For now, I want to emphasize the fact that mathematics are connected with semasiology first, because of Ardener's challenge (i.e. "prove it"). "How," he wanted to know, "are you going to deal with the problem of identity?[24] After all, change exists: all things become other than what they were. Spoken languages and sign languages change, dance idioms change. People change; habits, manners, customs -- nothing remains the same."

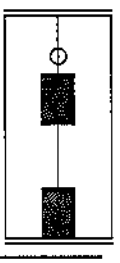
"That's as may be," I replied, "however, from a dancerly standpoint some things do *not* change. The law of gravity, for example, and the fact that knees and elbows only bend one way and facts like having only two legs. No matter how complex dance steps may be, humans only have two feet and legs with which to perform them. It is this kind of thing that makes human movement *rule-based*, although very few people think of it that way." The second reason why semasiology is connected with mathematics turns around the complexity of the rules that govern human movement in any of its manifestations.

Transformational Rules and Semasiology[25]

Over the years, I've become increasingly aware that the notion of 'rules' presents serious obstacles for some. Because of this, I ask that readers put aside images of injunctions issued by judges or courts and/or codes of discipline such as those prevailing in schools or religious orders because this is not the kind of rule to which I will draw attention. We are concerned here with the 'meta-rules' that are 'principles' or 'laws' to which all human actions conform. They are 'intransitive' that is, they are not man-made. Some of the knowlege in semasiology is, therefore, knowledge *of* things that are givens.[26]

Sometimes, however, it is necessary for an investigator to examine what transformational rules characterize the data they have collected. They might want to work out specific syntactical features that govern how a particular dance form is organized (for an example, see Myers 1981). This kind of analysis is based on the fact that human beings only have two legs and there are only so many underlying ways of moving them. There are five meta-rules that can be used for this purpose.

RULE 1



Where X = R leg and X' = L leg,
then [X+ X'] → [X+ X']

In common English, a jump or
hop from both feet to both feet.

[24] Notice that I had to deal with the connected ideas of 'continuity' and 'identity' in semasiological theory.

[25] The transformational rules I explain partake of the intransitive nature of, for example, the set of degrees of freedom for the semasiological body, not explained here owing to their complexity and lack of space.

[26] Up/down, right/left and front/back (hereafter U/D, R/L and F/B respectively) are the intransitive meta-rules of the *spatial environment* in which movement takes place (see p. 144).

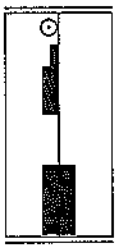
In terms of more 'ordinary' moves, Rule 1 is usually one of the distinctive features of jumping rope -- at least most people learn to jump rope using Rule 1, although accomplished performers use other transformational rules as well.

In the idiom of ballet-dancing, *soubresauts, entrechats, temps de poisson, échappé* and some *rélevés,* for example, use Rule 1.[27]

Locomotion in a sack race employs Rule 1 because the presence of the sack prevents going forward any other way.[28]

Rule 2 is manifested in any move where the person jumps ('steps', 'glides' or somehow proceeds) in any direction from both feet to the *right* foot or both feet to the *left* foot. Clearly, if someone moves from the right foot to both feet or the left foot to both feet, it is simply a reversal of the same rule. It would be written in reverse from the text below:

RULE 2



Where X=R leg and X'= L leg.
then [X+X'] $\rightarrow$ X', or [X+X'] $\rightarrow$ X
or X $\rightarrow$ [X+X'], or the reverse.
In common English, a hop from both feet to one foot or a hop or jump from one foot to both feet.

With reference to ballet-dancing, *sissone, temps levé* and *assemblés* are some of the actions that conform to this rule, but it isn't necessary to have studied ballet-dancing to understand the rule. Anyone who has played hop-scotch, for instance, has used this rule -- although not by the name 'transformational rule' -- nor usually with any awareness that he or she is following a rule.

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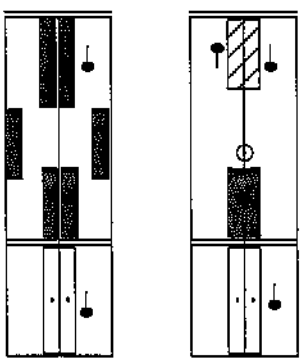
[27] It is important for readers to understand that I use examples from ballet-dancing simply because I know the idiom extremely well. Examples from other idioms of dancing are equally relevant and readers can substitute terms from these if they wish.

[28] The transformational rules for the body members 'arms' are given in Williams (1977). For the purposes of comparison with the written expression of Rule 1, these stretches of text are relevant:

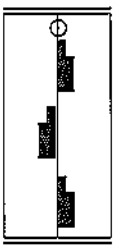


soubresaut relevé

To begin hop-scotch, one jumps from both feet onto one foot, and there are sequences internal to the game involving jumps from one foot onto both feet and vice-versa. Those who have never played hop-scotch can claim familiarity with this rule by becoming aware of what they do when they walk to a counter in a department store: their last step will usually take them from the R or L foot onto both feet. The first step away from the counter takes their weight off both feet onto one foot. Although the rule is written in Laban script above as a 'hop' or a 'jump', one need not 'hop' from both feet to one foot, as the department store example indicates.

In between shop counters, sauntering along a country path, or running for a bus, people follow transformational Rule 3, which is familiar to the majority of people because ordinary walking is an expression of Rule 3.

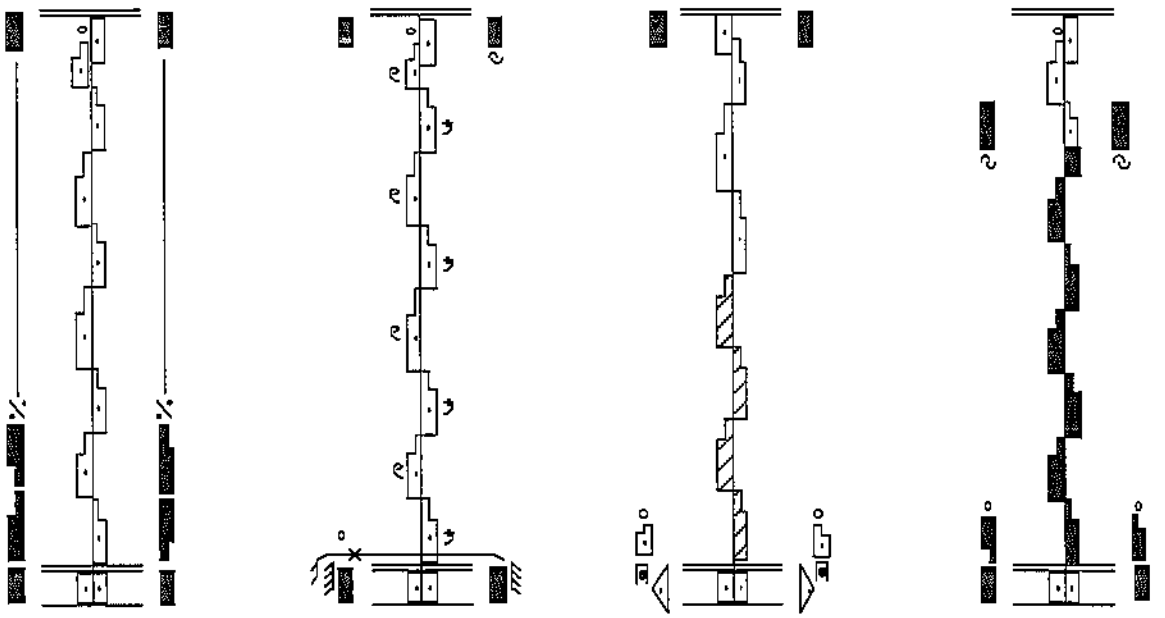
RULE 3



[X → X' → X → X', etc]

Where X=R leg and X'= L leg, then X and X' can alternate, hopping jumping or walking from Right to Left, etc.

Semasiologists call Rule 3 the rule of alternating-weight-stress.



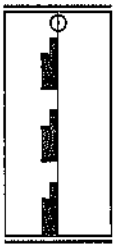
Ordinary Walk | Limp | Tiptoe | Chaplin walk

As the four stretches of movement text indicate, someone who limps also follows Rule 3, but with less weight-stress on one leg than on the other. Walking on tiptoe puts equal weight-stress on both legs, but changes the

vertical dimension by elevating the body slightly in space. The 'Chaplin walk' in contrast, lowers the body on the first six steps of the action, but finishes with the body in an ordinary upright relation to space.

Moves in the ballet-dancer's body language game using Rule 3 are *piqués, petit tours en chaine* and *pas de boureés* (which can also begin or end on both feet). Marathon running (or any kind of running) is based on Rule 3 and Olympic hurdlers also use Rule 3. Instead of alternating weight change, Rule 4 is the rule of *iterated*-weight-stress. That is, weight placed on one leg over and over again:

RULE 4



[X' → X' → X', etc.]

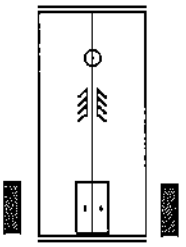
Where X = R Leg and X' = L leg, then hops, assisted jumps, etc. can be made from one foot to the same foot, creating a rule of iterated weight stress.

A *ballerina* or a *premier danseur* in a show of technical virtuosity might, for example, hop while turning in one place or she might travel small distances on one *pointe*. Where the male dancer might do a series of turns *a la seconde* on one leg to display his strength, the famous set of thirty two *fouettés* in the last act of Swan Lake (performed by Odile to bedazzle Prince Seigfried) consists of a series of turns on one leg alternating between *demi-plié* and full *pointe*. A series of *relevés* can be executed by either performer using only one leg, in which case the dancers are conforming to Rule 4.

Rule 4 is infrequently used or seen in ordinary life, but, for example, if someone teeters on a cliff-edge trying to regain his or her balance, they would likely do so in terms of Rule 4. The act of "staggering" often includes tiny hops on one foot, because the body is out of balance and, besides an effort to regain command of oneself, the hops indicate loss of control. In contrast, performing while jumping rope on one foot for prolonged periods of time is a mark of virtuosity. Gymnasts expert on the balance beam often use this rule.

As written below, Rule 5 merely shows a change of weight from one set of body members to another -- in this case, feet to hands. Use of this rule is visually familiar to many, because in the world of skilled gymnasts, it is frequently used as the basis for demonstrations of unusual prowess.

RULE 5



Where X = R Leg and X' = L leg, [X+X'→ hands], or to another body part, i.e. knees, buttocks, etc. as in kneeling or sitting.

NB: This is a written version of a rule, not a 'handstand'.

A vault, for example, involves running (Rule 2), then shifting the body weight from one or both legs to hands on the horse, followed by the execution of maneuvers in the air, then landing cleanly on both feet. In the vocabulary of ordinary movement, the act of sitting down in a chair is an example of Rule 5, as it involves a transfer of weight from feet to buttocks.

These rules state all of the formal possibilities of weight change involving the body-members 'legs'. There are no others.

Moving human bodies utilize these rules in combination, of course, and they are not the sort of rules that people think about while they are moving -- nor should they. *That is not the point.*

The point is that one thinks about these things if one is interested in analyzing structured systems of human movement without recourse to the technical languages of anatomy, biology or kinesiology. To be able to think in these ways students must *re-conceptualize* their notions **1.** of 'movement' and **2.** of 'bodies' and the spaces in which they move, because the languages of older theory and methods in the field of human movement studies are corrupted by Cartesian dualisms, by mechanical models of 'behavior' and by numerous inherited ideas from 'The Old Paradigm' (Harré 1971).

Moreover, students will never be able to reverse the trend about which Evans-Pritchard speaks in the opening of the Azande essay (1928) unless they think about the Saussurean ideas (and the linguistic analogy) upon which semasiology is based (Ardener 1971). They must learn to think for themselves about 'behavior' (Ardener 1973).

In any case, it is necessary to see semasiology, not as a 'method' that is applied *carte blanche* to raw movement data as, for example, one might apply statistical method without reflecting on the consequences of doing so. Semasiology is constructed so that it can handle any movement-based phenomena, however

> One of the consequences of our interest in variation among human body languages is the idea that systems of body languages are not unitary phenomena. That is, they cannot adequately be described by only one set of organizing principles, although at a structural meta-level, we can postulate certain invariant features of (a) the body, (b) the space in which it moves, and (c) certain transitive and intransitive features of an hierarchy of human choice, such that we can say that there are elements of these body languages that are in complementary distribution in the world, and so do not, at this level, conflict with one another.

> Our method(s) of approaching the vast field of human movement studies consists, not of a unitary descriptive "grid" into which we force highly variant cultural data. Rather, we aim to encourage the point of view that "unity" will perhaps emerge from seeing the ordered relations between variants and contexts. This is possible only if one sees "variety," including sometimes incompatible ideologies and beliefs perceived in the systems on the ground, *not* as deviations from an assumed "norm," but as manifestations of intricate sets of rules that, at base, can be seen to reiterate a linguistic truism: the medium (in this case, movement) is the message (Williams 1982: 162-63).

'Movement' or 'Action'?

In semasiology, the broad, ambiguous term 'movement' is separated into two fields, i.e. 'behaviors' which are taken to imply mechanical, causal accounts of movements which are appropriate when agency is either absent or (in a human being) temporarily or permanently destroyed. In contrast, 'actions' are taken to be movements or comprehensive sets of movements which have *agency*, that is, intentions, language-use, meanings, rules. Thus there are organisms and/or animals which monitor their behavior on an elementary or first order level in terms of movement. However, human beings are conceived of as *agents* ('actors', 'persons') whose actions reflect an hierarchy of powers (see Harré and Madden 1975). That is to say that human actions exist in systems consisting of *reflexivity*, simply stated, as people possessing the power to be conscious of being conscious of being conscious -- and so on. From a semasiological point of view, we say that animals 'live' or 'exist' but human beings have *conceptions of living or existing*. Because of this they 'act'. They do not merely 'behave'. It follows that 'to act' is to be able to have models of 'behaving' (Williams 1975: xvi).

An axiom of semantic anthropology is that in dealing with human actions, one is dealing with actions which are suffused with meanings. From this point of view, a scientific description which ignores the meanings of actions is purely metaphysical in a pejorative sense and is not scientifically realistic. If it is true that human beings are language users; that they are rule-, role-, and meaning-makers, then these facts have profound consequences regarding what a human scientific investigation amounts to. Not only does the investigation itself involve symbolic interchange, the objects of semasiological investigation are usually systems of human symbolic exchange (Williams 1975: xiv).

Reflexivity

> At the simplest level of our enquiries, we start by asking, "how would the people of some other culture or the users of some other body language expect me to behave if I were a member of that culture or wanted to use their body language?" We ask this because we believe that to explicate the rules of the body language of 'x' is to provide a few beginning answers to that question and at the same time lay the groundwork for a low-level theory of that body language. Because we advocate a self-critical style of anthropological study, we constantly compare the rules of 'x' with the known rules of our own idioms, thus the knowledge that emerges is of a basically reflexive nature (Williams 1982: 164).