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JOURNAL

**Vol. 22
1990-1991**

The Lambda Alpha JOURNAL is published by the Lambda Alpha Anthropology Honors Society at Wichita State University. The **LAMBDA ALPHA JOURNAL** is partially funded by the Wichita State University Student Government Association.

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AIDS IN AFRICA: AN ECONOMIC PERSPECTIVE

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The global Acquired Immune Deficiency Syndrome (AIDS) pandemic has had severe economic ramifications for some countries in Africa. Third World countries have scarce resources to devote to AIDS education or treatment, and they have other health and development concerns which need funding. A large proportion of the labor force is infected with the HIV virus, which will have negative consequences for the economy when these people become ill and are no longer a part of the work force (Sebatier 1987). Many of the urban elite are infected with HIV; these are the people who are considered to be the leaders of the next generation. The stigma and fear attached to AIDS may prevent foreign corporations from investing in Africa and could cause a decline in tourism, which is a major factor in economies of some countries. According to a report by the Panos Institute, an international research and information organization based in London, "The survival of whole industries and national economies may be at stake" (Mallet 1987:53). The countries most seriously affected are those of Central and Eastern Africa, so this paper will mainly address them; however, special concerns of South Africa and parts of West Africa will be mentioned as well.

Jonathan Mann, director of the World Health Organization's AIDS program, has said that, "Africa has the largest gap between the seriousness of the [AIDS] problem and the resources to deal with it" (Dickson 1987:605). Many African countries have gone through years of civil upheavals as a result of unstable political regimes. Much of the infrastructure has been destroyed and the economies are very weak. As a result, resources for development are scarce in these countries (Select Committee on Hunger [SCH] 1988). In some cases this lack of resources did not allow the government to respond expediently to the diagnosis of AIDS in their countries. In Rwanda, Uganda and Zaire, the first AIDS cases were identified between 1982 and early 1984. Government sponsored education programs did not begin until 1985.

Although there was a time lag between the diagnosing of these **first** cases and the beginning of the campaign to stop the spread of AIDS, this lag may be due to the lack of resources, communication facilities and an inadequate understanding of the threat than to indifference on the part of the governments (Waite 1988: 146).

However, once the World Health Organization (WHO) became **involved**, these countries worked quickly to institute programs to deal with the AIDS epidemic. Representatives from 45 African countries came together to develop a plan of action.

Each country will (i) establish a national AIDS committee that includes representatives from the health and social services and from communications, education, and other relevant governmental and nongovernmental sectors; (ii) conduct an epidemiological assessment of the burden of HIV infection and associated risk factors; and (iii) institute a surveillance system for AIDS and HIV infection that includes serological surveys of selected populations..." (Quinn 1986:962)

In addition there are plans to equip laboratories with instruments to diagnose human immunodeficiency virus [HIV] infection and train health care personnel to recognize and manage HIV associated disease in hospitals and the community (Quinn 1986). Several countries have already put these plans into action. Uganda has carried out a national serosurvey to determine the prevalence of HIV infection in the country. AIDS primers and wall charts have been provided to schools. A group of HIV-positive people are running a counseling service. Three million pairs of gloves and crates of rubber boots have been brought in to protect health care workers, especially midwives, from possible parenteral transmission of the virus through blood of infected patients (Wilson 1988). Educational programs have been set up in all of the primary and secondary schools and teachers are being trained to teach AIDS education. The Health Education division of the government has been strengthened and is printing educational leaflets, bumper stickers and posters,

holding prevention **seminars** and facilitating teachers' training. Uganda is developing new blood screening centers, purchasing special blood testing equipment for areas of the country with no electricity, and providing money to virus research institutes (SCH 1988). Popular education campaigns have been using the mass media - radio and television commercials, public meetings, political rallies and church gatherings to inform the people of prevention strategies (Okware 1988b). Education campaigns in Zaire have included pop songs, posters, comic books, television and radio programs (Brooke 10/10/88), and a six-part series on AIDS prevention in one of the national newspapers (Waite 1988). The Rwandan and Kenyan programs are similar to those of Uganda and Zaire. Although these education and **prevention** programs are entirely necessary to combat the spread of AIDS in these countries, the money used to implement them will "... take funds and personnel needed for other programs in health, family planning, and education" (SCH 1988:70).

This redirection of resources will further deplete already impoverished health care systems in Africa. Per capita spending on health care in many nations has declined over the past decade (Sebatier 1987). Medical treatment facilities are largely unavailable in Central and East Africa, and those existing are taxed in treating endemic diseases such as malaria, leprosy, tuberculosis, and undernourishment which are rampant in these areas. In fact, the AIDS problem is small (in regards to the numbers of people sick and dying) compared to other problems such as intestinal parasites, diarrhea in children, malaria and tuberculosis, all of which require money to upgrade the existing programs of treatment (Novicki 1988). The child immunization and tuberculosis control programs in Tanzania are threatened by the redirection of money to AIDS care in that country (Pede 1988).

The treatment of **people** with AIDS in these countries is a problem given the small budgets of the health care organizations. The cost of caring for ten AIDS patients for a year in the United States (approximately US\$450,000) is greater than the entire annual budget of

a large hospital in **Zaire** (Quinn 1986). It is estimated that "... the cost of providing medical services to an AIDS patient is about 100 times what the Tanzanian Government spends annually on health care per person" (perlez 1988:A34). The Ugandan AIDS budget for 1988 was less than five million US dollars. Ugandan hospitals do not have medicine to treat opportunistic infections, and neither hospitals nor the patients can afford to pay for constant health care. The use of **AZT** to slow the course of AIDS is entirely out of the question given the cost of the drug (Wilson 1988). Hospitals in these countries also have limited amounts of space. "These [AIDS) patients occupy hospital beds and consume scarce resources (phannaceuticals, personnel time) in palliative treatment that might be better used for illnesses that can be cured" (Piot 1988:577-8). The hospitals are often forced to send AIDS patients home to make room for patients with diseases that can be cured. In many countries, there is a shortage of medical staff. For instance, in Uganda there is one doctor for every 40,000 people (SCH 1988). Doctors and nurses do not have the time or training to counsel AIDS patients and their families. Unfortunately, these health care workers have had their time wasted by western journalists looking for sensational stories on the epidemic in Africa (SCH 1988).

In some cases this general lack of funding for health care may have contributed to the spread of **HIV** infection. HIV can be transmitted through the sharing of needles or the reuse of needles without sterilization. In rural areas, sterilization of needles is not easy to perform because of scarce resources such as water and fuel (SCH 1988). Because many mothers believe that medication by injection is more effective than medicine taken orally (Mann 3(26/87), large numbers of children receive a great many injections, which puts them at risk when ,the needles are not properly sterilized. These needles are reused because health care workers can not afford to throw them away. They are much too expensive and in short supply. Dr. Mathilde Krim, a research scientist and founding co-chair of the

American Foundation for AIDS Research, has said, " A needle is very valuable and it cannot be used only once. Even the disposable ones must be reused, and we should never talk them out of doing it, because if we don't reuse needles, people may go untreated" (Novicki 1988:24).

The scarcity of water does not affect only sterilization of needles. "The lack of a pure water supply in **central** Africa, however, makes bottle feeding a poor alternative [to breastfeeding]" (Feldman 1987:97). As **HIV** can be transmitted through breast milk, children of infected mothers are at risk. Another transmission factor involves the irregular use of gloves and masks in hospitals due to the high cost of supplying them. This may pennit some parenteral transmission of HIV through contact with blood of infected patients.

South Africa is experiencing a special set of problems regarding health care. Although the hospitals that are maintained for white South Africans are well equipped, "[t]he inadequate number of *black* state hospitals that do exist are grossly overcrowded, underserviced, and poorly equipped and fmanced" (SefteI1988:19) [*italics mine*]. White AIDS patients receive state-of-the-art intensive care unit and AZT treatment, mostly paid for by the government. In contrast, black patients are forced to used the overcrowded, understaffed state medical care facilities. These hospitals are not even adequately equipped to deal with the load of curable diseases they get. The government has refused to provide proper plastic gloves in the emergency rooms of these hospitals. There are no intensive care or isolation facilities. "...[T]hey [AIDS patients] simply lay among the rest of the patients, often bleeding onto other patients because their intravenous lines were neglected by heavily overworked nurses in chronically understaffed wards" (Seftel 1988:21). This inequity in care for blacks and whites is a **direct** indication of the racist policy of the apartheid government of South Africa. The situation for black people with AIDS will not get much better unless the policies of the government are changed.

Some countries in West Africa are also suffering from lack of health care resources. If the Cote d'Ivoire is to be taken as an example, hospitals in West Africa do not have the proper supplies to prevent the spread of HIV. Needles are reused and gloves are scarce (Brooke 3/12/89). Although the AIDS epidemic in West Africa is not presently of the same proportion as in other parts of Africa, the situation could get worse if the hospitals cannot obtain proper supplies.

The blood supply for transfusions also presents problems because of the state of the economy in many African countries. AIDS cases due to blood transfusions are a major problem which needs to be addressed. However, the funds for blood screening are either seriously lacking or completely nonexistent

In most areas of Africa, unfortunately, the cost of screening and the general infrastructure requirements for bloodbanking have limited the implementation of such safety measures...voluntary abstention of infected individuals from donating blood or the screening of donors is not likely to protect the blood supply and could drastically reduce the available donor pool (Mann 10/88:89).

The upgrading of blood transfusion services to prevent HIV infection is likely to cost approximately 30 times the annual per capita health budget in many countries (Quinn 1986). The risk of blood transfusion recipients for HIV infection may be as high as one in ten and yet in many areas blood is still not being screened because the facilities for this procedure are nonexistent. This is especially true in many rural areas. Intennittent electricity and unreliable cold-storage facilities are two of the problems facing blood screening in these areas. The cost of the tests used to screen blood is another deterrent. The desire of A.merican companies to profit from this epidemic has led them to charge five to eight dollars (US\$5-8) per test kit, as compared to the two dollars (US\$2) it costs to obtain a kit in West Germany (Klingholtz 1987). The failure to screen blood has

contributed greatly to the spread of **HIV** infection among children. "The high rate of seropositivity among **African** children with sickle cell disease has been related to their total number of transfusions" (Von Reyn 1987:699). The spread of **HIV** by contaminated blood transfusions is a tremendous problem which could be eliminated if the infrastructure and financial means existed to test **blood** for antibodies to **HIV** (Mann 3/26/87). Unfortunately, the means do not exist. One official from Uganda **said**, "Instituting [blood] testing would cost more than our entire national health budget" (Klingholtz 1987:57).

The problem of **blood** transfusions is especially pertinent to the AIDS epidemic in South Africa. Although **blood** screening became mandatory in the United States in September of 1984, by September 1985 the South **African** provincial health services were still buying from a U.S. blood bank Factor 8 and 9 **blood** concentrate products that had not been tested. These blood products were distributed to all of the state hospitals. The health agency probably thought it was saving money by not having these blood products screened. The unfortunate result of this act of omission was the contraction of the **HIV** virus through blood transfusions by 87% of South Africa's hemophiliacs. This situation was further exacerbated by the failure of the government to attempt to trace or inform any of the black hemophiliacs that had been infected (Seftel 1988).

West Africa also has some special economic concerns regarding the testing of blood for **HIV** seropositivity. In West Africa, it has been found that AIDS is caused by a virus known as **HIV-2**, which is different from the **HIV-1** virus prevalent in Central Africa. Unfortunately, screening tests for **HIV-1** do not always detect **HIV-2** seropositivity (Dickson 1987). The use of the existing screening tests in this area may be a waste of money as blood samples containing **HIV-2** may be considered seronegative and will be distributed for use in transfusions. A new test must be developed to detect the specific antibodies to **HIV-2**. In many West African countries, funding for research is limited, and

money will need to be diverted from other development programs.

In Africa., **HIV** is spread predominantly through sexual intercourse between heterosexuals. Heterosexual contact accounts for approximately 75 percent of **HIV** infections among adults (Mann 3/26/87). It is mainly an urban phenomenon. In many urban centers of the Congo, Rwanda, Tanzania, Uganda, Zaire, and Zambia from five to ten percent of the sexually-active age group is HIV-positive (Mann 10/88). Migration to cities, famine, war, and economic **turmoil** tend to break down the traditional relationships and increase the amount of sexual relations (Press 1987).

...[T]he social and political upheavals which occurred in Central and East Africa since the 1960's and the very large population migration to the cities during the 1970's, which may have disrupted the social values of traditional rural Africa, are believed to be important factors in the documented spread of **HIV** in Africa (WHO 1988:15).

It has been estimated that six percent of the general population of Kinshasa, Zaire is infected, mostly men and women between 20 and 35 years old (Swenson 1988). Men and women are affected equally. This has economic ramifications for a number of reasons.

It has been shown that a significant number of AIDS cases in urban centers are among people in the middle and upper classes (Altman 1985 and Von Reyn 1987). "A Zairean study presented at the conference [Third International Conference on AIDS] indicated that workers with higher salaries and senior positions had a higher prevalence of the AIDS virus" (Perlez 1988:A34). In Zambia's copper belt, 68 percent of the men who tested positive for **HIV** were skilled professionals (Mallet 1987). This will have a direct effect on the businesses, hence the economies, of these countries. Those people who are infected are the most economically productive generation,

... on which the government has expended vast resources in terms of educational and other social services. It also provides the bulk of the professions, the police, the

Armed Forces, the businessmen, and therefore if the problem is uncontrolled, one can see that there can be a serious effect on the economic activities of the country... (SCH 1988:4)

These are the future leaders of Africa. Because of the traditional family structure, the rest of society is economically dependent upon these people. In traditional African society, the extended family is the only social security system. This continues to be true in contemporary Africa because the government is usually unable to provide any means of social security to its citizens. The young, **infirm** and elderly are all dependent upon those members of their family who are economically productive. Unfortunately, these economically productive people are the very group that is at the greatest risk for AIDS (SCH 1988). Businesses are also affected. There has been a two to ten percent decline of skilled manpower in urban centers (Press 1987). Half of the staff of a Kinshasa bank is infected with the HIV virus (Altman 1985). Skilled professionals are already in short supply in Africa. These nations cannot afford to have more die. Loss of work indirectly costs Tanzania from US\$2425 to US\$5093 for each AIDS case (perlez 1988). This is a serious problem for developing countries. In trying to rebuild their economies, they are dependent upon these very people who increasingly are becoming seropositive.

The Harvard Institute of International Development estimates that by 1995 the annual loss to Zaire from AIDS deaths will be [US]\$350 million, or 8 percent of the country's 1984 G.N.P.: this was more than Zaire received that year from all sources of development assistance combined. The same study estimates that economic losses in Central Africa by 1995 will be [US]\$980 million. It is not inconceivable that such social and economic impacts could lead to political destabilization of the countries involved (Mann 10/88:88).

The effects of AIDS have already been seen in some urban areas. Several townships in the Rakai district of Uganda have been hit particularly hard by the epidemic. Badru Rashid, a

Rakai local government official, was quoted:

In the last week ten people that I know of died. I myself have lost two brothers and a sister. And our town, it used to be so busy. But a lot of traders **died**, and others left because they were afraid. Can you see all the empty shops? So many orphans come into my town, but there is nothing for them, and they start to steal to get food (Caputo1988:484).

In some areas of Africa, the AIDS epidemic came about as a result of the growth of commerce. For example, AIDS was **first** noticed in Uganda in small **fishing** villages around Lake Victoria. In these villages, smuggling is a major economic activity. Boats and lorries traveling between these villages and towns in other countries around Lake Victoria brought a large number **of** transitory people into the area. Bars, hotels, breweries and prostitutes increased in number as a result of the increased commercial activity (Caputo 1988). This may have brought more people in contact with those already infected with the HIV virus and served as a mode of transmission. "The lines of AIDS concentration in centre:1 and eastern Africa follow very closely those of commerce" (484). The prostitutes working in these towns and the **truckdrivers** passing through have shown an unusually high rate of seropositivity. In Kampala, Uganda, 67 percent of **truck-stop** barmaids are HIV positive (Wilson 1988). Thirty percent or more of **truckdrivers** and 90 percent of prostitutes working in towns along **truck** routes in Kenya, Uganda, Rwanda, Tanzania, and Zaire are infected with **HIV** (Hilts 1988).

The AIDS epidemic may also affect foreign investment in these areas of Africa. Because a large proportion of the labor force is dying, foreign firms may resist investing in these areas. Reduced local markets, the cost of sick pay for AIDS-affected employees, higher premiums for health or life insurance and reluctance of non-African employees to be transferred there all may influence transnational corporations to remove existing investment from African countries (Klingholtz 1987). This reluctance to invest is understandable,

considering the costs to companies relative to AIDS: sick pay, pensions for relatives, wasted investment in skilled employees, time off (for funerals, hospital visits, doctor appointments), and lack of motivation among people with AIDS (Mallet 1987). The earnings of existing companies may already be in jeopardy. "AIDS epidemics in export industries could possibly affect both potential foreign exchange earnings and international commodity prices" (SCH 1988:40). Unfortunately, this will have a serious impact on the economies of the countries involved, as foreign investments are a large source of revenue for many African countries.

Tourism is another international industry whose revenues are important to the economies of some African nations. The leaders of these nations have every reason to fear that the AIDS epidemic will jeopardize tourism and deprive their economies of a leading source of foreign exchange (Altman 1985). The tendency of western media to overestimate the numbers of people infected and to 'blame' Africa for the origin of the **HIV** virus has encouraged the resurfacing of racist beliefs about Africa

Unfortunately, as anxiety and fear cause some to blame others, AIDS has unveiled thinly disguised prejudices about race, religion, social class, sex, and nationality. As a result, AIDS now threatens free travel between countries and open international communication and exchange (Mann 1988:7).

Some areas have already experienced a loss of tourism. The British Ministry of Defense banned members of the Parachute Regiment from going to Kenya's coastal resorts at Mombasa and Malindi (Mallet 1987). Other countries in East, Central and West Africa have reported a drop in tourist revenue as a result of the negative publicity about AIDS infections there. This negative publicity has induced other countries to subject African students studying abroad to compulsory screening for the **HIV** virus. If a student is found to be infected, he or she is sent home at his or her own expense (Sebatier 1987). This

practice has negative ramifications for the economies of African countries. **If** these students are denied the quality education they can receive at foreign Universities, they will not have the **training** to participate in the reconstruction of the economies in their native countries.

In countries where trained manpower is in short supply, as is the case in central Africa, a reduction in the number of university graduates, whether through deaths from AIDS or through loss of educational opportunity, it is likely to reverberate through the economy (20).

AIDS in Africa is a largely urban phenomenon. It is relatively rare in traditional rural villages where codes of morality forbid casual sexual conduct, thus limiting the spread of HIV through heterosexual contact (Okware 1988a). In some traditional African **societies**, chastity plays a large role in the qualification of women to be considered for marriage. Among the Luo of Kenya, for example, bridewealth prices are very high. In order for a son of one clan to pay a bridewealth, the clan must receive equally high prices for their own women. Therefore, the chastity of the women is strictly guarded to insure the women's 'worth' (Southall 1981). This limiting factor is very important to the survival of agriculture in Africa.

AIDS will no doubt seriously hamper both industrial and agricultural production **if** it spreads from the urban to the rural areas. Given the subsistence, labor-intensive agriculture in many African countries, food production may be significantly reduced (SCH 1988:40)

Unfortunately, the spread of AIDS to rural areas may already be taking place. There is a tradition in some areas for a widow to return to her native village when her husband dies (Dickson 1987). **If** her husband died of AIDS, she is likely to be infected, and may pass on the virus **if** she has sexual contact with another person. Although traditional codes of morality forbid casual sex, this does not mean it does not occur. The woman may marry

again, in which case she will be likely to infect her husband, or if she becomes pregnant, her child. This method of transmission is likely to occur in polygamous societies where tradition dictates that the brother of the husband must marry the widow. This situation is especially problematic because the brother may then pass on the infection to his other wives and the wives to any newly conceived or currently nursing children.

In addition to the threat of infection in rural villages, AIDS poses serious problems for the future of agriculture in Africa. Women provide the majority of the work force for both domestic and export-oriented agricultural production. At **present**, these women are not at high risk for infection with HIV. However, as the incidence of seropositivity increases, the risk of infection will increase for all sexually active people. Since these women are in their sexually active years, they will be at higher risk for **HIV** infection. **If** a significant number of these women die of AIDS, there will be a negative effect on the output of agriculture. Profits from export of produce will decline, and the amount of food available for domestic consumption will also decrease (SCH 1988).

The threat of AIDS is especially prevalent in the urban areas of Central and Southern Africa. This has direct bearing on the women who live in these areas, many of whom are prostitutes. As a result of poverty in these developing countries and the limited amount of traditional work available for women in the towns [i.e. food raising, marketing], many women are forced to work as prostitutes to support themselves and to pay for their children's schooling (Press 1987 and Southall 1961). "Apartheid-induced poverty" is the reason many black South African women turn to prostitution (Seftel 1988:20). Women are leaving their rural villages to look for employment in the cities. Cities and towns are especially attractive to country **women** who are barren due to the stigma attached to barrenness in many traditional societies. In many cases, the disqualification of women from becoming wives due to this stigma perpetuates the resortion to prostitution (Southall

1961).

In many developing countries there is an increasing displacement of women to urban slum areas. There, because of what is considered acceptable or appropriate behavior for men and women, and because of discrimination in access to education, training and land ownership, many women drift into prostitution and become vulnerable to infection with the [HIV] virus (Reid 1988:28-9).

In urban centers in Central Africa, a large majority of the prostitutes are already infected with the virus. In Kinshasa, Zaire, 27 percent are seropositive. The numbers are even higher for Nairobi, Kenya and Butare, Rwanda: 66 percent and 88 percent respectively (Mann 10/88). At Kenyatta Hospital in Nairobi, within six years 60 percent of the prostitutes examined there tested seropositive (Klingholtz 1987). AIDS is spreading at an alarming rate among these urban prostitutes. Unfortunately, economic and cultural conditions prevalent in these areas make **it** necessary, and even desirable, for these women to continue prostitution. These women are at high risk for contracting HN, and due to the nature of their work, for aiding in the spread of the virus. Many of the men who frequent prostitutes are truck drivers or migrant workers who are very mobile.

If urban prostitutes constitute a major reservoir of AIDS virus in such African capitals..., we may expect that the virus will continue to be spread throughout the African continent by heterosexual men serving as vectors of infection from one community of urban prostitutes to another (Kreiss 1986:417).

Another issue concerning women is the cultural acceptance of the habit among single and married men of having many affairs (Hilts 1988). "...[M]ost Africans still consider that sexual access to a plurality of women is a male right". However, economic change has **undermined** the traditional structure of polygamy, resulting in a practice of serial monogamy or a combination of affairs with official monogamy (Southall 1961:52). This creates a demand for available sexual partners. Some women become mistresses, instead

of prostitutes, in order to support themselves.

The young women arrive in the city from the village, are unable to find work and so turn to the simplest means available to gain some money and security. They seek men with means. The older men, who have jobs and are often married, find they can carry on such affairs with relative ease. Thus...there is a relatively small group of young, sexually active women who are serving the sexual needs of a relatively large group of somewhat older men. There is a combination of male dominance and female freedom to have sexual relations that is specially African (Hilts 1988:29).

This small group of women is at high risk for contracting **HIV**. Even if a woman has a monogamous relationship, under these circumstances, there is no way of knowing with whom the man has had sexual relations. If he has had several affairs, as is culturally acceptable, there is a greater chance that he is infected with the virus. The women in these areas are culturally and economically coerced into high-risk behaviors.

Another contributor to the AIDS epidemic in Africa is the migrant labor system which is especially prevalent in South Africa. "The [South African] mining industry imports 40 percent of its workforce from high-risk AIDS countries like Malawi, Angola, Zambia, **Zaire**, and Burundi" (Seftel 1988:20). The widespread system of migrant workers acts as a mode of transmission of the **HIV** virus. "The single-sex migrant labor system institutionalizes many factors that facilitate the spread of AIDS - long absences of men away from their partners, ... and single sex hostels creating a market for prostitution" (20). **If** these workers are infected with **HIV**, they are likely to spread it to prostitutes in the communities in which they are working, which in turn will spread the virus to local clientele and other migrant workers. Over 2,000 Malawian miners have already tested positive to **HIV** antibodies in tests administered by the South African government. These men will **lose** their jobs and be **sent** back to **their** homelands (Seftel 1988), where they will no doubt infect still more people.

In conclusion, the AIDS epidemics in Africa have serious ramifications for the

economies of these developing nations. If the HIV virus continues to spread at the current rate, several countries may face political and economic destabilization. There will be a **decimation** of the industrial, agricultural and intellectual labor force. The education and prevention programs that have been put into practice are necessary to curb the spread of HIV, however this will be done at the expense of other development concerns. In this perspective, Africa may face a more significant threat to society relative to AIDS than any other country in the world.

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A COMPARATIVE APPROACH
TO THE TAXONOMY AND PHYLOGENY OF *PAN*

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INTRODUCTION

In the dim light of dawn a nest high in the canopy rustles with the movements of its inhabitants. The sun appears on the horizon as a slender male chimpanzee emerges, followed by a female. An infant clinging to the female's belly yawns, grasping its mother's hair in tiny, tight fists as it stretches against her. After a moment of quietly gazing at each other the adults silently swing to an adjacent *Antiaris* tree which is laden with ripe, red fruits, and begin a leisurely breakfast.

One familiar with *Pan* behavior might discern from this limited description that the "chimpanzees" in question are *P. paniscus* a species (or subspecies) of the genus *Pan* which displays marked contrast to the behavior of *P. troglodytes*. What is not so easily discernable is *P. paniscus*' place in the phylogeny and taxonomy of *Pan* and of anthropoids in general.

Schwarz (in Horn 1980) was first to formally describe *P. paniscus* in 1929, relegating it to subspecies level based on the skull and skin of a female collected near Befale and a male skull from Djombo (in Susman 1984). Schoutenden corroborated this opinion with behavioral data from a captive *paniscus* compared to the behavior of a captive *troglodytes* (Susman 1984). Coolidge (1933) initially proposed that Schwarz' designation of *Pan saryus paniscus* be changed to a species status, *P. paniscus*. He supported his contention with previous reports and the gracile skeleton of a small female. Additionally, he suggested that the behavior and morphology of *paniscus* made it a probable candidate for a living model of early hominids.

Since then many have supported or contradicted the taxonomy and phylogeny of *paniscus*. Zihlman et al. (1978, 1983) suggest *thatpaniscus* may be a living example of a Ramamorph or some other precursor of *Australopithecus*, *Pan* and *Gorilla*. J. E. Cronin (1977) supports this view utilizing immunological testing of albumin and transferrins from *Pan*, *Homo* and *Gorilla*. Although these samples demonstrate more similarities between *paniscus* and

troglydites than between any other species (thus supporting close phylogenetic ties), gel electrophoresis suggests a greater diversity within *paniscus*. Cronin suggests this diversity indicates *paniscus* may be a primitive rather than derived form; a relict of a species that gave rise to all three African anthropoid lineages. Stanyon et al. (1986) offer chromosomal evidence of *paniscus* as a separate species and as the best model for the common ancestor of humans and African apes. Horn (1979) concedes the possibility of *paniscus* as an extant form of a protohominid but reserves his opinion until the taxonomic issue is satisfactorily settled. Horn (1979) notes that *paniscus* and *troglydites* exhibit morphological and size differences similar in kind to lowland and highland *gorillas* as evidence of *paniscus* subspecies status. From allometric comparisons of *paniscus* and *troglydites* morphology McHenry and Corruccini (1981) conclude that observed differences between the two are due to allometry and neither resemble *Homo* more than the other in cranial, postcranial or dental features.

The 1984 publication *The Pygmy Chimpanzee* offers numerous opinions on this debate including a comparative study by Socha who discovered many differences in red cell antigens between *paniscus* and *troglydites*. Unlike *troglydites*, *paniscus* demonstrates only one blood group in the ABO system in a sample of 14 wild and captive bonobos. Other systems also demonstrate this lack of polymorphism. Sarich (1984) provides another molecular perspective using electrophoresis and mtDNA cloning techniques. Electrophoretic data concur with Socha's as 13 of 20 bands between *paniscus* and *troglydites* demonstrate the same mobility when *Pan*, *Gorilla* and *Homo* are compared. mtDNA results show an accumulation of 6% change since the separation of these three lineages with 4% change in both *Pan* species. Laitman (1984) demonstrates a lack of exocranial flexion in *paniscus* similar to other non-human primates and unlike the obvious flexion in humans. Kinzey (1984) adds to the argument in favor of species designation and against a phylogeny **ancestral to *Homo*** with dental evidence. He establishes clear differences between *paniscus* and *troglydites* but maintains that both share more characteristics with each other than either does with *Homo*. Shea (1986) support's Coolidge's claim of species level with an allometric study of scapular form. The observed differences in

scapular morphology are discussed with reference to locomotor patterns and phylogeny.

DESCRIPTIVE GENUS MORPHOLOGY

It is apparent that the taxonomic position of *paniscus* and its relevance for hominid evolution remain ambiguous. Although molecular biology has made the argument for species level more vigorous a survey of the characteristics of the different forms of *Pan* might better elucidate not only the most appropriate taxonomic level for *paniscus* but its relationship to *troglydytes* and the homonid lineage. Molecular biology provides the most rigorous test of taxonomic and phylogenetic associations, including that of *paniscus* to the hominids. However, the preponderance of non- molecular data requires a review of that which is often cited as a supportive, sometimes definitive argument for the use of *paniscus* as a human prototype.

Such a survey requires a description of the accepted members of the genus *Pan*. Yet even the genus designation proves problematic. Tuttle (1987) contends knuckle-walking is the determining feature of *Pan*. Thus *troglydytes*, *paniscus* and *gorilla* should be subsumed under *Pan*: *Pan (Pan) paniscus*, *Pan (Pan) troglydytes* and *Pan (Pan) gorilla*. Szalay (1979) explains that the **assumption** of these three species under the genus *Pan* reflects a close relationship to *Homo*, thereby distinguishing these species from Asian apes (*Pongo*). However, this phylogeny is based only on a few phenotypic characters and does not address the issue of *gorilla* subspecies (species) **or** morphological differences between the three African lineages. Most continue to place *gorilla* in a separate genus (Richards 1986, Groves 1989). Until recently Groves (1970) also supported *gorilla* as a species of the genus *Pan*. Subsequent investigations have convinced him that two subfamilies (*Ponginae* and *Homininae*) dividing the Asian and African Hominoidea into the genera *Pongo*, *Gorillini*, *Panini* and *Hominini* is more parsimonious. Concerning the subspecies of *Pan*, Hill (1969) recognized four: *Pan troglydytes* verus, *P. t. troglydytes*, *P. t. schweinfunhi* and *P. t. koolakamba*. These 4 species range from western to eastern equatorial Africa.

P. t. verus have light-colored faces at birth which darken with age, retaining mask-like splotches. They have large, pale ears, pale palms and soles and white beards. *P. t. troglodytes* is known as the black-faced chimp. Though pale-faced at birth, the face, ears, palms and soles are dark at maturity. They have few or no white chin hairs and are thought to be recently extinct from the south bank of the Zaire in Angola.

P. t. schweijnunhi is the eastern or long-haired chimp. Neonate faces are pale but mature to a brown hue which matches their ears, palms and soles. As the common name implies, they have long cheek whiskers and body hair, though few white chin hairs.

P. t. iwolakamba is the least known and not recognized by all taxonomers. Shea (1984) has suggested they are hybrids of *gorilla* and *P. troglodytes* but this has not been substantiated. Unlike other chimps, infants have blotchy, brown faces which become prognathic and black with maturity. They share such features with *gorilla* as small ears and padded nasal alae and, in general, do give the appearance of a *troglodytes/gorilla* hybrid.

P. pansicus is considered by Hill (1969) to be a separate species of *Pan* which is confined to the west bank of the Zaire river (in early accounts referred to as the Congo) and west of the Lualaba river. Hill (1969) reported that the body weight of *pansiscus* was less than half that of *troglodytes*. However, more recent studies indicate that although overall *troglodytes* are larger, *P. t. schweijnunhi* weights overlap with those of *pansiscus*. *Pansiscus* are reported to have black faces (except around the mouth), ears, palms and soles from infancy. However, like *troglodytes*, captive *pansiscus* are sometimes lighter. Adults often retain the white perianal tuft from infancy and the hair on the cheeks and body is long. Species specific alopecia seen in *troglodytes* is absent and the ears are small, similar in size to *Homo* and *gorilla*. Besides an overall slender build and a more 'gibbon-like' scapula (long and narrow perpendicular to the scapular spine) *pansiscus* demonstrates a more rounded cranium with less facial prognathism than *troglodytes* and have been likened to juvenile *P. t. schweijnunhi* (Coolidge 1933, Hill 1969, Shea 1984).

MOLECULAR COMPARISONS

As previously noted, *paniscus* demonstrates little polymorphism in its blood groups (Socha, 1984). Conversely, serological polymorphisms in *trogodytes* and *Honw* are numerous. *Trogodytes* are either type A or 0 whereas all *paniscus* tested were Type A. While *paniscus* A antigens are indistinguishable from human A antigens, the A antigens on red cells of *trogodytes* differ from humans. *Trogodytes* are either M or MN and *paniscus* samples are all M (Socha 1984). The *trogodytes* V-A-B-D system (an extension of the MN system) demonstrates 16 types yet only one type is found in all 14 *paniscus* samples (Socha 1984). The R-C-E-F system (an extension of the human Rh-Hr group) demonstrates at least 24 types in *trogodytes* but only a single irregular type is found in *paniscus* (Socha 1984).

A karyological comparison of *paniscus*, *trogodytes* and *Honw* indicates that although there is a high degree of similarity among the three, *paniscus* is more specialized than either *trogodytes* or *Honw* (Stanyon et al. 1986).

MORPHOLOGY

Much of the morphological comparisons between *trogodytes* and *paniscus* have been discussed in previous sections. However, some characteristics not specifically mentioned are noteworthy. Although McHenry (in Susman 1984) postulates that *paniscus* and *trogodytes* show similar morphology of 47 separate postcranial features, he also makes note of over 2 dozen features that differ. Most of these relate to morphological differences affecting locomotion, such as scapular shape and bones associated with intermembral indices. Of these he includes narrower chests and longer hind limbs (thus a lower intermembral index) in *paniscus* relative to *trogodytes*. Nishida and Hiraiwa-Hasegawa (in Smuts 1986) describe *paniscus* as having a shorter clavicle, smaller molars (Kinzey 1984), and less sexual dimorphism than *trogodytes*. In general, the morphology of *paniscus* is described as paedomorphic in comparison with

trogodytes (McHenry 1984, Horn 1979, Shea 1984, Coolidge 1933).

ECOLOGY AND DEMOGRAPHY

Both *trogodytes* and *paniscus* are found in primary and secondary forests in equatorial Africa. *Trogodytes* is also found in woodland and savanna areas, and *paniscus* in swamp forests (Nishida et al. 1986, Horn 1975, Kano 1980, Kuroda 1980, Tuttle 1987). Range sizes for *trogodytes* and *paniscus* are 6 to >278 km and 22-58km, respectively (Tuttle 1987). Variation of range size seems strongly influenced by region. In densely wooded regions *trogodytes* has smaller home ranges (5-38 km) and larger ranges in sparsely wooded areas (25-560 km). Regional differences are also associated with *paniscus* group size (ca. 22 km at Lomako and 40-50 km at Wamba, Nishida et al. 1987).

Trogodytes and *paniscus* are both considered omnivores with a preference for ripe fruits (Tuttle 1987, Nishida et al. 1987, Badrian and Malenky 1984). Both eat invertebrates although *paniscus* consumes a wider variety. Unlike *paniscus*, *trogodytes* utilizes tools in foraging for termites and driver ants (Cousins 1978, Goodall 1968). Both are assumed to hunt although this behavior has been observed only in *trogodytes*. *Paniscus* have been observed eating small animals and remains of snakes have been found in their fecal matter (Badrian and Badrian 1977). *Paniscus* is believed to rely heavily on tubers and fibrous foods and has been observed digging *shimoukiro*, a mushroom native to the Zaire basin (Kano 1979). There have also been unsubstantiated reports of *paniscus* catching mud fish in this area.

Locomotion between feeding sites is generally arboreal for *paniscus* while *trogodytes* usually descend and travel terrestrially between sites. However, *paniscus* and *trogodytes* are generally considered to be terrestrial knuckle-walkers. Like *trogodytes*, *paniscus* often flee terrestrially when disturbed. Yet, due to their light frame and slender scapula, they are able to locomote arboreally much faster than *trogodytes* (Susman et al. 1980, McHenry 1984).

Group sizes are similar in both species although *paniscus* tends towards a larger basic

unit group (Nishida et al. 1987, Kano 1979). Most party groups (temporary associations) number < 6 in *trogodytes* and > 6 in *paniscus*. However, sex ratios are quite different between the two. Although both species exhibit all male groups, bisexual groups of approximately equal ratios are the norm for *paniscus* and multimale associations are more common to *trogodytes*. When bisexual associations do occur in *trogodytes* groups they are usually characterized by a higher number of females than males (Nishida et al. 1987, Kano 1982).

BEHAVIOR

Although many molecular, morphological and ecological differences exist between *paniscus* and *trogodytes* perhaps the most obvious differences are behavioral. Marked differences in nesting, affiliative behaviors, agonistic interactions and tool use are noted.

Trogodytes generally build nests each evening in the lower part of the canopy. Adult females share nests with their infant but older juveniles often construct nests of their own adjacent to the mother. Adults rarely share nests and nests are loosely clumped (Goodall 1968, Tuttle 1987). *Paniscus* also build fresh nests each evening, though higher in the canopy. These are **reported** as high as 82 meters from the ground (MacKinnon 1976). However, Hom (1980) reports that nests were no higher than 25 meters. The discrepancy may be due to regional differences between the Lamako community and Lac Tumba. Although there are similarities in distribution of nests *paniscus* demonstrate more tolerance of nest sharing.

Affiliative behaviors are also unique in *paniscus*. These roughly consist of grooming, rump-touching, genital- genital rubbing and appeasement gestures such as brief grooming and presenting. The highest frequency of grooming is between mother and dependent infant (Badrian and Badrian 1984). Among adults the highest frequency is between males and females, followed by female/female and male/male grooming. Among *trogodytes* male/male grooming accounts for **most adult grooming**, followed by female/female and then male/female grooming (Nishida et al. 1987). Rump touching and genital-genital rubbing (GG rubbing) are

common and unique gestures of *paniscus*. Rump touching by males (lightly touching the rump of another with rump or hands) is seen in many contexts, although it is thought to be a form of greeting. Like GG rubbing it is exhibited as appeasement behavior or in the context of social or feeding excitement (Kano 1982, Kuroda 1980, Badrian and Badrian 1984). GG rubbing between females is observed in similar contexts and often associated with estrus females. It appears to be a mechanism for decreasing tension and strengthening bonds between females. Females rub the clitoride regions of their perianal areas against one another, in either a standing or reclining ventro-ventral position. Anatomical differences may contribute to the expression of this behavior as the labia majora and clitoris of *paniscus* are located more ventrally than that of *trogodytes* (Kuroda 1980). Other forms of appeasement include brief grooming bouts and submissive presenting. Females are sometimes observed grooming a male for several seconds before passing him on a branch or narrow path (Kuroda 1980). In contrast, anogenital contact between adult male *trogodytes* is restricted to periods of intense social excitement, such as during fights, feeding bouts or inter-community interactions. GG rubbing is uncommon in female *trogodytes* although genital inspection is common (Tuttle 1987). Appeasement gestures demonstrated by *trogodytes* usually reflect current male status. Anogenital contact is usually performed by a lower ranking animal to a higher one. This can involve manual contact with the thigh, scrotum or perianal area. Other appeasement gestures of *trogodytes* include crouching, 'fear grins', kissing, patting, presenting, mounting and pant-grunts (Tuttle 1987).

Play also distinguishes the two species. Although adult *trogodytes* do engage in play behavior with one another, this occurs mostly in captivity where other forms of social stimulation are often sparse. Wild *paniscus* adults have been reported to play with one another regularly. The main contexts of this play appear to be courtship and feeding. Kuroda (1980) reports "sexual play" between males and females before and after copulation. This includes kissing, patting, play biting and one of the few vocalizations described: a soft [hagg...J uttered during play and occasionally during copulation. Feeding often involves a snatch/resnatch game where two or more individuals take turns repeatedly 'stealing' food from each other with no

apparent agonistic behavior. Adults also play with infants though females play with them more actively and males generally let the juveniles climb them. The [hagg...] pant and penile erection are not exhibited by juveniles during play as is common in adult play (Kuroda, 1980). The [hagg...] vocalization may be similar to the 'laugh' vocalized by *troglydytes* (Goodall 1968). However, juveniles and adult *troglydytes* often vocalize in this manner during play.

Food sharing is common to both *paniscus* and *troglydytes* but is expressed in different forms. Sharing of vegetable matter is rare among *troglydytes* and is generally exhibited by mothers towards infants. Meat sharing is more common to *troglydytes*. Meat is generally shared between adult males although females are given pieces or allowed to take or beg portions. Goodall (1986) reports that a good deal of social excitement accompanies the disbursement of meat including squabbles, kissing and general reassurance and appeasement behaviors. By comparison *paniscus* regularly share vegetable matter. Adult females often share with unrelated juveniles but there is little sharing between males (Kuroda 1980, 1984). Although there is little aggression during these feeding bouts GG rubbing and snatchlresnatch games are often components of large, intense feeding groups.

Although *paniscus* are not the only apes to copulate ventrally they are the only *Pan* species observed-to do so (Horr 1972). Copulation is often initiated by one of the individuals gazing intently at the other, usually when the male's penis is erect. Badrian and Badrian (1980) recorded ventro-dorsal matings 74% of the time and ventro-ventral 26% of the time (N=70). These data are similar to Kano's (1980) observations of 62% ventro-dorsal and 35% ventro-ventral (N=106). Three percent of these began ventro-dorsal but were completed ventro-ventral. Kuroda (1984) observed an increase in gazing and soft vocalizations during copulation and Kano (1980) states that all females uttered screams at completion. Badrian and Badrian (1980) reported that most copulations were silent and ventro-ventral copulation was more frequent between adults and juveniles (1984). Although *troglydytes* also exhibit visual contact (such as ventro-dorsal copulation accommodates) and copulatory pants (Tuttle 1987), ventro-ventral copulation between adults is clearly a *paniscus* feature.

Little is known of the menstrual cycle of *paniscus* from wild or captive studies. However, data from preliminary investigations indicate *paniscus* experience a relatively longer estrus cycle and more anovulatory cycles than *trogodytes* (Badrian and Badrian 1984, Kano 1980, Nishida et al. 1987). They also exhibit shorter postpartum anestrus cycles. *Trogodytes* remain anestrus for 3-6 years and *paniscus* for about 1 year post-partum (Nishida, et al. 1987).

Agonistic interactions among *paniscus* have been of particular interest to investigators. Kuroda (1984) determined that, when provisioned, *paniscus* were no less agonistic than *trogodytes*. These behaviors were, however, less intense and/or prolonged than *trogodytes*'. Although many reports of *paniscus* describe them as generally non-aggressive there are numerous examples of mild aggression and aggressive displays reported. These include branch-dragging, kicking, and drumming on tree trunks (Badrian and Badrian 1980, Kuroda 1980, 1984, Kano 1980). Such behaviors are qualitatively different from the impressive bipedal and quadrupedal charge displays of *trogodytes*. An addendum to these features is the vocalizations associated with particular behaviors. Many sources maintain a lack of vocal expression in *paniscus* that characterizes *trogodytes* behavior. *Paniscus* exhibit few or no vocalizations in association with feeding, grooming, appeasement behaviors, copulation, playing or **agonistic** behaviors within the group (Kuroda 1980, Kano 1980). Vocalizations have been reported during agonistic interactions with other communities (Badrian and Badrian 1984, Kuroda 1980) or when startled by humans or elephants (Badrian and Badrian 1980).

Dominance ranking is an important feature in the lives of *trogodytes* and male-male bonding and alliances are characteristic of dominance relationships. Males rise to high rank through aggressive displays and physical confrontations. Coalitions between males which may afford passage to higher status are formed and strengthened through grooming and supportive actions. This creates an unsteady status for males and the male ranking is generally temporary. *Paniscus* males also exhibit a dominance ranking although status is maintained mostly through **avoidance** behaviors. However, Kuroda (1980) reports that most agonistic encounters were between males. Male *paniscus* are generally dispersed throughout the group. Unlike

troglydytes, *paniscus* males tend not to associate with males but with females. Thus status is generally stable due to lack of male interaction. Like male *paniscus*, female *troglydytes* do not frequently associate with other females, except relatives. They too demonstrate fairly stable dominance rankings. Unambiguous dominance ranking has not been demonstrated for female *paniscus*. Like male *troglydytes*, they exhibit unique behaviors that would seem to serve as coalescing behaviors in same-sex relationships. GG rubbing and non-kin food sharing are such female bonding behaviors.

Troglydytes are well known for their different forms of tool use (Goodall 1968). In contrast, *paniscus* evidence a general lack of tool use with the exception of using leafy branches for rain cover (Kano 1982b). However, this may be a notable distinction, as *troglydytes* tend to simply sit in the rain.

SUMMARY

Early taxonomic and phylogenetic designations were hindered by a severe lack of data. Taxons and evolutionary associations were often assigned on the basis of only one or two samples of morphology and/or behavior. Currently, molecular evidence proves the most rigorous test of phylogeny and, although sample sizes remain small, sufficient data have been amassed to begin to speculate on the taxonomy and phylogeny of *Pan*.

Molecular, morphological, ecological and behavioral data support *P. paniscus* as a "group of interbreeding natural populations that are reproductively isolated from other such groups" (Mayr 1970). They are reproductively isolated not only geographically, as are the subspecies of *Pan*, but ecologically and, to some extent, behaviorally. *Paniscus*' specialized morphology and behaviors demonstrate speciation due to the geographic isolation of their range on the left bank of the Zaire river (MacKinnon 1976). Molecular data are evidence that this isolation is indeed speciation (Stanyon et al. 1986). Such geographic isolation has even been proposed as the impetus for the splitting of the three African hominoids (Kortlandt 1972).

The phylogeny of *Pan* is a more delicate issue and one is tempted to follow Marks' (1989) sage advice and "leave the chimp-gorilla-human clade as a sniglet". Yet naivete and the purpose of this article demand a proposal of phylogeny. Given the present data, neither species of *Pan* can be considered more closely related to *Homo*. Molecular analysis has repeatedly been demonstrated to be the most accurate tool for deciphering the relatedness of these species. Most of these analyses have demonstrated decreased diversity for *paniscus* as compared to *troglydytes* or *Homo*. These data suggest that *paniscus* is more specialized than either *troglydytes* or *Homo* and therefore, is most likely derived from *troglydytes*. Only Cronin (1977) reports increased genetic diversity in *paniscus*. However, this result may be indicative of autoapomorphic characters and could still be evidence of specialization in *paniscus*.

"Morphological, ecological and behavioral data are generally supportive of close phylogenetic ties to *troglydytes*. These characters, especially behavioral data, have often been advanced as

evidence of *paniscus* as the prototype of early humans. Although behavioral differences can often result in reproductive isolation, behavioral similarities do not necessarily reflect the closeness of phylogenetic ties. All extant genera of *Pan* and *Homo* exhibit adult play, non-kin food sharing and adult bonding behaviors in various forms. All display aggressive behaviors to varying degrees. And even GG rubbing has been reported not only in female *paniscus* but also in female *trogodytes* (personal communication).

Data demonstrate many similarities and dissimilarities in the expression of behaviors among the species of *Pan* and the genus *Homo*. Care must be taken not to anthropomorphize any particular species' repertoire in comparison with human behavior, as humans (and many other species) display a wide range of behavioral expressions. Molecular data indicate only that species designation is appropriate for *paniscus*, that all three are closely related, and that the two species of *Pan* are more closely related to each other than either is to *Homo*. When behavior is used in support of discussions of these relationships the effect of captivity, cultural and individual variation and geographic isolation on the expression of behavior must be seriously considered. What is already evident is the remarkable behavioral plasticity demonstrated by *Pan* and *Homo* and the many evolutionary solutions with which *Hominoidea* has met environmental challenges.

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THE USE OF THE SUCCESSIVE PILE SORT IN AN ETHNOGRAPHIC STUDY OF A SHELTER FOR BATTERED WOMEN

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Ethnographic data is often regarded solely as qualitative data. Very often, however, quantitative techniques can serve to illuminate patterns and themes in the ethnographic data which would be ordinarily missed. In this paper a formal data collection technique, the Successive Pile Sort, is introduced. Its application to ethnographic data of battered women and its representation through the quantitative technique of multidimensional scaling is discussed.

A Historical Perspective of Wife Abuse

Throughout history and societies all over the world, violence towards women, particularly wife abuse, has been an accepted cultural precept which has been ignored until the latter part of this century (Okun 1986; Sigler 1989). Extensive literature addressing wife abuse can only be found in the United States, Great Britain, and Canada (Gelles and Cornell 1983). Only within the last decade have anthropologists and researchers from other disciplines begun to explore this phenomena in non-Western countries. Even in the United States the majority of literature concerning wife abuse has been published mainly within the last two decades.

Interest in domestic violence resulted primarily because of two factors: the resurgence of the feminist movement in the 1970's and the initiation of laws protecting the rights of family members. The once private family domain could now be viewed and governed by the public sphere (Stets 1988). The term "wife abuse" as used in this paper denotes a woman who experiences violence within the context of a conjugal or cohabitating relationship.

At the time of my fieldwork, the literature revealed that anthropologists in the United States had done little work in the area of wife abuse. I hoped, therefore, that my ethnographic

study would be of value in better understanding this problem in order to end it.

Background Information

All the information used here, as mentioned previously, is derived from fieldwork conducted at a shelter for battered women. During the period of fieldwork, I observed, participated in various activities, talked with the women who were residing at the shelter, and did just about everything they did except live there. As a result, I collected much information about women who were forced to take refuge at the shelter for protection from domestic violence. Most of my information took the form of narrative and was composed of my observations, interviews with informants, and literature concerning domestic violence. It was during one of my interviews that an informant helped me to realize the need for a quantitative technique to supplement my qualitative data.

Tina, one of my key informants, made the following comment during an interview:

The shelter has helped me to learn and the groups
have helped me to learn that I need to to do for myself
first, anything and everything else second.

(Tina, a battered woman)

When Tina made this observation she was essentially telling me that she organizes her reality or existence in such a way that she comes first and everything else is second. I tried, literally, to envision what she meant. What kinds of items and values would be close to her, which ones would be far from her? These questions remained unanswered until Tina and other battered women did a Successive Pile Sort of items and values that they either cared very much about or were integral to their lives. After taking the results of the Pile Sort and applying the statistical technique of multidimensional scaling, I acquired a concrete representation of how she and other battered women viewed life and perceived the world around them.

I wished to examine two aspects of the lives of battered women through the Successive Pile Sort. First, I was interested in their perception of reality and how this technique might reveal a cognitive pattern in the battered women (Freeman, Romney and Freeman 1986). Second, few battered women have the opportunity to exercise or display any control over their own lives. How does this fact affect how they view the world around them? I hoped to discern patterns that showed how the notion of control and/or force shaped their lives.

A Brief Lesson on How to do a Successive Pile Sort

Before administering the Successive Pile Sort, I familiarized myself with the technique in order to carry out smoothly the procedure with informants. A brief description of how to do a Successive Pile Sort using the same stimuli used in the fieldwork is provided. For further detailed information on the Successive Pile Sort, please refer to Boster (1986b) or Romney and Freeman (1982) and Appendix A.

Thirty-two items or values served as stimuli in the set. Each of these items or values was relevant in some way to the group of women serving as my informants. (How these particular items were chosen will be addressed subsequently.) Each of these items was then written on an index card. On the back of the card a letter of the alphabet for identification was also written. Since there were thirty-two items in a complete set, lower case letters of the alphabet had to be used after the twenty-sixth item. Another set of blank index cards was then numbered one to thirty-two. A complete set of stimuli cards for a Successive Pile Sort procedure consisted, therefore, of stimuli cards with a uniquely corresponding alphabet letter and another set of numbered cards. There was one numbered card for each item in the set. In this case there were thirty-two items, so there were thirty-two consecutively numbered cards.

The next task was simply to have the informants sort the stimuli cards into various piles. It should be noted that there are variations in the procedure at this point. For example, I chose to administer the unconstrained top-down sort version of the Successive Pile Sort (Boster 1986b)

because then the informants were not restricted in any way as to how they sorted the various items. In some versions of the Successive Pile Sort, the informant is only allowed to make two piles. In the unconstrained version, the one used with the women, they were allowed to make as many piles as they wished *and* include as many items as they wished in each pile using any criteria they saw fit.

Most of informants made, on their initial sorting of the stimuli, four to five piles on the average. There were also some women who made many little piles with only a few items per pile and some women who performed the exact opposite procedure and made only one or two piles on the initial sort with all the items in these two piles. Once the women were satisfied with their piles of items, they were asked why they chose to group certain items **together**. Careful notes were taken on the information given. I then asked them if they wanted **to** change anything, such as move a particular item from one pile to another, create another pile or combine two or more piles etc. Once they were satisfied, the piles were **counted** and the informant was then asked which piles she would join if she had to make (N-1) piles. At this point an index card representing (N-1) would be placed between the piles. This process would continue until all the piles were separated with a numbered index card between them.

The card would be placed after the last item of one pile and before the first item in the adjacent pile so there would be a number between two item cards. Once the piles were separated, the informant was asked to go back to all the original piles and split one of the piles in order to make (N+1) piles. This process would continue until each item was separated from another by a numbered index card, or *each* item formed a pile onto itself. I then record the sequence of items (as identified by alphabet letters) and the numbers. I also **made** sure I had notes on how the informants went about splitting the piles. Very often, however, the informant doing the Successive Pile Sort volunteered this information on her own. Once the data were collected, they were entered into a computer program, ANTHROPAC 2.6 (Borgatti, 1989), and the **results** were analyzed through multidimensional scaling.

Why Use a Successive Pile Sort in an Ethnographic Study?

The rationale behind employing this technique is almost as important as the technique itself. The Successive Pile Sort can not be appropriately used to analyze every kind of ethnographic data. By using this technique and expressing it through **multidimensional** scaling, there is an assumption that there is an internal structure to the items or stimuli being sorted. In the minds of the informants, the items being sorted are related to one another in **some** way. The Successive Pile Sort serves to *reveal* the relationship among these items in a way that may not have been previously obvious or conscious to the informants or ethnographer.

In the case of the shelter women, I had to make sure I had items that were relevant to them. Information that was collected from interviews, observations, and other events served as the source for the initial set of items constructed for the Pile Sort set. In addition, I had the women do a free listing (Weller and Romney 1988). I told them to write down the most important items, people, values or "things" in their life, the "things" they were most concerned about. Using these two pieces of information, the free listing and ethnographic data, I was able to construct the items for my Successive Pile Sort. Each of the items were reflective of some aspect of a cultural domain within the shelter. Once the stimuli set was constructed, the only task left was to administer it to my informants. Administering the Successive Pile Sort to the women was easy. It was not terribly complicated and *all* the women who participated found the technique "very interesting and fun." This point was important because a negative experience with the Successive Pile Sort may have jeopardized future research. Besides the informants, the counselors also liked this exercise. It seemed to involve some therapeutic benefits for the women, because they would discuss why they piled certain items together and kept some separate.

Besides the advantages enumerated above, this technique also holds other benefits from a **research** perspective. **The** Successive Pile Sort can utilize a relatively large number of items (Perchonock and Werner 1968), as opposed to other ethnographic techniques, such as the triad

technique. This technique has also been proven to be quite informative *and* reliable in terms of consistency among informants (Roberts, Golder and Chick 1980). Finally, although all my informants were literate, or at least literate enough to understand the items on the cards, this technique could be potentially used with non-literate people. At one point during my fieldwork I did consider the possibility of administering the Pile Sort to the children in the shelter. In that case picture cards instead of word cards would have been used.

Analysis of the Results

Once the data from twelve women was collected, it was analyzed through multidimensional scaling. Very simply, this quantitative technique measures the similarity between the items and translates this similarity into distances in euclidean space. In other words, distance can be also viewed as a measure of similarity, the more similar the items the smaller the distance between them and the more different the items the larger the distance between them.

Anything beyond a brief description of multidimensional scaling is beyond the scope of this paper. Burton and Romney, however, provide an excellent description of multidimensional scaling with respect to its application to sorted data.

There are several computational procedures for multidimensional scaling. They all begin with a matrix of similarity measures and produce a set of coordinates for the objects. Scaling can be done for a space of any dimensionality. Ordinarily, the researcher does scaling for the same data in several different dimensions and uses two criteria to choose the **best** result. These are (1) the pattern of goodness of fit of the original similarity measures to the distances among objects in the multidimensional space and (2) the interpretability of the resulting configuration. (Burton and Romney 1972:399)

Goodness of fit, also known as "stress" improves as the number of dimensions increase.

This is a characteristic of multidimensional scaling. Therefore, as the number of dimensions increase, stress decreases. The only problem is that beyond three or four dimensions, the resulting configuration is often very difficult to interpret.

The multidimensional scaling of the data from the battered women achieved a final stress of 0.231 which is "fair" according to Kruskal's Formula 1 Stress Coefficient (Kruskal and Wish 1978). While I did attempt to lower the stress by analyzing the data in three dimensions, this option did not work. The data was virtually unintelligible in three dimensions.

All the data from the Successive Pile Sorts were combined and expressed in two dimensions a horizontal one as in Figure 1. and a vertical one as in Figure 2. Each of these dimensions will be separately discussed.

Figure 1. illustrates the first dimension, the horizontal one. In moving horizontally across the scale, there is a clear change in the quality of values and items. The values and items change from frivolous ones to more serious ones. On the left side of the scale, one finds the values or items, "adventure," "excitement," "fame," and "material items." In the middle of the scale the items are less superficial, "freedom," "place to live," "money," "freedom" and "future." Finally, on the right side of the scale there are very serious items, such as "honesty," "happiness," and "communication," "values," and " understanding oneself."

The horizontal direction illustrates a clear tendency for the women to separate those items, values, or beliefs which are important to them from those which are trivial or frivolous. It is also interesting to note that the items on the right side of the scale are the ones necessary to a healthy relationship with one's partner or spouse while those on the left side are not. It was not an accident then that my informants were explicitly addressing those items and values on the right side of the scale in their individual and group therapy sessions. Items such as "communication," "happiness" and "understanding oneself" all seem to be issues that battered women have trouble understanding. Mary, another woman I came to know, is proof of this fact.

I just want to encourage more women who should come to

MULTIdimensional Scaling Dimension 1

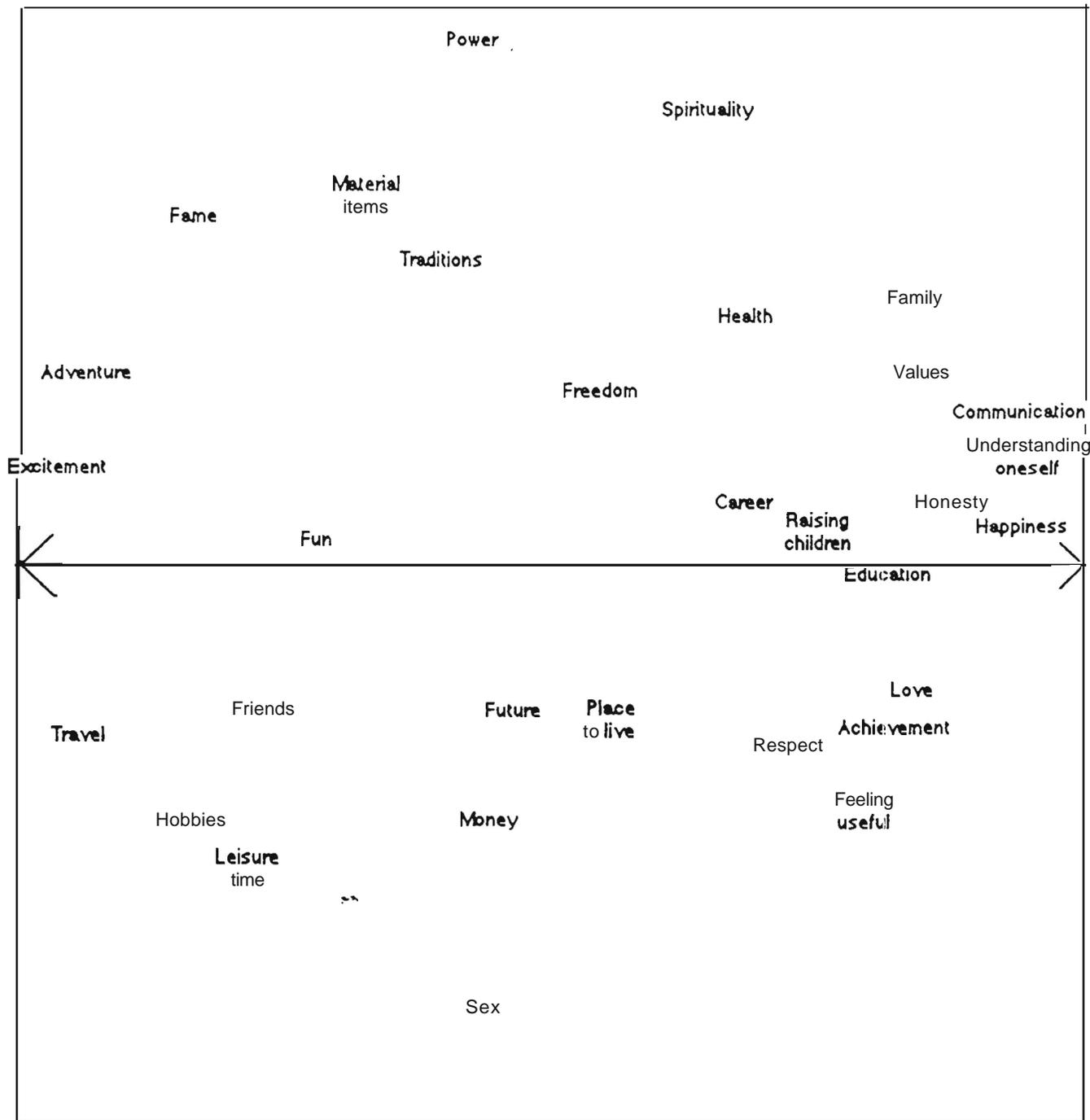


Figure 1.

this place . . . I feel like I grew up a lot, got more information and I know how to deal with [my boyfriend], if he should come around and start putting me down, or making me feel guilty, I know what to say now, and I know how to protect myself.

(Mary, a battered woman)

Finally, the items on the right side of the scale are all empowering values or items which will allow a woman to take control of her own life once she understands how to use them.

Figure 2. illustrates the second dimension, the vertical one. This dimension is more difficult to interpret than the first one and may account for the relatively high stress. While in the first dimension there was somewhat of a continuum present, the vertical dimension seems to represent a binary scale. Many items which are on the bottom part of the scale seem to have opposite "counterparts" at the top of the scale. The obvious ones are "money" and "spirituality" which are linked to materialism versus non-materialism. "Leisure time" and "excitement" are in contrast to one another in that the former one implies relaxation while latter one implies energy. "Future" and "traditions" are in contrast in that the former implies change while the latter implies conservatism or no change.

Some of the less obvious contrasting items are "power" and "sex." This particular pair is interesting in that one of the characteristics of an abusive relationship is the use of "sex" as a means of "power" or control, such as in the case of conjugal rape. In a healthy relationship these two items would not be opposite one another because sex would not be used as a weapon or as a means of exerting power. Only in abusive relationships, does power translate into force or control and sex translate into submission or victimization. Therefore, in light of the ethnographic data, this pair of items is highly revealing.

Another subtle contrasting set of items includes "health" and the cluster of items "love, achievement," "respect," and "feeling useful." "Health" usually refers to physical health while the other cluster of items are often linked with one's emotional or psychological health.

MULTIdimensional Scaling: Dimension 2

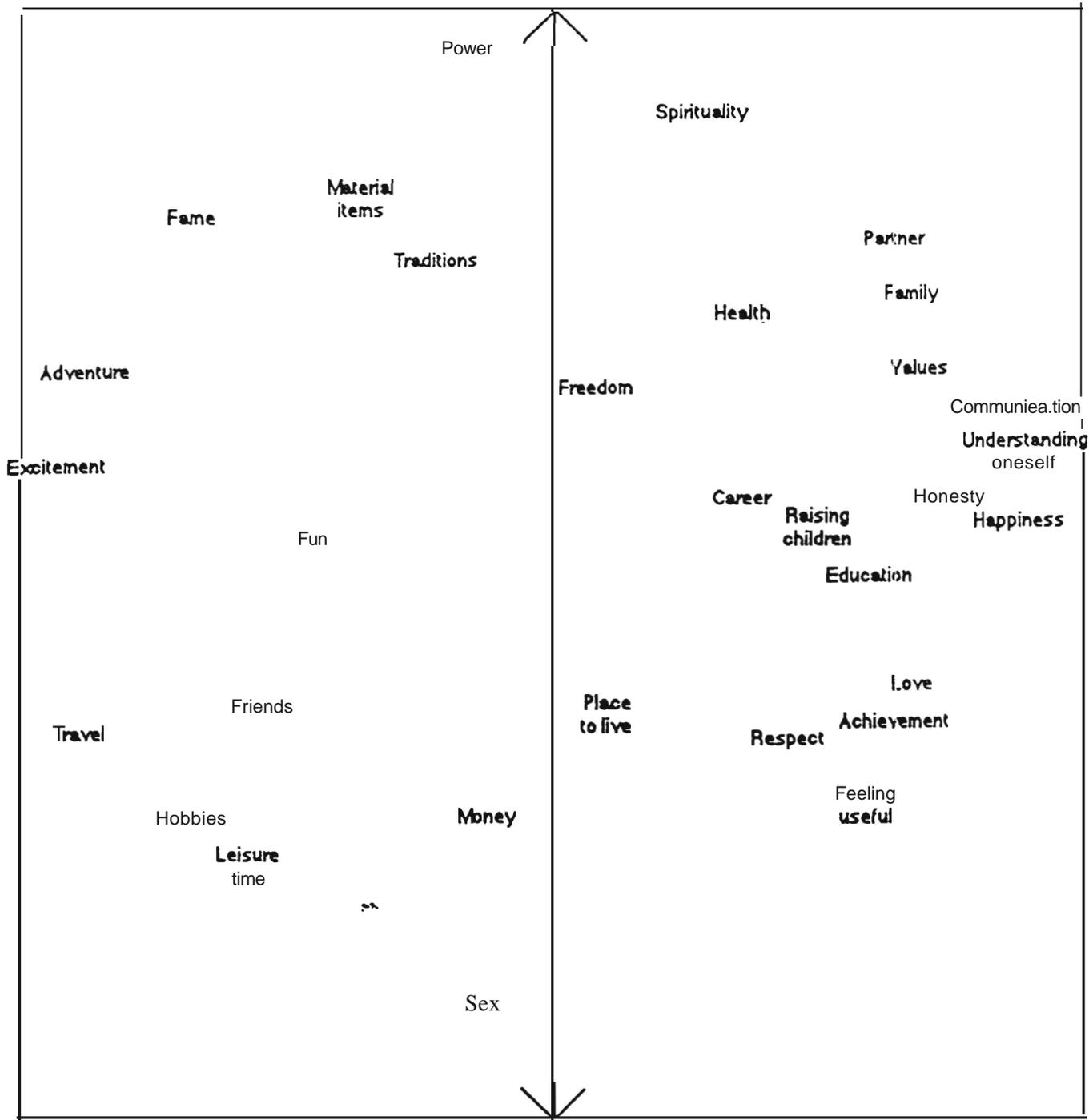


Figure 2.

Finally, there are number of items and values which fall in the middle of the scale, such as "fun," "raising children," "education," "honesty," "happiness," "understanding oneself," "communication," and "values." These *middle* items and values seem to mediate those on the upper and lower ends of the scale or to somehow balance them out. For example, a "career" would allow one to have "material items" and "freedom," items at the top half of the scale, but these items imply a sense of fleetingness. In contrast, a "career" will also ensure a "future" and "money" which are both located on the lower half of the scale and imply a greater sense of security.

When Mary makes talks about her future she includes many of the items and values or aspects of them found in this "middle level".

My future now is to get my GED. First, I got to figure out who will take care of my kids while I am at school. I'll be going back to school plus having my job, but they have night classes in GED. I want to get my GED . . . I've always wanted to become either a pediatrician or a cosmetologist.

(Mary, a battered woman)

"Understanding oneself," "communication" and "honesty," are necessary in understanding the balance between the items, "power" and "sex" and the items, "partner" and "love." In fact these last four items are precisely the reasons why battered women are in the shelter. They don't understand how these values items should work in relationship to one another.

The second dimension reveals an interesting cognitive pattern in the minds of the women. The contrasting sets of items and values on the extreme ends of the dimension may suggest that the women view the world from a "black and white" perspective. They perceive the world in terms of extremes. Situations are either in one state or its alternative state. **If** most battered women, such as my informants, do see the world in this way, it is not surprising. The lives of battered women are characterized by extremes, extremes in emotional states and physical states. They are either controlled or not controlled, they are either abused or not abused. They don't

know how to handle the "gray" areas of life. Many of these "gray" areas require social skills, such as negotiation and communication that many battered women do not have. As a result, they swing from one extreme to the other. When they finally learn how to communicate and attain an understanding of themselves they will be better able to balance the extreme situations in their lives.

Conclusion

The application of the Successive Pile Sort to ethnographic data concerning wife abuse proved to be very informative. On one dimension, informants were clearly differentiating between items or values of importance versus those that **were** not as relevant to their lives. On the second dimension, the battered women revealed the complexity involving the relationships of certain items or values in their lives.

While multidimensional scaling of the items sorted through the Successive Pile Sort was illuminating, it only made sense within the context of the other ethnographic data. The interviews with the women and the initial observations I made generated the relevant items to be sorted. Later, the multidimensional scaling of these sorted items confirmed and supplemented the qualitative ethnographic data. It is this reciprocal relationship between these two data gathering techniques which made the Successive Pile Sort technique such a useful tool.

Notes

Acknowledgements. Gratitude is expressed to Michael Vasquez for reviewing this manuscript.

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Appendix A

Successive Pilot Sort

The successive pile sort is the best method to use for tree structured domains with less than 50 items, particularly when one wants to compare the responses of different informants. In this task, informants begin by sorting the items as they would in an ordinary free pile sort. They are then asked to merge their piles until *all* piles are JOINED. Then they are asked to split their original piles until *all* items are SEPARATED. Although this method appears complicated at first, informants find it relatively straightforward and it has some important advantages, as discussed below.

To do a successive pile sort you need a collection of **STIMULI** and a set of **NUMBER CARDS** with the numbers 1 through [the total number of items] minus one. If there are 25 items, then you need 24 number cards. Each stimulus item should have associated with it a capital letter of the alphabet as an identifier. If there are more than 26 items, lower case letters may be used as identifiers of the next 26 items. This program allows up to 52 items which is about all informants can reasonably handle with this technique. We illustrate the method with an example of 25 cards, each with the **name** of a bird. Begin by laying the stimuli in random order in front of the informant and say something like the following:

"Here is a set of 25 cards, each with the **name** of a different kind of bird [or whatever domain you are studying]. Please sort them into piles according to which birds you think are most similar to one another. You can sort them according to whatever characteristics of the birds you like and into as many piles as you like."

After informants have finished the sort, leave the stimuli as they are and record the **NUMBER OF PILES**. This number of initial piles is the number "N" throughout these instructions. Next say:

"Now please tell me which of these PILES of birds (or whatever) are the most similar to one another? That is, if you could only make [N-I] piles, which piles would you join together?" [For example, if the informant made 7 piles, ask them which of the 7 they would join if they had to make only 6 piles.]

Take the piles that the informant indicates as being most similar and move them next to each other, if necessary. Place the number card [N-I] between the pair of piles the informant says that he or she would join. Now say:

"Treating the piles you have just joined as a single pile, NO\V which piles of birds would you join?"

Place the number card [N-2] between this pair of piles. Again, move the piles around if necessary. Continue this process until there are only two piles and place the number card 1 between them. Now say:

"Returning to your original piles, split the pile that contains the birds that are most different from one another. That is, if you had to make [N + 1] piles, which pile would you split and HOW?"

The informant has almost as much freedom in choosing how to split the piles as she or he has in the initial sort. For example, although an informant can only split a pile into two, he or she may choose to split a pile with 6 items into piles of 1 and 5, 2 and 4, or 3 and 3. Place the number card [N] between the piles that have just been split apart and say:

"Again, split the pile that contains the birds that are most different from one another. That is, if you had to make [N + 2] piles, which pile would you split? "

Place the number card [N + 1] between the pile that is split. Continue this process until there is only one pile remaining to be split and place the number card 24 (25 items - 1) between the remaining two items. You should now have a sequence of items (stimuli) and number cards that alternates: item, number card, item, number card, ... item. Record the informant's successive sorting of the items by writing down the sequence of item identifiers (letters of the alphabet) and the numbers on the number cards (e.g., B 2 A 4 D 1 F 3 E 5 C).

The strengths of the successive pile sort are: 1) informants' responses are comparable to one another since the same amount of information is extracted from each informant; and 2) a complete binary tree is elicited from each informant., so one can reasonably construct a representation of the responses of a single informant., either in a tree diagram or an MDS. The weaknesses are: 1) although the first step is as easy as a free pile sort (in fact, it IS a free pile sort), it is sometimes difficult to explain to informants what they should do next; 2) for similar reasons, it may be difficult to train field assistants to administer the task; 3) informants cannot take the test themselves without supervision; and 4) at the end of a long task, informants may not be able easily to decide which piles to split. Fortunately, this last difficulty has little impact on the results; most of the information is in the first few splits.

HEALING THROUGH LANGUAGE:
LINGUISTIC ANTHROPOLOGY AND THE RECOVERY
PROCESS OF CODEPENDENCY

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Words and magic were in the beginning one and
the same thing, and even today words retain much
of their original power.

Sigmund Freud

There are an estimated twenty-eight million Americans today suffering from the disease of chemical dependency. Their behavior, either while under the influence or in a state of deprivation, adversely affects another 75 million, the bulk of whom are family members (Bradshaw 1989: 18). More disheartening is the fact that many are children, who did not have a choice of **what** family they would like to be born into or raised by. Through **their** socialization they will learn to lie about their thoughts and feelings, to deny to themselves and others the truth and to protect the family at all costs, which for many will include their physical and emotional well-being (Black 1981 :22-26; English 1988:43; Bradshaw 1989: 18-9). Their parent who is not addicted- (if they have one) most often will also deny to themselves the reality of the situation, hoping against hope that things will change. Frequently, they too are were the child of a chemically dependent person, or grew up in a dysfunctional family themselves (Bradshaw 1988:18-9; Kohr 1988:44). Therapists and other mental health workers have discovered that these victims exhibit thinking, feeling and behavioral patterns that mirror the chemical dependents and are progressive, becoming further entrenched with time (English 1988:43). They call them codependents. The goal of this paper is to illuminate the contemporary views within the therapeutic community on this illness and, in particular, how language (or the lack of it) contributes to the disease and the recovery process.

Long and Wolin define a codependent as

an individual who develops relationships where they

become over-responsible for the welfare of others
(especially the alcoholic) and emotionally bound to
the point of dysfunction. (1989:41)

This over-responsibility and dysfunction contributes to a myriad of problems such as depression, anxiety, immaturity and insecurity. The Syracuse Post Standard (1990: 1) published an article containing the results of a study conducted by the American Psychiatric Association that found women to be twice as likely to suffer from depression in their lifetime than men. Dependent relationships were cited as one of the contributing factors for this phenomena. The point is that this dependence on the other, whether for security, sex, validation or acceptance has become in some way pathological, locking the sufferer into a reaction-response system that functions to separate him/her from what it is they are seeking; namely emotional support. They have been taught often from youth that it is only through familial loyalty that they can receive this support.

Codependence is a disease that is chronic, progressive and potentially fatal (Connell 1989:44). When referring to the disease and it's victims I am primarily focusing on the continuing research and treatment of Adult Children of Alcoholics (ACOA's), Grandchildren of Alcoholics (GCOA's) and the spouses or mates of chemical dependents. Janet Woititz (1983:3-29) identifies a number of characteristics that codependents share; two of which are pertinent to this discourse. First, codependents are unable to effectively communicate what it is they feel, think or desire, either because they simply don't know how or are unable to due to the internalization of parental messages encouraging them not to. Secondly is the widespread prevalence of the "no talk" rule employed to save the family disgrace (Black 1981:24). The ability to speak openly and with integrity, even in the face of fear is one of the primary objectives of treatment. Woititz (1983:3) discovered through working with groups of adult children of alcoholics that most suffered from a poor self-image and lacked the self-esteem that their peers enjoyed. Her research illuminated that this phenomena was in fact due to internalization of messages they received while growing up.

It has been only within the last twenty years or so that any significant attention has been paid to their plight (Bradshaw 1989:18). Since then, groups have been developing across the

country providing the codependent with the support they require for recovery. Because the nature of the illness is to deny to themselves and others the reality of their life with a chemical dependent, many require external help to pierce through their denial system and a place where they can candidly share their feelings. A structured "safe house" such as a therapist's office (who is familiar with the disease and its treatment) or an inpatient treatment facility can offer significant help to guide them on their way towards health. As of yet, however, the DSM-III-R has not recognized codependence as an illness in and of itself. Frequently the diagnosis is "personality disorder." An understanding of the problem and solution arose, in part, out of the work of Virginia Satir, a pioneer in family therapy. In her book *Peoplemaking* (1972) Satir was aware of the correlation between those families who were having problems and their inability to verbally communicate their desires, wants and opinions to the other. She went on to discover that in these nuclear families, (often plagued by the chemical dependence of a member), there existed unwritten "laws" governing "appropriate" transmission of information regarding the family. This pattern was also prevalent throughout much of the extended kin system as well. From her work she came to believe that not only were the family members learning and teaching self-defeating communication patterns, but also acquiring and transmitting poor self-worth. Her conclusion was that only through honest communication can an individual expect to gain self-esteem and in these families the members were unconsciously denying themselves that opportunity.

Satir went on to identify and label another type of language, she called it "the internal dialogue" (1972:34). This linguistic phenomena, she argued, was acquired during socialization, yet rarely given verbal expression. It is the talking that we engage in with ourselves throughout much of the day. Usually this form of "speaking" is not harmful in and of itself, but as Woititz (1983:27-8) notes, it frequently is carried over from childhood and tends to be critical and demeaning rather than affirming among ACOA's. They repeat to themselves, over and over, that they are "no good", "failures" and "bad" promoting thought patterns that when expressed in behavior often become a self-fulfilling prophecy. Louise Hay (1984) in her book You Can Heal

Your Life believes that the failure of an individual to change their negative belief system and the messages they tell themselves will ultimately result in somatic illness. Clearly this problem has vast psychological and social ramifications for the codependent in addition to physical discomfort. The internal dialogue constantly attacks the codependent's self-esteem and self-worth that they first learned from a chemically dependent person or dysfunctional family system¹. It also perpetuates the anxiety and fear that the individual initially experienced by symbolically recreating the situation over and over through the use of specific words. Voice tones set in psychologically similar social contexts trigger images or feelings of experiences incurred while living in a home affected by chemical dependence or dysfunction. To the victim they still exist.

Some of the family norms that Satir identified specifically pertained to "appropriate communication" as deemed by the family powers, particularly the parents. Family problems were often denied. These "no-talk" rules as Woititz (1983) found operate among; ACOA's too and function to isolate the codependent further from their true feelings regarding a situation; to talk is to violate the family and the codependent learns that it is "best" no to do that. Some may suffer physical punishment, but primarily it is the emotional abandonment that most fear. To understand the intensity by which this "rule" operates, Black describes this phenomena in the context of a family of five with the father suffering from the disease of alcoholism:

. . . All three children live in the home, the girls are in the first two years of college. . . The 13 year-old boy told me he thought he was the only one who knew his father was alcoholic, . . . He described his father crawling across the floor drunk, "he was throwing up on the living room floor but everyone acted as if it wasn't happening. My mom didn't talk about it, nor did my two older sisters. I thought that I was going nuts." (1981:24)

Echoing Satir, Black points out that in her clinical experience she has found that children learn early on the rules of what they can and cannot talk about, either directly via **verbal** warnings, punitive reprisals or through modeling.

Bradshaw (1989:19) points out that shame is the primary emotion experienced in the family and others are not to be expressed. In my own Irish-Catholic familial background², the expression of anger, verbal or behavioral, was not proper, especially if my parents happened to

be the target, and I became very adept at "stuffing it") to the point of not being able to recognize it. Children are taught to be less than honest when speaking to hedge in their vocalizations and to refrain from telling the truth especially if it might reveal embarrassing family secrets.⁴ Other happenings that are frequently kept secret include sexual, emotional and physical abuse, incest and neglect. What happens is that after a period of time this inability as they which begins to manifest itself as physical illness. The inability to honestly linguistically engage with another human has physical ramifications, implying that our innate linguistic ability serves as a possibly more vital function than purely communication; it also functions as a cathartic. Some voices in the therapeutic community would go so far to say that a significant percentage of childhood illness can be linked to this censorship of free expression. Recent research on gender-related issues reinforces this correlation between verbal expression of emotion and health. In a study reported by National Public Radio this past December, researchers found that men who deny themselves verbal expression of their anger run a 400% increased chance of dying earlier than their more loquacious counterparts.

The recovery process from codependency thus hinges on changing the "internal voice" that gives rise to the faulty belief system and cultivating a new form of linguistic response rooted in honesty. This phase of the recovery process is ongoing,⁵ although once the new pattern is established the codependent becomes better prepared to generate changes. The Spair-Wharf "hypothesis" comes to mind and this phase seemingly corresponds with their proposal that the language we use defines our "world view", our outlook on reality. This has immediate applications for the codependent attempting to change old ways. Rock'n'roll star Neil young sums up the plight of the recovering person in one of his more recent songs " ..old ways...their like a ball-and-chain." After years of internalizing messages that destroy their self-worth, they find themselves, as one person put it "talking to and treating myself worse than I would to my enemy. "

Verbalized statements that focus on the positive attributes of the individual are termed affirmations. Their recurrent theme is growth through acceptance of their plight combined with

faith in a solution that is both practical and spiritual. They are employed to change the belief system that lurks behind the words. Below is an example:

I WILL USE WORDS WHICH EMANATE POWER,
STRONG WORDS TO GUIDE ME

My words today will be strong and powerful
I will choose words that convey a sense of
mastery, competence and ability. I can. I will
I am. I do.

Rokelle Lerner (1985:24)

Repetition is the mechanism through which these devices work. Lerner (1985:1) points out that affirmations, when used persistently, will help alter the self-dialogue and have a positive effect on the codependent's behavior and emotional well-being. To obtain the greatest effect she recommends that one read the statement out loud slowly and repeat it over and again throughout the day in a fashion similar to a mantra. Louise Hay (1984) advocates a similar practice of changing the words we use. She suggests eliminating key words such as "should" and "must" or any other absolute, because if the person does not "do what he should", familiar feelings of guilt and shame are not encouraged or aroused. Mary Lee Zawadski, former clinical director at Suncoast Hospital's Chemical and Codependency Recovery Center in Largo, Florida and now at Self-Discovery, an inpatient treatment facility in northern Alabama, places heavy emphasis on word usage and voice level for the codependent. She has her patients replacing words such as "can't", with "won't" and "try" with "am doing" because they can unconsciously "lock" the individual's growth.⁶

In recovery⁷ codependents learn that they choose what to say and that they alone possess the power to begin to change their reactions to life by simply becoming conscious of and changing the words they use. It is not that the words themselves possess some sort of power over the individual but the meaning they attach to these symbols. Certainly this is only the beginning of this healing process but, all journeys begin with the first step. these symbolic expressions of thought **and** their subsequent verbal externalizations require conscious effort to become effective; the very physical expression of these thoughts is vital for recovery. Michael

Drowin, former clinical director at St. Joseph's Rehabilitation Center in Saranac Lake, drives home how crucial this need for honest expression is in the recovery process. Now employed by the New York State Division of Alcohol & Substance Abuse, Drowin believes that

Talking is the most important action in the recovery process from dependency, chemical or co.. For so long these individuals have been shut up either due to drugs, family rules, and the like that it is imperative that they know that they do have worth. [In order to come to know this they need to share with others how they are truly feeling. This does not remove responsibility from them. In fact they become more responsible because they now know what to do.

Hay recommends repeating of the following phrase

I am willing to release the need to be unworthy
I now lovingly allow myself to accept it. (1984:65)

over and over until the new pattern is established. She suggests that by three years old a child has been programmed with their initial internal dialogue. If not changed, the child will continue to speak to themselves in the same way they were spoken to at three. For codependents who happen to be a ACOA or GCOA this pattern fits well, for the remarks they tell themselves is often self-criticizing.

Don Gerstch, senior counselor at St. Joseph's Rehabilitation Center stresses the **importance** of group therapy in the codependent's recovery. He views it as a testing ground where the individual take the risk of honest communication with a group of people they here-to-fore have not known, eventually discovering that it is possible to trust and express their thoughts and feelings to others without any penalties. It teaches them that there do exist safe places in the world for them to be honest and not guard what they say. Woititz urges the codependent to find at least one person with

...whom you do not have to worry about how stupid you sound.
(1983:59)

To the codependent who already has low self-worth, the fear of sounding **stupid** becomes another stumbling block to health and the typical symptoms of repressed feelings and thoughts exacerbate their condition (Kohr 1988:44).

Failure to participate in this critical stage has a variety of ramifications including a

relapse into old patterns of behavior. Breaking through the linguistic barriers that contribute to the condition is the essential first step; all else hinges on it. Successful relationships, either intimate, vocational or codependent continues to remain true to patterns of speech that stifle growth and creativity they waste their lives.

Bradshaw (1988: 19) agrees with Drowin, believing that in order to heal the toxic shame that spawns the disease, the individual needs to linguistically engage with another openly. This, he maintains, is absolutely necessary in order for the recovery process to successfully continue. Reinforcing this is the pertinent cliché heard among people involved in recovery circles " *You're only as sick as the secrets you keep.*" The focus is placed on the importance of honest expression implying that by neglecting to exercise their linguistic abilities, a codependent's illness will remain intact. Kohr (1988:44), cited research of one hundred GCOA's came to a similar conclusion as Bradshaw. The study found that 90% of grandchildren of alcoholics/addicts, like their earlier generation counterparts, expressed difficulties asking for help because they were ashamed. **I**t was also discovered that these GCOA's tended to be secretive "thinking they would cause trouble if they talk to anyone about how they feel."

A program designed to intervene as early as possible in a person's lifespan elucidated that the disease of codependence follows a progression similar to chemical dependency that if left untreated can ultimately end in death. Typically the earlier the intervention the easier the beginning stages of recovery, particularly breaking through the denial.^s This suggests that the longer one is enmeshed in this pathologic lifestyle the longer it may take for them to begin to open up and share. Trust has been absent for so long for many and they need to be taught how to employ their innate linguistic abilities to help themselves heal. Black (1981:25) found that children develop the coping mechanism of denying themselves verbal expression because it serves a function; **i**t allows them to carry on in the world "properly" but at a high price.

In the recovery process codependents become aware that they are responsible for the words they use and that they alone possess the power to change. They choose who they engage in conversation with, who they confide in and are urged to be careful that they are not following

the same pattern they did growing up. Zawadski stresses the importance of the codependent becoming aware of their social context when speaking. She teaches them how to act as an observer, to research [themselves], paying attention to what it is they are hiding from whom and where they are being invalidated when speaking. She also recommends the keeping of a journal where the person can write out their feelings and often gain a new perspective regarding their situation. During her tenure at Suncoast Zawadski impressed upon her patients that their emotions and the verbal and behavioral expression of them was their "right." Experiential therapy was employed in the therapeutic process, creating "lifelike" situations for the patient to practice their new skills with impunity. Men, who in twentieth century American culture have often been socialized into believing that "men don't cry" and "men don't talk about their feelings" were encouraged to find new role models that reject those "linguistic norms" and receive emotional benefits including improved self-esteem.

Despite the progress many make some refuse to continue to use their new tools, to connect with support groups and to make the changes that are necessary to continue in their recovery. They will avoid using affirmations, return to the familiar albeit self-restricting lifestyle. Why this is so is not clear. Like chemical dependency, codependency is a disease that is characterized by relapse and denial. Codependents need love, sometimes "tough-love", they require a "safe" place to learn how to speak to themselves and others, to know that they can change the rules (real or imagined) that governs their speech and like anyone they need to be treated **with** compassion and dignity. The good news is that all of this and more is available, as any recovering codependent will testify. The bad news is that not all will choose to grasp the chance to heal through language.

End Notes

1. For more information regarding dysfunctional family systems and the effects of alcoholism and addiction on family systems refer to John Bradshaw's "Healing the Shame that Binds You."
2. This is merely a subjective viewpoint and is not intended to stereotype any particular ethnic group. Codependence is not choosy.
3. Term used among the therapeutic community referring to the act of not expressing a feeling, especially anger and sadness.
4. Examples usually given pertain to a loved ones tragic behavior and family members reaction to [sic]. Often but not always alcohol and/or other drugs are directly involved. See Janet Woititz's Adult Children of Alcoholics (1983).
5. Codependency, like alcoholism and addiction, is a lifelong illness characterized by relapse and denial. As of yet there has been no cure discovered for any of them. Linguistic responses, however, particularly of emotions is regarded as a necessary component to remain in the recovery process.
6. This practice seems to extrapolate from the Sapir and Wharf by providing practical applications.
7. Referring to ACOA, GCOA, CODA (Codependents Anonymous) and the therapeutic community.
8. While this is generally true one must take into account that we are discussing individuals and their acceptance of their disease is dependent on a number of factors including whether they are chemically dependent themselves and the severity of the dysfunction in their family of origin.

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THE PHYLETIC AFFINITY OF RAMAMORPHS: AN ONGOING CONTROVERSY

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ABSTRACT

The status of Miocene ramamorphs has been the cause of continuous debate since the early 1900s. Both cladistic and molecular data has been applied to answer **some** of the questions that arise. However, both approaches present problems. A discussion of taxonomic nomenclature, cladistic and molecular data pertaining to middle to late Miocene ramamorphs, and six possible phyletic affinities are presented.

INTRODUCTION

Since the first ramamorph fossils were discovered, their status has been a highly debated question. Numerous phyletic affinities have been presented for these middle-late Miocene **hominoids** in the last sixty years. When considering the phylogeny of middle-late Miocene hominoids several questions arise. Of these questions some are of major concern including: the taxonomic definition assigned to these fossilized hominoids on the generic level, the accuracy and interpretation of biomolecular data as it pertains to middle-late Miocene hominoids, and the significance and interpretation of anatomical features that reflect relationships between these taxa and later pongids and hominids. A discussion of problems arising in the interpretation of ramamorphs will be presented in this paper. Furthermore, this paper will **address** six possible phylogenies proposed for ramamorphs and the debates pertinent to them.

Ramamorphs

Ramamorphs were a relatively successful hominoid who occupied a large territory in comparison to extant Great Apes. Fossil forms have been discovered in East Africa, Asia, Europe, and the Near East. Dates from these sites ranging from 15-6 million years old (see figure 1). There are only a few ramamorph specimens from Africa--all from Kenya. These specimens have been dated around 15-12 million years old, and assigned to the genus *Kenyapirhecus*. Ramamorph fossils from Asia have been discovered in India, Pakistan, and China. From these areas three genera of ramamorphs have been identified: *Ramapirhecus*, *Sivapirhecus*, and *Giganthropirhecus*. Specimens from Asia have been dated between 12-6 million years old. European specimens have been recovered from Hungary, Greece, and Germany. The European specimens include *Rudapirhecus*, *Bodvapiirhecus*, *Ouranopirhecus*, and *Graecopirhecus*. Ramamorphs from the Near East have all been discovered in Turkey. *Sivapirhecus* and *Ramapirhecus* are both represented in Turkey with an age of approximately 12 million years old.

Morphologically, ramamorphs can be characterized by molars with low crown relief and thick enamel, incisors that are small relative to molars, or large molars relative to body size, and a short face with widely flaring zygomatics. Postcranial remains are poorly represented, so specific characteristics are hard to define (Wolpoff 1980, Kay 1981).

Ramamorphs varied in size from a medium monkey to as large or larger than gorillas. Sexual dimorphism is uncertain. Kay (1982) concludes very little sexual dimorphism can be seen in ramamorphs. Andrews (1983), however, disagrees with Kay's interpretation and states there was a great deal of sexual dimorphism. Many anthropologists feel that the large degree of sexual dimorphism present in ramamorphs is illustrated in the *Ramapirhecus-Sivapirhecus* complex. Pilbeam (1986) and others argue that *Ramapirhecus* does not represent a separate genus but only females within *Sivapirhecus*.

Based on scanty postcranial remains, Andrews (1983) suggests ramamorphs were terrestrial

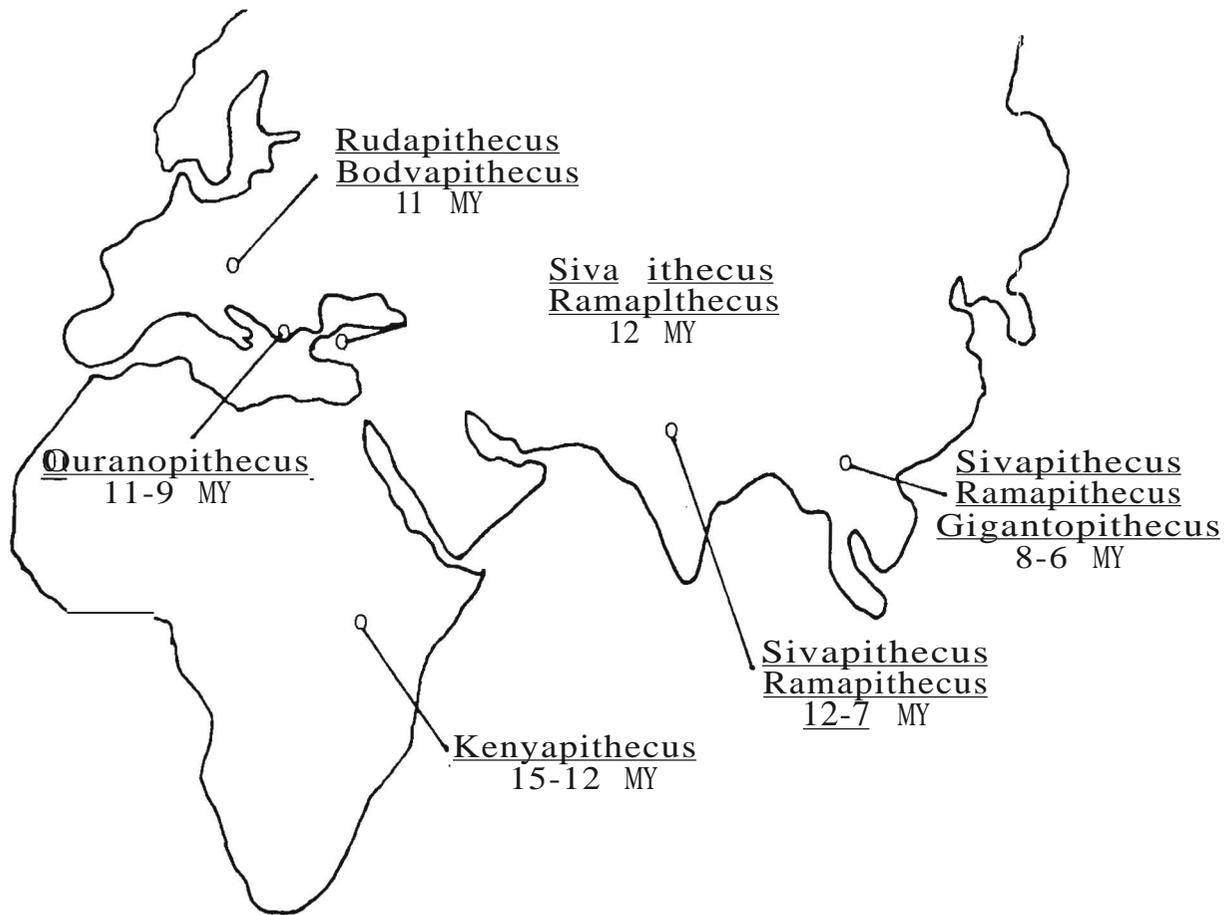


Figure 1.

Distribution of ramamorph fossil materials (modified after Harrison et al. 1988: Fig. 4.4).

adapted quadrupeds, that exploited the woodland habitats prominent during the Miocene. Dietary adaptation in ramamorphs is also uncertain. Kay (1981) argues that because of the thick enamel and poorly developed shearing capacities in the cheek teeth, ramamorphs probably eat large amounts of hard nuts or seeds enclosed in tough pods. It is probable ramamorphs were omnivorous. However, body size and geographical location most likely played a vital role in their diet.

A Brief History

Since the middle 1800s, paleontologists have been curious and sometimes **obsessed** with the question of which animal first separated humans from the apes. This curiosity has driven numerous paleontologists into the field in search of fossilized hominoids that may represent the transitional form that gave rise to hominids.

Ramapithecus became the earliest candidate in 1934 when G. Edward Lewis described *Ramapithecus* and announced it as the first recognizable member of the hominid lineage. Since Lewis's first announcement, vigorous debates have arisen over *Ramapithecus*' status. Most paleoanthropologists outright rejected Lewis's idea until the 1960s when Elwyn Simons restudied *Ramapithecus* and concluded it indeed warranted hominid status. Later in **1965**, David Pilbeam joined Simons in revising Miocene hominoid fossil interpretations and confirmed *Ramapithecus*' place in the hominid lineage. By the 1970s most paleoanthropologists accepted *Ramapithecus* as a hominid (figure 2 depicts the views held in the 1960s and 1970s). The confidence in *Ramapithecus*' status as a hominid at this time is illustrated in Ian Tattersall's publication *The Evolutionary Significance of Ramapithecus*, where he wrote:

Most students of hominid origins would agree today that *Ramapithecus*, at least on the basis of known material, can firmly be regarded as a hominid, i.e., that it lies on or **close** to (in the latter case, in the sense that it shares with the actual ancestral hominid an ancestor that was not pongid) the ancestry of man. (Tattersall 1975: 32)

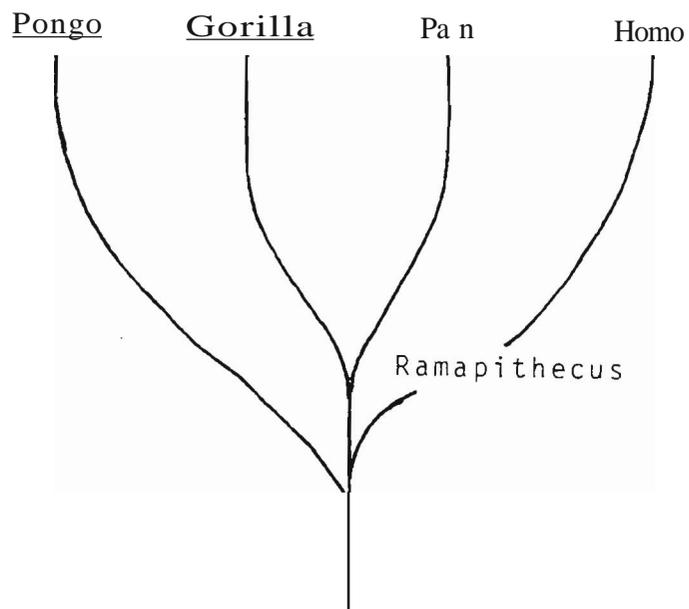


Figure 2.

Diagram showing the view held by many paleoanthropologists in the 1960s and 1970s. Ramapithecus was considered the earliest hominid.

Towards the end of the 1970s and into the 1980s, the position of *Ramapithecus* in the hominid lineage was challenged. New discoveries, reexaminations of older material, and the use of biomolecular data to establish evolutionary relatedness of extant animals caused many anthropologists, including Pilbeam (1978, 1986) to change their position.

Although not well received for many years, Wilson and Sarich's (1967) study of blood proteins to determine genetic relatedness between and among living animals has captured the attention of many human paleontologists in recent years. Wilson and Sarich (1967) concluded the divergence of African apes and humans was much more recent than previously thought--taking place around five million years ago. If this hypothesis is correct, then *Ramapithecus* would have existed prior to the African ape and human divergence and can not be considered a hominid.

Furthermore, new discoveries of another Miocene hominoid, *Sivapithecus*, has caused doubt about *Ramapithecus*' status as a hominid. Growing numbers of paleoanthropologists (Pilbeam 1986, Ciochon 1983, Andrews and Cronin 1982, Greenfield 1979, and others) now speculate that *Ramapithecus* and *Sivapithecus* are synonymous and belong to the lineage of *Pongo* (orangutans) and not humans (figure 3 illustrates this view). Although many paleoanthropologists now support this hypothesis, others (WU and Oxnard 1983, Kay and Simons 1983) still support the status of ramamorphs in the human lineage. Consequentially, the argument continues.

PROBLEMS IN THE EVALUTATION OF MIDDLE-LATE MIOCENE HOMINIDS

The interpretation of Miocene hominoids is borne with difficulty. Fossilized remains from this time period are scarce and usually in very poor condition, which only enhances the problems. The taxonomic assignment of ramamorphs, like most fossils, has been disputed for many decades. Both cladistic and molecular data has been used to interpret these fossils, but both approaches present unique problems of their own.

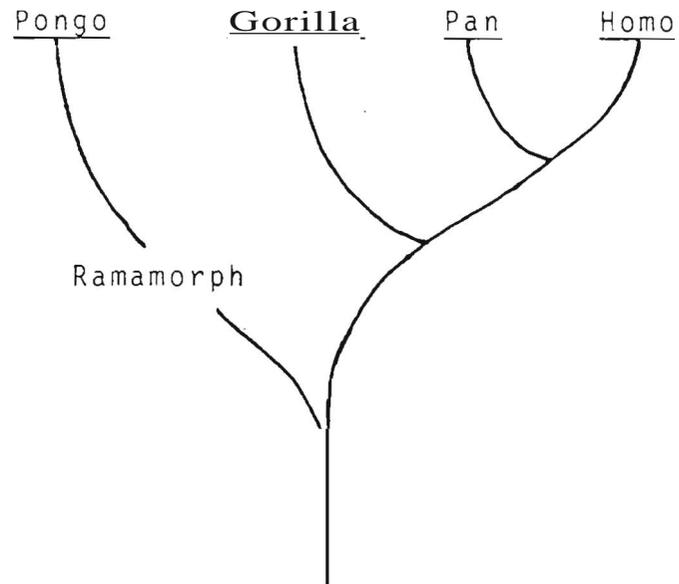


Figure 3. Diagram showing the view held by many paleoanthropologists today. Ramamorphs (specifically *Sivapithecus*) is considered in or near the ancestry of orangutans.

Taxonomic Classification of Middle-late Miocene Hominoids

Before we can discuss the phylogeny of Miocene hominoids, we must first understand the taxonomic nomenclature used to identify middle-late Miocene hominoids. There is little consensus among paleoanthropologists as to the correct taxonomic terms, especially at the generic level, that should be used to describe these hominoids. *Ramapithecus*, *Sivapithecus*, *Gigantopithecus*, *Ouranopithecus*, *Bodvapithecus*, *Kenyapithecus*, and numerous other genera have been assigned to middle-late Miocene hominoids within the subfamily Ramapithecinae. The placing of various specimens within a genus is as varied as the researchers studying them.

Kay and Simons (1983) propose that all hominoids within Ramapithecinae are represented by two genera: *Sivapithecus* and *Gigantopithecus*. They used dental metric and morphological observations to set up a taxonomic system for middle-late Miocene hominoids. This, they felt, showed similar variation found within the taxonomic system of extant apes and monkeys. Kay and Simons' studies indicate that variation in dentition is least in the upper and lower first and second molars, while sexual dimorphism was greatest in canines and anterior lower premolars. Using these criteria, Kay and Simons (1983) concluded on the bases of metric and morphological observations of the molars, most ramamorphs, except *Giganthropithecus*, fit within the range of a single genus. Because of its taxonomic preference, *Sivapithecus* was assigned to this genus. Included in their classification of *Sivapithecus* was *Ramapithecus* (Africa, India, Pakistan, and China), *Ouranopithecus* (Greece), *Kenyapithecus* (Africa), *Graecopithecus* (Greece), *Bodvapithecus* (Hungary), and *Ankarapithecus* (Turkey). Within *Sivapithecus*, Kay and Simons identified eight distinct species using canine size to establish a male and female range for each species. *Gigantopithecus* remains a distinct genus in their classification with two species representing it in their model.

Pilbeam (1986) also classified many of the ramamorphs in the genus *Sivapithecus* based on morphological similarities. But, he only included specimens from Turkey, India, and Pakistan.

He excluded *Kenyapithecus*, both *Sivapithecus* and *Ramapithecus* from Lufeng and the Greece hominoids. Pilbeam excluded these specimens because he felt they did not share the same features that characterize *Sivapithecus*.

In contrast, other researchers (WU and Oxnard 1983, Oxnard 1987) dispute the consolidation of various groups. Wu and Oxnard strongly disagree with the lumping of *Ramapithecus* and *Sivapithecus*. Based on criteria similar to Kay and Simons (1983), Wu and Oxnard concluded that Miocene hominoids from Lufeng, China represent two distinct genera. **They** demonstrate that dental observations indicate there are two groups with a clearly defined male and female representative. From the two groups, Wu and Oxnard (1983) and Oxnard (1990) assigned all the smaller specimens to the genus *Ramapithecus* and all the larger ones to *Sivapithecus*. Pickford (1982) also dispute the lumping of genera when it pertains to *Kenyapithecus*, which is commonly lumped with *Ramapithecus* or *Sivapithecus* by many authors. Pickford (1982) argues *Kenyapithecus* should be distinguished from the other two genera because it exhibits distinct morphological characteristics that separate it from *Sivapithecus* and *Ramapithecus*.

To avoid the problems that occur in formal taxonomic designations, Ward and Pilbeam (1982) propose the term "ramamorphs" be used to describe all middle-late Miocene species resembling the *Ramapithecus-Sivapithecus* complex. Other authors, such as Wolpoff (1980, 1983), also avoid the contention and use the designation of Ramapithecines to describe all middle-late Miocene hominoids with ramamorph features.

Without substantially more material, the argument of taxonomic classification will probably continue. This author subscribes to the use of the term "ramamorph" to **discuss** all middle-late Miocene hominoids at the generic level for the present time. The use of the term eliminates some of the controversy of these hominoids and allows for further discussion of their phylogeny.

Molecular Approach

In 1965, Alan Wilson and Vincent Sarich strived to resolve some of the questions pertaining to hominid and hominoid evolution by looking beyond the fossil record. They searched for answers in the biochemistry of humans and closely related primates (Sarich 1971). Sarich and Wilson (1967) measured the differences between various primates by using immunological techniques. Since Sarich and Wilson's data was published, many molecular scientists and anthropologists have expanded on their ideas and searched for new ways to use biomolecular evidence to resolve problems in the phyletic interpretation of hominoids (Goodman and Cronin 1982). Many of these studies have helped increase the understanding of Miocene hominoid evolution. Amongst the numerous studies, immunology and DNA hybridization have contributed to the knowledge needed to unravel the evolution of hominoids. A brief explanation of these techniques is required to understand the role they play in the comprehension of human evolution.

Immunology

The idea of using immunological techniques to measure distances between extant primates is derived from the theory that vertebrates will respond to foreign substances by producing antibodies (Sarich and Wilson 1967). A single molecule, serum albumin, was used by Sarich and Wilson to determine distances between various primates. Serum albumins are single polypeptide chains that contain 570 amino acids. The order of these amino acids differs from one species to another, and this fact was used as the basis for Sarich and Wilson's study. To determine distances between primates, Wilson and Sarich extracted serum albumin from **various** primates and then purified it. The purified serum albumin from a single primate was then injected into rabbits. Like primates, rabbits have albumin but it is a very different molecule than albumin from primates due to the different directions of evolution. Rabbits will produce antibodies to fight the foreign albumin injected into their system. The sera from rabbits injected with primate

serum albumin was then used to measure distances between primate albumins by observing the reaction between the homologous (albumin injected) and the heterologous test albumin. The data from this observation was calculated and compared with other primates to see the amount of difference between two species (Sarich 1971).

The data from Sarich and Wilson's (1967) study indicated chimpanzees and humans had only an immunological distance of seven. This immunological distance is compatible with studies done on other closely related species such as horses and zebras who have an immunological distance of eight according to Wilson and Sarich's study. The results indicate that the human - chimpanzee albumin difference is very small relative to the total evolutionary differences of albumins. This suggests that the chimpanzee is an extremely close relative to humans.

DNA-DNA Hybridization

Another method in molecular biology that has offered valuable insight into the evolutionary process of hominoids is DNA-DNA hybridization (nucleic acid sequencing). DNA hybridization is a technique used to examine similarities in DNA between two species. DNA is a double helix in structure. It consists of two strands of nucleotides linked together by organic bases. When a DNA double helix is exposed to high temperatures (approximately 100 degrees Celsius) the two strands of nucleotides will separate. A single DNA strand from one species can then be matched with a single strand from another species, and the DNA strands will re-bond. The degree of re-bonding can be determined by reheating the hybrid DNA. The greater the difference between the two strands the less heat that will be needed to separate them again (Sarich 1971, Goodman and Cronin 1982, Sibley and Ahquist 1984). A study by Kohne (1972) concluded there was only a 1.7 degree Celsius or 2.5 percent difference between temperatures required to separate a human DNA double helix and a human-chimpanzee matched DNA. This evidence strongly supports the immunological data already discussed.

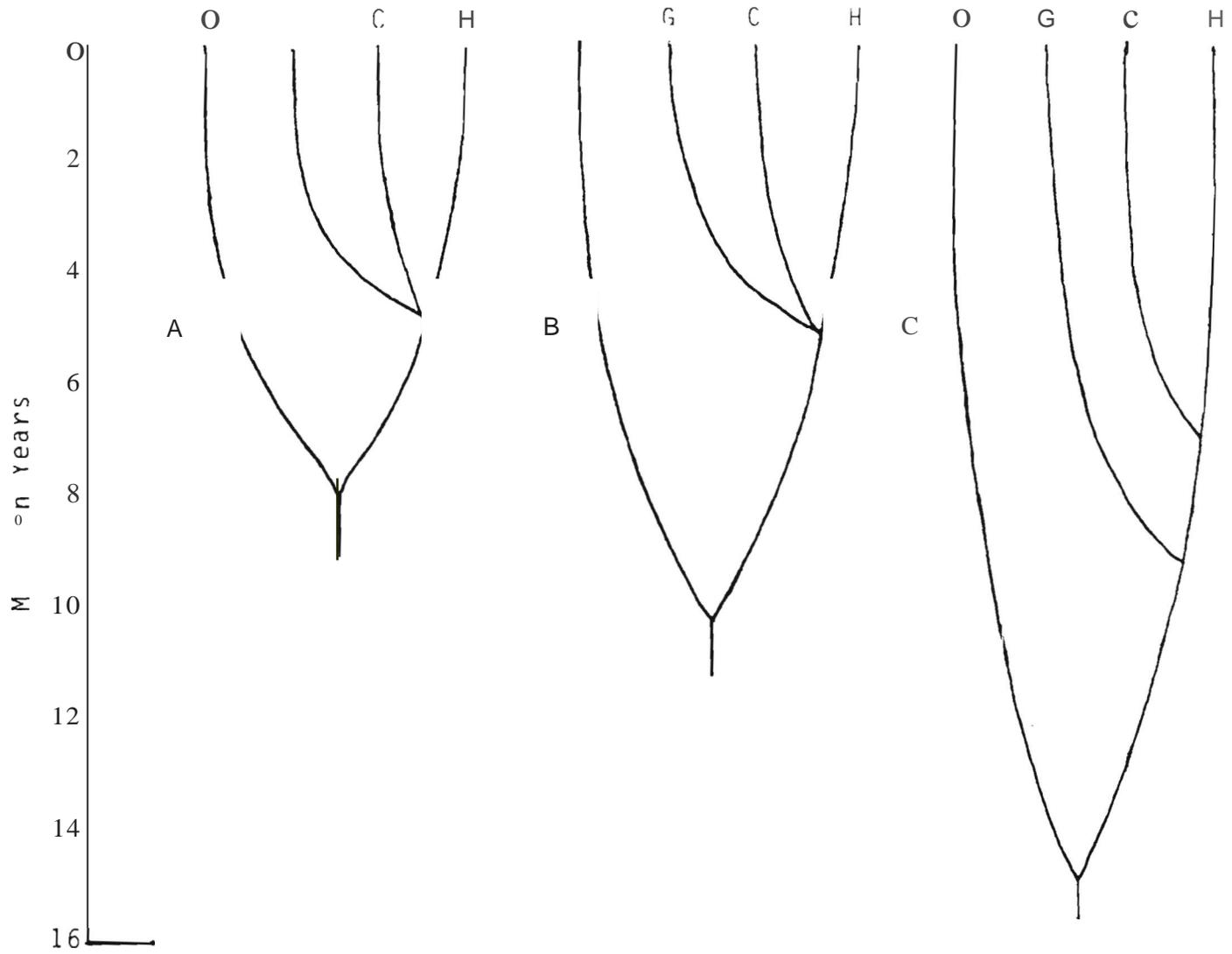


Figure 4.

Proposed branching sequences based on molecular evidence. **A**, Sarich and Wilson 1967; **B**, Cronin 1983; **C**, Sibley and Ahlquist 1984. O, orangutan; G, gorilla; C, chimpanzee; H, Humans.

Molecular Clock

Sarich and Wilson (1967) proposed that the biochemical data they collected could be carried even further than just determining a branching sequence for hominoids. They proposed that the time of divergence between two species from their common ancestor could also be determined with this method. Sarich and Wilson used the hypothesis that evolutionary changes in albumin happen at a constant rate in all species as the basis for their molecular clock. Excepting this hypothesis they formed an equation (immunological distance = K (time)) to calibrate the clock. K was set by using a known time from fossil data and corresponding immunological distance. Once K was determined, then all other times of divergence were calculated. Using this molecular clock they suggested humans, chimps, and gorillas last shared a common ancestor just slightly over four million years ago. Wilson and Sarich also suggested the **orangutan** separated from this lineage around seven to eight million years ago and gibbons around ten to twelve million years ago (Sarich 1971).

The molecular clock has since been revised several times (Cronin 1983, Sibley and Alquist 1984) using various biochemical-molecular evidence. All these clocks however, have been calibrated using at least one date from the fossil record. Times of divergence have been different in various clocks, but all the clocks suggest the separation between hominids and African apes was a relatively recent event--taking place between 5-9 million years ago. Figure 4 illustrates the results of three different molecular clocks.

Problems With The Molecular Clock

Biomolecular data has contributed great insight to the understanding of Miocene hominoid evolution, but it still remains controversial. Many researchers believe the **molecular** evidence can not be correctly interpreted because our knowledge of DNA is too minimal to delineate the differences found between species. In addition, anthropologists who agree with the divergence

sequence provided by molecular data sharply criticize the molecular clock because the clock does not correspond with evidence in the views (Wolpolf 1982). Moreover, criticism of the molecular clock has come from molecular scientists themselves. Goodman also agrees with the divergence sequence indicated by molecular evidence. However, he feels the molecular evidence can not accurately be used to estimate times of divergence (Goodman and Cronin 1982). Studies by Goodman suggest the rate of amino-acid substitution during protein evolution is not as constant as Sarich and Wilson had suggested. Rather, he feels the evidence indicates proteins accelerate when advantageous mutations are being selected for and then slows down once the selection is well established (Goodman and Cronin 1982). This constant acceleration and deceleration can not be measured by molecular data. Goodman's studies also indicate protein evolution has decelerated in the *Homo* lineage (Goodman and Cronin 1982). Gingerich (1985) argues that studies of primate albumin supports Goodman's suggestion of a deceleration of molecular change in primates.

One of the strongest proponents of molecular evidence is Jeffrey Schwarts. Schwarts (1984) suggests molecular data is misinterpreted. In his view the reason there are so many characteristics in ramamorphs fossils shared by both *Pongo* and *Homo* is **because** orangutans and humans **are** more closely related than the African apes are to humans. Schwarts claims humans and orangutans share many anatomical structures which are not present in the African apes.

Cladistic Approach

Traditionally, anthropologists have looked to the fossil record for answers about the evolutionary process of hominoids. Anthropologists examine fragments of fossilized bone and teeth from these fossils to determine morphological characteristics which can be used to identify and recognize a group of fossils and show their relatedness to other groups of fossils or extant species. From comparative anatomy data, researchers attempt to establish a divergence sequence of related taxa from a common ancestor. Cladistics, the grouping of organisms exclusively by

the possession of shared characteristics, has been the dominant approach to paleontology (Delson, Eldredge and Tattersall 1977, Tattersall, Delson, and Van Couvering 1988). Many hypotheses about the evolutionary processes of hominoids have been established using this methodology. But, new fossil discoveries and the constant dispute over characteristics continually changes these hypotheses.

In the analysis of morphological characteristics, those characteristics or character states that are present among a series of related taxa are considered ancestral (plesiomorphic). New characteristics that are found in only one group, and are not present in the ancestor, are derived (apomorphic) characteristics. The definition of plesiomorphic and apomorphic characteristics presents no major problems. The problem arises when deciding which characteristics in a given group are plesiomorphic or apomorphic (Tattersall and Eldredge 1977). The fragmentary condition of most fossil material leaves room for misinterpretation of morphological characteristics.

Once plesiomorphic and apomorphic traits have been established, which is rare, the significance of the traits are often challenged. Arguments arise as to the **genetic** affinities of characteristics. Since bone is plastic and responds to functional stresses due to diet and **environmental** factors, the genetic bases of these characteristics are not as significant as more stable characteristics. Furthermore, the relationship of functional characteristics from one group to another may be a result of parallel evolution. Because of similar habitats and diets, two taxa may develop traits that are very similar but are not genetically related (Tattersall and Eldredge 1977).

Disputes have even arisen as to how many traits must be looked at. **Tobias** (1985) suggests analysis should be concentrated on the "total morphological pattern." He argues that only by looking at all the morphological characteristics possible can determination of phyletic similarities of two or more taxa be established. Olson (1985), on the other hand, argues that only a small number of features have any taxonomic relevance, and the use of numerous characteristics does not resolve any problems. Instead, Olson suggests only a few characteristics are needed as long

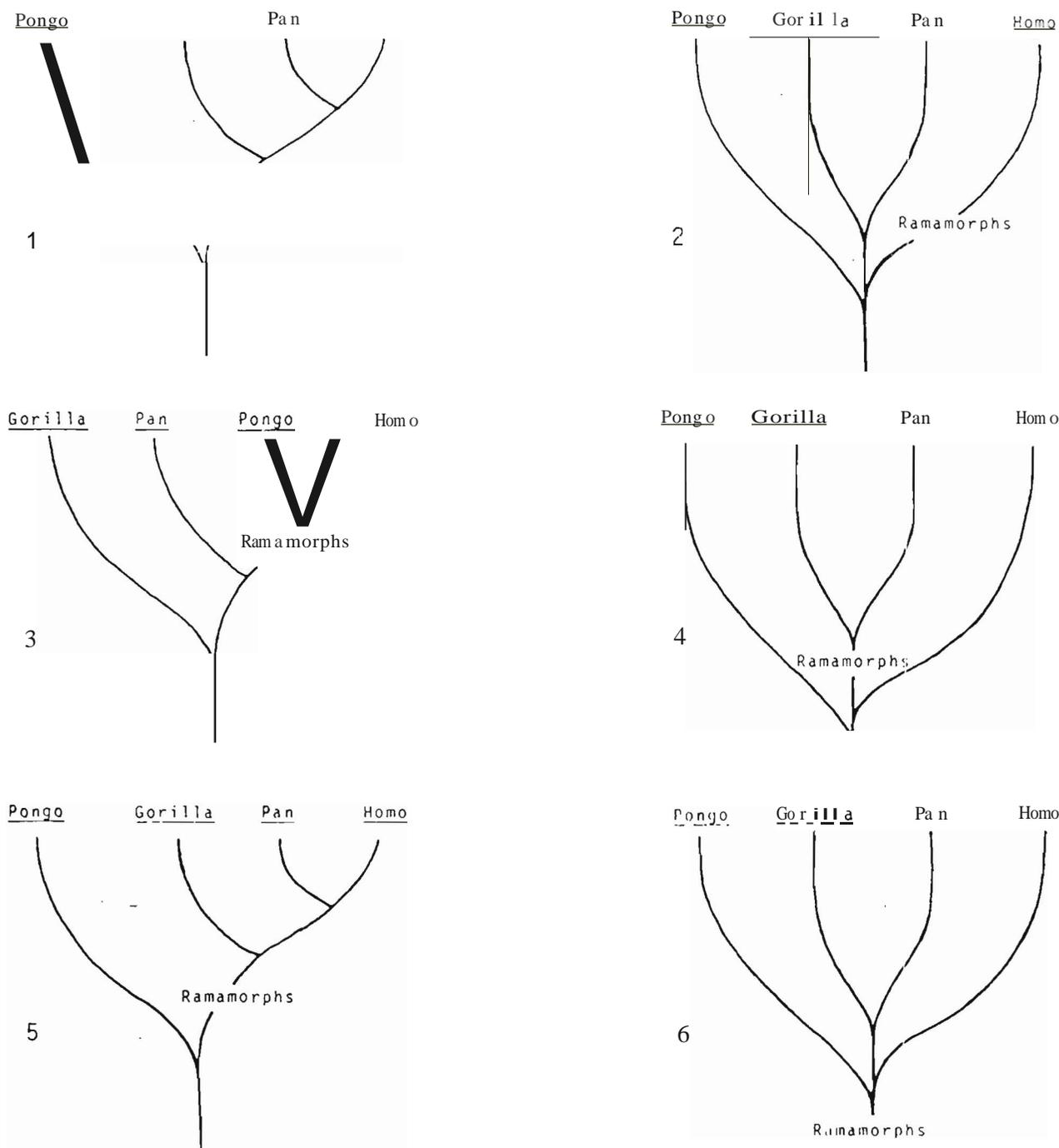


Figure 5.

Illustrates six possible phyletic affinities for ramamorphs. (1) Ramamorphs as a group are in or near the ancestry of *Pongo*, (2) ramamorphs as a group are ancestral to hominids alone, (3) ramamorphs are ancestral to hominids and *Pongo* but not African apes, (4) ramamorphs are ancestral to African apes alone, (5) ramamorphs are in or near the ancestry of *Pan*, *Gorilla*, and hominids, but not *Pongo*. (6) ramamorphs are ancestral to *Pongo*, *Pan*, *Gorilla*, and hominids.

as they have minimal influences from entrinsic factors.

POSSIBLE PHYLETIC AFFINITIES

Accepting *Homo*, *Pan*, *Gorilla*, and *Pongo* are to some degree closely related, there are several possible relationships between ramamorphs and extant hominoid groups. First, ramamorphs as a group are in or near the ancestry of *Pongo* alone. Second, ramamorphs as a group are ancestral to hominids alone. Third, ramamorphs are ancestral to hominids and *Pongo* but not the African apes. Fourth, ramamorphs as a group are ancestral to African apes alone. Fifth, ramamorphs are in or near the line of ancestry leading to *Pan*, *gorilla* and hominids, but not *Pongo*. Finally, ramamorph species are ancestral to *Pan*, *Gorilla*, *Pongo* and hominids. Figure 5 illustrates the six possible phyletic affinities.

Of the above six phyletic affinities, molecular evidence best supports the scheme placing ramamorphs in the ancestry of *Pongo*. Molecular data suggest *Pongo* last shared a common ancestor with African apes and hominids around 8-14 million years ago. Based on this hypothesis, ramamorphs chronologically fit well in or near the ancestry of orangutans.

Molecular data does not support any of the pthe phylongenies mentioned above. For ramamorphs to be hominid the divergence of humans and African apes would have to have taken place long before molecular evidence suggests. Furthermore, biological distance studies conclude that chimpanzees and gorillas are more closely related to humans than orangutans are. **If** this data is correct, a scheme placing ramamorphs in an ancestral position to orangutans and hominids, as suggested by Schwarts (1984), but not African apes would be unsupported.

Morphologically, *Sivapithecus* displays many derived craniofacial features with *Pongo* including a similar subnasal morphology, high oval orbits, narrow interorbital distance, similar morphology in the zygomatic region and thick enamel on the molars (Andrews and Cronin 1982, Harrison et al 1988, Klein 1989). Andrews and Cronin (1982), Ward and Pilbeam (1983) and many other paleoanthropologists aruge that *Sivapfthecus* uniquely shares derived characteristics

with the orangutan, which indicates their evolutionary close relationship.

In contrast, Kay and Simons (1983) argue that the characteristics used to link *Sivapithecus* and *Pongo* are not significant and badly misinterpreted. Kay and Simon (1983) describe 19 characteristics they feel ramamorphs share with australopithecines and not orangutans. These characteristics include an arched palate, small canines and incisors in relationship to molar size, minimal premaxillary prognathism, forward projecting and flaring zygomatics, thick enamel, and others. Although these characteristics can be used to show similarities between ramamorphs and the australopithecines, like others, they can be equally rejected or can be observed in other groups.

One explanation for the similar traits being observed in different groups and the presence of both *Pongo* and Australopithecine characteristics in ramamorphs is that various species of ramamorphs are ancestral to both groups. Wolpoff (1980) suggests that African forms may be ancestral to hominids, and the other ramamorphs probably lead to *Pongo* or became evolutionary dead ends. Wolpoff (1983) believes that an African ramamorph will be found which is ancestral to the ape-human clade.

Fossil evidence for African apes is almost nonexistent. If the course of African ape's evolution was better known, then the evolution of Miocene hominoids would not be such a mystery. Despite the lack of evidence found in the fossil record, the problem of thick enameled ramamorphs giving rise to a thin enameled ape stirs up controversy among paleontologists. Many anthropologists feel that unless thick enamel is a primitive characteristic that was lost by both *Pan* and *Gorilla*, the divergence between them and hominids must have taken place in the early Miocene. Several anthropologists (Kay and Simons 1983, Pickford 1985) suggest that the African apes are derived from a thin enameled Dryopithecine. However, the enamel structure and development of in chimpanzees, gorillas, and humans is very similar. Thin enamel may be a derived characteristic which occurred after hominids and African apes last shared a common ancestor therefore making it possible for them to have shared a thick enameled ancestor (Klein 1989).

Lowenstein and Zihlaman (1983) place a new twist on the biological affinity of African apes and hominids. They suggest that the pygmy chimpanzee, *Pan paniscus*, has the generalized features that would be found in a common ancestor of African apes and hominids, therefore, the pygmy chimpanzee can not be ruled out as an ancestor. Zihlaman et al (1983) hypothesise that a Miocene ramamorph probably evolved into a form which is similar to the **extant** *Pan paniscus*.

DISCUSSION

On the generic level, taxonomic classification is complicated at best. Present work has begun to show evidence that many ramamorphs may be congeneric and possibly even conspecific. Probably many of the genera are synonymous, but it is equally possible because of the rapid divergence of primates in the Miocene that two genera could be morphologically similar. Most genera are represented by far too little material to be convincingly considered synonymous or not at the generic level. At this time, this author feels the separating or **lumping** of taxon is a matter of personal opinion, reflecting more the researchers criteria than the fossil material itself. An example of this is demonstrated in the Lufeng, China ramamorphs. As discussed above, Wu and Oxnard (1983) argue the consolidation of *Ramapithecus* and *Sivapithecus* is not warranted because there is a well defined male and female group within both. These results sharply conflict with Pilbeam's (1986) analysis of Lufeng ramamorphs, which he considers only represents **two** sexes within one species. I see problems with both their conclusions. Since the determination of gender is not usually possible with fragmentary specimens, Wu and Oxnard's analysis only demonstrates there are two distinct size ranges in the Lufeng material. This size range does not necessarily represent two distinct genera, but possibly only two distinct species. There is no convincing evidence illustrating they could not be of the same genus. I do agree with Wu and Oxnard, however, that there is far too much difference in sizes to suggest ***Ramapithecus* represents a female and *Sivapithecus* represents a male of the same species as** suggested by Pilbeam. As Greenfield (1980) points out, *Ramapithecus* and *Sivapithecus* display

about the same degree of morphological variation that is seen between *Pan paniscus* and *Pan troglodytes* and far less variation than is observed between *Pan* and *Gorilla*. Therefore, *Ramapithecus* and *Sivapithecus* could, and probably should, be synonymized at the generic level but not at the species level.

Although there are problems in the approaches used to interpret the phylogeny of ramamorphs, some conclusions can be made. Molecular and morphological evidence both support the placement of ramamorphs--at least *Sivapithecus*--in the lineage of *Pongo*. However, they also support the placement of ramamorphs in or near the lineage of orangutan, African apes, and hominids, with all these forms passing through a ramamorph-like stage in their evolution. Molecular evidence does not favor this scheme but it does not completely rule the idea out either. Taking in consideration errors in the divergence times suggested by the molecular clock, it is possible that a divergence of African apes and hominids took place during the late Miocene. In Sibley and Ahlquist's (1984) model of the molecular clock (see fig. 5), they estimate the time of divergence between *Pongo* and the African ape-hominid clade at 14.5 million years ago, and the separation of African apes from the hominid line between 9-7 million years ago. This time frame falls within the decline of ramamorphs in the fossil record and allows for African apes, orangutan, and hominids to pass through a ramamorph-like stage in evolution.

The lack of fossil material present for ramamorphs and its usual fragmentary condition make interpretation of morphological characteristics debatable. Various morphological features indicate a close relationship between ramamorphs and *Pongo*. But, other characteristics appear to be shared by ramamorphs and Australopithecines. Based on morphological characteristics it is possible that *Pongo*, *Pan*, *Gorilla*, and hominids all are derived from ramamorphs. Wolpoff (1980, 1982) supports the idea that orangutans, chimpanzees, gorillas, and hominids all passed through a ramamorph form. Wolpoff (1982) states, : "If *Ramapithecus* itself was not a hominid, there is great likelihood that the earliest hominid was a ramapithecine" (252). [In this author's opinion, this sums up the evidence available for middle-late Miocene **hominoids**. Taking into consideration the problems involved in the interpretation of the fossil record, **the present**

evidence strongly supports this phylogeny more than others. I propose that within the ramamorphs, the Asian ramamorph *Sivapithecus* probably diverged from a common ancestor and gave rise to the genus that now includes the extant orangutan. The large Asian ramamorph *Giganthropithecus* probably was derived from a large *Sivapithecus* and met its end when the Panda bear outcompeted it for resources (Wolpoff 1980). The African ramamorphs diverged into later forms, which have not yet been discovered, and gave rise to both the African apes and hominids. At this point I do not know where to place the European specimens. It is possible that they are synonymous with either the Asian ramamorphs or the African forms, or they became extinct.

CONCLUSION

In conclusion, the status of Miocene hominids has been a very controversial topic. New approaches and discoveries will only add fuel to the debates between anthropologists. The debate as to the proper taxonomic nomenclature to use will also persist for some time. New studies may present evidence that requires the synonymizing of most of the ramamorphs, but at this time I feel the splitting or lumping of these taxa is still a matter of personal choice.

Molecular data has contributed major information into the understanding of hominoid and hominid evolution. Furthermore, research in this area can do nothing but benefit anthropologists. At the present time, however, I see problems with the molecular clock. I agree with the divergence sequence derived from molecular data, but I would have to question the accuracy of the molecular clock. Too little is known about the rate of evolution to rely on the molecular clock for accurate dates of divergence.

The cladistic approach also has many problems. The interpretation of plesiomorphic and apomorphic traits is almost impossible considering the fragmentary condition of ramamorph fossils. However, at present, this method is probably the best available for interpreting the fossil record.

The phyletic affinities for middle-late Miocene hominoids is overwhelming. Problems arise when trying to determine the phylogeny of ramamorphs using both molecular and cladistic evidence. In my opinion, the evidence present best supports a phylogeny placing ramamorphs in or near the ancestry of orangutan, hominid and the African apes with each group passing through a ramamorph-like stage of evolution.

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January 1969

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