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A COEVOLUTIVE HYPOTHESIS ON THE ORIGIN OF LAW*

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Abstract: Human culture is governed by rules that possess the characteristics of normativity. Normativity allows the current consideration of a future and uncertain event. It is a temporal shifting which allows contemporaneous consideration of temporally separate realities.

The first part of normativity is *what ought to be*, which simulates a causal relationship in contexts where a relationship of probability is more convenient. The trust that *what ought to be* will occur (expectation) is the second part of normativity. In this hypothesis, the identification between representation and reality, in the first cave paintings, caused the emergence of normative thought, making the mechanism of trust - in human brain in the paleolithic age - operative even for simple representations.

Representation triggers the mechanism of trust in *what ought to be* and the mental state of belief (and expectation), which allows cooperation among individuals in situations different from those for which normativity evolved, allowing a more powerful information exchange and a more effective predation, thus an egalitarian division of prey, allowing the expectation to realize and the force of evolution acting at the group level.

Law originates in the stabilization mechanism of human societies where the information exchange is not regulated exclusively on a genetic level, but at a normative-symbolic level too, on a quasi egalitarian basis. Thus law has allowed the major transition ensuing the evolution of human culture.

Keywords: Origin of law, law instinct, evolution and law, gene-culture coevolution, trust, sociobiology, major transition, law and cooperation, evolutionary analysis in law, behavioural biology

1. The question of the origin of law

The question of the origin of human social relations, broadly understood, is not new in the history of science - since Darwin, it has

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* This hypothesis has been presented on two previous occasions: at the *Donnerstagseminar* at the Institut für Rechtsphilosophie und Rechtsinformatik, Ludwig-Maximilian University of Munich, 4th June 2009, and at the *Constitution, Ethics, and Law* Conference at Macerata *16-17 February 2010* (Le Marche, Italy). The idea for this research arose from my discussions with Oliver R. Goodenough and Craig M. Pease at the Vermont Law High School, November 2004, and became crystallized in my discussions with Gaetano Carcaterra. My sincere thanks to them all.

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been connected to the theory of evolution[1]. Certainly scientists have not yet found an answer to all the questions posed in the desire to scientifically explain the complexities of human social relations. Studies in this field are constantly carried out, but scientists are split into multiple branches of research. While this suggests the high level of interest in these questions and the presence of many hypotheses, it also points to the lack of a comprehensive explicative theory.

Some distinctions and explanations are necessary *in limine*.

First, the answer or explanation that I am seeking is not intended to serve as a foundation. Like any link, it must be hooked into the chain of other causal evolutionary explanations: the question I pose is on the *origin of law, not its foundation*. In this explanation law *emerges*, as empirical, historical fact, its content is changing from society to society, but present in every human culture.

Secondarily, but situated at the heart of the problem, the question is really intended to address legality and legal systems, not moral or social systems in general. It is not a question on human social relations but on *the lawfulness* of human society. Put in another way, the question, or part of it, may be posed as follows: *does there exist a human genetic or biological tendency tied to lawfulness? How is it different from similar tendencies tied to social relations, and what was its role in the evolution of human groups?* So enlightened, the question is somehow jarring; it seems almost inadmissible for lack of meaning. In effect, most of the research conducted up to this point, though focused on the relationship between law and evolution or genetics, has made sense of things by using an open concept of law, without clear boundaries between law, ethics, politics and other aspects of human social relations.

Finally, an explanation of the origins of law within the theory of evolution is an explanation of *what law is*, not just *how it appear*s. Evolution should tell us *why* legality arose at a certain point in human history. What needs did law fulfill, or allow people to fulfill? What are its ontological boundaries in human society? What did the individual gain through acting lawfully?

To begin with, the fact that traditional theories of law are unable to thoroughly and convincingly explain their object of study is quite relevant.

[1] C. Darwin, *The Descent of Man and Selection in Relation to Sex*, London, John Murray, 1871; However, in 'On The origin of Species', Darwin sought to avoid connections with humans and culture.

Sociological approaches do not adequately address the problem of the relationship between normativity and social reality. These theories do not fully recognize to law the ability to change individual and social behavior, thus leaving the solution of the legal case to an inexplicable act of decision, which *occurs*, uncaused, at a certain moment (itself indefinable), and which transforms a certain behavior from fact to duty[2].

Natural law approaches suffer from a similar problem regarding the relationship between just law, derived from an act of theoretical knowledge, and law that actually exists because it is set down or socially recognized as such. Branches of natural law set within a religious matrix then directly assert the supernatural origins of law.

During the twentieth century, however, both these theories largely accepted the importance of normative theories. What brings all these theories together today is recognition of the unavoidable presence of the *normative* contained within the linguistic propositions – the norms - that make up, at least in part, legal systems.

These norms are products of human cultural activity[3] and a part of 'law' is surely contained in some of them. Normativism, however, refuses to investigate the origin of this law. The rule of recognition, or basic norm, is an expression of this refusal or, at least, it is a-self-

[2] The research on the cause of this makeover from act to duty is largely unsatisfactory: Oliver Wendell Holmes was the most consistent in drawing conclusions from the decisionist premises of legal realism. In realism, however, the norm is defined in relation to the individual and his relationship with reality. In Pattaro, for example, the norm is part of a state of mind, it is a belief in bindingess, in what ought to be, a certain behaviour, the occurrence of the situation provided in the description of the case. On a par with many other details that construct states of mind, the norm, in part, creates the belief while, in the hypothesis presented here, law (though depending on individual biological characteristics and on normativity, understood as trust in an ought to be) has a different origin, external to the individual and closely connected to the existence of a cooperative group with an elevated exchange of information, which is structured by law. E. Pattaro, *The Law and the Right, A Reappraisal of the Reality that ought to Be*, in: *A Treatise of Legal Philosophy and General Jurisprudence*, Vol.I, Springer, Dordrecht, 2005. Pattaro's theory, however, is very close to the hypothesis presented here.

[3] In the meaning of K. Popper, *Three Worlds, The Tanner Lectures on Human Values*, delivered at the University of Michigan, April 7, 1978: http://www.tannerlectures.utah.edu/tanners.html. In the legal doctrine G. Carcaterra, *Corso di filosofia del diritto*, Bulzoni, Roma, 1996, pp. 213 ss..

limitation of legal research. In Kelsen such a norm, correctly, is not a posed norm, like every other norm in the system, but is presupposed. At the same time it acts as a limit to legal research: beyond this, it is up to other sciences to investigate phenomena not relevant to legal science. Thus remain unexplained a great number of activities that actually do characterize legal science, from interpretation to the endorsement of the norm. Consequently, in normativism, the problem is a lack of relationship and connection to the reality to which law directly leads, claiming to describe and understand it: in short, the relationship between utterance and meaning.

Law is in the middle, almost a prisoner, of this scientific triad that gazes out in three opposing directions - the natural, the social, and the mental - yet fails to find in any of these an exhaustive theoretical explanation. At different points, but present in each of these positions, there is an unexplainable moment, the occurrence of a 'scientific miracle' (allowing myself the use of this oxymoron) having the task of getting the theoretical accounts square. How fact becomes norm, the imperative becomes cause or the utterance becomes meaning remains a subject of mystical wonder and academic faith.

For this reason I do not want to allow, in the beginning, any definition of law and legality, while placing myself in the position of a Kelsenian theoretical normativist. Outside the boundaries of the pure legal doctrine, the Kelsenian definition of law is no longer valid. Thus it is preferable, for now, to leave the concept undefined. We must intuitively refer to legality as that complex of phenomena that occur in human society for which we use the terms 'law' and 'legality', and which include, but are not limited to, norms. I reserve the right, however, to propose a more precise definition of the semantics at the end of the essay. My aim is to find out why social-legal relationships arose at a certain point in human history, and exactly what role these relationships played in human cultural evolution and in the structure of our current society[4]. With this essay I do not intend to reconstruct a historical truth, only a theoretical validity.

[4] This choice is shared with many researcher, beginning from the pioneers. Margaret Gruter and Paul Bohannan at the First Monterey Dunes Conference, starting point for these researches, begun their paper as follows: "*Law is multidimensional. It is, therefore, difficult to define law in its totality. We agreed early at the conference not to spend our time defining law, for we knew we could get bogged down in it and never emerge*." M. Gruter and P. Bohannan

2. Some previous paths of research: attempts to explain law in human social relations and the problem of group selection

Without wanting to reconstruct the course of attempts to join legal science with evolutionary theory, I quote here its beginnings with Margaret Gruter's research[5] of the 1980s, until the present day with studies that simultaneously probe behavioral biology, neurobiology and evolutionary psychology, gene-culture co-evolutionary theory and memetics, and research in the biological, genetic or cultural roots of law[6].

The vast majority of these studies are set within the American context, and have inherited the sociological approach which distinguishes many American schools of jurisprudence. In most cases, human social relations are studied evolutionary, suggesting their utility for the production and application of law. It is not surprising that the problem of the relationship between law and human cultural evolution corresponds to different aspects of human behavior, and that none of these appear to be exclusive. Philosophical analysis of past centuries

(eds.), *Law Biology & Culture, The Evolution of Law*, Ross-Erikson Inc., Santa Barbara (Ca), 1983, p. 1.

[5] M. Gruter, *The Origins of Legal Behavior*, in: *Journal of Social and Biological Structures*, 2, 1, 1979, pp.43 ss.; M. Gruter, *Law in Sociobiological Perspective*, in*: Florida State University Law Review*, 5/2, 1977, pp. 181 ss.; M. Gruter, *Law and the Mind, Biological Origins of Human Behavior*, Sage Pub., Thousand Oaks (CA) 1991.

[6] In this journal you can find the Italian translation of some important papers on this topic: O. R. Goodenough, K. Prehn, *Un modello neuroscientifico del giudizio normativo nel diritto e nella giustizia*, in: *i-lex*, 2, 2005, pp. 161 ss., orig.: *A neuroscientific approach to normative judgment in law and justice*, in: *Phil. Trans. Roy. Soc. Lond.*, B359, 2004, pp.1709-1726; A. Fernandez, *Diritto e natura umana: la funzione sociale-adattiva del comportamento normativo*, in: *i-lex*, 3, 2005, pp. 307 ss.; O. D. Jones & T. H. Goldsmith, *Diritto e biologia comportamentale*, in: *i-lex*, 4, 2006, pp. 27 ss., orig. *Law and Behavioral Biology*, in: *Columbia Law Rev.*, 105, 2005, pp. 405 ss.; A. Fernandez, *Moral Intelligence: Mind, Brain and the Law*, in: *i-lex*, 5-6, 2006, pp. 207 ss.; an accurate and up to date bibliography could be found on the Web pages of the *SEAL, Society for Evolutionary Analysis in Law*, edited by Owen D. Jones: http://law.vanderbilt.edu/seal/resources/readingsjones.htm.

had already emphasized these multiple ties to law, so their re-emergence in scientific research was expected.

Some hypotheses, for example, see the origin and evolution of the legal systems and rules in the arising of socially-shared behaviors for dispute resolution in archaic societies. In some primate species we see echoes of the antecedents of similar behaviors, replacing aggression or fight with the intervention of third parties, usually relatives, with the intention of keeping the peace[7].

Other hypotheses see the rise of the conviction of an obligatory duty to hold a customary behavior as a strengthening of evolutionarily stable strategies, joined with a genetic predisposition. In these hypotheses, the phenomenon of legality would arise with the strengthening of trade and economic relationships within an already-evolved culture, as an expression of specific genetic predispositions such as the *property instinct*[8].

Other studies connect lawful action to ethical action. From the genetic predisposition to ethical action, to altruism, these studies identify the origin of legal behavior as the implementation of an ethical feeling of obligation to regard a certain behavior as disadvantageous for the individual who performs it[9].

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[7] F. B. M. de Waal, *Peacemaking Among Primates*, Harvard University Press, Cambridge MA, 1989.

[8] J. E. Stake, T*he property 'instinct'*, in: P*hil. Trans. R. Soc., Lond. B* (2004) 359, pp. 1763 ss..

[9] The tight relation between law rules and ethic norms is very well advocated, not only in the philosophical studies, but in these new researches too, beginning with Margaret Gruter, T*he origins of legal behavior*, in: *Journal of Social and Biological Systems*, 2, 1, 1979, pp. 43 ss., suggesting that "*Precursors of legal behavior in non-human primates suggest that some elements of a sense of justice are transmitted genetically, i.e. legal behavior may be an innate biological mechanism, vital for survival. [...] The moral ideas or ethics which support the legal structure are flexible and change in relation to the environment. These moral concepts shape the individual's sense of justice within the groups, replacing the rigid genetic commands governing social organization in other species*". It's easy to remark that object of the research is not directly law, or rules or norms, but human behaviors. Basically the same structuring of the problen is in G. Jervis, *Individualismo e cooperazione, psicologia della politica*, Laterza, Roma-Bari, 2003, who defines the political behavior not the legal one, that remain quite hanging-up.

In more recent studies[10], more complex and sophisticated in identifying the particular characteristics of legality, the '*legal instinct*' is connected to the search for a specific sensitivity to conventional rules in the individual, asking if "*humans instinctively turn to a protean system of legal rules to organize social behavior, a claim that I call the 'law instinct' hypothesis.*"

Connected to these hypotheses are those coming from cultural anthropology[11], where law is considered to be the product of power management and the subdivision of society into hierarchical rank.

It is beyond the scope of this essay to give a reasonable account of the several areas of anthropological research[12], but most of these hypotheses, whether from evolutionary or cultural anthropology, share a common-sense approach, though well-represented philosophically, and place ethics and economics as empirical and logical antecedents to legal concepts. Thus they reduce the legal concepts as carried out or derived from ethics and economics, or, more generally, as a performance of a larger phenomenon, human culture - in its turn expression of the individual. Note that Idealism, Marxism and twentieth-century Neo-Idealism share this basic idea, together with the economic utilitarian and perfect rationality approaches, beginning with the economic analysis of law.

The birth of sociobiology[13] in the mid-1970s marked the development of new evolutionary theories explicative for the human culture. Today the scientific debate is lively and wide-ranging, particularly in areas related to behavior considered altruistic or otherwise not directly optimizing individual fitness.

The initial reception of sociobiology into the scientific community was cool, and the criticisms devastating. The union of biology and human social relations raised philosophical questions, but also raised exquisitely

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[10] M. D. Guttentag, *Is there a Law Instinct?* in: *Washington University Law Review*, 87, 269, 2009, pp.269 ss.. Guttentag succeed in assembling many pieces of the genetic-biological-cultural puzzle regarding the biological origin of the 'law instinct'.

[11] Sacco's hypothesis, even though it arises from a culturalist perspective, finds in the *formants* of law a universal grammar that should have a biological correspondence.

[12] In this issue see A. Colorio, *Diritto e cervello, verso le nuove frontiere del neurodiritto*.

[13] E. O. Wilson, *Sociobiology: the new synthesis*, Harvard University Press, Cambridge MA, 1975.

political prejudices that would bring about unfortunate results in subsequent years, and the opening up of other research fronts. Today science is busy assessing the results of these studies and their respective theoretical positions, rethinking, in part, the whole path. I will briefly retrace that path here, to bring into focus the key points of the still incomplete evolutionary explanation of human social relations, and to advance my hypothesis.

The current sociobiological explanation extends the evolutionary selective mechanism to groups of many individuals, hypothesizing that evolutionary laws work on more than just the genetic level, in ways that are influenced by the interaction of the units of that level with the environment. So, for example, at a cellular level selection will work directly on the cells and not only on the genes they are made up of, giving account of the ability of the cell to interact with and adapt to the environment. The same can be said for individuals. According to the sociobiological hypothesis, selection works on genes and on cells but also on the individual itself, favoring or disfavoring different genetic combinations according to the phenotypical adaptation[14] to the environment, depending on the behavior of the individual, not of genes or cells directly. Similar considerations apply on the group and species levels, since the final change in a population at a given level will be a more powerful function: selection in units within the level (*within group selection*) and selection between the units that make up the level (*between group selection*). In the example of selection between groups of individuals, the two components of the selection vector will be the selection of individuals that belong to each group and selection between groups. Thus sociobiology claims it can construct a biological explanation of human social relations and explain the historical sequence of different social forms, extending the natural selection mechanism from genes to individuals and from individuals to social groups.

The problem, however, resides just in the evolutionary assumptions, since natural selection seems to necessarily lead to the selection of 'selfish' genes that tend to replicate themselves at the expense of the more altruistic ones. At the individual level, it is largely those with selfish genes who will be able to maximize their own fitness and reproduce. Natural selection will favor the evolution of those who are better adapted for their environment, those who will be able to

[14] Phenotype is the observable individual product of the genotype in a certain environment. The genotype is the set of genes present in a genome of an organism (influencing the phenotypical characteristic).

reproduce their (selfish) genes more successfully than others. Thus, according to natural selection, each individual should try to look after his or her own interests, putting others at a disadvantage. Altruistic individuals – unconditional co-operators – who, according to the hypothesis, tend to be useful to others at their own expense, would not be able to maximize their own fitness. They would reproduce their genes at a lower rate compared to other individuals, and the altruistic genes would be headed for extinction.

At the group level, in a group of selfish individuals – those who help others only if it advantages themselves – it appears unlikely, if not impossible, according to Darwinian law, that altruistic genes and behaviors will be favored by evolution.

This is the apparent paradox that arose during the first attempts at an evolutionary explanation of human social relations: groups of altruistic individuals (cooperators) are advantaged in comparison to groups of selfish individuals. But in the long run, selection within groups would tend to make altruistic individuals disappear and therefore altruistic groups as well; consequently natural selection at a genetic level is unable to select for altruistic genes or groups.

The 1960s and 1970s were a focal point for the discussion and dismissal of group selection hypotheses in favor of the hypothesis of exclusivity at the genetic level of the selective force.

These studies will not be detailed here, but I will briefly mention that they delineated a hypothesis of selection for quasi-altruistic traits, but without providing a satisfactory response to questions presented by the paradox of altruism discussed above. There are two important examples. The first one is represented by kin selection, which favors the genes carried by offspring or by relatives. The second example relates to the hypothesis of *reciprocity*, the act of giving with the expectation of receiving a future benefit. Both cases explain apparently altruistic behavior in terms of genetic selfishness. On this basis, some researcher tried to explain the entirety of human social relations[15]. But they are far from explaining many human social behaviors, from heroic sacrifices for

[15] W. D. Hamilton, *The Genetical Evolution of Social Behaviour I e II*, in: *Journal of Theoretical Biology*, 7, 1964, pp. 1 ss. E 17 ss.; R. L. Trivers, *The Evolution of Reciprocal Altruism*, in: *Quarterly Review of Biology*, 46, 1971, pp. 35 ss.; W. D. Hamilton, *The evolution of altruistic behavior*, in: *The American Naturalist*, 97, 1963, pp. 354 ss.; J. Maynard Smith, *Group selection and kin selection*, in: *Nature*, 201, 1964, pp. 1145 ss.; R. Dawkins, *The selfish Gene*, Oxford Univ. Press, New York, 1979.

a common cause to the most ordinary charitable acts of giving without the expectation of return. Heroic sacrifice, or suicide bombing, for example, bring death to the altruistic individual, and thus the non-reproduction of his or her genes, designed to extinction[16].

Even in this second hypothesis group, many pivotal questions remain open: What happened to favor such evolution and what stabilized it, preventing selfish individuals from having the upper hand and destroying the group? How was it possible for bigger groups with individual altruistic characteristics to form out of smaller family groups?

The main criticism against the Group Selection hypothesis essentially regarded the weakness of *between group selection* compared to *within group selection*. Subsequently, the attempt to explain human social relations – or on a larger scale, culture - in terms of genetic selfishness led to a proliferation of different hypotheses. All of them, however, ended up accepting, in different ways and more or less explicitly, the thesis that, *at a genetic level, natural selection is insufficient for an evolutionary explanation of human culture and social relations*[17].

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[16] The sociobiological hypothesis introduces the conjecture that natural selection, operating on many levels, may provide an answer at the selection level among groups: one assumes a selective force between different groups, not only between the individuals within groups, so the change in characteristics and genetic frequencies will be the result of the two different components: the *within group selection* and the *between group selection*. The action of the *between group selection* should, at least in some cases, be strong enough to dominate over genetics and among individuals, allowing for the selection of groups that are more cooperative at the expense of ones that are less cooperative and favouring the reproduction of altruistic genes. The existence of multiple levels of organization and selection of living organisms has led to the development, always within the sociobiology of *multilevel selection theory* (which is to say that group selection was transformed into multilevel selection) in which natural selection is the result of selective forces acting at different levels. At each level of organization selection acts both on the individuals that make up the level and on the individuals of the previous levels. In this way, natural selection acts directly on genes, on individuals and on the group of individuals. Disadvantageous characteristics at a genetic or individual level may become advantageous at a group level, and this may cause the result of natural selection on the genes to vary.

[17] For instance Richard Dawkins devotee of the selfish gene and opposing the group selection or multilevel selection hypotesis, introduces anyway the memes, replicators different from genes, aiming to give an evolutionary explanation of

None of these hypotheses explains how, when and why human society evolved differently from those of other primates or prosocial animals[18], where similar characteristics are present, and it does not explain what made possible the enormous cultural development typical of human society. They are also partially refuted by the fact that adaptations at the group level are not individually advantageous, and that human societies would be highly unstable.

The entire human culture has therefore not found a convincing, unambiguous and shared scientific position in evolutionary theory. Despite the existence of numerous fascinating hypotheses, whatever unchained human cultural evolution remains shrouded under a giant question mark. There must be a more general mechanism that favors these adaptations, or something that acts as a stabilizer.

With regard to the tiny body of research on culture and social relations that deals with the origin of law, it does not provide an explanation on the *normative* function of law, as a linguistic and symbolic expression of *what ought to be*[19]. The competing hypotheses in this field seek out in other animals characteristics common to or antecedents of law, finding its origin in this or that behavior. On the contrary, it could be interesting to identify, maintaining an evolutionary approach, what other animal species definitely do not share[20].

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the human culture. S. J. Blackmore, *The meme machine*, Oxford, 1999; R. Brodie, *Virus of the mind: the new science of the meme*, Seattle, 1996. R. Dawkins, *A Devil's Chaplain: Reflections on Hope, Lies, Science, and Love*, Boston, 2004; Id., *The Selfish Gene* 2. ed., Oxford Univ. Press, New York, 1989.

[18] Prosociality refers to a group made up of individuals acting in ways that benefit others, or who look after the interests of others without expecting anything in return. Eusociality, by contrast, is mainly used for insects and is defined by three factors: cooperation in caring for the young, reproductive division of labour (caste), individuals of overlapping generations who cooperate.

[19] Normativity is well expressed, on the contrary, from the *law of law's leverage*, *proposed* by Owen D. Jones. In this journal: O. D. Jones & T. H. Goldsmith, *Diritto e biologia comportamentale*, *cit*. p. 40; Owen D. Jones, *Time-Shifted Rationality and the Law of Law's Leverage: Behavioral Economics Meets Behavioral Biology*, in: *Northwestern University Law Review*, 95, 2001, pp. 1141 ss..

[20] For the past several years in Italy, Bruno Romano has been philosophically investigating the limits of biological theories in the legal field, bringing out some particular characteristics of law and human society. I welcome the philosopher's

3. The trusting monkey and the origin of law

With regard to law, I believe the most important distinction in these studies has to do with continuity, or lack thereof, in the development of concepts regarding certain behaviors common to humans and other animals. In short, the possibility that in the human species there is a trait that does not exist in other species; admitting, however, that such a trait originates from common biological and genetic features.

Substantial conceptual discontinuity[21] is admitted in the sociobiological hypothesis of *major transition*[22], whereby we are confronted *with* a *change in the level of organization and selection, connected to a change in the way information is memorized and transmitted*[23].

Examples of major transitions are the shift from gene to DNA, from unicellular organisms to multicellular organisms, from isolated individuals to groups of individuals. "*The challenge is to understand these transitions in Darwinian terms. Why was it advantageous for the lower-level units to sacrifice their individuality, cooperate with one another, and form themselves into a larger corporate body? And how could such an arrangement, once first evolved, be evolutionarily stable?*"[24]

The most recent *major transition* is, in sociobiological theory, human culture, for which law is a fairly recent development. The questions advanced above also apply to culture: why was it advantageous for human beings to exchange information at the expense of their own fitness and to live in large groups at the expense of their own individuality? What prevented the forces of evolution from breaking up these groups, letting the major transition to take place?

It is possible to formulate a new hypothesis in response to these questions, according to the conceptual itinerary that I will delineate here, keeping in mind that it *is* a hypothesis, capable of explaining many aspects of human cultural evolution, and above all to explain law according to the laws of evolution. As

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criticism for the purpose of elaborating an evolutionary theory in a more coherent legal frame.

[21] Discontinuity is not referred here to the evolutionary process, which is continuous.

[22] J. Maynard Smith, E. Szathmary, *The major transitions in evolution*, Freeman/Spectrukm, Oxford 1995.

[23] E. Szathmáry, J. Maynard Smith, *The major evolutionary transitions,* in: *Nature*, 374, 2002, pp. 227 ss..

[24] Samir Okasha, *Multilevel Selection and the Major Transitions in Evolution*, in: *Philosophy of Science*, 72, 2005 pp. 1013 ss..

with every scientific hypothesis, it will need to be validated by a future set of empirical evidence and tests.

Cultural traits are present in many species, as are rudimentary and very limited exchanges of information which are not dependent on direct genetic control. But no other species has an exchange of information as widespread and pervasive as the human species, which creates cultural societies in which the actions of individuals go largely against genetic predisposition. Each exchange of information could potentially damage the individual. Thus human behavior is inexplicably open, anomalous compared to that of other species. The exchange of information is necessary for human cooperation, but potentially harmful for the optimization of individual fitness. The evolution of the faculty for symbolic expression meant that the exchange of information was not regulated exclusively genetically, and the evolution of this characteristic, so useful for cooperation, but also so dangerous to the individual, required a stabilizing mechanism so as not to destroy the society that utilized it[25].

As with the exchange of information, so it is with the exchange of goods, or barter. Humans exchange goods in situations where earnings may be relatively small, while chimpanzees, for example, do not exchange if earnings are not high[26], nor are they able to use substitutes for goods that function as currency[27]. A possible explanation - surely a perceptible difference - is that unlike chimpanzees, humans possess norms that regulate exchange, decreasing the danger of defection, and norms that regulate property, attributing ownership

[25] This is a particular important point: D. S. Wilson, E. O. Wilson, *Rethinking the theoretical foundation of sociobiology*, in: *The Quarterly Review of Biology*, 82, 2007, 4, pp. 327 ss. "*Our capacities for symbolic thought and the social transmission of information are fundamentally communal activities that probably required a shift in the balance between levels of selection before they could evolve. Only when we could trust our social partners to work toward shared goals could we rely upon them to share meaningful information*." p. 343.

[26] S.F. Brosnan, M. F. Grady, S. P. Lambeth, S. J. Schapiro, M. J. Beran, *Chimpanzee Autarky*, in: *PLoS ONE*, 2008, 3(1): e1518.

[27] In artificial life simulations, for given environmental conditions based on trust and security in trade, exchange mechanisms similar to currency emerged from the interaction of artificial agents governed by genetic algorithms: Simone Giansante, Domenico Parisi, *Dal baratto alla moneta: un modello di vita artificiale*, in: G.Baldassarre, D.Marocco, M.Mirolli (eds), *Atti del II Workshop Italiano di Vita Artificiale*, Roma, 2005. Reperibile in: laral.istc.cnr.it/giva-aisc/ws2va/cd_online/.../Giansante%20(3).pdf

independently of physical possession, thereby decreasing the danger of aggression[28].

In human societies such exchanges are always governed by rules that possess the characteristics of *normativity*.

Normativity brings with it a long history of philosophical research. I will try to explain it through a function not often highlighted: normativity allows to perform in the mind a future and uncertain event *as if* it were present. It is a *temporal shifting* which allows contemporaneous consideration of temporally separate realities. The first component of normativity is *what ought to be*, which simulates a causal relationship in contexts where a relationship of probability should be substituted[29]. Here there is a clear difference between the sense or instinct of ownership – or better, possession - shared with other animals, and the normative meaning that only humans associate with it, as humans are able to anticipate future events as the effects of our current actions. If one believes that an asset to be exchanged in the future will not be taken away, it will then become possible to leave it behind in order to gather and accumulate other goods. But for this to happen one must imagine, or better, *trust* that it will

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[28] "*First, the risk of defection discourages costly commodity barter. When a chimpanzee hands another individual a barter commodity, the second individual (let's say 'the seller') could defect and run away with both commodities. To the buyer, the expected cost of defection will be smaller the lower the value of the commodity that the buyer must hand over and the greater the reputation for cooperation possessed by the seller. [...] A second, compatible, theory is that commodity barter probably cannot develop in the absence of ownership norms.*

Such norms allow individuals to lay down valuable commodities and store them for future barter or consumption; finding a barter partner while one is carrying a commodity would be a very rare occurrence. Chimpanzees do maintain possession norms (a kind of property norm) that protect commodities that they physically control, but an individual cannot specialize in production, or engage in large-scale barter, if the individual must hold its inventory in its hands. Property possession norms are less costly to enforce than property ownership norms because it is easier for an enforcer to witness and to correct a forcible dispossession than to decide which among competing claimants 'owns' a commodity that one of them has set down." S.F. Brosnan, M. F. Grady, S. P. Lambeth, S. J. Schapiro, M. J. Beran, *Chimpanzee Autarky*, cit..

[29] That which depends on human will is, by definition, based on probability, as is the perception of so-called *God's will,* to which situations of what ought to be were often connected in the past.

happen. The trust that *what ought to be* will occur is the second component of normativity[30].

This particular mechanism of human thought opens up a series of questions about its origin. I propose the following hypothesis: to function, normativity must be closely tied to the cerebral functions having to do with trust, to the positive evaluation that something will occur. A guarded trust which allows prosocial animals to cooperate is a *bias* which regulates human social actions as well[31]. The social sharing of a goal or a plan is based on *present* trust in the behavior of others. The question here is how such a mechanism could have evolved even with regard to *what ought to be* - in situations that are not actual, not only with regard to the exact moment where an action is carried out in a group, but also in the expectation of completing it - the achievement of the goal or gaining of the spoils.

Many situations can be imagined, but normativity is characterized by a lack of reality and objectivity. To be known, it must necessarily be communicated. It cannot be perceived in itself because it has to do with a reality that is expected, imagined or represented, but does not yet exist. In fact, law is characterized by its very close ties with language, with the communication of what ought to be and of normativity. This tie, strengthened and intensified by the philosophical speculation of the previous century, today appears impossible to dissolve. Thus one may hypothesize that identification between representation and reality caused the emergence of normative thought, making the mechanism of trust operative even for simple representations.

Cave paintings mainly depict hunting scenes. It is conceivable that our ancestors may have virtually identified representations of prey with the prey itself, and the depiction of the hunting party with the actual group, triggering the biological mechanisms of trust. This capacity for identification is still present in humans – one thinks of today's virtual reality, or even simply the eroticism inspired through images and representations.

The mechanism of identification between lived reality and narrated reality is still leading human thought, but another trait has emerged, which allows us to

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[30] The foundation of normativity is trust, or faith, which allows the current perception of a future and uncertain reality. *Trust is a strong belief that a reality will come true*, It gives the assurance of contemporaneousness in future exchanges. With the passage of time, trust becomes an expectation.

[31] D. Cesarini, C. T. Dawes, J. H. Fowler, M. Johannesson, P. Lichtenstein, B. Wallace, *Heritability of cooperative behavior in the trust game*, in: *PNAS*, 105, 2008, 10, pp. 3721 ss., http://www.pnas.org/content/105/10/3721.full; B. Wallace, D. Cesarini, P. Lichtenstein, M. Johannesson, *Heritability of ultimatum game responder behavior*, in: *PNAS*, 104, 2007, 40, pp. 15631 ss., http://www.pnas.org/content/104/40/15631.full.

work on represented reality independently of such identification. Nevertheless, language has lost none of its evocativeness.

In this hypothesis, then, representation triggers the mechanism of trust[32] in what ought to be and the mental state of belief (and expectation), which allows cooperation among individuals in situations different from those for which such mechanism evolved[33].

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[32] On the relation between oxytocin and neural circuitry for prosocial behaviors and trust there are already many empirical evidences: M. Kosfeld, M. Heinrichs, P. J. Zak, U. Fischbacher, E. Fehr, *Oxytocin increases trust in humans,* in: *Nature*, 2005, 435, (7042), pp. 673 ss.; P. J. Zak, A. A. Stanton, S. Armadi, *Oxytocin increases generosity in humans*, in: *PLoS ONE*, 2007, 2 (11), e1128; P. Kirsch, C. Esslinger, Q. Chen, et al., *Oxytocin modulates neural circuitry for social cognition and fear in humans*, in: *The Journal of Neuroscience*, 2005, 25 (49),pp. 11489 ss.; H. Tost, B. Kolachana, S. Hakimi, H. Lemaitre, B. A. Verchinski, V. S. Mattay, D. R. Weinberger, A. Meyer-Lindenberg, *A common allele in the oxytocin receptor gene (OXTR) impacts prosocial temperament and human hypothalamic-limbic structure and function*, in: *PNAS, Proceedings of the national academy of neurosciences*, 2010, 107(31) pp. 13936 ss.; B. B. Averbeck, *Oxytocin and the salience of social cues*, in: *PNAS, Proceedings of the national academy of neurosciences*, 2010, 107(20), pp. 9033 ss.; R. Hurlemann, A. Patin, O. A. Onur, M. X. Cohen, T. Baumgartner, S. Metzler, I. Dziobek, J. Gallinat, M. Wagner, W. Maier, et al., *Oxytocin Enhances Amygdala-Dependent, Socially Reinforced Learning and Emotional Empathy in Humans*, in: *The Journal of. Neuroscience*, 2010, 30 (14), pp. 4999 ss.; M. Di Simplicio, R. Massey-Chase, P. Cowen, and C. Harmer, *Oxytocin enhances processing of positive versus negative emotional information in healthy male volunteers*, in: *Journal of Psychopharmacology*, 2009, 23(3), pp. 241 ss.; U. Rimmele, K. Hediger, M. Heinrichs, and P. Klaver, *Oxytocin Makes a Face in Memory Familiar*, in: *Journal of Neurosciences*, 2009, 29(1): 38 – 42; Z.R. Donaldson and L. J. Young, *Oxytocin, Vasopressin, and the Neurogenetics of Sociality*, in: *Science*, 2008, 322(5903), pp. 900 ss..

[33] On the contrary, the genetic predisposition to cooperation does'nt seem to have a strong correlation to the modulation of trust through cerebral oxytocin receptors: C. L. Apicella, D. Cesarini, M. Johannesson, C. T. Dawes, P. Lichtenstein, B. Wallace, J. Beauchamp, L. Westberg, *No Association between Oxytocin Receptor (OXTR) Gene Polymorphisms and Experimentally Elicited Social Preferences*, in: PLoS ONE 5(6): e11153. doi:10.1371/journal.pone.0011153.

The normativity favors the behaviors of cooperation, and the sociobiological explanation allows us to understand the rest of the story: "s*elfishness beats altruism within groups. Altruistic groups beat selfish groups*"[34].

In the hypothesis, normativity allows the symbol to fulfill its communicative function and to stabilize the group, causing individuals to act, in reciprocal relationship, as if future gain were present or as if the fruits of common action were current. But temporal shifting can produce its stabilizing effect only if what ought to be is normatively believed. In this way, each member of the group may be satisfied. For this to take place, two conditions must probably exist: predation is so efficient that it produces a number or quantity of prey sufficient for everyone, and the prey is shared more or less equally.

Information materialized in a representation is accessible to everyone, and therefore everyone can equally understand it. It is uncontrolled, and everyone can reproduce it, eluding the control of the individual and the genes. Symbolic information contains within itself the power of diffusion and replication. This makes communication precarious and the communicating individual insecure, placing each individual on an equal plane. It is conceivable that the introduction of cave paintings also favored equal relationships between individuals belonging to the same group, disadvantaging hierarchical relationships based on authority.

Fig. 1 This picture was used in the campaign against 'omertà', the cultural conspiracy of silence regarding criminal activities. The name of the campaign was 'the flowers battle', pursued from a group of young people of the association 'addiopizzo'.

The cultural conspiracy of silence regarding criminal activities is an example of the malfunction of information exchange due to an inefficient legal system, arising from a lack of trust. If a similar lack of trust applied to every social behavior, modern societies would cease to function. Nobody would trust enough to maintain any social behavior at all, even those as simple and ordinary as driving a car, taking a plane or riding the subway. To maintain these behaviors it is necessary to trust that 'something' will

[34] D. S. Wilson, E. O. Wilson, *Rethinking the theoretical foundation of sociobiology, cit*., p. 345.

occur, and that this 'something' will be responsible behavior maintained by another - a stranger, or perhaps even an enemy. Contemporary societies are based on trust created by the normativity of legal rules, pervasively present in social life, even in its most intimate aspects.

Similar to trust, but without admitting contrary evidence, faith allows a temporal shifting of both events and payoffs. Future and uncertain rewards in the afterlife are written onto the current account of payoffs *as if* they were present or real. This makes certain behavior appear rewarding when it otherwise would not be, and faith precludes, anyway, the idea of gathering observable, empirical and measurable evidence. This is a possible explanation for otherwise inexplicable actions such as suicide bombings. But certainly the matrix of payoffs is altered if possible and future rewards are counted as current: an otherwise disadvantageous behavior could become theoretically advantageous. More than ethics, the aspect that religion shares with law is really the normative mechanism of trust. For millennia, religion has lawfully regulated human societies. It is conceivable that faith is actually based on the evolution of the biological mechanism of normativity which, once genetically or biologically evolved, no longer necessitated a posteriori verification of the payoffs.

Thus efficient predation allowed for the ever-increasing enrichment of society and its members, for a continuous growth of the *fitness* of all its members, and for the working-out of egalitarian rules, actually introduced by the materialization of information, with new rules regarding the sharing of spoils. The increased wealth allowed the strengthening of the mechanism of normativity and the exchange of information. In this way, culture began to evolve and paved the way for the *major transition*.

The history of human society and of legal systems can confirm this hypothesis[35].

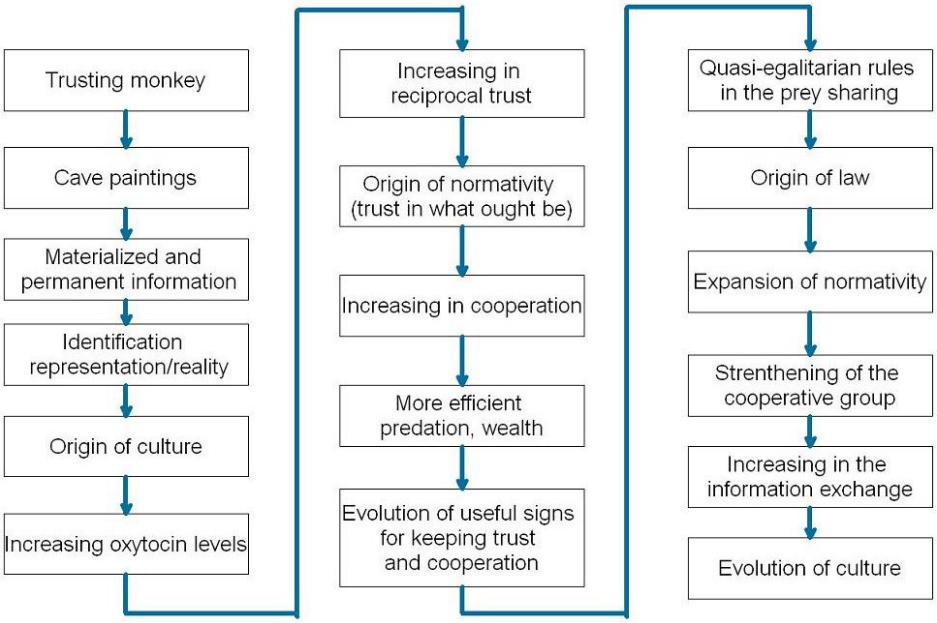
Law is not, therefore, a development of human culture, but just the opposite: culture was able to evolve because of law. Law is a group of rules used to exchange information based on normativity - trust in what ought to be - which allowed the *major transition* represented by human culture, allowing individuals to exchange information within the group and for selective forces to work between large groups of humans. It is the mechanism of societal stabilization through materialized information exchange, and thus not ruled exclusively at the genetic level, which

[35] D. S. Wilson, E. O. Wilson, *Rethinking the theoretical foundation of sociobiology, cit.*, p. 343 ss.

allows, due to a change in the way in which information is memorized and transmitted, the *major transition* of human culture. As a stabilizing structure for human social action, law has enlarged human societies from small groups of relatives to enlarged groups, to today's groups, formed with individuals who are not relatives and do not know each other, allowing the evolution of human culture - the widening of the exchange of information.

Similar mechanisms are present even in other major transitions, as in the structure of DNA, for example. The DNA chain is made up of a great number of genes that, *together*, create the organism. Each gene is expected to act, according to the theory of evolution, exclusively in order to replicate itself (not to replicate the DNA or the individual). Each gene works for its own replication, while the reproductive achievement of each depends on the replication of all, of the whole DNA. DNA's double helix form guarantees, through cotemporality, equal possibilities of replication for each gene belonging to the chain: all the genes replicate themselves together. The role of law in human cooperation within society works the same way, to guarantee the fitness not of single individuals but for the creation of cooperation. Legal relations allow the replication not only of single individuals but also of the culture.

Fig. 2 The trusting monkey and the origin of law.



It seems reasonable to suppose that law rules arose even before language, which may indeed be considered as a tool to broaden normativity: an information exchange tool as powerful as language could not have evolved without the presence of a social structure that allowed the prediction of the future behavior of others.

Unbound from the concept of norm, as a proposition contained in an utterance, law is therefore bound to all information related to cooperation within a social group, and the maintenance of trust in what ought to be – that is, of normativity.