraculous and magical' , R. Moore (11); or that "state of enchantment," S. Dexeus (12).

However, in spite of the fascination its activity has created in us, that gene is not alone. The brain evolved to regulate, channel and, if necessary, counteract our biological impulses, and in reference to the topic at hand, it has done so consciously. Once our brain achieved sufficient development to take the reigns over our behaviours, humans were already organized into family units. Since the desire to live in partnerships was universal and our intellect's own analysis confirmed the utility of this social structure, it therefore accepted it, but not without organizing different ways of establishing pair-bonding in each location, giving way to the apparent disorder we see today. We can categorize pair-bonding relationships into a continuous series based on the degree each factor – body and soul, heart and mind – influences the partnership: At one extreme the categories are primarily influenced by biology (falling in love and passion – these types of relationships have existed always and everywhere). At the other extreme are the more cerebral relationships: pragmatic, personal interest, convenience, conforming, etc. And the intermediate categories include relationships with a more balanced participation of the cerebral and biological: friends in love, intelligent love, or what other authors call true love. It is clear to us that even the most cerebral relationships are supported by a biological impulse that drives us to live in partnerships (which would mean that a significant percent of even forced marriages could produce some degree of happiness). The sexual liberation of recent decades initially appeared to threaten the family institution, yet it actually brought about a new appreciation of the family unit by revealing two facts: The first is that in spite of frequent failures, the majority of people prefer to live in a partnership. And the second is that, in spite of the indisputable importance that financial, professional and material factors have on our quality of life, when it comes to choosing a spouse (especially for our first love) people prefer to let their feelings guide them. The day when these topics become common knowledge, rather than mere fantasy, should not be far off given the current advances in DNA technology. Although this new knowledge will not end the debate; at least we should be able to contemplate the topic with greater insight ... or

perhaps not? There is a legion of advisors recommending we guard against such emotional turbulence (Rougemont, Ortega y Gasset, Fromm, Rojas, Tierno), which is considered by others to be the sustenance of a partnership (Stendhal, Alberoni). And perhaps both positions are partly correct. There are many times when our heart's choice turns out to be wrong, but turning our backs on our feelings is also uncomfortable, and making them disappear is nearly impossible. Furthermore, even though in principle there seems to exist a radical antagonism between these two positions, things are not so simple. We've already established that, in spite of his hostility towards falling in love, Ortega recognizes that love is often based on one of these extremes. Rojas admits that "the root of our emotional core is love" (*El amor inteligente*, Madrid, Temas de Hoy, 1997, p. 70) Although later Rojas states, "The positive and essential part is that it be true, that it brings love and that love comes to stay" (Ibid, p. 74). And although Fromm (13), tries to separate his concept of erotic love from falling in love, he has some difficulties. According to this author, the only difference is the first type of love has a good dose of brotherly love, which should always be present, because we should feel that type of love with all of our peers. In reality, and considering the confusion surrounding these concepts, for these authors love is a type of falling in love that "hits the target" and therefore the brain can approve of it. This is expressed even more obviously by B. Tierno. He states that, "the truth about love is the feeling" (Bernabé Tierno, *La fuerza del amor*, Temas de hoy, Madrid, 1999, p. 20) and that, "love always appears freely and naturally" (Ibid, p. 25). But when he tries to differentiate love from falling in love or that need that, "comes without wanting it or searching for it, and which we cannot avoid" (Ibid, p. 151) – true or unconditional love, in other words "authentic love... a love chosen with complete awareness" (Ibid, p. 153) – he ends up proclaiming that, "love is a happy choice, born from the heart with the blessings of our will and intelligence." It seems to us that this "happy choice, born from the heart," must not be far from the act of falling in love.

In summary… ¡There is no doubt that the ideal situation would be for the heart and the mind to work together! ¡To be so lucky that the person who our brain chooses also be the one that triggers our "love" reaction! But falling in love is an autonomous emotion, uncontrollable, which starts when it wants to and ends when it feels like it. To achieve both doesn't seem easy and would require our full attention and care. We've already stated that we do not know all the stimuli necessary to begin the process, but it seems only logical that, at least in some cases, it has something to do with sexuality. Perhaps sexuality is more complex than we've thought and gives rise to some of our more noble feelings. In that case, we should complement sexual education with emotional and sentimental education.

Western Civilization tended to undervalue emotions in favour of intellectual predominance. Thus the psyche (the emotional I) of the Ancient Ionians and Atticans, passing through Plato becomes a mere receptacle of reason. Although the material well-being of individuals and societies depends on the intellect, at this point in time we cannot neglect the emotional world that is so important for our happiness. As professors Lewis, Amini and Lannon (14) claim, although we cannot change the nature of love, we can defy its dictates or prosper within its walls. And we still have not agreed as to which option is best...

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ADDITIONAL COMMENTS TO THIS ARTICLE FOLLOWING ISABELLE DUPANLOUP'S DATING AND REVIEW OF HUMAN MONOGAMY

The very interesting work conducted by the team at Isabelle Dupanloup (Department of Biology, University of Ferrara, Italy) published in the "Journal of Molecular Evolution" about the DNA variations on the "Y" chromosome (inherited exclusively by males) clearly shows a large disparity with the results obtained by studying the DNA variations in mitochondria, which being inherited exclusively by females (they are not present in spermatozoids) allows us to analyze the independent contributions of each gender to the genetic inheritance of our species. While female genetic diversity remains very constant during the past seventy thousand years [although it seems to show some peaks around 70,000 (Africa), 55,000 (Asia and the Pacific), and 40,000 (Europe) years ago], in males it reaches very low levels until about 20,000 years ago, when it suddenly increases dramatically. These results seem to indicate that until relatively recent times very few males passed their genes to the next generation when compared to females. The researchers deduced that the only possible explanation is a polygamous social structure, which was later replaced by monogamy.

As we've stated, this is a very original research, but so recent that the most prudent approach would be to wait until there are more data. In some aspects the conclusions presented by the authors clash head-on with our article "Is *Homo sapiens* a Monogamous Species?" (In particular regarding the date human monogamy began, but not with the rest of our thesis, which would continue to be more or less valid.) Our article is still available on this website. This apparent conflict has not escaped some of our readers, who have requested our opinion on the topic. Therefore we have decided to offer a few comments herein.

Homo sapiens' global colonization of the planet from their African origin began, according to the majority of researchers in this field of study, with a very small number of individuals. The numbers suggested by various authors oscillate between 500 and 10,000, which of course would include females and children. Given the fact that other hominids already occupied many of the areas to which *Homo sapiens* emigrated, it is unreasonable to think the existing hominids peacefully ceded their territories, but instead there must have been terrible confrontations, to such a degree that in many cases the original inhabitants disappeared from the newly colonized areas (it seems there was no genetic mixing between the *H. sapiens* invaders and the existing populations of Hominids.) Taking into account that both groups shared very similar technological resources (both had fire and used flint and wooden spears) the males must have paid a high price in these conflicts (females would be too busy trying to protect and feed the children.) This would inevitably and significantly reduce the amount of males available to transfer their genes to the next generation compared to females, and explain these genetic variations, because a high proportion of males would die due to these confrontations during this period of time. These blood baths would come to an end only when the competitors were eliminated and *Homo sapiens* achieved total hegemony.

Would this reasoning suffice to completely explain the discrepancy in the genetic contribution of each gender as shown in Isabelle Dupanloup's research? Possibly not. It might be valid for Europe, where the period between the probable extinction of the Neanderthals and the sudden increase of male genetic contributions in *Homo sapiens*, as apparently demonstrated in the

aforementioned study, could have been so short that these events practically coincided. Even though the last Neanderthal remains found date to 30,000 years ago, this is no evidence that they didn't exist until much more recently. For example, we know that *Homo sapiens* already lived in Europe more than 40,000 years ago, because Aurignacian tools, made only by *H. sapiens*, have been found in archeological sites dating to this period. However, the earliest fossils of our species date to only 35,000 years ago. So, there is no reason to doubt that Neanderthals may have persisted a few thousand years after all traces of them disappear, especially given the fact that as their numbers progressively declined, so would their remains. This does not apply to other areas such as Australia, the Americas, etc. where no other type of hominids seem to have existed upon the arrival of *Homo sapiens*.

Even in Europe, where for thousands of years males died at a much earlier age than females, it's difficult to believe that they died so prematurely that they had no time to impregnate a female before dying. Furthermore, we are talking about too long a time to not have more or less lasting periods of peace, at least at the local level, when the proportion of males to females would tend to equal out.

Of course, besides the conflict with other hominid species, there is no reason that confrontations would not have also existed between various clans of *Homo sapiens*. What is striking is our ancestor's amazing inclination to emigrate. Few mammalian species have colonized practically the entire surface of the earth the way we have. This would lead us to believe such a predilection might have been due to an ardent competition over natural resources in many cases. Such competition may have resulted in violent clashes between bands, which would contribute to greater mortality among the males and thus reduce their numbers compared to females.

These disputes, according to Dupanloup's theory, would have been fostered by other motives as well. Because prolonged polygamy during these periods and in situations where, as Dupanloup defends, there would be an equal number of males and females, would give rise to another type of conflict. To maintain peace within each clan, these polygamous groups would be forced to expel a good part of the young males when they reached maturity. Even supposing that some of these males formed new families with the adolescent females, there would always be extra males, giving rise to numerous groups of young, well-fed males (they would not have to share their prey with females and children). It would be very difficult to believe that these groups would be content to live out their lives isolated from potential mates: Most likely, they would soon opt to attack one of the polygamous groups and take possession of their females. Repeating this scenario thousands of times would lead to the slaughter of males at nearly unsustainable levels.

So what then? We agree there are logical reasons to believe that the number of males has been significantly lower than females many times in the past, although that might not be enough to explain the disproportionate genetic contributions shown by our Italian colleagues. The only thing that is clear is if our monogamy began only 20,000 years ago, its characteristics would be more open to every interpretation. Certainly during that period there were ongoing mutations, which explain the differences in stature; morphology; eye, hair and beard coloring among the different human races. Therefore we cannot rule out that one of these mutations might have affected how we express our sexuality. Nevertheless, there would have been many fewer

advantages to a biological monogamy and a much greater possibility of a cultural origin: Their intelligence was already equal to our own and their level of communication should have been very satisfactory. In fact, besides the dates and the arguments based on reduced sexual dimorphism following *Homo ergaster*, our remaining points could be valid, but we cannot hide the fact that they would be less robust or credible. Sufficiently so to invalidate our position completely? We do not believe so. Because, even if Dupanloup's dating is confirmed for human monogamy, we do not believe this is sufficient to assure its cultural origin, especially considering the universal nature of this character and its near total simultaneity. But for now we will have to await additional data.

Because, without a doubt, this is the destiny of any theory: Only future observations will determine how much fantasy and how much reality each possess. This is a risk that, in the opinion of F. J. Ayala, should never hold us back, "Hypotheses and other products of our imagination are the foundation of scientific research. The imaginative preconception of what might be true provides the stimulus to seek the truth and a clue as to where it might be found. Hypotheses guide our observations and experimentation by reducing the scope of relevant observations to something more manageable than the entire universe of possibilities. With independent validation or definitive rejection, every hypothesis that stimulates scientific research is a valuable contribution to science." (F. J. Ayala, *La naturaleza inacabada*, Barcelona, Salvat, 1994, p. 153.) We know these flattering words in no way apply to our modest article, but at least they motivate us to continue our work. If only because the topic is so fascinating that even the possibility of choosing the wrong path is worth the effort. And among other reasons, it's worth the possibility that by stumbling we may allow another to avoid the same pitfalls and find their way to a more appropriate path. In the end, and setting aside all pursuits of personal fame, that is what it's all about!