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LETTERS TO MACT

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THE READ-LEHMAN LETTERS ON KINSHIP MATHEMATICS

DWIGHT READ
DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF CALIFORNIA, LOS ANGELES
<DREAD@ANTHRO.UCLA.EDU>

KRIS LEHMAN (F. K. L. CHIT HLAING)
DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
<F-LEHMAN@UIUC.EDU>

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DWIGHT READ, DEPARTMENT OF ANTHROPOLOGY, UCLA
AND
KRIS LEHMAN (F. K. L. CHIT HLAING), DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Editors Note: Following the publication of the letter from Dwight Read, (see "New Results: The Logic of Older/Younger Sibling Terms in Classificatory Terminologies" in MACT Letters, November 9 2004) Kris Lehman (F. K. L. Chit Hlaing) responded to that letter. Together Professors Read and Lehman then agreed to compile an exchange, including previous discussions, and have submitted the sequence of letters below to MACT. They offer the exchange both to record some important developments in the mathematical theory of kinship category systems as reflected in their joint work-in-progress, and to record the way such work develops through technical exchanges. Read's initial letter provides basic published citations as background for his initial remarks; for background on Lehman's side of the exchange, see his 2001 paper, "Aspects of a Formalist Theory of Kinship: The Functional Basis of its Genealogical Roots and Some Extensions in Generalized Alliance Theory". *Anthropological Theory* 1 (2): 212-239 [Special Issue, edited by D. B. Kronenfeld], Sage Publications.

30 October, 2004
Dwight,

This is a beautiful demonstration and an excellent counter to several influential, older papers, which you address in your letter, such as the one by Nicholas Allen, that try in various ways to oversimplify the domain of kin term/category systems by replacing serious analytical treatment by a sort of naïve and speculative 'evolutionary' sequencing of category types.

Let me follow this up with some remarks, basing on the work you and I did a few summers ago. I think it is easily seen that there's a logic to the distinction you draw, namely, where SIB is a core term for merging systems, whilst I is a core term for lineal ones. I shan't go into detail here, save to recall our demonstration that in some underlying sense it is the sibling-set that is the inverse of Parent, so that, speaking informally at least, there is a natural sense in which I commutes with SIB. Now, consider that in 'zero' generation ({- asc, - desc]) there is no lineal kin term/category. Then, with 'I' not a term in itself ('EGO is not itself a kin term but only an identity relation as a starting point for calculations of relationship), merging is ill-defined, since non-lineals are all we have (technically co-lineals, of course). So, in some sense that I still want to work out formally, SIB more perspicuously 'represents' the situation of this generation, if only because, in any case, so-called 'Ego' is somehow a member of the sibling set (in the self-reciprocal sense that a sibling of a sibling is a sibling and so on).

Kris
F. K. L. Chit Hlaing
University of Illinois at Urbana-Champaign

30 October, 2004
Kris,

Can you send what you have written to MACT, responding to my letter? Then I'll respond to your letter etc. and this way we will have a record of the interchange of ideas. I agree with the need to go back to what we worked out earlier and to see how that discussion helps to fill out the "initial conditions", as it were, under which the terminological structure is constructed.

Cheers,
Dwight
Dr. Dwight W. Read
Dept. of Anthropology, UCLA

30 October, 2004
Dwight,

Certainly, Dwight . I think we are on to something. I am reasonably sure that your phrase 'the initial conditions' is at the heart of the matter. That is, if, as we have done, we agree that, while genealogy is not the generative source of KTS, it is the universal 'model' that motivates KTS, or, let us say, suggests basic parameters or whatever, then we have indeed begun zeroing in on those initial conditions. This also, obviously, gives one a particularly apt handle on Hawaiian/generational terminologies, which I myself have shown NOT to be derived by morphisms on PGS. One looks at PGS, selects only (basically) two dimensions (generation and sex) and builds a KTS directly from that. If so, it is unsurprising that for more-or-less core-generational terminologies (possibly including Tongan after all) the core term is indeed SIB in some sense.

Kris

31 October, 2004
Kris,

Your comment about Hawaiian and what I've done on Tongan clarify the Hawaiian terminology and permit us to keep it within the framework of alternative ways that a structure can be generated consistent with the general outline (first ascendant, then descendant + reciprocal) that I've discussed.

Hawaiian:

The generating set is {I, F} and we make the ascending structure {I, F, FF}, say. Now add a sibling element B (and the equation BB = B) and the equation FB = F (as must be the case, going back to our discussion about the basis for PGS; this is a place where the genealogical "initial condition" is necessary). Construct the ascending structure which will have the elements {I, B, F, FF, BF, BFF}. Now we make the descending structure, but keep B unchanged, so that the generating elements for the descending structure are {I, B, S}. The descending structure has the equation SB = S by virtue of the descending structure being a structure isomorphic to the ascending structure. We add the equation FS = I to make F and S reciprocal elements. We need an equation for the cross product SF. Let SF = B (this is not a necessary equation !). We also need an equation for the cross product BS. For this crossproduct BS = B since this is the reciprocal equation for the equation FB = F which is already in the ascending structure. So now we have determined what happens to each of the cross products SF, FS, BS and SB.

The equation SF = B implies that B is a self-reciprocal element. So the equation SB = S has reciprocal equation BF = F and so BF and BFF will no longer be distinct elements.

Our structure of ascending and descending elements consists of the elements {I, B, F, S, FF, SS}.

Now make an isomorphic copy of this structure to make the female structure. In this isomorphism keep I fixed, so that the female structure has the elements {I, Z, M, D, MM, DD}. Now we need crossproduct equations for B and Z, namely BZ = B, ZB = Z. Crossproduct equations for B, Z , S and D follow from existing equations: e.g. ZS = D, BD = S follow from BS = S and ZD = D; DB = D , SZ = S follow from SB = S and DZ = D. The equation ZF = M and BM = F follow from taking the reciprocals of the equations DB = D, and SZ = S (where we have to keep track of sex of speaker to correctly compute reciprocals).

Put all of this together and the elements in the structure are {SS, S, I, B, Z, F, M, FF, MM} with the equations BF = F, ZF = M, ZM = M and BM = F. That is, we have generated the Hawaiian terminology.

Note that what we worked out in regarding a more complete foundation for PGS is necessary in (at least) two places: the algebraic equation for reciprocal elements; e.g. FS = I, and the equation FB = F. This is what we need to work out more explicitly-- to show how PGS really does provide the initial conditions for the algebraic structure.

Cheers,
Dwight

31 October, 2004
Dwight,

One further remark, however. Consider the position of B in what you say about Hawaiian. Then, given such an insertion, what you call 'ascending' becomes non-descending, and conversely, your 'descending' is in reality non-ascending. This allows one to generalise 'reciprocal' beautifully, as nothing did previously! Moreover, B is 'inserted' (as you put it) in such a way as to define or give substance to zero generation as the common intersection of [-asc] and [-desc], making them not merely reciprocal but in fact mirror-image reciprocal, which is something I've been doing effectually for years in the map PGS>K, so as to generalise, e.g., merging rules and the like. After all, merging etc. work in a perfectly general way ideally, provided they are stated as having their domain in simultaneously 'opposite directions' (viz. 'up' and 'down') from I/B, etc.

Kris

1 November, 2004
Kris,

I think we are saying much the same thing. The two steps of making a descending structure isomorphic to the ascending structure AND introducing an equation such as FS = I provides the basis for viewing the descending structure as, in some sense, the reciprocal of the ascending structure. While the algebraic construction is straightforward on this matter, the underlying PGS has different nuances. First, tracing down and then up corresponds to FS = I. But, as we discussed, we also have the reciprocal of tracing up and the reciprocal of tracing upward is a set of positions and does not take one back just to "ego", which is why we "normally" won't have the equation FS = I since that equation is not in accord with reciprocity as it occurs with genealogical tracing.

To put it another way, reciprocity as it is defined in KTS is not identical to reciprocity as it is defined in PGS in the sense that KTS and PGS are not even homomorphic structures as we previously discussed, so the notion of reciprocity in the PGS structure, call it r, does NOT relate to reciprocity in KTS, call it R, by a morphism m with mr = R. This is not a problem; instead, it simply points out that calculations in KTS are not formally reducible to calculations in PGS and vice-versa, which makes sense for if it were the case that we could formally reduce one to the other we could well ask why we keep two conceptual systems. Nonetheless we can translate the calculation in one space into calculations in the other space via the instantiation of generating elements with the basis of genealogical tracing; e.g. F --> tracing up to male person.

The zero generation level has two aspects. Forming the descending structure via an isomorphic copy of the ascending structure already introduces a zero generation level, namely I. But it is an odd kind of zero generation level as its only content is I. I like your idea about B giving substance to the zero generation. Given the way in which the Hawaiian introduces B, when we set SF = B this precisely forms a zero-level generation of terms: B = SF, SSFF, SSSFFF, etc. (and similarly for female terms). Notice that this notion of zero-level generation terms is not a unique property of Hawaiian-like terminologies as in the AKT we have SF as a compound term (i.e., a new node in the structure) and we assign the linguistic label Brother to this node and this is equally the basis for zero generation level terms.

In contrast, when we start with B and then introduce B' as the isomorphic element corresponding to B, then we do not have a zero-level generation for kin terms as B is 'ascending' and B' is descending. In the Tongan or the Trobriand we have the single kin term "opposite sex sibling" (which may or may not be sex marked) at the zero-generation level, but this is due to the male identity element I and the female identity element i becoming nodes labeled with "opposite sex sibling"; that is, they are zero-generation terms only in the sense that I is a zero-generation element in the algebraic structure.

This lack of a zero-generation for B and B' means that we automatically have an ordering for the sibling terms B and B': B' < I < B, which suggests why the attributes older and younger are assigned to these terms. But more generally it suggests that any ordering that exists in another domain can be assigned to these terms.

Dwight