I. Introduction:

I am concerned broadly with the distinction between data processing and classification (see Chit Hlaing 2006). This has to do with formal theory formation, and with the generating of empirically interpretable additional theorems.. More particularly here I am concerned with how formalization, far from abstracting away from data, makes one look at levels of detail one never before even noticed, and then enables us to resolve long standing questions in socio-cultural anthropology that have heretofore not been subjected to analysis in terms of formal, logico-mathematical considerations. Note in particular that formalization need not be done in the terms of formal notation. What is essential is the general form of logico-mathematical thinking and reasoning. That ultimately and in principle algebraic[1] or other notation will need to be used for greater rigor is, of course, clear.

I shall examine a number of related series of essentially sociological categories and distinctions in this paper, such as corporations *vs.* groups~crowds, corporateness more generally and in its legal sense, the corporateness of descent groups and the supposed distinction between descent and alliance as basic theoretical frameworks for kinship analysis.

I want it to be clear that I am dealing with completely general notions of organization here. This has nothing to do with any distinction between how 'they' (the people whose social or cultural data are to be analyzed) understand their system and how we see it; it is not subject to considerations about cultural relativism or whether all imaginable theories are necessarily culturally parochial. Furthermore, I am dealing with the generic ordering properties of systems of behavior, and it has to be understood that human behavior is what has been called 'rule-governed', i.e., its well-formedness properties are cognitive systems, which, however, do not generate actual, real time performance. Rather, as with natural language, these cognitive competence systems do two related things: they make possible orderly meaningful interpretation *of* behavior and, therewith, they monitor performance and keep performance error from getting, as it were, out of hand so that the performance becomes uninterpretable and incoherent, making orderly on-going social interaction break down (see Chit Hlaing 2005b and 2006)

I a. On Groups and Corporations:

Let me begin by taking up a conjecture (due to my pupil Zhang Wenyi) about the formalism for distinguishing crowds (on crowds, the sociological literature goes back to Le Bon, 1896) and 'groups' from corporations or corporateness. This is a long-standing question in social organization theory. Years ago, George Appell (1983) and others began to question what I may call the received standard idea, due partly to Weber and partly to Sir Henry Maine (1861, reprinted 1963), to the effect that what defined a collectivity as *corporate* was some sort of super-personal jural 'personality' independent of its members, such that it existed 'in perpetuity'[2]. It became increasingly clear that this will

[1] I say algebraic in the sense that where one is dealing with structure or relational order or some domain, by definition, any coherent space of such relations is necessarily closed under an algebraic description. To that extent a coherent theory of said domain is a theory of such a coherent set of relations amongst its parts (see Chit Hlaing 2006).

[2] The matter may be a bit more interesting because one might wish to follow a distinction introduced into anthropology from jurisprudence by Sir Henry Maine between corporations sole

not do. It is, of course, a standard fiction of European legal systems that corporations (but not necessarily 'corporate groups') are persons with regard at least to limiting the liability of shareholders/'members' but that is far from a universal characteristic of corporateness. Moreover, the person-at-law in these instances is in fact invariably represented by actual persons, namely, the officers of the corporation, so that it is not strictly accurate to say the corporation exists independently of real persons belonging to it. Rather, what is important is that the corporation can exist independently of any *particular* persons, so that over time the membership of actual persons can change. The result is that it exists (has, if you will, a lifetime) independent of the lifetime of any such member. But notice that is incorrect to jump from this observation to the claim of perpetuity even in principle. One the one hand, even in European (including British and American) law a corporation may have from its founding charter a very limited lifetime, in fact shorter by far than that of its members (special purpose corporations, as it were) and may be defined as ceasing to exist with the demise of one or more of the founding members. On the other hand, corporations may cease to exist for all sorts of reasons, however long they may last beyond any given members' lifetimes. What then is it that defines corporateness?

II. Descent and Descent Groups

I suggest the answer is bound specifically to the very idea of its membership. If one looks at either corporations in the official legal sense or at corporate entities, e.g., anthropology's favorite kind, the corporate 'descent' group, one finds that they are what one may call properly bounded with regard to membership. That is, there are rules and/or procedures for deciding who is and who is not a member. For business corporations, of course, this is clear. Either you are a registered shareholder, or you are not a member; as for officers, either the shareholders have elected certain persons to the offices or not. For the case of descent groups, the matter is more complicated and anthropologically interesting. So let me explore that next.

If we consider unilineal cases, the default solution is simple enough. You are born into an agnatic/patrilineal group just in case your father (or your mother in uterine cases) is a member. There are non-default situations, as we know, but for these there are specified rules too. Adoption procedures for example. Sometimes, where there is bride-service, a child may be born into its mother's group (in otherwise agnatic/patrilineal systems) before bride-service is terminated, and so on (see, e.g., Cunningham 1964). Supposedly the matter is different for cognatic ~ non-unilineal cases. That is why Fortes (1959, 1963) argued that there can be no cognatic 'descent group', namely, that there is no 'rule having regard to filiation' about membership; one has to make a 'choice' (it is on this word that his argument turns) as to membership. Note that this need not constitute a

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and corporations aggregate. Corporations sole are simply ordinary individual social identities ('roles') and the latter are either corporate groups, or 'true' corporations (in case there are designated officers uniquely able to act for the aggregated membership). The distinction is useful for us because it connects the theory of corporateness with the theory of 'roles' (properly Social Identities in the sense of Roger Keesing 1970) more generally. For, just as a given social identity ('brother', 'king', 'priest', 'teacher' and so on) has definitive social-relational conditions of recruitment and occupancy, so also does membership in a corporate group. It follows that we now have a proper account of the intuition (enshrined in at least Euro-American jurisprudence as a legal fiction only) that corporations are in some sense jural 'persons'.

claim that these entities may not be corporate but only that they may not be descent groups as such. Anyhow, having regard to filiation, they seem on first view indeed not well-bounded. But is this line of argument (with a tradition reaching back through Radcliffe-Brown to Rivers) good? To answer this question one must look more closely at the matter of choice.

Is it really a fact that in unilineal cases no choice is involved? No, one is born, as it were, genealogically, into the whole set of connections specified by the standard notation of kin-type reckoning. That the choice of counting as jural consanguines only those positions for which you are connected by patrifilial reckoning is definitely a choice, where this word, computationally, has to do with partitioning a field or set, and it is not less so if the *default* partition is specified in advance. In the case of a cognatic system, then, there is simply no default choice in general. All partitions being equal, one is effectually born into the union of all such partitions (a virtually infinite set) and one *activates* any one such for a time, leaving all the others dormant. The two cases are hardly radically distinct: In the unilineal case, the activation is, as it were, once and for all (barring, say, adoption), whereas in the cognatic case it need not be. But let me elaborate.

Let me invoke here the concept of lineation, due first to Löffler (1960). If any immediate link of filiation (the parent-child link or line of genealogical reckoning of length 1) can be either partifilial or matrifilial, then any mode of lineation (speaking only roughly now) is a line of length 1 or greater, where each ith link is specified as m or as f (male parent, female parent). From this it follows that in Primary (Universal) Genealogical Space (PGS) there are in fact indefinitely many modes of lineation, noting that, for example, a line of length 3, say, has unequal modes of lineation if one is, successively mmf and the other is, say, mfm and so on. Then, say, patriliny chooses only patrifilial links by default. Cognatic (‘non unilineal’) systems choose particular modes of lineation based upon the availability of lines going upward to ‘prominent’ ancestral couples, where prominence has to do with their being purported to have founded some sort of ‘estate’, say. Moreover, in such cases, the more lines and modes one can invoke in tracing to any such ancestral couple, the more it may be that one’s claim on the estate is effective. The work of Firth (1963), of Davenport (1959), of Peranio (1961) and of Freeman (1958) is basic here. In the Maori case analyzed by Firth, as in other Polynesian instances, the more patrifilial connections, the better the claim to at least offices in the estate. But it is Freeman’s work on the Iban of Sarawak that is of special use here. For, in spite of his *claims*, Freeman’s actual data show that whilst once a given couple activates a claim to a given such corporation it can’t be changed during their lifetime, it is clear it is only a matter of the activation, since their children or further issue can in fact activate connections to different links through the same original couple. E.g., let couple c choose to join the *bilek* house of the husband’s birth, their child, grandchild or whatever may well choose to activate membership in the natal *bilek* of the wife of couple c. Hence, the default partition is such that all lineations are equal and one is a member (possibly inactive, or latent) of all such, whilst in unilineal systems one partition leaves all other memberships in one residual class. This is shown nicely by the fact that, should a man be adopted or otherwise placed, say at birth, in one’s non-default group, one’s legitimate issue will still, by default fall into the group he, their father, was initially, or by adoption placed in.

How does this relate to the issue of corporateness? Clearly in the unilineal case, membership in a given descent group is uniquely decidable. Either the default rule determines membership or else a specific choice is made of an alternate group membership for any individual at birth (and we can disregard any changes later on by adoption). In the cognatic case the argument has been, to repeat it here, that these groupings cannot be called 'descent groups', corporate or not, because membership is not determined by 'descent', i.e., mode of lineation[3]. Now, in fact any current *active* membership may in fact be well defined: we can know who is and who is not a current member. As for latent membership, the matter is only slightly more complicated. It may be the case that some such groups will reject a claim to activation for any genealogically or 'socially' distant claimant, in which case active membership is not well-defined, not corporate. That, however, is not a question of membership in the sense that by birth the latent claim is well-defined. What one is 'born into' is in fact, as stated above, the union of all modes that can link to any such estate-grouping through the appropriate ancestral couple. Hence, to put it straightforwardly, the Rivers-Fortes-Radcliffe-Brown thesis that cognatic reckoning cannot define corporate groupings is shown to be incorrect.

IIIa. Crowds and other non—Corporate Collectivities as Topologies

Now, let me return to more general issues regarding the corporateness of social groupings. What about crowds and the like? This is an old social-theory question. It has to be understood now that such categories are not corporate because there are no fixed criteria for deciding who is and who is not in it (the very word 'member', then is inappropriate). If you are passing by and there are a lot of people there, say, mostly watching some accident, or whatever, are you in or not in the grouping? If you decide to stay and watch, yes you are in it; if you merely look briefly and move on, no. It is, as my pupil, Zhang Wenyi said in a seminar, a topological neighborhood category, and it is understood that the neighborhood of, say, a point, has no specifiable external boundaries. If the neighborhood is understood as the *field* of its focus or focal point, then the only principle is that the field's 'effectiveness' diminishes more or less monotonically with distance from the focus. It is, of course, true that at some arbitrarily great distance there can be no meaningful connection between anyone, say, and the focus of the crowd, and yet there is no determinate distance beyond which, suddenly, this connection disappears

[3] Technically, we cannot accept the usual (e.g., Radcliffe-Brownian) idea that 'descent' refers to the identification of one mode of filiation that defines the kinship structure as a whole. This paper is not the right place to explain this but, very crudely, the algebraic (more exactly category-theoretic morphism **(**Chit Hlaing 2000 and references therein**)** map from PGS to any particular kin-category/terminology system, PGS—>KTS (Primary Genealogical Space —> Kin Term Space), has to mention various modes of lineation. For instance, in an agnatic system with asymmetrical alliance, there has to be a rule specifying that all males agnatic to one another linked to speaker's agnates through a mother of any of speaker's agnates are 'wife-givers', subject to upward cross-generational skewing. Such a rule can specify this set in PGS only by mentioning a mode of lineation (actually a family of modes of lineation) that can be called 'maternal agnates', a mode defined by agnatic links with one and only one ascending uterine link of filiation — one's mother's agnates, one's father's mother's agnates, one's father's father's son's (paternal uncles') son's mother's agnates, and so on. In fact, then, what anthropologists quite generally refer to as a 'descent' group has to be called more accurately just a group defined by the paramount mode of lineation who are *jural consanguines* to one another.

absolutely. If, for instance, you are say several hundred yards away and notice a bunch of persons gathered and looking at something, and you stop, however briefly, to look at what might be going on, you have *some* connection, whilst someone walking bye rapidly much closer may have less— or none, if we make use of one's intention with respect to being 'there'. There are no 'rules' that can be used or invoked by the observer to decide (in the literal all-or-nine sense of 'decide') whether one is 'in' or not. Of course, as one reviewer of this paper remarked, crowds are recognized as such (as a category of folk sociology, say) in many different cultures and, as such, there are culturally particular ideas and expectations about crowd behavior, about, for instance, what happens individuals and individual behavior when individuals are 'caught up' in a crowd. However, that does not define 'membership, if only because not every person so 'caught up' necessarily behaves according to such expectations; and in fact an individual not intending participation or even interest may be quite literally and physically carried along in the press of the action and thus become part of the crowd — but only, as it were, gradually and, in the final analysis, only after the fact of the observation of the whole event.

IIIb. Event-Theory and non-Corporate Topologies0

These are what I may call event-theoretical topologies (neighborhoods), event theory having to do with temporal-aspectual-modal categories, on which I have written elsewhere (Chit Hlaing 2005a). In turn, this has everything to do with the whole controversial question of fuzziness, because such neighborhoods are in the intended sense fuzzy, namely, 'in/out' is a matter of degree not an all-or-none matter. I argue that so-called fuzzy sets (here, the 'crowd' or 'bunch' or whatever) are topologies, particularly having to do with the saliency of the 'extent' of a field. So, as Zadeh, the originator of Fuzzy Set theory, himself pointed out (see Zadeh *et al.* 1974) fuzziness is essentially a matter of Decision Theory rather than a theory defining a species of conceptual categories as such. Note that crowds etc. seem to be set-theoretically open sets. That is, their closure may not apply to actual members of the set, in as much as by-standers and other temporarily by-standing passers by are not centered upon the event or whatever the crowd may have formed round, although they may be centering upon the crowd itself (I talk here of 'centering' as a shorthand for the idea that passers-by are likely to stop not to see the original event but rather to see the crowd that has gathered round; and furthermore whilst some of them may inquire and then turn towards the original event-centre, thus enlarging the original crowd, others may not, so that the crowd is bounded, as it were, by persons for whom the crowd and its dynamic of size has become the relevant 'event'). The closure, then, of such a grouping is an instance of ambiguous membership rather than fuzziness in the sense of degrees of membership, set-theoretically. There are now two (or more?) competing 'events': the original event round which people have gathered and the crowd dynamics itself. For some, say at the outer part, even if and when they find out about the original event-centre, the crowd dynamic may still be more relevant for them as their focus of interest and attention. This is not altogether different from what I have written elsewhere (Lehman 1985) with regard to the so-called fuzziness of color categories, where, for example, 'blue-green' (in English usage) consists of a region of points on a linearized color sphere which are in *both* the region centering on focal blue and the region centering on focal green, such that for some such points the

former is the more salient, for others the latter (cf. 'bluish green' and 'greenish blue', respectively). Moreover, although I shall not be able to pursue this in the present paper, one can easily note that the 'events' of these topologies are themselves fundamentally topologies over the extent of time itself! For instance, suppose there's a terrible accident. Now at some point one person stops and focuses on it. Clearly this one person is not a crowd. Subsequently another comes, asks the first 'what's up?' and maybe stays to see the matter unfold. Do we have a crowd now, of size 2? Then comes a third, and so on. We can ask at what point we start having 'a crowd' but there is no principled or non-arbitrary answer, save maybe the proverb 'Two's company, three's a crowd', which serves actually to say that the real answer is that the more persons there are the more 'crowd-like' the aggregation is.

There is of course much more to say about these matters. For instance, is the ordinary English use of the word 'group' for, say, a set of persons who have, as we say, 'come together' for some possibly ephemeral purpose, corporate? Equivalently, is that generalized kind of (social) 'group' corporate? I dare not try and pursue this systematically in this paper but at least it should be clear that the answer is '*trivially* yes'. More exactly, from the viewpoint of cognitive theory they may be seen as only ambiguously *instantiating* the corporate concept, as not being corporate in any culturally salient way (see Lehman 1985 and Chit Hlaing 2001)

Let us suppose that the sharing of a conscious specific intention as a reason for coming together is enough to count as a decision-rule for who is a 'member' and who is not. Then it would follow that what one might call the 'core' of a crowd, all and only those persons who are there because of some event that has brought them together however briefly, is indeed at least in some weak sense corporate. But there are difficulties in accepting this conclusion. On the one hand, say intuitively, one might wish to claim that this collection or set of persons is not corporate because their 'membership' does not confer upon them any 'rights' or duties towards one another or in respect of any 'estate' belonging to the supposed corporation. There is a long-standing sociological tradition along such lines in fact, a tradition that is sometimes associated with a distinction between corporations and ('mere') corporate groups (see Appell again). However, I think we can do better than this. Empirically, to start with, the supposed shared intention is actually hard, if even possible to pin down. If we take as an example, say, a party, it turns out that what I said above concerning event-centered topologies with regard to crowds applies here nicely. Let some person happen to turn up for some extraneous reason, or 'by accident'. Then that person may stay to enjoy the festivities or whatever. If so, and if he/she is not in fact turned away as a possible 'gate-crasher' with a 'Sorry! There's a party going on here!', that person, as we say, joins the party — possibly, at first, not even knowing exactly what the occasion for it is. Isn't the shared intention at best then only 'after the fact' of joining? Furthermore, even if 'gate crashers' are systematically turned away, there is still no *relational* computation or associated action[4] instantiating it that constitutes the decision about who is in or who is not; there is nothing but the presumption of a common intention or motivation. Moreover, were there any rights in an 'estate', however ephemeral once again, involved, surely it would have to be based upon some prior relation or action. seen to establish such a relation. A fee is paid *to* someone authorized to accept it on behalf of a group — say a club, a show, or whatever, for

[4] A fee for joining or entering could count, certainly, or the presentation of a proper invitation.

instance, and similarly for the issuing of invitations, whilst a claim to a genealogical or other prior relation as a basis for joining would be obvious as a prior relation. Therefore, assuming by convention that groups are 'more than' crowds, I am forced to conclude that the usual sociological connection between 'mere' groups and corporate groups collapses into incoherence because the so-called (mere) groups, though we cannot in ordinary English usage call them crowds, are *formally* of the same order as crowds.

IV. On Resolving the Descent/Alliance Controversy in Kinship Theory

In closing, I want to adduce an additional example of the virtues of formal thinking for the solution of long-standing puzzles and controversies in social-cultural anthropology. I have written about this elsewhere (Chit Hlaing 2000), so I need only summarize briefly here. The example concerns a particular point in the old controversy amongst kinship theorists as between descent theory and alliance theory, in which the principal adversaries seem to have been Fortes and Leach (1959). According to Fortes at least Leach's alliance theoretical analysis of Jinghpaw/Kachin kinship and marriage comes down to the proposition that, e.g., the outstanding jural connection between a man and the men of his Wife-Giving group such as his MB has to do with the fact that these men are his FW agnates. Fortes wishes to reduce this to the idea that the man in question is after all, genealogically related to them directly as consanguines, and not just affinally, through his own mother. I need not go into the complexities here, such as the obvious fact that this man (let me call him 'Ego' for brevity's sake) has Wife Givers to whom he is also connected but *only* affinally, e.g., his FFBSW's agnates (= FFBSSM's agnates)[5]. Anyhow, Fortes is arguing here on the analogy of the well-known African cases of a young man's special relation with his own, genealogically actual MB). Fortes then calls this non-alliance relation a sort of supplementary or complementary 'descent' membership in Ego's M's agnatic set — complimentary in the sense that it is not strictly agnatic genealogically in an otherwise agnatic system of descent groups.

Fortes refers to this as 'complimentary filiation', meaning membership through a mother rather than (primarily) through a father. But above all, he says that complimentary filiation is a *vague* sort of relation, say, not as definitively membership as is membership in a set defined agnatically. I want to deal with this (ultimately in favor of alliance theory) by attempting to pin down in a formal way the otherwise fuzzy notion of vagueness in this relation. In order to do this, I must refer to the map PGS—> KTS (Primary Genealogical Space —> Kin Term Space) that I have constructed for the kin terminology and category system of the Central Chin of Burma (Lehman 1963, 1970), a classical case of asymmetrical marriage alliance.

Now, it turns out that whilst Wife-Giver (WG) males are all put into a 'grandfather' category terminologically (called *ka-pu*), and Wife-Takers (WT) are all correspondingly skewed downwards, generationally, and called 'grandchild', there is a marked asymmetry in this skewing. For any speaker, *all* male WG are grandfathers but only those persons in a WT lineage[6] who are in lower generations from a marriage initiating the alliance are

[5] Of course this might be got round by the proposition that, for any agnate of Ego, that person's mother's agnates are also Ego's.

[6] I am using the word 'lineage' in this context for convenience. In fact, as I have shown elsewhere, and as Leach and others have shown for many other asymmetrical alliance systems, the effective unit of alliance is always some proper segment of a formal lineage, commonly a

skewed downward; the rest being classed terminologically as ‘pseudo-agnates’. For present purposes, the crucial case is that of a father’s sister’s husband (FZH). For, he is not a ‘grandchild’ but is called *ka taang*, a word for only this relative and all the men of his lineage of his own generation. The reasons for this are crucial.

WTs make claims upon the resources of their WGs, and often enough the various gifts and things like marriage payments demanded from WT do not compensate for these demands. This is especially the case for more genealogically distant member of one’s WT lineage, who, after all, do not in general make such gifts and payments to the WG. Therefore, it is to the WG’s advantage not to recognize the latter as WT, although in fact the latter try to have themselves recognized as WT because, in such systems, WG provide for their WT all sorts of support in their capacity as what one might call overlords to WT. Therefore, the aforementioned asymmetry arises or is defined. That is, on the one hand, the entire lineage of one’s WT claim recognition whilst WG make every effort to reject recognition of more distant agnates of their WT. There is independent evidence for this in the fact that there are recurrent arguments about the terminology itself; some persons recurrently insisting that FZH *should* be called ‘grandchild’ (*ka-tu*), others, the majority, insisting on the special word *ka taang*, insisting likewise on pseudo-agnatic terms for all other members of his lineage when there has been no previous recent marriage with the group up to the point where one’s real or classificatory FZ has acquired her husband in question. This argument happens again and again in the course of ethnographic elicitation of kinship terminology. For, of course, one rarely can do this without bystanders being present, and when one’s immediate consultant says *ka taang* when prompted with the name, say, of his or her FZH, one or more bystanders (commonly for some reason female) will interject the remark that the logical term ought really to be the grandchild term. Indeed, it is worth pointing out that the interjected counter argument is precisely of this form: not that the term *isn’t* the unique term *ka taang* but rather that it *ought* to be *ka tu* and that, furthermore, this latter term *ought* to be extended to the entire lineage of the FZH.

The upshot of all this is that we now have, direct empirical evidence that Fortes was correct that the claim that a man has on his mother’s agnatic group is indeed a vague and ambiguous one, a supplementary one to his claim on his own agnatic group. However, it is abundantly clear that this follows strictly from an alliance-theoretic standpoint, and is not a matter of any kind of supplementary ‘descent’ relationship, more accurately, given what I have argued above concerning ‘descent’, or any kind of relationship of jural consanguinity. More particularly still, is it not a matter of *corporate ‘membership’* in the sense of there being any rule for deciding in all-or-none fashion that the young man in question is in his mother’s agnatic group.

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rather low-level segment at that (see my remarks in Chit Hlaing 2007 on the Jinghpo/Kachin word for such a unit of alliance, *dap*). Moreover, it is worthwhile pointing out that one consequence of this situation is the eventual further segmentation of one’s newly established WT lineage, with the ‘rejected part of it’ becoming a separate unit of alliance, not sharing the alliance relation of the segment eventually descended from the marriage of one’s real or classificatory FZ — a segmentation or fission in fact not precipitated or motivated by the internal relations of the ‘lineage’ up to the point of that new marriage but only by the ‘rejection’ of the superordinate WG in question.

V. Conclusions

What I have tried to do in this paper is to present some examples, relating kinship and the wider domain of social groupings, for which the solution of long-standing theoretical controversies can be seen to arise from, *and only from*, the application of formal, algebraically based reasoning and analysis. Note in particular that this demonstration depends not at all upon the direct application of any formal *notation* but rather upon the application of formal conceptual *reasoning*, based upon the inescapable fact that social and conceptual-cultural organizations are domains of structure, or relations. For, by definition, in mathematics though, alas!, not in ordinary anthropology, a *structure* is any set of *relations* closed under a given algebra — a given formal system. Furthermore, and in closing, it wants to be noted that, once again, far from its being the case that mathematics is 'abstract' in the sense of removing our attention to rich empirical human detail, it ought to be clear that, applied properly and not in the sense of just stating our work in abstruse notation, it can and should force our attention to (levels of) empirical detail that we would not have attended to otherwise. For, mathematics as rigorous formal reasoning produced theorems, propositions that *must* be true if one's assumed starting points or positions are to be accepted, and these theorems, at least in the best cases, such as the cases presented here, though purely formal/relational in themselves, force us to seek empirical facts that can count as their proper interpretation or model (in the logical sense of this latter word, as when formal logicians say that something is 'true in the model').

Here are the sorts of questions that this paper necessarily raises for further work; for, any paper that does not raise further questions is likely to be (literally) inconsequential.

Appendix

In response to several readers' questions and excellent suggestions, I want to go farther and give a far more particular example of the proposition that, at least frequently, serious and fundamental theoretical issues cannot be effectively dealt with at all unless one applies formal, algebraic apparatus (I prefer not to say 'methods' since all to commonly this is taken to have to do with processing or handling data, and I am dealing here with the way one constructs theoretical arguments for which empirical data can actually be used *decidably*). The instance shall pursue here is one of absolute centrality in cognitive anthropology and, indeed, cognitive science more comprehensively. It is the issue of the relationship between human cognition and the (apparent) human capacity for 'sociality', i.e., our social-interactive context of life. There is a whole book of considerable importance that has recently appeared trying to come to grips with this matter (Enfield and Levinson 2006). I propose here to show that, with a proper view, formal-=algebraic yet at the same time thoroughly data-driven, of both 'interaction' and the cognitive capacity for imputing to others intentionality and so on (ToM, as it is called, *viz*., 'Theory of Mind'), we have to turn the Enfield and Levinson view on its head to arrive at an acceptable solution.

Let $*I \subseteq \{R\}$ – where *I is all [human social] Interactions, and {R} is the set of all formally well-defined Relations. Let I_{refl} be the interaction with oneself.

Then, $I_{refl} \subseteq *I$

The way this plays out I have dealt with before, namely, with universal linguistic facts about reflexive morphology, where what Huang has called the Disjoint Reference (DJR) principle requires that for two or more arguments of the same clause, if they are to refer to 'the same' (thus entailing the Identity relation) object, person, or whatever, real or imaginary, they must have disjoint indices of reference, namely, must pick out different members of the set of all possible/imaginable such objects. It follows straight forwardly that there must be a 'designated' index such that it is borne by the 'object' argument and will invariably be set *equal to* (=) the subject argument. In fact, in as much as all predicates have what logicians call an external argument (a subject) but only some have an object, we can say that, in a hierarchy-theoretical view of the algebra of partially ordered sets, the designated index, which I shall call $_r$, has always to be = to the argument commanding it! From this I shall show that it follows that all human interaction is based, in the first instance, cognitively, on a human capacity to interact with *oneself*! In fact this will end up as showing that it is not that our capacity to 'think' humanly has originated in evolutionary terms and lives on our being mutually dependent social animals but rather (or at any rate equally) that our sociality, and crucially our ToM cognitive capacity, arise on the cognitive foundation of the fact (for which it turns out there is massive evidence in language/reflexives, in the whole area of Rule Governed behavior, which I shall recapitulate here, again in formal terms of cybernetics, and in our intuitions about 'thinking' as effectually talking to oneself, even if often silently, for which there is neurological evidence) of consciousness and self awareness! That is, it arises, in effect on the basis of the fact that, in the first place, in thought itself, *we are invariably interacting with ourselves*. I shall also have to invoke the idea that ToM necessarily involves/ entails even the self-interaction/ reflexive relation. For, to impute to another a 'mind like one's own' is to impute to it/him/her an image of one's own mind/self, entailing, in ideally infinite regress, the other's view of one's own image of that other, and so forth. Indeed, as I shall try to show, without this the cognitive foundations of sociality would fail; for, in this, depends absolutely our capacity for Mutual Knowledge of being able in interacting to zero in on each other's ideas, intentions, etc. and thus, *inter alia*, our capacity for social learning involving changing one's self-representation and even one's supposed essential 'personality'. This last, in turn, clearly, bears crucially upon our understanding of how it is that not all societies/cultures impute a 'personality' in that sense to individuals (see, e.g., Shweder 1982, Rosaldo 1980).

To evaluate what I have written in this paper, here are some considerations that have to be considered. If a student were to come to me and ask – how might I apply this formal approach to the definition of groups to a problem of identity in contemporary society, would the formal framework help to delimit the kinds of empirical facts/data needed to decide questions of ambiguous, fuzzy or categorical forms of group membership?

Does my definition of corporateness help to better understand what it means to be a gem merchant at the Burma borderlands (my most current ethnographic project)? What sorts of data would the formal approach lead one to collect if this issue were a problem? And further can the formal definition of corporateness help us design research on practices or processes where group membership is at issue?

References

Appell, George N. (1983) Methodological Problems with the Concepts of Corporation, Corporate Social Grouping, and Cognatic Descent Groups. *American Ethnologist* 10, 2: 302-317.

Chit Hlaing, F. K. L. (2000) Aspects of a Formalist Theory of Kinship: The Functional Basis of its Genealogical Roots and Some Extensions in Generalized Alliance Theory. Pp. 212-239 in D. B. Kronenfeld, ed., Special Issue of *Anthropological Theory*. Sage Publications.

Chit Hlaing, F. K. L (2001) The Instantiation Problem: A Cognitive-Computational View. Paper for the Symposium on Cultural Ideas Systems: Logical Structures and the Logic of Instantiation I Annual Meetings of the American Anthropological Association

Chit Hlaing, F. K. L. (2005a) Towards a Formal Cognitive Theory of Grammatical Aspect and its Treatment in Burmese. P. 125-142 in J. Watkins, ed. *Studies in Burmese Linguistics*. Canberra: Australian National University, *Pacific Linguistics.*

Chit Hlaing, F. K. L. (2005b) On the 'Globality Hypothesis' about Social/Cultural Structure: An Algebraic Solution. *Cybernetics and Systems* 36, 8: 803-816.

Chit Hlaing, F. K. L. (2006) Research Methods and Mathematical Anthropology: Prolegomena to The Logic and Place of Statistically Based Methods. Paper presented to the 2006 annual meetings of the Society for Anthropological Sciences.

Chit Hlaing, F. K. L. (2007) Introduction: Notes on Edmund Leach's Analysis of Kachin Society and its Further Applications. In M. Sadan and F. Robinne, eds. *Reconsidering Political Systems of Highland Burma*. Leiden: Brill (Handbook of Oriental Studies, series, Section 3, South East Asia).

Cunningham, Clark E. (1964) Atoni Borrowing of Children: An Aspect of Mediation, pp. 21-37 In M. E. Spiro, ed., Symposium on New Approaches to the Study of Religion, *Proceedings of the 1964 Annual Spring Meeting of the American Ethnological Society*, Seattle: University of Washington Press.

Davenport, William (1959) Nonunilinear Descent Groups, *American Anthropologist* 61, 4: 557-572.

Enfield, Nicholas J., and Stephen C. Levinson (eds., 2006). *Roots of Human Sociality: Culture, Cognition, and Interaction* Oxford: J. Berg,

Firth, Raymond (1963) Bilateral Descent Groups, An Operational Viewpoint. pp. 22-37 In I. Schapera, ed., *Studies in Kinship and Marriage*. Occasional Papers 16, Royal Anthropological Institute.

Fortes, Meyer (1959) Descent, Filiation and Affinity, *Man*, 59, nos. 209, 331.

Fortes, M. (1963) Letter on Descent, etc., Current *Anthropology*, Oct. : 398.

Freeman, Derek (1958) The Family System of the Iban of Borneo, pp. 5-52 In, Goody, J. ed., *The Developmental Cycle of Domestic Groups*, Cambridge Papers in Social Anthropology, 1, Cambridge University Press.

Keesing, Roger (1970) Toward a Model of Role Analysis. Pp. 423-453 In R. Cohen and R. Naroll, eds. *A Handbook of Method in Cultural Anthropology*. NY: Natural History Press.

Le Bon, Gustave (1896) *The Crowd: A Study of the Popular Mind*. NY: Macmillan.

Leach. E. R. (1959) Reply to Fortes 1959 *Man* 59.

Lehman, F. K. (1963) *The Structure of Chin Society*. Urbana: University of Illinois Press.

Lehman, F. K. (1970) On Chin and Kachin Marriage Regulations. *Man* n.s. 5: 118-125.

Lehman, F. K. (1985) Cognition and Computation. Pp. 19-48 In Janet W. D. Dougherty, ed. *Directions in Cognitive Anthropology*. Urbana: University of Illinois Press.

Lehman, F. K. (2001)

Lehman, F. K., and Klaus G. Witz (1974) Prolegomena to a Formal Theory of Kinship, pp, 11-134 In P. Ballonoff, ed. *Genealogical Mathematics*. The Hague: Mouton & Co.

Löffler, Lorenz G. (1960) Patrilateral Lineation in Transition, *Ethnos*, 1-2: 119-150.

Maine, Sir Henry (1861, reprinted 1963) *Ancient Law*. Boston: Beacon Press.

Peranio, Roger (1961) Descent, Descent Line and Descent Group in Cognatic Social Systems: pp. 93-113 In *Proceedings of the Annual Spring Meeting of the American Ethnological Society*, Seattle.

Rosaldo, Michellle Z. (1980) *Knowledge and Passion: Ilongot Notions of Self and Social Life*. Cambridge: Cambridge University Press.

Shweder, Richard A. (1982) Does the Concept of the Person Vary Cross-Culturally? pp. 97-137 in A. J. Marsella and G. White, eds. *Cultural Conceptions of Mental Health and Therapy*. Boston: Reidel.

Zadeh, Lotfi *et al*. eds. (1974) *Fuzzy Sets and their Applications to Cognitive Decision Processes*. NY: Academic Press.