

The Dynamics of War and Alliance

Among the Yanomami

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Introduction

Since the 70s - after the decline of functionalism and under the impact of the wars of independence in the Third World - anthropology has regained its interest in war in tribal societies¹. Indigenous wars, as can be observed in Amazonia, in the highlands of New Guinea, in East Africa and elsewhere, are wars of "our contemporary ancestors" (Service 1968), i.e. they are premodern wars occurring nevertheless in today's world of states and global economy. These wars, however, do not aim to achieve secession from a state or to gain control over a state. Rather tribal wars are armed conflicts between largely autonomous local groups and/or between coalitions, to which they line up (Otterbein 1973)².

This article explores the dynamics of war and alliance among the Yanomami in the Mavaca-Orinoco area of Venezuela between 1930 and 1980³. The Yanomami, numbering about 20.000, are scattered over 200 to 250 villages of on average 100 people with variations between 40 and 200 inhabitants (Chagnon 1983:79; Lizot 1971:139). They practise shifting cultivation with plantain, manioc and other crops as a mainstay; in addition, they do some hunting, gathering of wild plants and fishing (Lizot 1971,1977, Johnson/Earle 1987, chap. 5). The village territories have a radius of about 10 km. Every 5-6 years the groups move between 50 m and 1 km further on, to build a new *shabono*

¹ I use the (problematic) concept of tribal society in a purely descriptive sense as a regional population of cultivators, pastoral nomads and sedentary fishermen, who live in autonomous local groups and who entertain kinship relations, exchange women, fight each other, enter into alliances and celebrate feasts (Rappaport 1968 on regional population, Sahlins 1968).

² Cf. Otterbein 1973, Hallpike 1973, Harris 1977, Clastres 1977, Hanser 1985, Ferguson 1984, 1990b, McCauley 1990, Ross 1993 on war in tribal societies in general.

³ On the Yanomami cp. Chagnon (1968, 1983, 1992), Lizot (1971, 1977), Alès (1984), Herzog (1990), Zerries/Schuster (1974), Biocca (1972), Ferguson (1995).

(Lizot 1971:149f.). The population density averages only 0.2 P/sqkm (Hames 1983:415,425).

The relations between local groups are characterized by war and alliance. Allied villages engage in trade and feasting. However, alliances are always conflictive: allies try to outsmart each other and can turn into enemies virtually overnight. When conflicts emerge, they first take the form of club fights between individuals. Eventually, however, they escalate to a collective clash between the two parties (Chagnon 1983:171ff.; Alès 1984:92-97). Wars usually take the form of surprise attacks aiming at killing as many enemies as possible while minimizing their own losses, and at capturing women. Wars are often of remarkable cruelty and perfidy, and hostilities often culminate in treacherous feasts (*nomohoni*): here one group tries to convince an allied group to invite a third group which together can be overwhelmed and massacred during the feast (Chagnon 1968:138f.; 1983:152-168; Zerries/Schuster 1974:197-236). Although no precise statements about wars per local group per decade can be found, the war frequency seems to vary according to region and time: the groups of the Namowei and Shamatari bloc in the west (in the Mavaca-Orinoco area) wage war more frequently than the groups of the other population blocs. Among the former the settlements are larger and mortality in war is higher. Up to 30% of adult men die in war (Hames 1983:424), and Lizot (1989:106) writes that "toutes les communautés de la montagne sont en guerre les unes contre les autres"⁴. According to Lizot (ibid.:103) the intensity of war decreases with increasing acculturation.

Contradicting theories on the causes of war have been proposed: among them conflict over scarce game (Harris 1977,1984), over trade goods in short supply (Ferguson 1992), because women are scarce (Chagnon 1968,1988), in order to maintain the local groups' sovereignty (Chagnon 1968, Clastres 1977, Lizot 1989) and for revenge (Lizot 1989, Chagnon 1983). I will not discuss in detail here all these different theories because this has already been done extensively⁵. I will however, just briefly discuss some of them. It is highly questionable whether game and women are scarce (cp. Lizot 1971:149-168, 1977:190-202; Chagnon 1983:57,85f.,119; Ferguson 1989). But even if resources, such as game were scarce, these are consequences of an already existing bellicose environment rather than causes of war (Ferguson 1989, Helbling 1995,1996). It is war itself that forces local groups to adopt an expansive "reproduction strategy" (high growth rates) to increase group size as well as to intensify production (hunting and farming) in order to recruit allies, thus leading to a shortage of local resources (Ferguson 1989:186). Although, war may strengthen the

⁴ For new developments in the Yanomami area, especially on the influx of gold diggers and the impact of epidemics etc., cp. Helbig et al. (1989) and Chagnon (1992, chap. 7).

⁵ Cf. Ferguson 1989, 1995, Harris 1984, Lizot 1977, 1989 and Helbling (1996) on the Yanomami.

cohesion of a local group, this does not explain why groups wage war and incur high costs and risks of being defeated or annihilated. Furthermore revenge for previous killings or a cultural disposition for aggressive behaviour only make sense in an already warlike environment and therefore cannot explain it (Alès 1984:97f.).

Most of the above-mentioned theories do not take into account the context of states and the economic world system, in which indigenous wars have always occurred (Ferguson/Whitehead 1992). These wars always take place in the "tribal zone" in which state and nonstate societies interact (ibid.:5, cp. Wolf 1982,1987). According to Ferguson and Whitehead, the competition for scarce import products (iron tools and weapons) - introduced by expanding states - leads to an intensification of war in the tribal zone. "What has been assumed to be pristine warfare now seems more likely to be a reflection of the European presence" (1992:27). Important as the context of expanding states and world economy may be, it seems nevertheless imperative to analyse the internal logic of indigenous war, without falling back on rhetoric like "pristine wars". Thus a theory of tribal war is needed that takes into consideration both the inherent logic of war and alliance, as well as the wider political and economic context in its historical dimension.

The theory of strategic interaction (game theory) could be of some interest here because it links the structural aspects with the strategic perspective of the actors. While the institutional approach explores the (changing) structural framework and incentive structure in which local groups pursue their interests, the strategic approach elucidates how actors decide and what (unintentional) consequences their strategic interaction may have for the institutional system (Axelrod/Keohane 1986:252).

I will first turn to the structural conditions conducive to war and deal with the models in game theory that analyse the strategic interaction of political actors. In the second part the dynamics of war and alliance among the Yanomami will be discussed.

1. War in a System of Anarchy

According to Koch (1974,1976), war between local groups in tribal societies can be explained by the fact that there is no overarching institution, such as a state, which has the power to sanction agreements and to prevent the violent settlement of conflicts between local groups. According to Sahlins (1968:4-13), tribal societies are in "a state of war", a situation in which war is an imminent possibility at any moment. Koch and Sahlins take up the argument of Hobbes who explained endemic warfare by the absence of a common government (Hobbes 1968, chap. 13,15,17). Thus, war is not the result of an aggressive disposition of men competing for women and higher status, as maintained by Chagnon (1990), but of an all-pervasive uncertainty, of a fear of being annihilated and thus of the anxiety about survival. Furthermore, local

groups do not fight each other because of any positive effects war may have on society, but rather because there is no overarching political structure to prevent and stop these fights (Hallpike 1973:455). The multipolarity of the political system, which consists of autonomous local groups, is a necessary condition of war but not sufficient in itself: hunter-and-gatherer societies also lack a state but usually groups do not wage war against each other (although there may be some interpersonal fighting). Thus we must look for a second condition.

Contrary to hunters-and-gatherers, shifting cultivators have long-term interests in their fields; resources are concentrated locally and yield predictable outputs; monopolizing a territory, therefore, pays off (Dyson-Hudson/Smith 1978). A local group may leave its fields only by incurring high opportunity costs (Hames 1983:397,408ff.) because it is bound to lose its harvest and thus risk starvation until new fields elsewhere yield crops (Gross 1983:436). Hence, local groups are unlikely to withdraw from armed clashes but have to adapt to the requirements of war (cp. Fried 1967; Helbling 1987,1992). Among the Yanomami and other warlike shifting cultivators, it is not the competition for scarce resources but the monopolization of local resources and the high opportunity costs of mobility that make war highly probable or even inevitable. But still, not all tribal societies are warlike and not everywhere is war fought with the same intensity.

The intensity of warfare depends on the frequency of contact, which in turn depends on settlement density. Thus, conflicts intensify with decreasing distances between groups. On the other hand, epidemics and massacres in the context of colonial expansion reduce settlement densities, and formerly warlike societies cease to wage war (Ferguson 1990a:242 on the Panare, Piaroa etc.). The settlement density also influences the costs of mobility: mobility is especially limited where settlement density is high and where local groups are faced with "social circumscription" (Carneiro 1973:171ff.; Chagnon 1973:250; 1983:147,153). Where settlement density is low, the intensity of war, too, is lower, and the costs of mobility can be reduced by having fields in different places. This will reduce the risk of starvation if the group has to relocate after a military defeat (Lizot 1971:152ff.). Where settlement density is higher, the intensity of war, too, is higher and local groups are increasingly forced to improve their military strength (Ferguson 1992:213f.). Equally, feasts for allies are more costly and, therefore, the fields tend to be larger and hunting more intensive (Lizot 1971,1977).

Thus, local groups fight, firstly, because no overarching institution such as the state can prevent a violent settlement of conflicts between politically autonomous groups and, secondly, because groups are relatively immobile and cannot withdraw from conflicts with other groups without incurring high costs. Furthermore, the intensity of conflicts and warfare increases with the frequency of contact and with settlement density.

Having described the structural conditions leading to war in tribal societies, we will now focus on the local groups pursuing their interests and interacting strategically within the existing framework. The logic of strategic interaction can best be analysed by the models of game theory. In a first step we will try to explain why the Yanomami fight each other so fiercely instead of settling conflicts in a peaceful way. In terms of game theory we have to explain why an iterated prisoners-dilemma game does not have a co-operative solution but evolves into a destructive zero-sum game. In a next step we shall deal with the complex interaction between enemies and allies by introducing a n-person-zero-sum game.

2. War as the result of strategic interaction

Local groups can be interpreted as collective actors both in war and alliance. Each local group consists of individuals of different position according to sex, age, status in the web of kinship and marriage etc. and, therefore, with divergent interests (Chagnon 1968:131,143f.; 1983:27f.,129f.; Lizot 1971:144ff.). Furthermore, a local group may be divided into two or more political factions each led by an ambitious leader with his own interests. Factional conflicts have to be dealt with by a village leader (*tushawa*) who is sometimes successful but in the long run cannot prevent the splitting of a local group (Chagnon 1983:6, 26ff.,152ff.,186). In spite of these facts, a local group can be treated as a collective actor because it usually acts in unison both in war and alliance.

The warlike interaction of local groups can be described in terms of game theory as a prisoners'-dilemma game, the basic logic of which can be elucidated in the following way: Two local groups would benefit from settling their disputes peacefully, since costs and risks of violent conflicts could thereby be avoided. Let us now assume that group A is willing to settle its disputes with group B in a peaceful way. However, because no superior force sanctions such an agreement, group A can not be sure that group B also prefers a similarly peaceful way of conflict settlement. Group B could increase its chance of military success by only pretending to stick to an agreement but secretly preferring a warlike strategy. In this way group A, not being prepared for war, could easily be defeated or even annihilated, as in the case of a treacherous feast (*nomohoni*). Because breaches of contract cannot be prevented under the given conditions and because it is too risky to rely on the peacefulness of the other groups, each local group has to avoid the risk of its defeat, or even annihilation. Groups, therefore, prepare themselves for war by increasing their fighting strength in order to deter possible attacks or, even better, to attack first in order to anticipate the attacks of other groups and to destroy the enemies. Hence, local groups wage war, paradoxically, for defensive reasons, i.e. because they cannot trust each other, and because a peaceful strategy would be too risky. Consequently, a Yanomami explaining the reason why they fight each other is cited as having said: "We are fed up with fighting. We don't want to kill any more. But the others are treacherous, and one cannot trust them" (Pfeiffer, J. in "Horizon", Jan. 1977).

Even in an iterated prisoners'-dilemma game with many players, a co-operative (peaceful) strategy such as tit-for-tat (tft) will not evolve. A tft-strategy promises to co-operate, as long as the other co-operates, but threatens with retaliation if the other no longer co-operates (Axelrod 1987:32). According to Axelrod such a co-operative strategy is profitable if actors (must or want to) interact for a longer time period and, therefore, attribute a sufficiently high value (measured as discount parameter) to other's reaction to one's own action⁶: Each group will co-operate (settle conflicts peacefully), if the expected damage by retaliation is larger than the expected advantage of an attack. At least two reasons speak against such a peaceful strategy.

In the first place a tft-strategy requires that the actors are informed about the intentions of the others and can communicate their own intentions to the other actors. However, as information about strength and intentions of other groups are always incomplete, the pretence of false intentions and the dissemination of rumours is possible and profitable (Biocca 1972:142ff.). For this reason a tft-strategy is difficult to handle and risky, for each actor can misjudge the other actors and be misjudged by them (Hirshleifer/Martinez Coll 1988:381f.)⁷. The risks involved may be reduced by stereotyping the other "players" according to past experiences (by considering the worst case) as well as by acquiring a deterrent reputation in order to communicate one's own intention efficiently (Axelrod 1987:132ff.). It is precisely in this context that aggressive behavioural ideals and a "tough guy" reputation are important and make sense⁸: A "tough guy" threatens to strike back at the slightest provocation regardless of losses⁹. However, such a strategy has not only a deterrent effect, but escalates threats further because the other groups are convinced of the dangerousness and aggressiveness of the adversary and of the necessity of corresponding counter-measures. An aggressive behavioural ideal, therefore, encourages risk-prone behaviour which leads to mutual provocations and preventive strikes, as does

⁶ The discount parameter measures the influence of the other's future reactions to one's own action in the present (the "shadow of the future") and serves the calculation of the accumulated pay-off: The higher the discount parameter, i.e. the smaller the value loss of the next pay-off compared to the present, the larger the accumulated value of the long-term pay-off (cp. Axelrod 1987, parts I and II).

⁷ The probability of misunderstanding increases and the probability of conditional cooperation such as tft decreases with the number of actors (Axelrod/Keohane 1986:234f.).

⁸ On the *waiteri* complex at the Yanomami cp. Chagnon (1968:112), Lizot (1989:107). However, men who behave too aggressively are feared and hated by the other villagers as in the case of Rohariwe and Fusiwe (cp. Biocca 1972; Alès 1984:108f.).

⁹ This irrational moment - attacking regardless of losses - may be rational in the context of a deterrence strategy (Deutsch 1968:179-184).

the labelling of other groups as potential enemies (sorcerers and malefactors), whom one has to mistrust. The escalating effects of mistrust, preventive violence and violent reputation are clearly reflected by the Yanomami conceptions of illness and death¹⁰. Offensive mistrust and preventive violence are attractive strategies, because they allow the local groups to rely on their own strength, instead of depending on the uncertain intentions of the other groups and on solving the security problem in complicated and risky negotiations (Vasquez 1993:35; Evens 1985:93ff.).

A second reason for the failing of a co-operative tft-strategy lies in the very nature of the game itself. A tft-strategy pays off in a ceremonial gift exchange because it is always possible to stop exchanging gifts if the other refuses to reciprocate (cp. Görlich 1992). However, if the survival of local groups is at stake, a tft-strategy would be too risky because it would be too late to retaliate after a military defeat (Riker 1962:31,174; Axelrod/Keohane 1986:232). In order not to be taken as cowardly and weak and, therefore, to be attacked, each group has to inspire respect by behaving ferociously and aggressively and to demonstrate that it will leave no provocation unanswered, but strike back inexorably (Chagnon 1977:41,203; Ferguson 1992:223).

Although each local group would like to behave peacefully, it nevertheless has to attack pre-emptively because if it does not attack at a favourable moment it risks being attacked at an unfavourable moment (Waltz 1960:5)¹¹. Thus, the logic of massive deterrence, retaliation and pre-emptive attack leads to an un-interruptable chain of retaliation and counter-retaliation. Because no group can be sure that the other groups will renounce violent means when pursuing their interests, each group must reckon with the others using military force. This security problem can only be solved by arming and trying to gain military superiority, each group threatens simultaneously the safety of the other groups who try in turn to gain military superiority (Levy 1989:224ff.; Otterbein 1988). Thereby, the prisoners'-dilemma game transforms into a destructive zero-sum game in which one group wins military superiority, if the other loses it (Hirshleifer/Martinez-Coll 1988). What counts is, to win and not to lose, i.e. "to stay in the game" (Riker 1962:22). Because the costs of moving away are

¹⁰ The Yanomami believe that deaths are caused by the shaman of another village. Therefore, the shamans of their own village have to employ counter-magic in order to defend it and to preventively attack the other groups. By making neighbouring groups responsible for death and illness, reasons to take revenge are permanently generated (Chagnon 1968:112,127f.; 1983:176; Alès 1984:99). However, only if the relations with another village are already in a bad state, is it accused of having used sorcery, and only if the group is strong enough to overwhelm the enemy will it take revenge (Lizot 1989:105f.). If the enemy group is too strong, their purported responsibility for a death is simply "forgotten" (Ferguson 1992:223f.; Chagnon 1977:118; Lizot 1989:31f.).

¹¹ However, the extent of threat and therefore the necessity of preventive attacks depend on the spatial distances between the local groups.

usually too high, each local group will maximize its military strength. The military strength of a group essentially depends on the number of its warriors. Hence, local groups pursue an expansive "population policy"¹².

3. War and alliance

The military strength of a local group, however, not only depends on its size and on the determination of its warriors but also on the number and the reliability of its allies. Local groups have to form alliances against common enemies, and it is the common enmity towards third parties that makes (conditional) co-operation between allies both necessary and possible¹³. Alliance partners expect more from an alliance against third parties than from a war against each other, however each of them wants to avoid being cheated; hence, the mode of the alliance must be negotiated (Schelling 1960, chap. 3; Elster 1989, chap. 14). Wars and alliances between local groups may be described as an N-actors-zero-sum game: a zero-sum game between war coalitions, a bargaining game within a coalition characterized by both conflictive and cooperative aspects i.e. the logic of the prisoners'-dilemma game (Barth 1959, Riker 1962:81ff.). Each group wants to belong to the victorious coalition (being large enough to defeat the common enemy) but also to maximize its share of the spoil (land, women, strategic position etc.) within the coalition. A group looking for allies will try to concede as little as possible but it must concede enough to avoid losing its ally (Riker 1962:121). In addition, the risk that an alliance partner will secretly desert, ally with the enemy and organize treacherous feasts has to be faced. If an ally has many enemies and, therefore, is desperately seeking an alliance, one can be sure that he will not commit treason (Chagnon 1968:120). However, the propensity to form an alliance with a weak group is low if a joint victory is doubtful. Thus the Hekurawe-teri, when they were threatened by the powerful Shamatari, invited the Karawe-teri for an alliance feast, but the latter declined with thanks for obvious reasons (Biocca 1972:49). In any case every group will profit from a (momentary) weakness of an ally and press him into an unequal exchange of woman and goods etc.

So, even between allies the relative military strength is decisive: each group looks for allies who are weaker, but strong enough to jointly defeat common enemies. The bargaining power of a local group depends, firstly, on its relative strength (size and unity) and on its determination; for instance, an aggressive

¹² In order to increase the size of a group's fighting force, as many adult women as possible must be available in the group: through local endogamy, through unequal exchange of women with allies as well as through wife stealing from enemies. According to Harris (1977, chap. 4 and 5) female infanticide serves to raise the relative share of warriors in a group.

¹³ Among the Yanomami adjacent villages are either allies or foes; indifferent villages become either enemies or allies sooner or later (Chagnon 1983:170).

group threatening to retaliate on the slightest provocation will influence the bargaining process to its own advantage. Secondly, the bargaining power of a local group depends on its alternative alliance options as well as on its relative threat situation. A local group that is more threatened by a common enemy and therefore is more dependent on its ally has to make more concessions (more costly feasts, unequal trade and unequal exchange of women). Bargaining always requires information and communication (Riker 1962:79). However, because strength and threat, readiness for concessions and alliance options of other groups are never fully known, information can be used strategically, that is, by withholding information, spreading rumours, using false pretences etc. (cp. Biocca 1972:142-148). For the same reasons, misjudgements concerning the strength of opponents and the support from their allies as well as the reliability of one's own allies are frequent, as the example of the treacherous feasts clearly shows.

The bargaining process between allies of about equal strength can be described as a prisoners'-dilemma game: threats, promises and side-payments (Riker 1962:109ff.,120) as well as the groups' relative position in the regional balance of force must be considered. If the "shadow of the future" is long enough (high discount parameter), i.e. the common interests are strong enough, then a co-operative tft-strategy, i.e. an alliance, is adopted. The impression of being weak, however, must not only be avoided in relation to enemies but also in relation to allies because allies would immediately try to profit from it¹⁴. On different occasions - trade, feasts, marriages, wars - the reliability of allies is tested (Zerries/Schuster 1974:197-215; Chagnon 1983:148f.; 1968:121f.). Meetings between allies seldom take place in a harmonious mood; on the contrary, they are always accompanied by mistrust and provocation, threat and cheating. These tensions may erupt at any time into open enmity ranging from club fights to treacherous feasts and surprise attacks (Chagnon 1968:132ff.; Biocca 1972:135ff.; Alès 1984:92-97). Thus, a "tough guy" image is the best reputation for a local group, even when dealing with its allies. Because allies have to be deterred and intimidated by aggressive behaviour, additional conflicts are created in turn, and because each of them suspects the other of breaking away or even planning a betrayal first, both will try to anticipate the treason of the other and to break away first, as soon as the balance of force and the situation of threat has changed (Chagnon 1983:147ff.,170ff.).

The mutual interdependence between allies is not always symmetrical but may take a marked asymmetrical form: If two allies are of unequal strength and varyingly threatened, the better-positioned group will take advantage of its weak ally: the Momariböwei-teri and the Reyabobowei-teri were surrounded by

¹⁴ Cp. the alliances between Bisaasi-teri and Monou-teri, between Momariböwei-teri and Reyabobowei-teri (Chagnon 1968:153ff.), between Bisaasi-teri and Korohi-teri (Chagnon 1983:165-168), between Namowei-teri and Mahekodo-teri (Biocca 1972:156-164).

enemies and thus largely dependent on an alliance with the Bisaasi-teri and Monou-teri. The latter groups were quick to force the former groups into an unequal exchange of women. The weaker allies had to accept this in order to prevent a disastrous defeat by a powerful enemy. Alliances are even more asymmetrical if a defeated group takes refuge with its ally. In this case the stronger group is even more freed to exploit its alliance partner as is seen in the example of the Kreibowei, who joined the Mahekodo-teri after having been decimated in a treacherous feast. Although the Mahekodo-teri supported them in waging war against the Möwaraoba-teri who, together with the Iwahikoroba-teri, decimated the Kreibowei in a *nomohoni*, they nevertheless forced the Kreibowei to cede many women, not without having threatened to kill all men in order to take all the women. Thus it is understandable that the Kreibowei tried to leave the Mahekodo-teri as soon as possible, to cultivate new gardens in a secure place and to become an autonomous and independent group again (Chagnon 1968:119f.;1983:147-153; Ferguson 1995:251-255,305). A weaker ally is likely to behave according to the logic of the chicken game because the disadvantages of a non-alliance by far exceed the possible disadvantages of being allied. The stronger alliance partner, behaving according to the logic of the prisoners'-dilemma game will not break the asymmetrical alliance as long as it profits from it (unequal woman exchange, support by weaker partner in war against third parties), i.e. as long as the discount parameter is sufficiently high.

4. The process of escalation and de-escalation

The basic instability of an n-person-zero-sum game sets in motion a dynamic process of war and alliance. Alliances are always ambivalent and precarious; an alliance can quickly change its character and turn into enmity, accelerated by the suspicion that the other group may already have changed its intentions. The allies of today may easily become the enemies of tomorrow, or they may have become enemies already and may be secretly planning a treacherous feast. The relative strengths and balance of force between groups may change following victories, defeats and demographic hazard as well as macro moves, thus leading to a constant regional restructuring of relations regarding enmity and alliance (Alès 1984:103ff.). This also changes the pay-off matrices: the "shadow of future" may shorten (the discount parameter decrease) and a co-operative strategy in a prisoners' dilemma between allies may transform itself into a zero-sum game.

Whether a local group decides on war or peace in a given situation, depends on its relative strength, i.e. its fighting strength and the number and reliability of its allies. The fighting strength of a local group depends on the number and determination of its warriors, on its leadership and its armaments. The number and reliability of its allies depend on mutual concessions and commonality of interests, on their relative strength and threat situation (Brown 1994:67-79;

Levy 1989:243,268-278). In order to start a war, there must be a sufficiently high chance of thereby improving one's position in relation to the status quo. A group (or a coalition) will attack, if it considers itself to be stronger than its adversaries (Ferguson 1995:293,300,302f.) or if it hopes to hit the adversary before the latter becomes stronger and finally too strong¹⁵. Smaller groups may also start a war in order to gain respect from a stronger adversary. They try to compensate their military inferiority by foolhardy hit-and-run attacks and thus demonstrate their determination - regardless of losses - to maintain their sovereignty against enemies as well as allies (Chagnon 1983:147,182ff. on the Monou-teri). Local groups consider, therefore, the costs and advantages of war and its alternatives as well as the probability of a victory (Levy 1989:240-245,279-289). Not only the strength of a group and the number of its reliable allies but also the willingness of a group or its warriors to take risks are decisive with regard to war and peace (Bueno de Mesquita 1980:383): While some *waiteri*-men are prepared to take high risks, other group members tend to be more cautious; village factions argue about whether to wage war or not (cp. Biocca 1972:112-119 on the Namowei-teri)¹⁶.

Hostilities run through different stages of escalation: they extend from the destruction of fields and the killing of individual enemies, ambushes and hit-and-run attacks up to the siege of hostile villages, wars of annihilation, or persuading other groups to organize a treacherous feast (*nomohoni*) in order to massacre their enemies. Attacks aiming at killing as many hostile men as possible and robbing their women are the most frequent form of war among the Yanomami. This mode of war has the inherent tendency of escalating hostilities still further (Chagnon 1983:175; Biocca 1972:26-34)¹⁷. On each level of escalation a group has to decide on how it should react: escalate, wait and see or withdraw. The weaker group has the alternative, either of being annihilated, of getting the support of allies or fleeing nearby its ally. However by deciding on the latter option, it would lose its fields and would be dependent on its ally until the new fields yield, an option which is both costly and risky, even if the macro move costs may be reduced by having plantain fields in different places (Chagnon 1983:71-78; Gross 1983:436). Because hostile groups move away from each other - enemies usually settle about half a day to three days away from

¹⁵ Thus the Shamatari attacked the Hekurawe-teri at a moment when most men were out for several days on a hunting expedition (Biocca 1972:50-55; Ferguson 1995:256 on the attack of the Shipariwe-teri against the Mahekoto-teri).

¹⁶ Sometimes village members plot against their far-too-aggressive leaders who provoke unwanted wars, as in the case of Rohariwe, *tushawa* the Konabuma-teri (Shamatari) who was killed by Fusiwe with whom Rohariwe's close relatives collaborated (Biocca 1972:171-189; on Rohariwe and the tragic end of Fusiwe who killed him cp. Ferguson 1995:226-236).

¹⁷ This is in marked contrast to the Maring in the highlands of New Guinea among whom hostilities proceed through different levels of ritualised violence, and where the process of escalation may be interrupted - if the mutual losses are about equalized - on each level (Vayda 1976).

each other (Alès 1984:110) - the spatial distance between them will gradually dampen their hostilities, and conflicts de-escalate. Furthermore, their bellicosity sometimes decreases because allies refuse to participate in a raid as they are secretly intending to steal women in the absence of their allies (Chagnon 1983:181ff.; Ferguson 1995:291f.).

While bellicosity decreases with increasing distance, new conflicts may emerge between allied groups settling in close range (from 2 hours to a day; Alès 1984:103ff.). They will quarrel about the distribution of the spoils (women, trade products), like the Karawe-teri and the Koroshiwe-teri (Biocca 1972:26-34). Allies test each other's strength and determination, look for new allies and try to obstruct each other's alliance policy (Chagnon 1983:178). They fuel internal conflicts - competition between factions and between faction leaders - in order to weaken each other: Thus the Bisaasi-teri had to support the Monou-teri against the Patanowä-teri who in turn tried to win the Bisaasi-teri as allies by attacking only the Monou-teri and by weakening the pro-Monou-teri faction in Bisaasi-teri (Chagnon 1983:122ff.,178). Mutual mistrust and the fear that the other has already allied with the common enemy will contribute to a further escalation of these conflicts. Allies will start to fight each other, or one of them will try to massacre the other in a treacherous feast. If the alliance partners finally become enemies, both of them will move to their new allies.

Sometimes indifferent groups or even former enemies - foes of foes - may become allies and start to trade and to hold feasts together. Although Chagnon (1983:170) writes that indifferent villages are often suspected of bad intentions - this explains why attempts at alliance between such groups often fail - he nevertheless reports on successful pacts, especially after such a group has split into separate groups, and one of them has shown interest in a new ally¹⁸. Factional conflicts within a village may lead to the break-up of a group; one of the factions moves away, but settles near the old village with a view to co-operating in the face of common enemies, or they become enemies forever as in the case of the Namowei-teri and the Bisaasi-teri. After the breaking up of their village and several attacks by the Bisaasi-teri, the weakened Namowei-teri moved near the Tetehei-teri where they were later fiercely attacked by the Bisaasi-teri, their former co-villagers, who increased their military pressure and adapted a tactic of siege (Biocca 1972:135ff,196-235).

Due to the fundamental unreliability of allies and the constant threat by enemies in an unstable and insecure environment, each group strives for military superiority in order to prevail against its enemies but also to assert itself in dealings with allies. This fundamental volatility of both alliance and enmity

¹⁸ Cp. the unsuccessful attempts to form an alliance between the Kreiböwei and the Möwaraoba-teri who later even fought each other (Chagnon 1968:151;1983:1ff.,152) as well as between Bisaasi-teri and Mahekodo-teri (Chagnon 1983:156,161-168).

may be largely explained by the (somewhat restricted) mobility of local groups depending in turn on low settlement density: Each group has the (somewhat costly) opportunity to move away if threatened by superior neighbouring groups or after a fission of the group. Therefore the tactical goal of each group consists of not being expelled but of expelling (if not annihilating) its enemies by war, but never of seeking a truce or compensation payments (Biocca 1972:26ff.,50ff.,198ff.; Chagnon 1983:215-237). By having the opportunity to stop interaction with a neighbouring group by moving away, the probability of a continued alliance decreases (decreasing discount parameters) and mutual mistrust grows. Moreover, insecurity and mistrust between allies are not overcome by a large-scale exchange of gifts and women among the Yanomami, which would make alliances more stable and binding. Thus, the politically motivated macro moves away from superior enemies to nearby one's allies, with whom new conflicts emerge in turn, generate the destabilizing dynamics that make the alliance relationships short-lived and enmities more erratic and inexorable than in other societies.

5. Conclusion

Although indigenous wars are not pristine wars but take place in a national and global context that influences the course and intensity of wars in the tribal zone, they cannot be explained only by reference to this wider context. Important as expanding states and the world economic system may be, it seems nevertheless imperative to analyse the internal logic of indigenous war. Both the wider political and economic context in its historical dimension, as well as the inherent logic of war in the tribal zone, should be taken into consideration. War can be explained structurally by the multipolarity of the political system consisting of autonomous local groups, i.e. the lack of an overarching institution, and by the fact that shifting cultivation limits the mobility of local groups so that they cannot prevent an armed conflict by simply moving to another place. This socio-cultural constellation forms the conditions under which the strategic interaction of local groups takes place.

War and alliance can be analyzed according to models of game theory. Even in an iterated prisoners'-dilemma game a co-operative tft-strategy will not evolve because, firstly, it would be too late for an unprepared group to retaliate once it had been defeated, and because, secondly, the reputation of a "tough guy" - the best way to deter even with a tft-strategy - fuels the escalation of conflicts and leads to provocation and preventive attacks. Thus, a bellicose strategy is chosen because a peaceful one is too risky; this means that groups opting for war could do better at the expense of groups who adopted a peaceful strategy. A policy of deterrence, of strength - caused by a defensive concern for survival - will paradoxically lead to escalation and a warlike settlement of conflicts. Each group strives to gain military superiority at the expense of the other groups that in turn strive for superiority. Thus, the prisoners'-dilemma

game evolves into a destructive zero-sum game. I have argued that the complex constellation of enmity and alliance may be analysed as an n-person-zero-sum game: a zero-sum game between coalitions, a prisoners'-dilemma game (sometimes a chicken game) within the coalitions between allies. Groups form an alliance if they do better in an alliance than in fighting each other, although each of them tries to outsmart the other. A specific quid-pro-quo has to be agreed upon by both partners. In this bargaining process a reputation as a tough guy pays and does not lead to a break-up of the alliance as long as the mutual interests are strong enough (high discount parameter). However, a change in the relative strength and/or threat by third parties may lead to a transformation of the constellation: allies become enemies, enemies become allies; the prisoners'-dilemma game between allies transforms into a zero-sum game between enemies or vice versa. Because of this fundamental volatility of both alliance and enmity, each group strives to be as independent and strong as possible by becoming larger and recruiting more warriors than its enemies.

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