

# Population, Warfare, and the Male Supremacist Complex

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*We present cross-cultural data on the existence of a pervasive institutional and ideological complex of male supremacy in band and village sociocultural systems, and we identify warfare as the most important cause of this complex. We explain the perpetuation of warfare in band and village society and its interaction with selective female infanticide as a response to the need to regulate population growth in the absence of effective or less costly alternatives. Our hypothesis is supported by a demographic analysis of 561 local band and village populations from 112 societies.*

IN THIS PAPER<sup>1</sup> we (1) confirm the existence of a pervasive institutionalized material and ideological complex of male supremacy in band and village societies; (2) identify the practice of pre state warfare as the most important cause of this complex; (3) explain the perpetuation and propagation of warfare among band and village societies as a response to the need to regulate population growth in the absence of effective or less costly alternatives; (4) relate the complex of warfare and male supremacy to additional widespread cultural phenomena. By warfare we mean all organized forms of *intergroup* homicide involving combat teams of two or more persons, including feuding and raiding.

The primary ethnological evidence for the existence of a pervasive institutionalized complex of male supremacy consists of asymmetrical frequencies of sex-linked practices and beliefs which on logical grounds alone either ought not to be sex-linked or ought to occur with equal frequency in their male-centered and female-centered forms. Certain aspects of this complex are well-known; others are less well-known or have hitherto been viewed as isolated phenomena.

Among the more familiar parts of the complex are the male-centered postmarital locality practices and descent ideologies. Three quarters of 1,179 societies classified by Murdock (1967) are either patrilocal or virilocal while only one tenth are matrilocal or uxorilocal (Table I). Postmarital residence is closely associated with control over access to, and the disposition and inheritance of, natural resources, capital, and labor power. The best comparative evidence for male dominance in these spheres consists of the skewed distributions of descent rules. Thus patrilineality occurs five times more frequently than matrilineality (Table I).

The interpretation of the statistical imbalance in sex-linked residence and descent rules as evidence for male dominance of the decision-making process responsible for the allocation of domestic resources, capital, and labor power, is strengthened by two remarkable facts: in matrilineal societies avunculocality occurs more frequently than matrilocality, and the logical opposite of avunculocality does not occur at all. The logical opposite of avunculocality is called amitalocality (Murdock 1949:71). It would involve, if it existed, postmarital residence with wife's father's sister rather than as in the case of avunculocality, residence with husband's mother's brother.

The high frequency of avunculocality and patrilocality in matrilineal societies—they are

TABLE I. FREQUENCY OF RESIDENCE PATTERNS BY TYPE OF DESCENT

Predominant Residence Pattern	All Types		Patrilineal		Matrilineal		Ambilineal		Double Descent		Bilateral	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Patrilocal or Virilocal	823	70.9	563	97.0	30	19	31	68	39	93	160	48
Matrilocal or Uxorilocal	132	11.3	1	.2	50	33	5	11	—	—	73	22
Avunculocal	67	5.7	—	—	62	39	2	4	3	7	—	—
Bitocal	81	7.0	5	.9	6	4	8	17	—	—	62	19
Neolocal	52	4.5	8	1.4	6	4	—	—	—	—	38	11
Duolocal	7	.6	3	.5	4	2	—	—	—	—	—	—
No Information	17	—	8	—	3	—	—	—	2	—	4	—
Totals	1,179	100.0	588	100.0	164	100	46	100	44	100	337	100

Based on Murdock (1967).

the prevailing residence pattern in 58% of matrilineal societies—is best explained by the following theory: In matrilineal societies no less than in patrilineal societies, males dominate the allocation of domestic resources, labor, and capital. Matrilineal societies therefore tend to revert to patrilocal, patrilineal systems. Avunculocality is a phase in the cycle that leads back to patrilocality (Divale 1974a, 1974b; Murdock 1949; Schlegel 1972).

In contrast, there is no basis for interpreting most cases of matrilineality as a phase in a cycle that begins with matrilineality, passes through a patrilocal phase, and then reverts to matrilocality. Such an alternative interpretation would be valid only if evidence existed to indicate that patrilocal, patrilineal systems passed through an amitalocal phase. As we have just said, amitalocality does not exist.

Equally strong evidence for the pervasiveness of male dominance in the domestic sphere is provided by the distribution of marriage forms. Polygyny occurs 141 times more frequently than polyandry (Table II). Logically, there should be some advantages in having several males simultaneously provide food and services for one woman and her children. Such an arrangement would seem to be at least as efficient as having one husband provide food and services for several women and their children. Polyandry is also remarkably under-represented when its potential for regulating population growth is considered. Polygyny encourages the rearing of female infants in order to provide plural wives, whereas polyandry, in theory at least, is better suited for societies that rely on female infanticide to regulate population growth. Such populations are extremely common (Table IV). Therefore, the fact that polygyny is so much more common than polyandry implies the existence of powerful adaptive advantages associated with polygyny.

TABLE II. FREQUENCY OF MARRIAGE FORMS

Marriage Form	Frequency	%
Monogamy	171	14.6
Limited Polygyny (424)		
General Polygyny (565)	989	84.8
Polyandry	7	.6
No Information	12	—
Totals	1,179	100.0

Based on Murdock (1967)

The nonexistence of the female-centered opposite of another widespread marriage-related institution, brideprice, has received less notice but is no less puzzling. Brideprice occurs in 57% of the societies in the *Ethnographic Atlas*, but groom price, the logical opposite of brideprice, is as nonexistent as amitalocality. This fact has been obscured by the frequent juxtaposition of dowry with brideprice. Brideprice is an economic compensation given to a bride's family for the loss of her valuable productive and reproductive services (Goody and Tambiah 1973:6). Dowry often is compensation given to the groom's family, but it is seldom given for the loss of the groom's valuable productive and reproductive services. Rather, it is given as compensation for the cost of maintaining an economically burdensome woman or as payment for the establishment of political, economic, caste, or ethnic alliances valuable to the bride's family. Almost all cases (83%) of brideprice and dowry are associated with patrilocal, patrilineal systems. Groom price, if it existed, ought to be associated with matrilocality, matrilineal systems.

The theory that best explains why groom price does not occur in matrilineal systems is that marriage in such systems does not entail the permanent transfer of the productive and reproductive services of males from one corporate unit to another. On the contrary, as is well-known, marriage in most matrilineal, matrilineal systems is notoriously fragile and is made and unmade with little ritual. Husbands in matrilineal, matrilineal systems in other words, do not occupy a position analogous to wives in patrilineal, patrilineal systems; they are not incorporated into their wives' domestic group and they do not surrender control over their natal domestic affairs to their sisters; hence there is no groom price paid to their sisters. This also explains why 15% of matrilineal or uxorilineal societies continue to have brideprice (Table III).

TABLE III. MODES OF MARRIAGE BY TYPES OF RESIDENCE

Mode of Marriage	All Types		Patrilineal or Virilineal only		Matrilineal or Uxorilineal only	
	Freq.	%	Freq.	%	Freq.	%
Extensive Brideprice	673	57	560	68	19	15
Bride Service	118	10	55	7	30	23
Gift Exchange	61	5	49	6	3	2
Exchange of Women	34	3	32	4	1	0.8
Dowry	31	3	21	3	1	0.8
Not Important	253	22	102	12	76	58.4
Totals	1,179	100	823	100	132	100

Based on Murdock (1967)

Male dominance is also implicit in the widespread asymmetry of the sexual division of labor. Women in band and village societies are usually burdened with drudge work, such as seed grinding and pounding, fetching water and firewood, and carrying infants and household possessions. Hunting with weapons is a virtually universal male specialty.

Male supremacy is even more directly displayed in the asymmetry of political institutions. Headmanship occurs widely in band and village societies; headwomanship, in a strictly analogous sense, is no more common than polyandry, if it exists at all. Control over redistributive systems in pre-state societies is seldom if ever vested in women. The institution of "big man" which occupies a critical position in the evolution of class stratification is not matched anywhere by a comparable institution of "big woman." Shamanic leadership is also male-centered; female shamans do occur, but they are almost always less numerous and less prominent than male shamans. When the total number of occupations in a society are considered, women always have fewer economic roles open to them (M. Naroll n.d.), and even when they exercise some control over the economic process their status remains lower than males (Divalle 1976; Sanday 1973:1682).

Central to the sexual distribution of power is the fact that almost everywhere men monopolize the weapons of war as well as weapons of the hunt. Nowhere in the world do women constitute the principle participants in organized police-military combat. In many band and village cultures women are not even permitted to handle the weapons which males employ in combat. The male police-military specialty is closely associated with sexually differentiated training for fierce and aggressive behavior. Here another link in the male supremacist complex is forged: the combat effectiveness of males is enhanced through their participation in competitive sports such as wrestling, racing, dueling, and many forms of

individual and mock combat. Women seldom participate in such sports and to the best of our knowledge, almost never compete with men.

The material, domestic, political, and military subordination of women is matched in the ritual and ideological spheres by pervasive beliefs and practices that emphasize the inferiority of females. Menstruating women are almost universally regarded as ritually unclean (Simmons 1937:495); menstrual blood pollutes, whereas semen is used widely in rituals aimed at improving production, health and well-being. While a belief in witches is usually accompanied by a belief in warlocks, witches are regularly regarded as the more evil of the two. Although female gods occupy important positions in the pantheons of many ecclesiastical religions, male supreme gods greatly outnumber female supreme gods (Gangloff n.d.), and legendary heroes greatly outnumber legendary heroines (Simmons 1937). Throughout the world, males menace women and children with bull-roarers, masks, and other sacred paraphernalia. Men's houses, in which these sacred items are stored, are also part of the same complex. Women seldom menace men in general in their religious activities and there are few communal women's houses reported in the literature known to us. Also, there are instances of funeral suttees for widows, but we know of no instance where husbands are grave escorts for their wives.

TABLE IV. SEX RATIOS OF CHILDREN BY FREQUENCY OF INFANTICIDE.<sup>2</sup>

Ethnographer's Report of the Frequency with which Infanticide is Practiced	Sex Ratio of Age Group 14 years or Younger (Males per 100 Females)	Number of Populations Censused
1. Commonly Practiced	117 : 100	179
2. Occasionally Practiced	117 : 100	29
3. Not Commonly Practiced	104 : 100	94
4. Not Practiced	108 : 100	91
Total		393

*T* tests for significance of difference between the average percent of males for each group: 1 vs. 2, *P* = n.s.; 2 vs. 3, *P* = .05; 3 vs. 4, *P* = n.s.; 1 & 2 vs. 3 & 4, *P* = .01.

But the most important component in the male supremacist complex remains to be mentioned. A widespread cultural preference exists for male children among preindustrial societies. In Simmons (1937) study, male children were strongly preferred in 66% of the cases. This preference is often explicit and sometimes embodied in a rule that the firstborn *must* be a male. More significantly, the actual demographic profile of the majority of band and village societies prior to modern contact is heavily unbalanced in favor of male infants and children. Demographic analysis of 160 band and village populations, censused prior to modern contact and while they still practiced warfare, shows an average sex ratio in the age group 14 or under of 128 boys per 100 girls (Divale 1972). The average sex ratio of humans at birth is 105.5 males per 100 females (Thomlinson 1965:429; Thompson 1942:49). The only way in which sex ratios as high as 128:100 can be achieved, is through postpartum selection (Lorimer 1954:151; Birdsell 1968:229). Infanticide involving strangling, blows to the head, exposure, and other direct acts, is correlated with the sex ratio as Table IV shows. Nonetheless, preferential overt female infanticide must be reckoned as only the tip of the iceberg. Many cultures with markedly skewed junior age-sex ratios deny that they practice any infanticide at all. Hence it can be inferred that the sexual imbalance in favor of males is achieved as much through covert infanticide, including clandestine aggression and various

forms of malign and/or benign neglect that adversely affect the survivability of female infants (Neel and Weiss 1975:32; Bahadur, Jammu, and Sharma 1931).<sup>2</sup>

What accounts for the scope, persistence, and distribution of the male supremacist complex? The most obvious explanation is that institutionalized male supremacy is a direct product of genetically determined human sexual dimorphism which endows males with taller stature, heavier musculature, and more of the hormones that are useful for aggression. But this hypothesis accounts for only part of the complex under consideration. It accounts for why males rather than females dominate domestic, political, religious, economic, and military institutions. Yet it cannot satisfactorily account for the preference for male children as objectified in the unbalanced sex ratios. Indeed to the extent that there is polygyny, competition for women, and the exploitation of female labor, simple biological determinism leads one to expect that more females than males would be reared to reproductive age. Infra-human primate populations do not have comparable sex ratios. Since women are exploited by men, one would expect girls to outnumber boys just as slaves outnumber masters, serfs outnumber feudal lords, and proletarians outnumber capitalists. Several recent studies have shown that even in hunting societies, per capita, women are productively more valuable than men (Lee 1972; Morren 1973). And polygyny confirms the great value which men place on women. Thus polygyny stands in mysterious contradiction to the high frequency of the practice of female infanticide. Polygyny renders most males superfluous as far as replacement of population is concerned. Since males control domestic and political institutions, one would expect the number of females per male to be maximized. Instead, we find female infanticide limiting the number of females, and polygyny exacerbating the shortage.

There is one distinctively human cultural practice, the presence of which can be used to predict all of the components of the male supremacist complex, and which seems capable of explaining the apparent contradiction involved in combining polygyny and the exploitation of female labor with the rearing of more males than females. Wherever preindustrial warfare occurs, we suggest that a premium survival advantage is conferred upon the group that rears the largest number of fierce and aggressive warriors (Sipes 1973; Otterbein 1970; Naroll and Divale 1976). Given warfare, males rather than females are trained to be fierce and aggressive because in hand combat with muscle-powered weapons the average height and weight advantage of males is decisive for individual and group survival. Despite the fact that some women are physically better suited for warrior training than some males, there is an advantage in making such training the exclusive prerogative of males and in establishing a male monopoly over military weapons. (Male monopoly over hunting weapons may be seen as a functional corollary of the monopoly over military weapons.) The advantage is that sex can be used as the principle reinforcement for fierce and aggressive performances involving risk of life. Sex, rather than other forms of reinforcement such as food or shelter, is used to condition warlike behavior because sexual deprivation does not lead to the impairment of physical fitness, whereas deprivation of food and shelter would cripple fighting capacity. Furthermore, if women are to be the reward for military bravery, women must be reared to be passive and to submit to the decisions concerning the allocation of their sexual, productive, and reproductive services. Polygyny is the objectification of much of this system of rewards. At the same time, polygyny intensifies the shortage of females created by the postpartum manipulation of the sex ratio, producing positive feedback with respect to male aggressivity and fierceness, and encouraging combat for the sake of wife capture.

In an attempt to rear passive and submissive women, males enlist the aid of the supernatural. Hence, women are intimidated by bull-roarers, masked male dancers, and male religious specialists. When intensive warfare is practiced between closely related neighboring bands and villages, it leads to the establishment of, or reinforces the prior existence of, solidary groups of males who have a joint interest in the exploitation and defense of a common territory. Patrilocality is the cross-generational objectification of these male-

centered interest groups; and patrilineality is the appropriate kinship ideology for enhancing the sentiments of solidarity within the co-resident core of sons, fathers, and brothers. We note in passing that recent quantifications of subsistence practices have largely invalidated the hypothesis that locality practices are determined by which sex plays a predominant role in production (Divale 1974a, 1974b). Indeed, something of an inverse relationship may exist. Women probably produce more calories per capita in most band and village societies. Women probably tend to be more thoroughly exploited and to produce an even more disproportionate share of goods and services in direct proportion to the intensity of the male supremacist complex (Sanday 1973; Ember and Ember 1971; Divale 1973; Witkowski n.d.). On the other hand, a shift from internal forms of warfare can be used to explain many of the shifts from patrilocal, patrilineal systems to matrilocal, matrilineal systems (Divale 1974a, 1974b). Thus, the hypothesized causal thread connecting warfare with the various aspects of the male supremacist complex, not only also helps to explain the development of matrilocality but also why males remain dominant in matrilocal, matrilineal systems.

Our use of warfare to resolve the apparent contradictions in the male supremacist complex does not dispose of the possibility that the male supremacist complex is the direct expression of human-sexual dimorphism. It may still be argued that warfare itself is the direct product of biologically determined aggressive impulses. However, we believe that the most parsimonious explanation for the prevalence of warfare in band and village societies is that war was formerly part of a distinctively human system of population control. The principle component in this system was the limitation of the number of females reared to reproductive age through female infanticide, the benign and malign neglect of female infants, and the preferential treatment of male children. Warfare functions in this system to sustain the male supremacist complex and thereby to provide the practical exigencies and ideological imperatives for postpartum cultural selection against female infants. The relationship between female infanticide and war is shown in Table V. For the 160 band and village populations that were censused while warfare was still practiced, the sex ratio of those 14 years or younger is 128 boys per 100 girls due to female infanticide, and the sex ratio of those 15 years or older is almost equal (101:100) due to male mortality in warfare. For the

TABLE V. SEX RATIOS OF CHILDREN AND ADULTS  
BY PRESENCE OF WARFARE AT TIME OF CENSUS.<sup>2</sup>

Presence of Warfare at the Time Population Was Censused	Sex Ratio	Sex Ratio	Number of Populations Censused
	of Age Group 14 Years or Younger	of Age Group 15 Years or Older	
	(Males per 100 Females)		
1. Warfare Present at Time of Census	128 : 100	101 : 100	160
2. Warfare Stopped 5 to 25 Years Before Population was Censused	113 : 100	*113 : 100	236
3. Warfare Stopped 26 or More Years Before Population was Censused	106 : 100	92 : 100	165
Total			561

\*Increase in this ratio of adult males is probably due to survival of males who previously would have been killed in warfare.

T tests for significance of difference between the average percent of males for each group:

Young Age Group: 1 vs. 2, P = .005; 2 vs. 3, P = .05; 1 vs. 3, P = .0005.

Adult Age Group: 1 vs. 2, P = .0005; 2 vs. 3, P = .0005; 1 vs. 3, P = .01.

236 populations that were censused a generation (5 to 25 years) after warfare had been stopped (usually by colonial authorities), the sex ratios among young and adults are 113 boys and 113 men per 100 girls and women. The increase in the ratio of adult men from 101:100 when war was present to 113:100 when war had been recently stopped is probably due to the survival of males who previously would have been killed in warfare. This change in the sex ratios with the cessation of warfare is strong evidence that warfare and not some other variable is responsible for these demographic effects.

The sex ratios are even more extreme when both the frequency of infanticide and the presence of warfare are controlled for. Table VI lists the sex ratios for 448 populations for

TABLE VI. SEX RATIOS OF CHILDREN AND ADULTS  
BY PRESENCE OF WARFARE AND FREQUENCY OF INFANTICIDE.<sup>2</sup>

Presence of Warfare at Time of Census and Frequency of Infanticide as Reported by Ethnographers	Sex Ratio	Sex Ratio	Number of Populations Censused
	of Age Group 14 Years or Younger	of Age Group 15 Years or Older	
	(Males per 100 Females)		
1. Warfare Present at the Time of Census and Infanticide is Reported as either Commonly or Occasionally Practiced	133 : 100	96 : 100	110
2. Warfare Stopped 5 to 25 Years Before Population was Censused	133 : 100	*113 : 100	236
3. Warfare Stopped 26 or More Years Before Popula- tion was Censused and Infanticide is Reported as either Not Common or Not Practiced	104 : 100	92 : 100	102
Total			448

\*Increase in this ratio of adult males is probably due to the survival of males who previously would have been killed in warfare.

T tests for significance of difference between the average percent of males for each group:

Young Age Group: 1 vs. 2, P = .0005; 2 vs. 3, P = .025; 1 vs. 3, P = .0005.

Adult Age Group: 1 vs. 2, P = .0005; 2 vs. 3, P = .0005; 1 vs. 3, P = n.s.

which information on both warfare and the frequency of infanticide is available. For the 110 populations where warfare was still practiced at the time of census, and where ethnographers report that infanticide is commonly or occasionally practiced, the sex ratio among the young is 133 boys per 100 girls. But among the adults, it declines to 96 men per 100 women. For the 102 populations where warfare had been stopped 26 or more years prior to the census, and where infanticide was reported as not common or not practiced, the sex ratio among the young is 104 boys per 100 girls and 92 men per 100 women. The sex ratios of these latter groups are not markedly different from the sex ratios at birth. Thus in band and village societies, we are most likely to find unbalanced sex ratios when warfare is present. T tests on the major geographical regions and in the 112 cultures which compose the 561 populations show that the differences in the percentages of boys to girls in the young generation are



significantly different (and always in the same direction—more boys than girls) when warfare is present than when warfare has been suppressed (Tables VII and VIII).

TABLE VII. GEOGRAPHICAL BREAKDOWN OF SEX RATIOS BY PRESENCE OF WARFARE.<sup>2</sup>

Presence of Warfare at Time of Census	Sex Ratio of Age Group 14 Years or Younger	Sex Ratio of Age Group 15 Years or Older	Number of Populations Censused
	(Males per 100 Females)		
<i>Africa</i>			
1. Warfare Present	133 : 100	69 : 100	10
2. War Stopped 5 to 25 Years	85 : 100	88 : 100	46
3. War Stopped 26 or More Years	104 : 100	79 : 100	16
Subtotal			72
<i>Asia:</i>			
1. Warfare Present	150 : 100	108 : 100	28
2. War Stopped 5 to 25 Years	122 : 100	138 : 100	1
3. War Stopped 26 or More Years	112 : 100	127 : 100	2
Subtotal			31
<i>North America:</i>			
1. Warfare Present	127 : 100	92 : 100	30
2. War Stopped 5 to 25 Years	96 : 100	114 : 100	2
3. War Stopped 26 or More Years	104 : 100	104 : 100	19
Subtotal			51
<i>Oceania:</i>			
1. Warfare Present	127 : 100	117 : 100	41
2. War Stopped 5 to 25 Years	122 : 100	122 : 100	186
3. War Stopped 26 or More Years	122 : 100	92 : 100	29
Subtotal			256
<i>South America:</i>			
1. Warfare Present	122 : 100	96 : 100	51
2. War Stopped 5 to 25 Years	108 : 100	96 : 100	1
3. War Stopped 26 or More Years	104 : 100	92 : 100	99
Subtotal			151
Grand Total			561

*T* tests for significance of difference between the average percent of males were run for each region comparing the war present groups with the combined average of the two war stopped groups. This was for both generations. The difference between the war present and the war stopped groups was statistically significant (at least the .05 level) in four of the five regions for the young generation (the difference was not significant in Oceania). Among the adult generations the difference was significant in all regions but Oceania and South America.

TABLE VIII. SEX RATIOS OF CHILDREN AND ADULTS BY PRESENCE OF WARFARE USING AVERAGES FOR SOCIETIES RATHER THAN LOCAL POPULATIONS.<sup>2</sup>

Presence of Warfare at the Time Populations in the Society were Censused	Sex Ratio of Age Group	Sex Ratio of Age Group	Number of Societies Censused
	14 Years or Younger	15 Years or Older	
(Males per 100 Females)			
1. Warfare Present at Time of Censuses	127 : 100	100 : 100	55
2. Warfare Stopped 5 to 25 Years Before Censuses were Taken	104 : 100	104 : 100	34
3. Warfare Stopped 26 or More Years Before Censuses were Taken	108 : 100	96 : 100	23
Total			112

*T* tests for significant differences in the average percent of males for each group:  
 Young Age Group: 1 vs. 2, *P* = .01; 2 vs. 3, *P* = n.s.; 1 vs. 3, *P* = .01  
 Adult Age Group: 1 vs. 2, *P* = n.s.; 2 vs. 3, *P* = n.s.; 1 vs. 3, *P* = n.s.

We suggest that postpartum selection against female infants is an unavoidable consequence of the absence of effective or safe prenatal contraceptives or abortion techniques. Extremely low rates of population growth have been characteristic of most of human history. The rate was probably no more than .00015% per annum for most of the Paleolithic, and about .036% for most of the Neolithic (Hassan 1973); Carneiro and Hilde 1966; Coale 1974). Part of the indicated control over fertility was probably achieved by the effect of low female body fat to body weight ratios on the postponement of menarche, and the postponement of the resumption of the menstrual cycle after birth (Frisch and McArthur 1974). The Bushmen are reported to maintain a .5% rate by prolonging lactation, which slows the build-up of body fat in nursing females (Kolata 1974). This rate, however, amounts to a doubling every 139 years. Had this rate been typical of band and village societies during the past 10,000 years, there would now be  $2^{79} = 604,463,000,000,000,000,000$  people in the world. Hence, even spacing of children to four or five year intervals by means of prolonged lactation cannot be regarded as the major means of population control for band and village societies. Moreover, village populations apparently cannot rely on nursing to prolong the birth interval much beyond 18 months (Van Ginneken 1974).

A moderately healthy population, for example, one that has a life expectancy at birth of 47 years, will become stationary if about one third of all females born never survive to reproductive age, and if each female who survives to reproductive age has on the average three live births. If the average woman in a population has four live births, about half of all the females born cannot live to reproductive age if the population is to remain stationary. Such a population will have an average life expectancy at birth of about 33 years (Coale 1974:45).

Since the reproductive potential of most sexually reproducing species is determined largely by the rate of female survivorship (Cavalli-Sforza 1971:670), the most effective mode of population control is to reduce the percentage of the population which consists of sexually active fertile females (Dickeman 1975a, 1975b). Outright suppression of sexual activity of fertile females was (and is) difficult to achieve. Abortion was widely practiced, but it affected the sex ratio only by shortening the life expectancy of adult women. While preferential female infanticide and preferential benign and malign neglect of female infants seem cruel and wasteful, it had two conspicuous advantages over abortion among band and

village societies: (1) male fetuses could be brought to term and selectively reared to adulthood; (2) the death of babies was less costly in an emotional, structural, and economic sense, than the death of mothers.

If the last point is true with respect to the alternative of lowering the life expectancy of adult females, why then should there be a preference for rearing additional numbers of males to adulthood, only to see them killed in battle? Would it not be less costly simply to rear the same number of males and females? Why didn't the cost of battle in pain and suffering dampen the system and force an end to the emphasis on rearing fierce and aggressive males? We suggest that male combat deaths were less costly emotionally and structurally than adult female deaths associated with abortion techniques that induce general body trauma. The decisive difference is that the agents responsible for male combat deaths are not part of the domestic or local group. Combat deaths are blamed on the enemy, and this enhances the solidary sentiments of the domestic and local groups, whereas adult female deaths from induced abortions destroy solidary sentiments.

Because of war's adaptively advantageous demographic and ecological feedback, war was self-perpetuating. Once introduced, its diffusion could not be resisted. Band and village societies which failed to attain stationary populations suffered cuts in their standard of living and were threatened by hunger and disease. Societies which achieved stationary populations by means other than the male supremacist-warfare complex were routed and destroyed by their more aggressive neighbors. Note that we are not suggesting that once in existence warfare simply perpetuated and propagated itself by inertia. Rather, we are saying that warfare perpetuated and propagated itself because it was an effective method for sustaining the material and ideological restrictions on the rearing of female infants.

Note also that we are rejecting the theory that war achieved its adaptive value by limiting population growth directly through combat deaths. The high death rate from combat deaths attests to the seriousness of war in band and village societies, but most combat deaths were males. In societies which practice serial monogamy or plural marriage, high rates of male combat deaths will not produce stationary or near stationary populations (Livingston 1968).

It follows that a single theory cannot account for warfare in band and village, as well as state-level, societies. Among state-level societies, warfare represents a systemic attempt to solve production deficiencies through perpetual territorial and demographic expansion (Naroll and Divale 1976; Carneiro 1970). Among the former, warfare represents a systemic attempt to achieve stationary or near stationary populations (Divale 1970, 1971, 1972; Harris 1972, 1975:264). Obviously, however, the two forms are evolutionarily related, perhaps in some cases through the development of matrilineal, matrilineal varieties of external warfare as a result of migration into an inhabited region (Divale 1974b:19-63).

It is not essential for our theory that the precise cause of the first instance of an outbreak of war in a given region be known. Rather it suffices to show why war would tend to be perpetuated and propagated among band and village societies. In general, however, we predict that the intensity of warfare and the rate of its spread, will vary inversely with the ability to achieve stationary populations by means other than female infanticide and benign and malign neglect of female infants. Band societies with diets high in protein but low in fats and carbohydrates can be expected to rely more on birth-spacing effects of prolonged lactation than on the male supremacist-war complex. Band and village societies with high-calorie, low-protein diets cannot rely on prolonged lactation and hence will depend more on the war complex. Hence, we predict an intensification of warfare (measured in terms of frequency of combat and relative number of deaths per capita due to combat) in association with the Neolithic and the spread of starchy diets. Moreover, with the development of permanent settlements, standing or stored crops, and domesticated animals, warfare more often led to territorial routs and pursuit with the intent to maximize enemy deaths, and appropriation of capital investments.

Some evidence already exists which supports these predictions. Leo Simmons' (1937) study shows that warfare is significantly associated with many variables found in village horticultural and agricultural societies: an increase in the frequency of warfare is correlated with agriculture, permanency of residence, durability of dwellings, use of grain as food, mining and smelting of metals, and pottery. In other words, warfare is infrequent when horticulture is absent or only casual, and warfare is frequent when horticulture is extensive. The frequency of warfare is also associated with many variables of the male supremacy complex. Frequent warfare is significantly correlated with patrilocal residence, patrilineal inheritance, polygyny, marriage by capture, brideprice, postmarital sex restrictions on women, property rights in women, male secret societies, male age grades, and men's houses. It is also significant that frequent warfare is negatively correlated with polyandry (Table IX).<sup>3</sup>

TABLE IX. CORRELATES OF WARFARE FREQUENCY AND SELECTED TRAITS.<sup>3</sup>

Traits	Gamma	Probability	N
Permanency of residence	.57	.001	66
Durability of dwellings	.41	.022	66
Men's houses	.59	.028	50
Agriculture	.71	.001	65
Use of grain as food	.51	.006	61
Mining and smelting of metals	1.00	.001	55
Pottery	.82	.001	60
Secret societies	1.00	.001	39
Patrilocal residence	.47	.027	61
Age grades	.75	.003	22
Polyandry	-.48	.053	52
Marriage by capture	1.00	.007	50
Brideprice	.55	.003	62
Postmarital sex restrictions on women	.88	.001	58
Property rights in women	.79	.009	34

Adapted from Simmons (1937)

One hypothesis which flows from our theory and remains untested is that any sudden shift from high-protein, low-calorie diets to low-protein, high-calorie diets, should produce a spurt of population growth, followed by an increase in female infanticide and the intensification of warfare. The Yanomamo of Amazonia may be the classic case. Expansion of their investment in banana and plantain gardens probably provided the starchy calorie supply for a 2-3% per annum population explosion among the central villages (Lizot 1971). This expansion may have adversely affected the fragile animal-protein ecology typical of interriverine Amazon habitats (Gross 1975). Female infanticide produced junior-age sex ratios of 148:100 for 11 Yanomamo villages in the intensive warfare zone, and an intense male supremacist-warfare complex developed. But in 12 Yanomamo villages that were peripherally located, junior-age sex ratios were only 118:100 and warfare was less intense. This contrast is even more marked in two villages studied by Lizot: the peripheral Karohi-teri have a ratio of 77:100; the war-making Ihirubi-teri, 260:100 (Chagnon 1973, 1974). Since bananas and plantains are perennials, recently fissioned groups fought each other for possession of jointly cleared garden sites, as well as for possession of the proportionately decreas-

ing number of women and protein resources (Harris 1974; Gross 1975; Ross and Ross n.d.; Chagnon 1974).

By accounting for the male supremacist complex without direct appeal to biologically programmed aggression, we suggest that our theory has important implications beyond the scope of this paper. The hypothesized causal chain that links the various parts of the male-supremacist complex to warfare subsumes, in more parsimonious form, the causal chain established by John Whiting and his associates linking protein deficiencies with prolonged nursing and special training for aggression in males such as initiations, mutilations, ordeals, and vision quests (Ember 1974). Our theory challenges the use of the Freudian Oedipus complex as an independent variable in the explanation of intergenerational conflict and sex roles. We reverse the direction of the Freudian derivation of war and intergenerational conflict. Intergenerational hostility between males is an integral part of the male supremacist complex. Our theory points to the derivation of intense Oedipal conflicts from war and allows for the possibility that war, Oedipal strife, and the entire masculine supremacist complex, may be an evanescent phase in the evolution of a stationary world population.

## APPENDIX

List of Societies Used in Tables IV-VIII (including percent of boys and adult men).

No.	Society	Date of Census	Average		No. Pop. Censused	Infanticide	Warfare
			Percent of Boys	Percent of Adult Males			
<i>Asia:</i>							
1.	Andamanese	1901	62	53	15	1	1
2.	Lepcha	1937	57	48	1	1	1
3.	Miao	1940	56	48	1	1	1
4.	Nicobarese	1886	64	54	8	1	1
5.	Toda	1870	54	56	3	1	2
6.	West Tibet	1847	56	45	2	1	1
<i>Africa:</i>							
7.	Dorobo	1938	53	61	3	1	2
8.	Edo	1910	55	47	1	5	1
9.	Fang	1951	47	44	3	1	3
10.	Ibo	1912	56	48	3	1	1
11.	Katab	1947	53	45	21	1	2
12.	Kukuruku	1910	55	46	1	5	1
13.	Kung	1952	40	44	19	1	1
14.	Lokko	1931	51	47	1	5	3
15.	Mende	1931	49	45	1	5	3
16.	Ngonde	1931	53	24	2	1	2
17.	Nupe	1934	50	44	3	5	3
18.	Tiv	1929	50	47	14	1	2
<i>North America:</i>							
19.	Airilik Eskimo	1907	64	43	1	1	1
20.	Alaskan Eskimo	1839	56	50	3	1	1
21.	Athapascans	1858	37	26	2	1	1
22.	Barren Grounds Esk.	1929	58	44	5	2	1
23.	Bernard Harbor	1922	54	52	1	1	1
24.	Central Eskimo	1883	56	49	9	1	1
25.	Copper Eskimo	1916	25	44	9	1	1
26.	Ponca	1874	49	52	1	4	1
27.	Omaha	1884	48	47	1	4	2

No. Society	Date of Census	Average		No. Pop. Censused	Infanticide	Warfare
		Percent of Boys	Percent of Adult Males			
28. Flatheads	1884	53	50	1	5	3
29. Greenland Esk.	1901	38	35	4	4	2
30. Iroquois	1845	49	47	1	2	3
31. Kaska	1944	46	53	3	1	3
32. Kutchin	1858	60	55	3	1	1
33. Netsilik Esk.	1902	68	49	1	1	1
34. Nootka	1863	51	50	3	5	1
35. Ogibwa	1955	55	49	1	5	3
36. Plateau Yumans	1919	49	59	1	2	2
37. Sauniktumiut	1902	55	44	1	1	1
38. Seri	1955	52	48	1	5	3
39. Sinamiut	1902	63	50	1	1	1
40. Tewa	1790	48	52	2	5	3
41. Yucatec Maya	1929	53	51	5	3	3
<i>Oceania:</i>						
42. Aitape	1914	26	31	2	5	2
43. Amwie Island	1926	48	50	1	5	2
44. Apui	1926	67	77	1	5	1
45. Arawa	1929	44	56	1	5	2
46. Aslingbun	1926	64	50	1	5	1
47. Aus Island	1922	51	72	1	5	1
48. Auti	1926	63	63	1	5	1
49. Baitsi	1929	54	56	4	5	2
50. Bali Island	1926	50	54	1	1	2
51. Banoni	1929	62	49	6	5	2
52. Biawaria	1927	51	53	2	5	2
53. Buka Island	1914	34	20	2	1	2
54. Dani	1962	49	39	1	4	1
55. Dukdukno	1926	50	57	1	5	2
56. Easter Island	1878	47	54	2	5	2
57. Emira Island	1925	61	50	4	5	2
58. Flores Island	1949	52	49	1	5	3
59. Groote Eylandt	1960	53	62	1	1	2
60. Iban	1950	62	50	1	2	1
61. Kapauku	1954	49	48	5	4	1
62. Lamani	1927	53	56	1	1	1
63. Maori	1891	57	54	2	2	2
64. Maring	1963	60	54	1	3	1
65. Marshall Islands	1907	48	48	5	1	1
66. Matty Island	1922	51	56	1	5	2
67. Mismis	1927	53	52	1	1	1
68. Mokalonglo	1926	78	63	1	5	1
69. Molbun-Mikeni	1926	100	80	1	5	1
70. Molo	1926	67	54	1	5	1
71. Mortlock Islands	1922	60	54	2	5	2
72. Nagovisi	1929	53	55	14	5	1
73. So. New Britain	1926	49	52	8	5	2
74. New Ireland	1929	51	56	71	4	2
75. Nukumanu	1922	62	50	1	5	2
76. Peregnen	1926	50	81	1	5	1
77. Pintubi	1957	55	44	1	5	1
78. Pukapuka	1935	56	50	1	4	3
79. Repu	1927	44	46	1	1	1
80. Romonum Island	1947	54	52	1	1	3
81. Rook Island	1926	51	48	1	5	2
82. Samoa	1920	54	49	4	4	2
83. Santa Cruz	1960	53	49	1	5	3

No. Society	Date of Census	Average Percent of Boys	Average Percent of Adult Males	No. Pop. Censused	Infanticide	Warfare
84. Siwai	1928	55	49	33	5	2
85. Solomon Islands	1938	51	51	1	2	2
86. St. Matthias	1925	54	53	16	5	2
87. Tasmania	1800	50	42	1	1	1
88. Telei	1927	62	54	29	5	2
89. Tikopia	1928	56	51	2	1	3
90. Truk Islands	1946	58	46	10	1	3
91. Walbiri	1957	54	47	1	5	1
92. Waria	1927	64	46	1	1	1
93. Woleai	1903	56	46	3	4	1
94. Yangman	1957	45	53	1	5	1
95. Yap	1948	55	53	2	2	3
96. Zia	1927	49	59	1	5	2

*South America:*

97. Aymara	1953	54	51	5	2	3
98. Bacairi	1884	56	59	1	2	1
99. Bush Negroes	1958	50	50	1	4	3
100. Caraja	1908	51	47	2	2	1
101. Cuna	1929-40	51	48	92	2	3
102. Guana	1918	57	47	2	1	1
103. Jivaro	1946	46	41	3	2	1
104. Siriono	1941	45	29	2	2	1
105. Tapirape	1935	59	53	2	1	1
106. Trumai	1938	80	52	1	1	1
107. Uru	1942	44	40	1	5	1
108. Warao	1954	50	48	1	2	3
109. Yanomamo	1966	57	50	26	1	1
110. Yauro	1947	50	40	4	5	3
111. Yupa	1954	61	47	2	5	1
112. Yuruna	1884	45	52	6	5	1

Infanticide codes: 1 = commonly practiced, 2 = occasionally, 3 = not common, 4 = not practiced, 5 = no information.

Warfare codes: 1 = war present at time of census or stopped within 5 years, 2 = war stopped from 5 - 25 years before census was taken, 3 = war stopped 26 or more years prior to the census.

## NOTES

<sup>1</sup> An earlier version of this paper was presented before the New York Academy of Sciences on 15 October 1974.

<sup>2</sup> The data for Tables IV through VIII come from a sample of 561 populations comprising 112 different cultures (see Appendix). Societies were included in the sample if data were available on (1) the age-sex structure of one or more local populations and (2) the presence of warfare, or, if absent, how many years had it been stopped prior to the census date. Data were collected by an unsystematic search of the literature and by examining the entire 300 societies processed in the Human Relations Area Files. While the sample is not random, we feel it is generally representative of the universe of preindustrial societies because (1) its large size greatly reduces the likelihood of sampling error, (2) the universe of HRAF societies is reasonably representative of the world's major geographical regions, and (3) no society encountered was dropped from the sample if information were available on the number of boys, girls, and adult men and women in a given population.

The percentage of boys and adult men were calculated for each population, and averages were computed for each of the warfare and infanticide categories in Tables IV through VIII; these percentages were then transformed into sex ratios of males per 100 females. We do not doubt that coding errors have been made. However, we feel that overall the data are reliable and our results are not due to systematic error bias. Some of the census data, including date

of census, percentage of young and adult males, number of populations censused, and codings on infanticide and warfare for each society in the sample have been published elsewhere (Divale 1970, 1972). A listing of all the data used in this paper appears by society in the Appendix.

<sup>3</sup>Simmons (1937) provides information on warfare frequency and 108 cultural practices and beliefs for a sample of 71 societies. We do not defend his sample or codings and have used them only because they permit a preliminary test of some hypotheses deduced from our theory. Simmons' variables are measured on a four-point ranked scale, but analysis suggests that his data do not warrant more than a two-point ordinal scale. The scales were thus collapsed, and one of his traits, "Prevalence of Warfare," was correlated with the relevant variables.

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