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CONTENTS

Editors' Notes iv

Call for Papers v

Cultural Relativism and Environmental Ethics Lawrence T. Willett 1

Change and Continuity in a Peruvian Expatriate Community: Sr. de Los Milagros in Lima, Peru and Chicago, Illinois Margo. L. Smith 9

Speculation on the Genetic Origin of Cultural Behavior: A Key Mutation for Asymmetry Anthony D'Agostino 23

National Executive Council 37

National Scholarship Award Winners 38

Lambda Alpha Chapters 39
TO OUR READERS

As co-editors of the JOURNAL OF MAN we would like to encourage readers to send us comments on Volume 16 No. 2 and the articles published in it.

We feel these comments can provide information useful for improving future volumes and help us in the continuing effort to produce a quality journal. We hope to publish as many of your comments as possible in the next issue of the journal.

In addition, we still welcome any ideas readers may have for future cover designs.

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CALL FOR PAPERS

Manuscripts are now being accepted for the JOURNAL OF MAN, Volume 17 published by Lambda Alpha, the national Anthropological Honor Society. Professional, avocational and student manuscripts are welcome. The deadline for acceptance of articles for this issue is March 1, 1985. Papers should range from five to twenty-five pages in length and should be typewritten following the format accepted by American Anthropologists.

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CULTURAL RELATIVISM AND ENVIRONMENTAL ETHICS

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ABSTRACT

In this paper the scientific objectivity of anthropologists is represented as a major hindrance to the development of an appropriate environmental ethic in Western culture. This is because anthropologists avoid the necessary feeling of responsibility which could allow a different attitude to develop. Moral neutrality is not the basis for overriding cultural relativism in matters of experimenting on humans; here I suggest it is not a valid basis for matters of environmental concerns to humans.

Also, I urge fellow anthropologists to re-view our position in nature, and suggest ways we might contribute to a more appropriate scientific and ethical world view.

Cultural Relativism and Environmental Ethics

Thirty years ago Robert Redfield explained in The Primitive World and Its Transformations why he could no longer agree with and maintain the proposition of cultural relativism. I understand this to mean that he continued to endorse its use as a method for research within the social sciences, and that Redfield believed tolerance for, and appreciation of, the culture of others lessened the effect of ethnocentricity.

In a chapter entitled "The Transformation of Ethical Judgment," Redfield wrote that he did not disagree with Westermarck and Herskovits about the difficulties inherent in attempts to evaluate systems and aspects of different cultures which provide for human needs by comparing them. Especially was this so when we remember that the individuals within various cultures have been, and are, through enculturation, seeing their respective behaviours as morally valid. Who are we, perhaps outsiders to these societies, to impose our values upon their conduct; or how, meaning upon what basis, can we value one system over the other?

Moreover, flying in the face of the scientific detachment and ethical neutrality assumed as part of
cultural relativism, Redfield then went on to cite examples from which he came to believe, like Kroeber, that we have through the process of civilization come to loathe practices like torture. People in general have gone beyond the tenets of ethnocentricity and cultural relativism and have come to value humane conduct as a universal principle. Anthropologists have retained the method for ethnography, but some have stopped using it as an ideal approach for evaluating, for example, ethical systems. The position of cultural relativity is still acceptable, however, for the scientific study of behaviors which do not prevent people from being human, from practices which do not rob them of dignity. Importantly, if we believe we can judge these acts as wrong in our culture because they are inhumane, then we can judge them as universally wrong, both for other "civilized peoples and for pre-literates, illiterate, pre-agricultural, pre-industrial, or all cultures. This is because anthropologists are human and Redfield could not separate science from humanity. To really be scientifically impartial and ethically neutral is to try to deny one's humanity, to deny the existence of the scientist as a human; and is absurd. Redfield doubted that detachment could be attained because the anthropologist is a product of civilization, and civilization is a "historic trend which has tended to make the totality of human conduct more decent and more humane" (1953:63).

Redfield's understanding compares with David Bidney's (1968:543) comprehension of cultural relativism as method for research and guide for evaluating value systems. Bidney wrote:

All anthropologists are in agreement on the value of the method of cultural relativism and the relative objectivity required to report and interpret data from the perspective of the adherents of the culture. There is considerable disagreement in the use of the method of impersonal, objective, functional evaluation (1968:543,544).

I sympathize with Redfield and Bidney and admit that similar beliefs have prevented myself becoming a cultural relativist (some might wish to add - and therefore a scientist). I cannot be unbiased, aloof, and ethically neutral because I feel sorry for people when they suffer. And this is so when I contemplate, like Redfield, the plight of a warrior displaying fortitude and manliness under Huron torture; he still suffered despite his cultural conditioning (op. cit.:164).

Moreover, in addition to Redfield's example of the shortcomings of cultural relativism, now I wish to put
forward a case for more than a humanistic argument, convinced however that his argument was sufficiently reasoned and stated. For despite Redfield's and Bidney's clear statements about the principle when used for evaluation, it is safe to write that many anthropologists still use it as more than method. I suggest that one of the results is the environmental discord in Western society.

Anthropologists, insofar as I have noticed, have not been contributing much to the development of theories about how we should be managing natural resources or otherwise considering the regulating of our natural environment. I suppose we do not consider it is part of our professional responsibility or that we feel ill-prepared to treat with problems better left to politicians, and philosophers, and resource managers. Yet as Bidney has defined our primary subject: "Culture is but our human means of adjusting to nature and utilizing its powers in the service of mankind" (op.cit:544). In other words, "culture" is the abstraction of all the means we use; and the reasoning behind our reticence is probably the result of the dominant myth or fallacy within the discipline that we are scientists who must be wholly objective and ethically neutral. This position, or culture of the students of culture, prevents us from making a contribution to our overall understanding of our prime subject.

Redfield and Bidney condemned our failure to evaluate on humanistic grounds; I point to shortsightedness on environmental grounds. Because, by a reversed application of the concept of cultural relativism in Western culture, we fail to evaluate the attitudes caused by our world view. If we cannot evaluate the cultural conduct of others, we cannot judge value in our culture. Thus we fail to evaluate the consequences of the attitudes which result from our world view. Here I mean world view in the Redfieldian meaning of what culture is for those within the culture, or their idea of common-sense approaches to viewing reality. We apply the unspoken concept that if we cannot evaluate other cultures, neither on their own merits nor in comparison to ours or other cultures, we have no business evaluating our own. We can have no opinion as researchers, though we might have them in private. This stance keeps us out of the dialectic and out of the controversy.

As Bidney has described the result of our cultural "logic":

Insofar as moral relativism is considered to be a function of society and culture, it may be said to rest on two distinct postulates or assumptions. First, all value judgments are culturally conditioned or determined, and this limits their validity to the social and cultural context in
which they originate. Second, it is impossible to establish any universally acceptable criterion for measuring and comparing values. Hence, all value systems are to be regarded as having equal validity (ibid:545);

and again (ibid:546)

The cultural relativist is very much concerned lest we commit the fallacy of ethnocentrism, which consists in the attitude that "one's way of life is to be preferred to all others." Hence, he prefers not to judge others at all.

And, as this leads to failure to judge conduct at all, the moral relativist fails to form judgement regarding his own conduct toward nature. That is, is he can envision nature as an entity deserving of ethical consideration.

This standoffishness has become unacceptable. It contributes to the ease with which we, as a society, continue to fail to develop an appropriate environmental ethic for regulating our technology. It results in the current world view which objectifies nature, which lets us presume we are entities quite different from our natural circumstances, and therefore which facilitates our destructive attitude toward the world. Our cultural relativism is a stumbling block in the way of our becoming more than students of simplistic culture.

Yet Sidney tells us that culture "is but our human means of adjusting to nature and utilizing its powers in the service of mankind" (loc.cit.). Which is to say that culture consists of two parts: (1) adjusting to, and (2) using (utilizing) nature; and currently we are overemphasizing the second part. This is so because by the definition culture is the summation of mankind's efforts to do both (1) and (2), which blinds us to the clearer view of nature we need to see our need to preserve ourselves as part of nature. To preserve ourselves we must preserve nature. And here is the most bewildering aspect of the problem: it is only through more culture - as learning to adjust, not as learning to use - that we can hope to escape our culturally afflicted problem.

Nature is overexploited because of our cultural way of seeing and behaving; and if nature "dies" (metaphorically), so do we. We need make no studies on the truth of the matter. Thus our world view, which allows us to misuse our world, is out of harmony with the nature of nature, i.e., with reality. And to continue to maintain cultural relativism, to remain neutral and skeptical, as objective
as scientifically possible, as we "ought" to be whenever studying another culture, is wrong when applied to our culture and duty toward nature. we cannot understand the outcome and believe that fallacy. To try is tantamount to believing that it is beyond our ability as scientists to make a morel judgment (an evaluation) of some act like the dropping of a hydrogen bomb, a process which results in environmental degradation, only much quicker than other kinds, broader in effect, and not necessarily more long-lasting. Or, that it is relative whether the Americans or the Russians are the first to do so, when we know the results would be similar in either case.

Anthropologists who realize the seriousness of the matter can no longer fail to contribute to the development of environmental ethics if they are capable of helping. The excuse of cultural relativism is no longer acceptable. In the light of this, physical anthropologists must change their emphasis from evolutionary process toward showing our true position within nature, and expose the commonly held fallacious belief that we are removed from nature through cultural relativism as a modern myth whenever it is overextended from science to ethics, and evince its development and consequences.

It is no longer a matter of whether a culture should be measured against another, whether it is relative when and if an ethnic group practices cannibalism, infanticide, or abandons the sick or elderly; it is a matter of life itself. These other concerns were small with regard to today's problem.

It is time to define mankind's position within nature and support the environmental ethicists. Even though pleas for a more humane use of scientific objectivity were largely disregarded in the 1950s, '60s, and 70s, the support system, and therefore the life, of all societies is in jeopardy - and partly because of this overextention and inversion of cultural relativism.

In order to protect the environment we must see how we are part of it. We must escape the cultural trap of attitudes based upon poor perceptions of reality and become humane scientists by assisting in the development and application of appropriate environmental ethics. This is the adjustment in which culture is defined as providing for people, and is beyond relativism.

The immense variety of culturally defined actions, as when a person hides his fingernail clippings to avoid becoming the victim of witchcraft, can be considered in the isolation of relativism. It is not a compromise because their impact on mankind in general, or upon mankind's
habitat, is negligible. Yet we usually transcend the dogma of relativism when we consider if it is proper to experiment with humans in ways which might cause them to suffer physically or psychologically. The anthropologists' code of ethics condemns these studies. Public outrage and outcry would be raised against us. This more-than-objectiveness which surmounts scientific objectivity and disallows moral neutrality is a vital or humane reasoning and is deemed appropriate in a universal sense. It is the proper attitude toward nature as well, because human life and its environment are co-existent. We cannot exist without the appropriate environment; therefore tolerance of our present-day cultural attitude and skepticism of the possibility of universal standards fails us when we are faced with environmental values as being in reality human values.

If it is immoral to experiment with humans in such a way that they suffer (an evaluation of scientific conduct), or because the researcher becomes inhuman in doing so, then it must follow that it is immoral to allow scientific objectivity to prevent anthropologists from weighing actions which affect the environment which supports, and is part of, those people studied (and the scientist as well). Otherwise the first part of the above statement is false and the second part has no dialectical basis; and anthropologists are inconsistent in their view of humans as unique and beyond the tenets of cultural relativism for experimentation. And, to-date, applied anthropology is a misleading term because it does not extend as yet to this important area. It concentrates on social problems and neglects environmental problems.
1) I thank Dr. David Bidney for reading a rough draft of this paper and for directing me toward sources.

2) That the idealistic conception of science "as a rational endeavour pursued by individuals of Olympian objectivity, many of the very human and mundane motivations of its practitioners are denied or overlooked by both the public and the scientific community itself" is inappropriate, is commented upon by Broad and Wade in a recent article in Equinox entitled "Betrayers of the Truth. Cases of fraud in the idealized world of science." The authors add that "just as such nonrational characteristics as creativity, imagination, intuition and persistence are essential to the scientific process," other less desirable "qualities as ambition, envy and the proximity to deception play a role in the workings of science." Which I take to mean that the human nature of other scientists overcomes their presumed objectivity as well; however, this is a negative example when compared to Redfield's break with objectivity.

3) For the views of another social scientist who has seen the shortcomings of cultural relativism in the light of problems arising because of the lack of moral initiative or position amongst anthropologists, see Harriet Lyons, "Anthropologists, moralities and relativities: the problem of genital mutilations," in The Canadian Review of Sociology and Anthropology 18:4 (November 1981) 499-518.

4) Theoretical Anthropology, pp. 450-452; as well, Dr. James Jaquith of St. Mary's University (personal communication), a former student of Bidney, assures me that Dr. Bidney was outspokenly against the simplistic use of cultural relativism.

5) In my M.E.S. thesis I have compiled a list of authors from a range of disciplines whose work expresses dissatisfaction with the Western world view.

6) Environmental philosophers are trying to develop a global ethic; see, e.g., Alan Drengson's definitions in The Trumpeter.
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When people move from one cultural environment to another, they do not automatically shed the cultural skin they acquired during their lifetimes to put on the new cultural skin characteristic of their new cultural environment. Instead, they retain some of their cultural baggage from the homeland in a manner relatively unchanged from traditional practice, re-interpret other parts of their cultural baggage in the context of their new cultural setting, and add to their cultural baggage items from their new cultural setting.

Having spent two years in Peru between 1967 and 1970 doing field work among a group of migrants to the capital city of Lima (Smith, 1971), it seemed only a logical step for me to pursue research in the expatriate Peruvian community in Chicago, Illinois. Here, my interest focused on the adaptation of Peruvians to their new cultural setting, a metropolitan setting characterized by considerable ethnic heterogeneity. In the long term, it also would be useful to compare the adaptation of small groups, such as Peruvians, with the adaptation of much larger groups (e.g., Mexican, Puerto Rican, etc., in Chicago). In addition, in the long term, it would be useful to compare the adaptation of groups like the Peruvians to a culturally heterogeneous setting, with the adaptation of groups to a more culturally homogeneous setting (e.g., some of the recently arrived refugee groups from southeast Asia in culturally homogeneous areas of the U.S.). Another useful comparison could be made between the adaptation of urban migrants, like the Peruvians, to another urban environment and the adaptation of rural migrant groups to a foreign urban environment (e.g., the Hmong in Chicago).

However, these last three topics are beyond the scope of this paper. Discussion here is limited to the adaptation of the Peruvian community in Chicago, as demonstrated in the annual religious observance honoring Sr. de los Milagros (Lord of the Miracles).

A brief history of the procession in Lima is presented first, followed by a description of the procession there in contemporary (1968-1969) times. The paper then turns to a
discussion of the Peruvian community in Chicago, focusing on the Sr. de los Milagros observances. Cultural changes and continuities of both practical and symbolic nature in the observance of the procession will be discussed. I contend primarily that the function of this procession, originally an expression of religious devotion and concern about earthquakes and serious illness, is increasingly taking on in Chicago the characteristics of a demonstration of Peruvian national/ethnic identity.

HISTORY OF SR. DE LOS MILAGROS IN LIMA

The procession has a long history (Documental del Perú 1969, and Novena a Historia del Señor de los Milagros) in Lima, and dates to the early colonial period. In the mid-17th century, in an area then not too far outside of urban Lima, was a building used by Black slaves to celebrate their festivals. One of the slaves painted an image of the crucified Christ on the wall. An earthquake in 1655 demolished the building, except for the wall on which the image had been painted. The preservation of this wall was recognized as a miraculous event. Soon a medical cure was attributed to the image in response to offerings of candles and flowers that had been made. After people began to visit the image, a small chapel was built on the site, and the first commemorative mass was held in 1671. The devout supporters of the image increased, particularly after the earthquake of 1687 which, although it destroyed much of the city of Lima, left this wall standing and the image undamaged. The first procession took place to commemorate the earthquake. Sr. de los Milagros, as the image came to be known, became patron of the poor of the city and came under the care of the Carmelites. Subsequently, in 1749, another earthquake destroyed the church in which the image was housed, and the image was relocated to the monastery adjoining the Church of the Nazarenes where it still resides. Some of the gold and silver medals, known as "milagros," contributed over three centuries by the grateful devout in return for favors granted by the Señor have been used to make a frame for the replica of the image carried in the procession; the remainder is stored in the convent.

The procession has grown longer and is now held on two days in October, now known as the purple month because of the color of the habits worn by the most devout followers of the Señor. Highest ranking government and church officials pay their respects to the litter. A commemorative hymn to the Señor, always sung by a small group of women in a nasal tone of voice, has become an integral part of the procession. Economic activities also have been integrated unofficially into the procession: the street sale of...
numerous procession-related objects (distinctively decorated candles, scapulars, pictures of the image, and white waist cords) and food (a sweet known as "turron de Doña Pepa"), the street sale of non-procession related objects (such as balloons) and foods, and reportedly, pickpockets. Although the devout still request health related favors from the Señor, they do not seem to rely any more on the image for help in the case of an earthquake.

CURRENT CELEBRATION OF SR. DE LOS MILAGROS IN LIMA

In contemporary times, the events marked by the greatest public participation in Lima are the annual processions honoring Sr. de los Milagros. On October 18 and October 28, several hundred thousand Limeños line the procession route, most walking along at street level to accompany the litter, with a small percentage observing from rooftops, balconies or at open windows. For weeks in advance, purple cloth and white waist cords from which to sew habits, pictures of the sacred image, distinctively decorated candles, and booklets about Sr. de los Milagros are available for purchase in variety stores (e.g., Tia, Monterrey) throughout the metropolitan area. As October begins, an increasing number of persons are seen on the street garbed in the purple habit, to demonstrate their devotion to the Señor or in fulfillment of a "promesa" or religious vow. On the day preceding the procession, a map showing the precise route of the procession and an accompanying article appear in one of the major daily Lima newspapers (e.g., El Comercio).

The procession begins with an early morning mass in the Church of the Nazarenes, where the original image of the Señor is housed but not available for public viewing. The procession continues to be sponsored by the "Hermandad del Sr. de los Milagros," a religious brotherhood of Black men. Members of the brotherhood, exclusively, carry the heavy litter on which is the replica of the original image. (See Fig. 1 for a diagram of the procession as it appears in the street, extending about one block in length.)

Individual participants in the procession, estimated to be approximately 10% of the entire population of the Lima metropolitan area, are primarily "cholos," lower income people of primarily Indian ancestry and often migrants to the capital city from the provincial areas of the country where this procession is not observed. The few (perhaps 5%) somewhat more affluent participants are those who observe the passing procession from an above-ground vantage point. Perhaps as many as 35% of the participants are wearing habits, scapulars, or purple ties or other purple articles.
of clothing. Some may throw flower petals, carry lighted candles, or set off fireworks.

Institutions, such as schools and commercial establishments, participate as well, by decorating their premises along the procession route and/or by contributing two cone-shaped floral arrangements or large candles to the litter as it passes. Official support of the procession comes from the highest levels of government and the Catholic Church: the Presidential Palace contributes floral arrangements, and the Archbishop delivers a homily from the balcony of the Archbishop's Palace. The Civil Guard, a branch of the military, provides a band to play the traditional procession chant, as well as officers who demarcate the most sacred area of the procession and keep the slow procession moving.

The procession route, which varies somewhat from year to year in the old central district of Lima, always passes the new (in 1969) headquarters of the sponsoring brotherhood, the cathedral, the Archbishop's Palace, the Presidential Palace and several major hospitals. The litter is returned to the Church of the Nazarenes at the conclusion of the procession, usually about 2-3 a.m. of the following morning.

October 18 and 28 are not official holidays, and people are expected to meet their job obligations. Stores, offices and schools are open as usual, except for stores which close as the procession passes by, in order to protect their storefronts from the dense crowd. Some people accompany the procession for its entire route; others for only a few hours.

THE PERUVIAN COMMUNITY IN CHICAGO

The Peruvian community in Illinois is the fifth largest group of Peruvians in the U.S., and comprises about 5% of the total Peruvian population in the U.S. These nearly 2,500 people (in 1980) live almost exclusively in the Chicago metropolitan area. They are exclusively migrants from urban areas in Peru. Among them, 72% report Peruvian ancestry as their only ancestry.

However, this community is nearly invisible in Chicago. Among all immigrant/ethnic groups in the metropolitan area, the Peruvians represent only a tiny fraction; in fact, they comprise less than .5% of just the Spanish speaking peoples. Unlike many other immigrant/ethnic groups which are residentially concentrated in one or another identifiable neighborhood, the Peruvians are dispersed primarily in the north side of the city.
There are a few areas in which the Chicago Peruvian community has a higher than expected public profile; restaurants, participation in the annual Ethnic Fair, and a shop which sells imported Peruvian crafts. During the 1970s and 80s, there have been from one to four restaurants at a time which feature Peruvian cuisine. The three which have survived are expensive and cater to an Anglo, non-Peruvian clientele. These three have been included in widely distributed restaurants guides to the city, and one has participated in Taste of Chicago, a heavily attended summer food festival (1980-82) where the public has been able to purchase for a modest price small portions of the specialties of the participating restaurants.

In November or December, the city sponsors a heavily attended Ethnic Fair where immigrant/ethnic organizations sponsor booths featuring ethnic artifacts on display, the sale of ethnic foods, and the sale of ethnic and/or other crafts, records, etc. The complementary Peruvian associations the Peruvian Arts Society (for the more affluent and socially higher ranking Peruvians) and the Centro Peruano, ordinarily not known outside of the Peruvian community, both sponsor booths. Each has a booth selling Peruvian foods. In some years, one or the other group also sponsors a booth in one of the other categories. This is a fund raising activity for the participating organizations and caters to the entire city population.

CELEBRATION OF SR. DE LOS MILAGROS IN CHICAGO

Since 1979, the Chicago Peruvian community, under the auspices of a sponsoring local brotherhood, has held a procession in honor of Sr. de los Milagros. Beyond regular year round participation in the activities of the Peruvian Arts Society, the Centro Peruano, and a soccer team, this is the single major annual rite of intensification for the Peruvian community. It is the only Peruvian activity in which all local Peruvians can participate. Participation has grown steadily from about 250 in 1979 to 600 in 1983.

In 1979 and 1980, the procession was held from Our Lady of Lourdes Church, a diocesan church in a modest neighborhood on the north side of Chicago. From 1981 to 1983, the procession (see Fig. 1) has been held from St. Ignatius Church, a Jesuit church and formerly Irish parish on the far north side of the city where the local replica of the image is now permanently housed. Both churches are bilingual Spanish/English churches. The concelebrated high mass which preceded the procession (1981-1983) was the regularly scheduled Spanish language mass for the parish.
A comparison between the traditional Lima celebration and the new one in Chicago reveals four clusters of changes and continuities: 1) changes which are practical adaptations to the Chicago environment, 2) changes which are symbolic, 3) continuities which are practical, and 4) continuities which are symbolic.

Many of the observable differences between the Lima and Chicago processions reflect practical adaptations to the Chicago context. In the first place, the procession is held only once a year and on the Sunday afternoon closest to October 18. To expect people to be absent from school or work on the 18th would inhibit participation. In fact, the ceremony in which the image was formally dedicated in its permanent niche at St. Ignatius Church, held on a week day in the evening (October 27, 1981), was attended by only 150-200 people, approximately 1/3 of the people who had attended the procession earlier that month.

The sponsoring brotherhood of 90 men has very different membership in Chicago. There do not seem to be any Peruvian Blacks in the Chicago Peruvian community, so that the membership is made up entirely of Peruvians of mestizo and European ancestry. The men and boys in the brotherhood wear the traditional purple habit. In 1979, it was somewhat of a shock to see all of the men wearing identical brand new habits sewn at home from apparently the same bolt of purple polyester cloth - until I realized that these men probably would not have worn habits to the procession in Lima, nor would they have been members of the brotherhood; consequently, all of them needed to acquire habits at the same time. There are also 18 male and female "promoters" of the ceremony. Their status is marked by a lapel decoration or by a heavy rectangular metal medallion hanging from a ribbon around their necks.

The focus of the activities honoring Sr. de los Milagros has shifted from a short (relative to the length of the total celebration) mass in which relatively few participate followed by a long (at least 15 hours) procession in which the bulk of the devout participate - to a relatively long (nearly 2 hours) mass to which all devout attend followed by a short (perhaps 2 hours) procession in which fewer participate. Weather in Chicago in October varies from balmy (1979) to frosty (1981). As the Chicago procession slowly winds its way around the block and especially in inclement weather, participants drop out of the procession and wait in the church basement for the procession to end. Consequently, both symbolic elements, the mass and the procession, are retained, but the route is shortened and held (1980-1983) exclusively on side streets, unlike Lima where the procession blocks several main downtown streets.
The procession is followed, in Chicago only, by a meal of typical Peruvian cuisine which is served in the church basement. However, the single food item associated with this celebration in Peru, the "turrón de Doña Pepa," is not served in Chicago. The food is sold at modest ($0.50 - $2 per item) prices. This, the collections taken during the mass, and prior fund raising are the only economic activities associated with the procession. In addition, the holy cards normally sold in Lima by street vendors during the procession are given away by the brotherhood in Chicago to those who attend the mass.

In Lima, the crowd of participants is made up largely of strangers. A person will attend the procession with one or a few friends or relatives, but they probably will not see other people they know (with the exception of some members of the brotherhood who do know each other). In Chicago, on the other hand, the mass and procession is an opportunity to be with a group of fellow Peruvians, "paisanos," and friends. People attend in larger family groups. The half hour before the mass begins, especially, is a period of animated greeting of a large groups of friends. This is reinforced during the meal in the church basement following the procession.

In Lima, the active roles in the mass and procession are very few relative to the crowd of participants. In Chicago, the active roles for the Peruvians are many in comparison. Including the approximately 45 adult male members of the brotherhood (who take turns standing by the image during the mass and carrying the litter and the cord defining the sacred area of the procession), the altar boys, the women singers, the choir, and the other participants in the mass (who read aloud passages from the Bible, make announcements and speeches, etc.), perhaps 70 people, more than 10% of all those who attend, have an active role. In addition, beginning in 1983, three Peruvians were awarded large framed reproductions of the image in recognition of their help in procession preparations. This high level of active roles is possible only because the total Peruvian community in Chicago is small. This would not be possible in the largest expatriate communities in New York and California, nor in Lima itself.

The image is detachable from its base, so that it can be disassembled in order to get it in and out of the main front entrance of the church and for it to be displayed in its year-round niche in St. Ignatius Church. The Peruvian image may also be detachable, but it is not publicly seen in that condition, a rather awkward and undignified one.

At the conclusion of the procession, the image is taken back into the church and placed in its niche along the
south wall. Flowers donated by devout supporters are arranged around it. Numerous participants gather around with their cameras to photograph the image and the priest as he blesses objects brought by the participants. This blessing of objects and close-up photos with the priest is also possible only because the number of participants is relatively small.

A number of other changes may reflect the fact that the procession has a short history in Chicago. Each year, the event is becoming more elaborate. For example, 1983 was the first year in which there was a succession of floral offerings; some participants in the procession carried armloads of flowers which were placed periodically on the litter. In previous years, it had been obvious that the several floral arrangements had been contributed by different groups or individuals because they were so different from each other, but all fit on the litter at the same time. In addition, 1983 was the first year in which an elaborately embroidered banner preceded the litter and in which the litter was adorned with silver Sacred Hearts. In future years, additional elements may be added. For example, the procession does not yet include a group of incense-burning older women. Neither is the litter adorned with appropriately decorated candles. There is no reason to conclude at this time that the omission of these elements reflects a symbolic change in the way the Peruvians perceive the procession.

Quite a few of the observable changes in the procession are symbolic. Some of these reflect what appears to be a gradually increasing emphasis on the procession as a demonstration of Peruvian identity and successful adaptation to Chicago, rather than only religious devotion.

For example, only at the procession in 1979 was the history of Sr. de los Milagros recounted during the mass. Since then it is assumed that everyone knows it. But 1981, the historical background merited only two sentences in the homily. Also in 1981, the homily included an appeal to attract other non-Peruvian Latin Americans to participate, but that appeal was absent from the following year's homily; very few non-Peruvians attend. In 1983, the homily cited the Peruvians' faith as an example for all Catholics in Chicago. Verbal references during the mass are to the Peruvian participants and to the few guests who are assumed to be non-Peruvians. In addition, floral arrangements on the litter, once multicolored, are now largely red and white, the Peruvian national colors. Furthermore, the only food associated with this procession in Lima has been replaced by exclusive consumption of year-round secular Peruvian foods. Finally, since this is the only Peruvian
activity open to all members of the community, cutting across the socio-economic distinctions between the Peruvian Arts Society and the Centro Peruano, and the specialized interest groups (the soccer teams), it is not surprising that the procession attracts a larger percentage (close to 25%) of the entire Peruvian community than the procession does in Lima. Participation in Chicago reinforces Peruvianness; in Lima, lack of participation, participation as a rooftop observer, or ground-level participation reinforces distinctions among Peruvians.

There are additional observable changes which reflect a demonstration of the successful adaptation, particularly in economic terms, of the Peruvians to the Chicago area. Peruvians arrive at St. Ignatius Church in their cars dressed in their "Sunday best." This is definitely a more prosperous group of participants than the bulk of those in Lima. Ordinarily very status conscious Peruvians have selected as their most important ritual an event most closely associated in their homeland with a very low income urban group. The Chicago procession is becoming an audio-visual event in that in each succeeding year, increasing numbers of Peruvians record the event with their own 35 mm. and videotape cameras. Furthermore, each year the procession in Chicago becomes more elaborate. A large expensive stereo tape player on the rear of the litter replaced (in 1982) the band playing the traditional procession music. In the long term, the tape player will save the brotherhood money and eliminate the band as one element of non-Peruvian participation. A substantial sum of money, approximately $14,000, has been spent on improvements to the litter: a silver veneer with low relief design covers the base, four large silver angels have been set on the bases of the litter, and a silver covering has been placed over the loin cloth and other parts of the image.

There are also a few changes in the Chicago procession which reflect religious importance. The red velvet canopy used in the procession in Lima to symbolically shelter a few leaders of the brotherhood has been used in 1979, 1980, and 1983 in Chicago, but to shelter the participating priest and bishop. In Lima, priests do not accompany the procession on its route; in Chicago, the priest always accompanies the procession. In Lima, with the exception of small children passed over the heads of the crowd, no one is allowed close enough in the procession to touch the litter. In Chicago, all of those who care to can crowd to the center aisle of the church to touch the base of the litter as it is being carried out of the church. In addition, the Chicago procession seems to lack what one might call in Lima the publicly most devout, those who are fulfilling very
serious religious vows and/or are permitted to participate within the defined most sacred area of the procession by carrying a heavy wooden cross, by participating barefoot, or by being in a group of women burning candles and praying. It is possible that Chicago has its publicly most devout who have fulfilled their religious vows by making substantial financial contributions to the adornment of the litter. Furthermore, an increasing number, but still few women wear habits in Chicago, although it is the most common way to demonstrate fulfilling a vow in Lima. Finally, the move from a diocesan to an order affiliated church should be noted.

There are few noticeable continuities which are practical. The brotherhood continues to perform the vital function of sponsoring the procession. However, the brotherhood in Chicago has less resources than its large land-owning counterpart in Lima. The Chicago police participate, but only for traffic control. They are not needed to demarcate the most sacred area of the procession because the crowd is not large. The Chicago celebration continues the traditional Peruvian practice of having migrant groups aid those from their home town by raising money which is sent home; in 1982, a second collection was taken during the mass for the benefit of the residents of an old squatter settlement in Lima, El Agostino. In 1983, the collection was to benefit people living on the north coast of Peru who were suffering as a consequence of the "El Niño" climate and recipients of unspecified social works in Chicago, as well as the El Agostino residents.

The procession in both Lima and Chicago continues to relate to the medical curing resulting from faith in the Señor. In Lima, the procession always passes by several large public hospitals where floral offerings are made. In Chicago in 1983, a severely handicapped young man was brought to the procession as it began. The Peruvian's wheelchair was pushed through the crowd to a position near the side of the litter. The litter turned to face him for about a minute until he was pushed to a position in front of the litter under the purple canopy sheltering the priests. He continued to participate in the procession for approximately 15 minutes.

The continuities in observance from Lima to Chicago also reflect the basic religious nature of the event, as well as precede the mass and procession in both cities. The essential format of the celebration, mass followed by procession, the essential form of the procession (see Fig. 1), and the traditional behavior of the participants remain. The men of the brotherhood carry the litter and, in Chicago only, demarcate the sacred rectangular area around the
litter. The traditional music and purple habits are found in both processions. The pace is slow, the tone serious, quiet, and reverent. People do not turn their backs on the litter. The Chicago procession increasingly incorporates official church and secular recognition as its Peruvian counterpart has done already: participation by the Peruvian consul (the highest ranking Peruvian in the city) and an American bishop who was highly regarded during his tenure in Sicuani (Peru); reading of messages of greeting from the Chicago Mayor and Illinois governor; and escorting the litter by the non-Peruvian Knights of Columbus, by a U.S. naval training color guard (in 1982), and by the Royal Chicago Scout Band (1983).

Other aspects of the observance reinforce the event as a Peruvian activity. The official Peruvian flag has been predominantly displayed. The Peruvian altar boys wear purple habits (except in 1983). Peruvian priests participate in some years (1979 and 1983). The exclusive use of the Spanish language effectively restricts the meaningful participation of outsiders.

CONCLUSION

This paper has examined the Sr. de los Milagros procession as it is held in Lima, Peru, and in the Peruvian expatriate community in Chicago, Illinois. Particular attention was paid to noting those elements of the procession which are similar in both places, and those elements which are different. It is anticipated that the study of activities such as this one will contribute to a better understanding of the processes by which a migrant group adapts to its new cultural setting. In this context, the most significant factor to be noted about the Sr. de los Milagros procession in Chicago is that the Peruvian expatriate community seems to be adding to an event of primarily religious devotion the opportunity to demonstrate and reinforce Peruvian identity.
NOTES


2. This paper is based largely on participant observation of the Sr. de los Milagros processions in Lima, Peru, in 1968 and 1969, and in the Peruvian expatriate community in Chicago, Illinois, from 1979-1983.

3. During most of the year, these items are available only from vendors set up in the plaza adjacent to the Church of the Nazarenes.

4. This is a good example of the operation of the dyadic contract, as described by Foster (1961).

5. After California (15,500), New York (14,000), New Jersey (7,375), and Florida (4,700). U.S. Census of Population, Table 3.


7. At least one other Peruvian expatriate community, that in Washington, D.C., also sponsors a procession for Sr. De los Milagros (Jorge Osterling, personal communication).

8. Although other immigrant groups in Chicago celebrate the independence days or other special days in their homelands with a parade, the Peruvian community does not have a parade on July 28, its national holiday.

9. The serving of food in the church basement, either for free or for modest prices, is common in midwestern U.S. churches but it is not customary in Peru.

10. It should be pointed out that non-Peruvians are always welcomed in English at the masses. None of the non-Peruvians except the priest, the anthropologist, and some of her students participate in the procession.

11. It should be pointed out that both of these officials were candidates for re-election in 1982, the first year such messages were read. Such messages may have been only part of the election campaign because none were read in 1983.

12. This group probably was included because it has a Peruvian member.
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U.S. Census of Population.
1983 Ancestry of the Population by State. 1980. Supplementary Report PC 80-S1-10, Tables 2, 3, and 3A.
Fig. 1 Sr. de los Milagros Procession: Lima, Peru (left)
Chicago, Illinois (right)

Purple velvet banner embroidered with the image
Peruvian altar boys

Similar purple velvet banner
2 women with book

Purple velvet banner, embroidered

Velvet canopy over priests/bishop

Group of women singing

NOTE: Not to scale
SPECULATION ON THE GENETIC ORIGIN OF CULTURAL BEHAVIOR:  
A KEY MUTATION FOR ASYMMETRY

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Abstract

The most basic elements of culture which separate humans from other animals are the efficient use of tools and the development of language. Evidence is presented suggesting that a key mutation for lateral dominance formed part of the biological basis for the subsequent development of culture which is dependent upon handedness for the efficient use of tools, and upon cerebral speech asymmetry for the lateral localization of language functions.

In the course of evolution, mutations sometimes occur which lead to quantum shifts in the adaptation of a species. G.G. Simpson (1953:391) calls these "key" mutations. A key mutation marks a turning point which allows a species to pass from one adaptive zone into another.

The origin of human culture reflected a quantum transformation in the adaptation of early hominids which allowed them to begin to exploit an adaptive zone unchallenged by any other biological form. Therefore, we might expect to find a key mutation which marked this turning point in hominid evolution and eventually led to our unique cultural way of life.

The most basic elements of culture which distinguish humans from other animals are efficient tool use and the development of language. Human behavior is universally based on these traits. If a biological basis for human culture were discovered, it could lead to a new understanding of human evolution.

Culture is passed on socially, but the uniquely human ability to acquire culture is passed on genetically (Tax, 1960). Any reconstruction of the origin of culture must relate tool use and the development of language to their biological foundations by applying the evolutionary processes of random mutation and natural selection.
Human behavior did not develop in a biological vacuum. One approach to the study of how culture originally evolved is to search for characteristics in the human nervous system which differentiate us from other living forms.

The biological locus of culture, of course, is within the boundaries of the human brain. During the past two million years, hominid brains have approximately doubled in size. Haldane (cited in Mayr, 1971) calls this the most exceptional evolutionary change of which he is aware. Human brains, however, are more than simply inflated pongid brains; rather, they have been differentially enlarged, as well as reorganized.

Halloway (1966) has shown that comparing gross cranial volume of apes and humans is not comparing equals. For example, Penfield and Rassmussen (1957) have drawn cortical maps of the human brain showing that more than half the sensory and motor areas are devoted to those body parts controlling tool use and language (e.g., to the hands and to the vocal apparatus). Washburn (1959) has contrasted this uniquely human cortical map with a map of a monkey brain. These data suggest that the evolution of the human nervous system has focused on the cortical areas related to efficient tool use and language.

Halloway (1966), Pilbeam (1972) and others share the opinion that the hominid brain has been internally reorganized as well as differentially enlarged. The evidence derived from the study of human microcephalics supports this conclusion. Microcephalics, although mentally retarded, usually learn at least the rudiments of language and are able to function within a cultural system in a way that is beyond the capability of any other animal. Yet they often have smaller brains which contain fewer neurons than some living apes (Lenneberg, 1967). Thus, the human brain has been reorganized, but the nature of this transformation has not been well understood. Perhaps we can shed some light on this problem.

While all higher animals exhibit bilateral symmetry, only humans seem to have a nervous system which contains a combination of major asymmetrical functions (Jung, 1962; Lenneberg, 1967; Geshwind, 1970). These functions are expressed by such traits as manual laterality (handedness) and asymmetrical cerebral functions which control language abilities (cerebral speech dominance).

Apparently this combination of traits is not shared by our animal relatives. In a thorough review of the literature, Hecaen and Ajurriaguerra (1963) concluded that among infra-human animals, one evidently cannot speak of handedness. In his summary of the conference on
Interhemispheric Relations and Cerebral Dominance, Jung (1962) agreed, stating that unilateral preference in animals is quite different from handedness.

Some kind of lateral preference of the forelimb, however, has been noted in a variety of infra-human species by several investigators (e.g., Lashley, 1924; Collins, 1968; Crinella, et al, 1972). In contrast to humans, with very few exceptions (e.g., Ettlinger, 1961), animal studies have been shown that the incidence of left-right preferences tends to be nearly equal (Finch, 1941; Yerkes, 1943; Cole and Grees, 1951). Paw preference in various infra-human forms is also more easily reversed than in humans (Warren, 1958). This evidence supports the contention that handedness, as expressed in humans, who make tools with freed forelimbs, is not the same as paw preference.

The study of vocalizations provides more interesting contrasts. The only vocalizing locus found in all infra-human primates tested is represented bilaterally in the primitive limbic system of the brain (Robinson, 1972). The limbic system is capable of communicating only simple messages which are limited to the present emotional state of the animal. Robinson further states that all attempts to find cortical representation of vocalizations among infra-human forms have failed.

Among humans the limbic system exhibits the same limited abilities found in monkeys. This, however, represents only a minor portion of our communication repertory. Human language is primarily controlled by specialized areas of the neocortex which are mostly lateralized to the left cerebral hemisphere. Cortical vocalizations are superimposed on these of the primitive limbic system.

A search of the literature reveals that the existence of cerebral asymmetry among infra-human forms has not been demonstrated. For example, Jung (1962:268) states that there is no evidence whatsoever for cerebral dominance in monkeys or carnivores. Teuber (1962) agrees, maintaining that both hemispheres in the monkey apparently function as does the right (nondominant) hemisphere in humans. This has been supported by the work of Gazziniga (1970) who surgically disconnected the cerebral hemispheres of humans and monkeys.

Certain unilateral specializations, however, have been ascribed to a few infra-human forms. For example, Nottebohn (1970) has shown that in the adult chaffinch the capacity for birdsong is carried asymmetrically by the left hypoglossal nerve. Crinella, et al (1972) feel that this may be an example of independent development. Webster
(1972) working with eight split-brain cats claims to have found significant hemispheric differences in visual discrimination learning. Although these appear to be examples of asymmetries, they are not the same as cerebral speech asymmetry since cerebral "dominance" is defined by unilateral language functions. So there seems to be little evidence for handedness, where the vast majority of individuals use the same forelimb, nor is there anything quite like human cerebral dominance in these infra-human forms. Indeed, our closest relative among the primates show no evidence of cerebral dominance, and virtually none of handedness.

In contrast, the vast majority of persons in all groups studied, are right-handed and presumably left-brained, although widespread cross-cultural data are not yet available. Geshwind and Levitsky (1968) have shown that these asymmetrical functions in humans may be derived from species-specific anatomical asymmetries in the temporal speech region of the brain. Wada (cited in Geshwind, 1970) confirmed this conclusion and, in addition, found these differences present at birth in human infants.

Not only do infra-human animals lack handedness and cerebral dominance, but Corballis and Beale (1971) have shown that they cannot even distinguish left from right. In Pavlov's (1927) brilliant series of experiments on conditioned response, one notable failure occurred when he tried to condition his dogs to respond to lateral stimuli from one side, but not the other. It seems that in a non-cultural environment there is little need to make left-right distinctions.

The ontogeny of lateral dominance provides interesting insights into the relationship between handedness and cerebral speech dominance. At birth, children possess neither handedness nor cerebral dominance although, as mentioned above, there may be anatomical asymmetries in the neonate brain. According to Lenneberg, in the course of development, the onset of language acquisition, the lateral localization of speech centers, important motor milestones related to the efficient use of tools, and handedness coincide rather closely. These traits also develop together in children retarded by Mongolism (Down's syndrome) although this often occurs several years later than in normal children (Lenneberg, Nichols and Rosenberger, 1964). Thus, there seem to be intimate, if not clearly understood relationships among handedness, the efficient use of tools, cerebral dominance, and the acquisition of language in the development of the human child.

We have thus far established that the following traits appear to be uniquely human: 1) culture, which is based
upon the efficient use of tools and language, 2) unilateral dominance, expressed functionally by handedness and cerebral dominance, and anatomically by cerebral asymmetries, 3) the differentially enlarged and internally reorganized brain, including unilateral cortical vocalizations, 4) the ability to distinguish left from right, and 5) the close developmental coincidence of the onset of handedness, efficient tool use, cerebral dominance and the acquisition of language. Since we do not find these traits among our relatives, we can assume that the human nervous system is qualitatively different from any other known living form and that these characteristics evolved after the phylogenetic separation of the hominid line. Let us now discuss how and why this combination of traits evolved only in humans.

The paleontological record reveals that our ancestors were at least partially bipedal before their brains grew so dramatically in size and before we had any archaeological evidence of cultural behavior. At some time in the past, the early hominids approached the threshold to a new adaptive zone based on efficient tool use. The biological and behavioral traits which allowed these forms to pass this threshold are at the crux of the problems concerning the evolutionary origin of culture.

Washburn (1959) and others have emphasized the significance of tool use on human evolution. It is well known that non-human animals occasionally use tools. When Jane Goodall (1963) found that chimpanzees in the wild made and used simple tools it was an amazing discovery. What is equally amazing, however, is how insignificant tool use is for chimpanzees. If they were to lose this ability it apparently would make little difference to their survival.

According to Goodall, wild chimpanzees are ambidexterous when using tools to "fish" for termites (cited in Lancaster, 1968). Lancaster (1968:347) maintains that, "this absence of handedness may be indicative of the limitations that the chimpanzee's brain places on its ability to develop highly skilled tool use." Washburn and Lancaster (1969:396) state that, "Handedness is a feature that separates man from ape... To be ambidextrous might seem ideal, but in fact the highest level of skill is attained by concentrating both biological ability and practice primarily in one hand."

Tool use requires complex motor patterns with different, but complementary, forelimb functions. For example, making stone tools, swinging a club, throwing a spear, and nearly all other activities involving the efficient use of tools depends upon non-equivalent, asymmetrical manual abilities. It would be physiologically redundant to be forced to relearn both sets of functions for
each hand. Also, each time a tool is used, there must be a choice of hands. Lateral dominance, in the form of handedness, makes this a natural choice for humans. This helps to explain why humans, with our unique possession of handedness, are the only animals whose very survival is dependent upon efficient tool use. Let us now turn our attention to the selective factors which I believe led to the original development of the efficient use of tools.

Bipedal toolmakers are exposed to different selective pressures than quadrupeds whose forelimbs are used primarily for locomotion. A dominant forelimb would provide no advantage to a four-legged animal since both sides generally function as mirror-images of one another. In this adaptive zone, natural selection would tend to operate against any mutation leading to unilateral dominance. A quadruped possessing this trait might literally have a tendency to run in circles. At any rate, there seems to be no selective advantage for a non-tool-dependent quadruped to possess a dominant forelimb.

The selective pressures were reversed, however, in the adaptive zone of the early hominids. When their forelimbs were freed from locomotor functions and they began to use tools, any mutation allowing the development of a dominant hand would have provided a definite selective advantage. They could then make better tools and use them more effectively, and thus, leave more progeny who would inherit this trait and pass it on to their descendants.

The development of linguistic abilities seems to be related to the evolution of handedness. The left side of the brain, where language abilities are concentrated, controls the right side of the body, the most common site of handedness. Oakley (1957) claims that this is an indication of the close relationship between manual activity and speech. Kimura (1973:76) agrees, stating that, "Although the relation between speech lateralization and hand preference is not perfect the high incidence of both left-hemisphere control of speech and right-hand preference is probably not coincidental." Holloway (1969) has equated the skills of efficient tool making and language since both are similar operations which impose arbitrary form on the external world. He maintains that an animal with a brain capable of efficient tool making would be equally capable of generating some kind of language.

Wallace, Tylor, Wundt, Hewes and others have proposed that human language originally had its basis in arm and hand gestures before the development of complex vocal-auditory symbolic language. Gardner's work with the chimpanzee Washoe, Premack's study of the chimpanzee Sarah, Patterson's work with the gorilla Koko and other continuing experiments
along these lines would tend to support this hypothesis. It must be remembered, however, that whatever linguistic abilities these apes may have acquired are the direct result of intensive dedicated instruction by human mentors. While even rigorous training will not produce a culture-bearing animal, a normal human child needs only to be exposed to any culture during the critical period in its development to become a full participating member. Attempts at teaching apes human vocal language have uniformly been unproductive.

Based on these data, Hewes concluded that the gestural origin of human communication may have occurred before the restructuring of the human nervous system. I have no disagreement with that possibility. In any case, this evidence supports the idea of a close relationship between manual and cerebral communicative abilities.

I am suggesting that the type of brain which can impose arbitrary form on the external world, had at its origin a key mutation which led to the transformation of the bilaterally symmetrical nervous system of our precultural ancestors into a brain containing asymmetrical functions. It was another key mutation many millions of years earlier in an ancestor of all higher animals, which led to the transformation from radial symmetry to bilateral symmetry.

This asymmetrical transformation in a population of early hominids may have served as a preadaptation for the subsequent development of vocal language. Ernst Mayr (1970:356) states that, "a structure is preadapted if it can assume a new function without interference with the original function." Language exists only in humans and is biologically based on the uniquely human trait of cerebral dominance. Thus a restructured nervous system based on unilateral dominance and originally selected for in the form of handedness, may have been equally productive of a new function (language) without interfering with the original function (the efficient use of tools). This analysis relates the biological trait of asymmetry to the origin of culture, and is consistent with known evolutionary processes.

G.G. Simpson (1954:198) states that quantum evolution normally progresses in three stages: (1) a key mutation which leads to the passing of a threshold into a new adaptive zone, (2) once the threshold is passed, there is a relatively sudden onset of strong selection for secondary adaptive traits useful in the new zone, and (3) once well adapted to the new zone, a stabilization of traits occurs.

The origin of human culture reflected a quantum transformation which appears to have followed the same steps suggested above. Stated simply, I believe the sequence was
as follows: (1) a key mutation for asymmetry allowing more efficient tool use, (2) secondary adaptive characteristics including the development of language which is represented asymmetrically in the cerebral cortex, and the differential enlargement of the brain, and (3) an apparent stabilization in human brain size and structure during the last 100,000 + years. The following chart provides a tentative, but more detailed, reconstruction of the sequence of major features which led to the evolution of Homo sapiens.

As mentioned earlier, culture is expressed primarily by the efficient use of tools and language. Both these behavioral traits are based on biological components which share one common denominator: the uniquely human trait of lateral dominance. Handedness forms the biological basis for efficient tool use, and cerebral dominance for language functions.

This relationship is portrayed in the following diagram:

This hypothesis does not conflict with presently held views on human evolution. It accepts the importance of bipedalism which freed the forelimbs from locomotor functions, and under scores the relationship of efficient tool use to human evolution. There is agreement that the hominid brain was internally reorganized and evidence is provided regarding the nature of this transformation.

SUMMARY

These views have been synthesized into a theoretical reconstruction which attempts to trace human culture to its biological foundations. Efficient tool use and language are not based on biologically independent variables. Instead, both these components of culture are biologically based on aspects of the uniquely human trait of unilateral dominance (e.g., handedness and cerebral dominance).
These data suggest that the original mutation for unilateral dominance was selected for because it allowed for more efficient tool use, thus providing a neurological structure preadapted for language function which are unilaterally located in the dominant cerebral hemisphere. This might help to explain why one biological line of early hominids was able to survive and spread throughout the world while others led to extinction.

Thus, I believe, a key mutation for unilateral dominance marked the turning point in hominid evolution which, for the first time, allowed the passing of a threshold into a totally new cultural adaptive zone based on the efficient use of tools and language. The repercussions of that minute genetic change are increasingly being felt in our corner of the universe.
## Tentative Reconstruction of Some Major Features in Human Evolution

<table>
<thead>
<tr>
<th>Hominid Forms</th>
<th>Biological Characteristics</th>
<th>Behavioral Characteristics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Pleistocene</td>
<td>- incipient bipedalism</td>
<td>- simple tool use</td>
<td>- most advanced primate of the time, but still not qualitatively different from other primates</td>
</tr>
<tr>
<td>Hominid</td>
<td>- forelimbs partially freed</td>
<td>- complex call and/or gestural system</td>
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**Key Mutation for Lateral Dominance in the Form of Handedness Provided a Strong Selective Advantage**

<table>
<thead>
<tr>
<th>Hominid Forms</th>
<th>Biological Characteristics</th>
<th>Behavioral Characteristics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Pleistocene</td>
<td>- asymmetrically restructured nervous system</td>
<td>- more efficient tool use</td>
<td>- those having handedness made better tools and used them more efficiently, thus providing a competitive advantage</td>
</tr>
<tr>
<td>Hominid</td>
<td>- manual laterality</td>
<td>- origins of language</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- dominant hemisphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- supplemental cortical vocalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle Pleistocene</td>
<td>- differential enlargement of the cerebral</td>
<td>- better control of hand and speech mechanisms</td>
<td></td>
</tr>
<tr>
<td>Hominid</td>
<td>cortex, especially areas controlling hands and vocal apparatus</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homo Sapiens</td>
<td>- stabilization of adaptive traits, including brain size and structure, since Homo sapiens is well adapted to culturally based behavior</td>
<td>- adaptive radiation of many different cultures exploiting a great variety of ecological niches</td>
<td>- the uniquely human characteristic of lateral dominance forms part of the biological basis for human culture which is dependent upon handedness for the efficient use of tools, and cerebral dominance for the lateral localization of language</td>
</tr>
<tr>
<td>sapiens</td>
<td></td>
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