

**Everything we always thought we knew about space -
but did not bother to question...**

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lichtung

manche meinen
lechts und rinks
kann man nicht
velwechsern.
werch ein illtum!

Ernst Jandl

1 Introduction:

The German novelist Eckhard Henscheid gave the third volume of his "trilogy of current idiocy" the title "The bishop's mistress". However, on the second page of the book Henscheid (1978, 6) confesses that the novel is not at all about a bishop's mistress. Like Henscheid, I must also confess at the very beginning of this paper that I will not, and cannot deal with everything we think we know about space; I chose this title just to show off.

What I will do in this paper is the following: First, I present some of the main ideas and insights in the phenomenon of space gained by linguists and psychologists during their description and analyses of space concepts and spatial reference in the familiar Indo-European languages. Although the theories of space are only based on the material the Indo-European languages offer and on Western-European - philosophical - concepts of space, they nevertheless claim universal status.

With this universal claim in mind, I will then confront some aspects of the theories and concepts of space and spatial reference with linguistic data on this topic gathered in what many

people, including linguists, would call more "exotic" languages, namely Oceanic and Mayan languages.

After this confrontation of theories and facts - that questions the status of what we think we know about space - I will reconsider what theories of space, spatial conception and spatial reference really can claim.

2. Some things we think we know about space and spatial reference

Behavioral physiologists, at least those like e.g. Hermann Schöne, working in the tradition of Erich von Holst's seminal contributions to the field seem to agree on the premise that there is no behavior whatsoever that is not oriented in some or the other way¹. Thus, it is only logical to state - with the psychologist Hans Hörmann - that communicative behavior is space-oriented as well (Hörmann:1978, 311).

Whenever we use (natural) language with one another, we use it in certain situations - at a certain place and at a certain time - interacting with people "who share a great deal of both situational perception and general knowledge" (Weissenborn, Klein: 1982b, 1). Thus, when we communicate we communicate in a certain context, and this context shapes our utterances. Indeed, one of the main features of natural language is its "contextuality" - and it is this context-boundness where language, perception and

1 See: Schöne (1983, 5f.): "Der Begriff Orientierung bezieht sich somit auf die räumliche Ordnung der Bewegungen. Bewegungen sind Verhaltenselemente. Orientierung hängt also wesentlich mit Verhalten zusammen...Verhaltensweisen sind Einheiten des Verhaltens. Eine Verhaltensweise ist eine durch ihre spezifische Raum-Zeit-Gestalt gekennzeichnete Bewegungsabfolge. Das weist uns auf die besondere Bedeutung der räumlichen Ordnung des Verhaltens hin...Die räumliche Ordnung ist ein wesentliches Strukturelement des Verhaltens. Es gibt kein Verhalten, das nicht irgendwie orientiert ist...Orientierung nennen wir die Vorgänge, mit denen Lebewesen ihr Verhalten im Raum und zum Raum, d.i. zu räumlichen Merkmalen, ordnen". For a different point of view see Kritchevsky (1988, 111) who claims, "Behavior must be divided into spatial and nonspatial components...the perception of the location of an object relative to the observer is a spatial behavior...whereas the perception of the color of an object is a nonspatial behavior...". Remember also in this discussion, that the term "orientation" has its roots in the Latin verb "oriri" which means "to spring, rise, have its source, come into being, originate...!"

cognition meet. All our actions - verbal and nonverbal - and all our experiences are tied to specific (times and) places (see Ehrlich: 1991, 5). Space, our perception of space, and our orientation in space are basic for human action and interaction in a number of domains - Konrad Lorenz even regards our spatial cognitive capacities as one of the roots for human thinking (Lorenz: 1977, e.g. 21ff, 148, 156ff, 166ff, 206ff; see also Weissenborn (1985, 210f.)).

The intimate relation between language, perception and cognition - especially with respect to space - is generally acknowledged in the cognitive sciences, especially in linguistics, psychology, neurology, and ethology, but also in anthropology and in philosophy, of course². As always, however, the problem is how to describe this relation and how to explain the predominance of spatial concepts in human thought (see Anderson, Keenan: 1985, 278, Herskovits: 1986, 1).

To solve this problem asks for answers to questions like the following: How can we describe and analyse what we do, how we do it, and on what basic assumptions and concepts we do it when we refer to something or someone in (time and) space? How do we relate entities to one another - and how do we express this - spatial or non-spatial - relation? How do we express place changes of entities, that e.g. move from a source position to a target position? We must know why we produce and why and how we understand the meaning of sentences like the one Charles Fillmore (1975, 1) opened his famous Santa Cruz Lectures on Deixis with, namely: "*May we come in?*".

We can only produce and understand the meaning of sentences like this if it is clear that both speaker and hearer share more or less the same conceptions of space and if we - as speakers and/or hearers - know the context in which such an utterance is "anchored" (Levinson: 1983, 55, see also Fillmore: 1975, 3, 39;

² Remember that we also have "spatial languages" in the strict sense of the term, namely sign languages; see e.g.: Bellugi (1988, 160, 180, 182); compare, with respect to linguistics in this context, also e.g.: Clark (1973, 28), Denny (1985, 111, 119ff), Herskovitz (1986, 1, 194), Kitchevsky (1988, 111, 130), Klein (1990, 9), Liben (1988, 173, 184), Pick (1988, 145, 155), Weissenborn (1986, 383), Wunderlich (1982, 7); for a summary of philosophical thought on "space" see e.g. Gosztonyi (1976).

Hörmann: 1978, 505)³. If we raise this question we must also immediately pose the following questions (see Fillmore: 1982, 35; Klein: 1990, 10), namely: With what means does a given language provide its speakers to anchor such utterances that refer to space (and time) in a given context, what do the expressions that refer to space mean, and how can they be used to form and construct a coherent, grammatical utterance? Klein (1990: 10) considers these questions as constituting the three basic problems of spatial reference he summarizes under the headings "referential domain", "context (- integration)", and "meaning of the linguistic expression". To come closer to answers to all these different and difficult questions, we first have to consider some basic insights into the phenomenon we are dealing with here, namely the phenomenon "SPACE" (for definitional issues see Liben: 1988, 169ff, 172f.).

For our species, "space" is a structured whole; it is isotropic and three-dimensional. In our Western-European tradition of thought - we consider space as being ego-centred, i.e., as egocentrically organized - and represented in language from an ego-centric perspective (Miller, Johnson-Laird: 1976, 395) -, as distinctively vertical, and as interconnected with respect to paths - i.e., as a topological continuum (see Wunderlich: 1982, 2-5). We understand space in the framework of Euclidian geometry which is suited to the relationships between lengths, areas and volumes of objects we have to consider referring to the location of a certain object in space, referring to its place - i.e., "the part of space it occupies" (Herskovits: 1986, 33, quoting Aristotle's *Physics*). Thus, all space is relative: "in order to specify the location of an object we must specify its location relative to something else whose position is already determined for us" (Bowden: 1991, 87)

For this specification, for this spatial reference we need a coordinate system with reference planes. Now we have to realize

3 For "unanchored" sentences see: Miller (1982, 65): "Kaplan considers a kidnapped heiress, locked in a trunk of a car, knowing neither the time nor where she is, who thinks, 'it's quiet here now'". See also Fillmore (1975, 39): "The worst possible case I can imagine for a totally unanchored occasion-sentence is that of finding afloat in the ocean a bottle with a note which reads, 'Meet me here at noon tomorrow with a stick about this big'".

that the "influence of our bodily experiences extends very far into our conceptual system" of space (Lee: 1988, 239), indeed, because it is biology that "provides us with three ready made planes of reference" (Bowden: 1991, 88) needed for establishing a necessary reference point in relation to which we can specify location - for starting from a basic reference point or "origo", for us places that we want to locate are ordered along three dimensions.

As Bowden (1991, 88f.; see also Clark: 1973, 33) nicely illustrates, the "first plane is symmetrical and runs down the centre of the body...The second plane ...is assymmetrical and runs across the centre of the body...the third plane...is also assymmetrical and runs along the base of the feet". The first plane separates left and right, the second plane separates front from back, and the third plane is the horizontal plane at ground level with which we distinguish objects above ground level from objects below ground level. Bowden's observation is not new, though. In 1768 Immanuel Kant (see also Watson: 1979, 80ff; for an English translation see van Cleve, Frederick: 1991, 28f.) stated exactly the same in his pamphlet against Leibniz titled "Von dem ersten Grunde des Unterschiedes der Gegenden im Raume":

In dem körperlichen Raume lassen sich wegen seiner drei Abmessungen drei Flächen denken, die einander insgesamt rechtwinklicht schneiden. Da wir alles, was außer uns ist, durch die Sinnen nur in so fern kennen, als es in Beziehung auf uns selbst steht, so ist kein Wunder, daß wir von dem Verhältnis dieser Durchschnittsflächen zu unserem Körper den ersten Grund hernehmen, den Begriff der Gegenden im Raume zu erzeugen. Die Fläche, worauf die Länge unseres Körpers senkrecht steht, heißt in Ansehung unser horizontal; und diese Horizontalfläche giebt Anlaß zu dem Unterschiede der Gegenden, die wir durch O b e n und U n t e n bezeichnen. Auf dieser Fläche können zwei andere senkrecht stehen und sich zugleich rechtwinklicht durchkreuzen, so daß die Länge des menschlichen Körpers in der Linie des Durchschnitts gedacht wird. Die eine dieser Verticalflächen theilt den Körper in zwei äußerlich ähnliche Hälften und giebt den Grund des Unterschieds der r e c h t e n und l i n k e n Seite ab,

die andere, welche auf ihr perpendicular steht, macht, daß wir den Begriff der v o r d e r e n und h i n t e r e n Seite haben können.

(Immanuel Kant: 1768)

The advantage of using the speaker her-/himself as the most natural reference point for verbal locations is obvious: "The very axes and planes through which locations are specified are common to all human languages (and, to all human beings, of course (GS)), and they are constrained by and defined in relation to the human body" (Bowden: 1991, 99; see also Andersen: 1978, 342f.) in - what Herb Clark (1973, 34, 35) called - "canonical position", i.e. standing upright and facing forwards. Brown (1983, 136) notes that in some languages canonical postures are also related to cardinal directions; Wassman and Dasen (in print) emphasize that for the Yupno of Papua New Guinea body orientation is not only related to cardinal directions but also has much symbolic impact. For the purposes pursued here it suffices to point out that our body provides us with the planes and coordinates with which we establish our "deictic field" (Bühler: 1934, 79 (=1990, 93)) - and these coordinates are constant "because they form the basic and permanent stock of orientation of every waking person in his present situation of actual preception" (Bühler: 1934, 137 (=1990, 154)). Although we can perform indexing acts with our index finger, with a lifted chin or puckered lips (see Fillmore: 1982, 46), we usually, and more effectively, use language for spatial reference, thus transferring information about the three-dimensional space into the one-dimensional format of language (see Ehrich: 1991, 234). Our languages provide a number of means for us to do this. Philosophers refer to these means and expressions as "indexical expressions (or just indexicals)" (Levinson: 1983, 55), but in linguistics most of these means are categorized under the general heading of "deixis".

The term "deixis" is borrowed from the Greek word for pointing or indicating. Discussing the etyma of the words for sign, Bühler (1934, 36f. (=1990, 44f)) also gives "demonstratio" as the Latin translation of this Greek word - emphasizing: "*demonstrare necesse est...*" (Bühler: 1934, 120 (=1990, 136)).

Charles Fillmore (1982, 35) gives the following definition of deixis:

Deixis is the name given to uses of items and categories of lexicon and grammar that are controlled by certain details of the interactional situation in which the utterances are produced. These details include especially the identity of the participants in the communicating situation, their locations and orientation in space, whatever on-going indexing acts the participants may be performing, and the time at which the utterance containing the items is produced...There are two general ways in which one speaks of deixis in natural language: first, in terms of the manner in which the socio-spatio-temporal anchoring of a communication act motivates the form, or provides material for the interpretation, of the utterance that manifests that act; and second, in terms of the grammatical and lexical systems in the language which serve to signal or reflect such anchoring. That is to say, we can either ask how speakers succeed in using their current situation for anchoring referential acts in space and time, or we can ask what grammatical or lexical materials a given language has dedicated to such purposes.

I will concentrate here on spatial deixis; with respect to the problem of space and time I refer the interested reader to the literature (see e.g.: Wunderlich: 1982; 1986; Clark: 1973, 48ff.; Fillmore: 1975, 28; Lyons: 1982, 114f., 121; Ehrich: 1991). Just recently Veronika Ehrich (1991, 17ff.) presented a clear and comprehensive picture of the relevant concepts, categories and terms for deixis (see also Vater: 1991, 46) - and in what follows I will heavily draw upon her contribution.

Ehrich understands "deixis" as the general term for Bühler's various "Zeigarten" or "kinds of pointing" (Bühler: 1934, 83 (= 1990, 97)), i.e. personal, spatial, and temporal deixis and "Zeigmodi" or "modi of pointing" (Bühler: 1934, 80 (= 1990, 94)), i.e. situative, anaphoric, and imaginative deixis. Ehrich also refers to anaphoric and imaginative deixis as "discourse deixis". Moreover, with situative deixis she distinguishes between the positional system of reference ("here" and "there" in English, "hier", "da", "dort" in German) and the dimensional system of reference ("before (in front of)/behind, left/right, above, below" in English).

The positional system of reference localizes areas in space in relation to, and dependent on, the speaker's or the hearer's position. The dimensional system of reference defines relations in

space dependent on the speaker's or hearer's position and orientation. Discussing these two systems, the difference between primary deixis, i.e. the primary "hic et nunc" of actual speech (or, if you like, the primary "origo" or "0 for the origin" (Bühler: 1934, 102 (=1990,117)) on which speaker and hearer must have agreed, however), and of secondary deixis, or secondary "origines" that are displaced, shifted or additional points of reference in the three dimensions of space (- and thus presuppose primary deixis) becomes extremely important. For in secondary deixis, the positional and the dimensional system of reference are used differently: With respect to discourse deixis (= anaphoric and imaginative deixis), the positional system disregards the speaker's/hearer's actual position in secondary deixis. With respect to the situation-independent or "intrinsic" use of deixis, the dimensional system of reference disregards the speaker's/hearer's actual orientation in secondary deixis. Here the differentiation between deictic and intrinsic orientation or perspective comes in. Clark (1973, 46) gives the following example to clarify this distinction: Consider a speaker standing not far from the side of the car who announces: "*There is a ball in front of the car*". In deictic, i.e. observer/speaker dependent orientation or perspective, we understand this utterance as "*the ball is between the car and the speaker*". In intrinsic, i.e. observer/speaker independent orientation or perspective, we understand this utterance as "*the ball is near the front bumper of the car*" (see also Levelt: 1986). However, Ehrich (1991, 19) referring to Herrmann (1990) notes that we have to subcategorize the deictic perspective further into a speaker-oriented, a hearer-oriented and a third-person oriented perspective. This differentiation reminds of Bühler's differentiation of the 4 "Zeigarten" or "kinds of demonstration" he calls "der-deixis (this-deixis)...Ort des Ich (place of the I)...Ort des Du (place of the thou) ...and...jener-Deixis (yonder-deixis)" on the basis of Brugmann's and Wackernagel's differentiation of "hic-, iste-, and ille-deixis" (Bühler: 1934, 83ff (=1990, 97ff)⁴.

4 See also Goeppert (1970, 16f.): "'Ici', 'la' und 'là-bas' teilen den Raum der Sprechsituation auf nach seiner Zugehörigkeit zur 1., 2., oder sogenannten 3. Person. 'Ici' ist der Ort, wo ich spreche, 'là' und 'là-bas' sind zwar nicht 'mein Ort', gehören aber zu dem Raum, den die Sprechsituation schafft als der Ort, wo du bist, mit dem ich spreche, und wo er ist, sie ist oder es ist,

Moreover, with dimensional deixis the ambiguity between deictic and intrinsic perspective is not the only crucial factor one has to keep in mind. We must also consider the ambiguity caused by different points of view from which spatial configurations can be seen. Hill (1982; see also 1978) differentiates between the mode he calls "facing" which is similar to the observation of one's own mirror image and the mode he calls "aligning" which is similar to a tandem configuration. Hill claims that Indo-European languages describe static configurations using the facing mode and dynamic configurations using the aligning mode (for criticism see Levelt: 1986, 198ff).

Finally we also have to mention that there is a difference between positional and dimensional deixis when used in indirect, reported speech. In reported speech, expressions of positional deixis must be translated from the perspective of the speaker quoted into the perspective of the person who quotes. Again, Ehrich (1991, 21) clarifies this observation with the following examples: assuming that the person who quotes and the person who is quoted are not at the same place, a speaker's utterance like "*It is cold here*" must be translated in reported speech into: "*He said it was cold there*". With expressions of dimensional deixis this translation is not possible. Anderson and Keenan refer to these phenomena with the technical term "relativized deixis" and emphasize that the "nature of this process of relativization, and the syntactic and discourse contexts which condition it, are highly complex and poorly understood" (Anderson, Keenan: 1985, 301).

Now that we have mentioned most of the relevant concepts with respect to the phenomenon of deixis, I would like to deal with the actual means and systems languages offer their speakers for spatial reference. In many languages the repertoire of elementary linguistic means to refer to space encompasses

- local and directional prepositions or postpositions (e.g.: at, on, in (topological prepositions), in front of, behind, to the right (projective prepositions)),
- local or place adverbs (e.g.: here, there),
- dimensional or spatial adjectives (e.g.: high, low, wide),

worüber ich mit dir spreche". See also Ozanne-Riviere (1987, 144f.).

- demonstratives (pronouns or adjectives) (e.g.: this, that),
 - static and dynamic (motion) deictic verbs (or verbal roots) (e.g.: to stand, to come, to go, to bring, to take),
 - presentatives (e.g.: voici, voilà, ecce, there is...)
- and
- case markers.

Their function is to localize (see Wunderlich: 1986, 227), to inform about, and to identify objects in space (see Fillmore: 1982, 45; Bühler: 1934, 146f (=1990, 163ff)).

However, we have to keep in mind that with the deictic expressions in this list we must differentiate between deictic and non-deictic usages. As Levinson (1983, 65ff) nicely illustrates, we have to distinguish two kinds of deictic usage, namely gestural and symbolic usage. Within non-deictic usages, we also have to distinguish anaphoric from non-anaphoric usages. To give examples:

"This bush-knife is sharp" (deictic, gestural usage)

"This village stinks" (deictic, symbolic usage)

"I drove the car to the parking lot and left it there"
(anaphoric usage).

"There we go" (non-anaphoric usage).

Levinson (1983, 67) also gives an example where a deictic term is used both anaphorically and deictically, namely in the sentence:

"I was born in London and lived there ever since".

But let us return to the linguistic means for spatial reference and see what kind of systems of spatial deixis they constitute. In their survey on deixis in various languages Anderson and Keenan (1985; for criticism see Hanks: 1987) present systems of deixis that consists of two terms (e.g.: English "this, that/these, those", "here, there"), three terms (e.g.: Latin "hic, iste, ille"), and more than three terms - like e.g. Sre (spoken in Vietnam - 4 terms), Daga (spoken in Papua New Guinea (Milne Bay Province) - 14 terms), and Alaskan Yup'ik Eskimo (over 30 terms). Denny (1985, 113, 117ff (revised version of Denny: 1978)) mentions even 88 terms in East-Eskimo that is spoken in the Western Hudson Bay and on Baffin Island. Anderson and Keenan (1985, 308) draw the

conclusion that "a minimal person/number system and at least a two-term spatial demonstrative system seem to be universal".

With respect to the development of these systems Heeschen (1982, 92) - in connection with his research on the Mek-languages of Irian Jaya - presents the following interesting hypothesis:

"At the origin we have a pure deictic system... These deictics can be substituted, or accompanied ...by a pointing gesture. The more the...formations assume discourse functions - i.e., the more they refer not to points in concrete space but to items previously mentioned in the linguistic context - the more they lose their potential for pointing to those things which are truly "up there" or "down there"...

Denny (1978, 80; see also 1985, 123ff) attempts to explain the differences between deictic systems for spatial reference as follows:

In a natural environment of non-human spaces one way to relate space to human activity is to use deictic spatial concepts, to center space on the speaker (or other participant). In a man-made environment this is less necessary - non-deictic locatives such as down the road, through the door and around the corner will relate space to human acts quite directly since the places mentioned are all artifacts designed to aid such acts...
...as the degree to which the spatial environment is man-made increases, the size of the spatial deictic system decreases.

With this - not undisputed - hypothesis⁵ Denny introduces the problem of linguistic relativity into our discussion. We will return to this topic in the next section of this paper.

Having introduced a number of basic concepts with respect to space and spatial reference, we must now start to discuss the

5 For a more modified version of this hypothesis see Ebert (1985, 266f.): "In lokalen Sprachen werden Ausdrücke räumlicher Orientierung in der Regel spezifizierter und häufiger verwendet als in großen Sprachgemeinschaften mit einer langen Schrifttradition...Ich vermute daß auch in der deutschen Umgangssprache, und besonders in Dialekten, räumliche Orientierung eine sehr viel größere Rolle spielt als in der Hochsprache". For a rejection of Denny's hypothesis and for a completely different position see Fillmore (1982, 48f.). In connection with this hypothesis see also Brown (1983, 122f.) who argues that with the increasing mobility of people - which is characteristic of large scale urban societies - the knowledge and use of cardinal direction terms becomes increasingly useful. But what about the Aboriginal languages and their systems of cardinal terms? For further criticism see Levinson (1991c, 27, footnote 84).

problem of how to describe the meaning of the linguistic expressions that are used for spatial reference.

A great many linguists and philosophers concerned with language certainly agree upon the fact that they deal with language and linguistics "out of a shared basic interest how language functions in context" (Jarvella, Klein: 1982b, vii) and that they want to solve the problem of meaning in language from the basic assumption that the "central issue is...not whether meaning is left to the context, but how it is, and how it is re-integrated from what is said and what is only signalled" (Jarvella, Klein: 1982c, 1). Although an excellent anthology on the topic of "Speech, Place, and Action" was introduced with these basic and programmatic assumptions, the claims asserted have hardly been met yet - at least within linguistics that deals with Indo-European languages. The difficulty of the problem is evident: Let me illustrate this with some examples⁶: To interpret a preposition like "in" in(!) the sentence: "*The socks are in the drawer*", we must know the meaning of the expression that encodes the spatial information given ("in" = "contained in"), we must combine this meaning with additional information given in the context (e.g. with the verb "are"), and it must be clear that the speaker of this sentence has more or less the same concept of space, of the "referential domain", as the hearer. It is only with these three components of spatial reference, namely meaning, context, and space conception, that we can infer the function and the interpretation of an expression like "in".

In our example we can differentiate between the entity to be situated, the "Theme" (Klein:1991, 78) or the "Figure" (Talmy:1978, 627), namely "the socks" and the reference object or the entity in relation to which the "Theme" is situated - which is called "Relatum" (Klein: 1991, 79) or "Ground" (Talmy: 1978, 627), in our example "the drawer" (with respect to universal characteristics of "figure" and "ground" see Talmy: 1983). The spatial relation between "figure" and "ground" - or "theme" and

6 The following paragraphs draw heavily on the - internal, unpublished, and undated, - project description of the "Reference Project" at the Max-Planck-Institute for Psycholinguistics and on Bartels (1991).

"relatum" is "being in" (- and we do not know what exactly this may be!).

Now let us look at the following sentences:

"The pin is in the box".

"The key is in the door".

"The thread is in the needle."

"The coffee is in the cup".

"The dog is in the yard".

"The satellite is in space".

Although these sentences have (almost) the same syntactic structure, their meaning is different, though we find the same preposition in the sentences. The difference of meaning is due to the variation of the spatial and functional relations between the "theme" or "figure" and the "relatum" or "ground" and in the variation of spatial qualities of the "theme" or "figure" and/or the "relatum" or "ground" of these sentences. The question we have to answer here is: Has a preposition like "in" a number of meanings or is there something like a basic, abstract meaning with a number of context-dependent derivations? There are at least three possible strategies to find an answer to this question (see Klein: 1990, 16).

First, we can assume that there is unlimited polysemy, i.e., all the various usages of an expression are listed.

Second, we assume that with these expressions there is complete contextualization, i.e., a word like "in" in our examples does not have a meaning of its own; meaning is assigned to it in context only.

Third, - in the tradition of Frege's differentiation between "Sinnaspekt" and "Referenzaspekt" (Ehrich: 1991, 9) - we assume that there is something like a "basic meaning" (or a "semantic form") that can be modified by various semantic (or cognitive) operations (into a "conceptual structure"). These operations are mainly controlled by the context, and from the basic meaning they generate the various usages⁷.

⁷ There are two ways of how to understand and define the concepts "basic meaning" ("Bedeutungskern") and the semantic or cognitive "operations". For a detailed discussion see Klein (1991,

Most of the more recent researchers of spatial reference in Indo-European languages try to solve the problem starting from the last mentioned assumption. These researchers have contributed immensely to the field, no doubt; however, I cannot help thinking that most of these contributions succeeded in providing us with minutely exact and highly formalized semantic descriptions of basic meanings of - isolated - spatial expressions, but forgot almost completely about the context; if they did consider context, it was the context of invented examples, but - at least to my knowledge - never the context of speech in natural interaction. I take this as a severe shortcoming of psychological and linguistic research on space and spatial reference so far, being convinced that Levinson (1983, 96) is right when he claims that at least "Deixis is...not reducible in its entirety, and perhaps hardly at all, to matters of truth-conditional semantics" (see also Vater: 1991, 7). I cannot agree with Herskovits (1986, 192) who - confronted with much vagueness and inconsistency in her research on prepositions in English - concludes that language has "design defects"; on the contrary, I would argue that much of the creative, dynamic potential of a natural language lies in its features we call "vagueness" and "ambiguity" - and that it is only our models developed for the description of natural languages that have these defects!⁸

However, there is no doubt that research on spatial reference so far has resulted in a number of interesting findings. Among other things, this research has proven - as the authors of the description of the reference project at the Max-Planck-Institute for Psycholinguistics point out - that the locative markers of a language impose an implicit classification on spatial configuration. Wunderlich (1986, 213) emphasizes man's basic need for categorization and classification and infers that among the most relevant acts of categorization and classification we find

91ff); see also Ehrich (1991, 9ff), Herskovits (1986, 39ff) and Fillmore (1982, 35f.).

8 In this context see Bühler (1934, 320 (=1990, 364): "We are again confronted with the fundamental fact that at all points natural language only hints at what is to be done and how it is to be done, leaving latitude for contextual indices and material clues. This must never be lost sight of...". See also Vater (1991, 6) who emphasizes that we should not forget "daß in der Sprache vieles "mitverstanden" wird, was nicht explizit ausgedrückt wird".

categorization of space and the qualities we assign to it. By the way, he concludes that the different categorization of objects in space which we find in different languages are responsible for the difficulties we have attempting to translate e.g. prepositions of one language into another: Thus we find "*dans la rue, auf der Straße, on the street*"... etc. (see also Denny: 1985, 116; Ebert: 1985, 269, Goepfert: 1970). For this kind of spatial categorization topological relationships (e.g.: proximity, inclusion, surface-contact), projective relations involving alignment and perspective point (see above), Euclidian notions of space (see above), functional notions concerning typical uses and canonical positions (see above) are most relevant.

I would like to finish this section with a few remarks on the possible universality of the concepts of, and insights in, space and spatial reference. I started this section with the reference to behavioural physiologists. Wunderlich (1986, 213) also argues rather plausibly from a biological perspective and states that there are semantic universals, not because space is the same everywhere, but because man's genetic equipment is the same everywhere (- though he does not present evidence for these two statements). It seems that on the basis of this general premise almost everything what is said and found in the research on spatial reference in Indo-European languages claims universal status - explicitly or implicitly. Although I will discuss these claims a bit more in detail in the following sections, I would like to mention a few of the more moderate claims with respect to universals in space and spatial reference here.

I already quoted Anderson and Keenan (1985, 307), who - on the basis of their comparative studies - state that at least a two-term spatial demonstrative system seems to be universal. This is in line with Denny's claim that we may indeed find space-deictical expressions in all natural languages (Denny: 1985, 113). However, we should not expect the same kind of flexibility and universality in the lexicon of the natural languages that we can expect in the human capacity for thinking (Denny: 1985, 122). Some interesting evidence for the claim of universality comes from language acquisition research - especially with respect to studies on the nature of locative learning as expressed in the acquisition of locatives in English, German, Hebrew, Italian, Japanese,

Portugese, Russian, Serbo-Croatian, and Turkish (Johnston: 1988). These studies show that at least in these languages locational concepts emerge in a reliable and consistent order⁹ (but see Bavin e.g. (1990, 64) and also de León (1991, 5ff) for the acquisition of locatives in Warlpiri and in Tzotzil as counterexamples to this finding!). Unfortunately, research on elementary spatial functions of the brain does not seem to be able to provide us with further insights into the topic yet (but see e.g.: Stiles-Davis et al. (1988), Kritchevsky: 1988; Zola-Morgan, Kritchevsky: 1988), though it seems to be the case that the right hemisphere plays a predominant role for most spatial functions of the brain. According to Claus Heeschen (personal communication 1991) it seems, however, that because of the division of our brain in two halves the world for us also seems to be divided into a right and a left half. It seems that - with respect to universal claims - we can expect that many languages indeed "draw on a similar set of spatial concepts when referring to the location/motion of entities in space" but we should also keep in mind that the cross-linguistic variability in the means used to express notions of location is remarkable, that "the particular concepts used and the ways in which they are encoded vary across languages" (Becker et al.:1988, 1). Denny (1978, 78; 1985, 122;) presents an interesting idea with respect to our problem. Asking the question about

9 See Johnston (1988, 197): "*In, on, under and next to* consistently preceded *between* and *in back of/in front of* for featured reference objects; these in turn preceded *in back of* and *in front of* for non-featured reference objects". See also the literature Johnston quotes, also: Johnston, Slobin (1979) Kritchevsky (1988, 144), Svorou (1986), Tanz (1980), Weissenborn (1985, 214, 226, 229; 1986, 400ff.). But see also Bavin (1990, 64) who found that in Warlpiri young children distinguish an "up/down" dimension but not "in" as a separate concept; for these children "front-behind" do not represent opposites on a line between two points, even after 6;0, and "between" is acquired before "front" and "behind"! See also Bowerman (1991, 19), who - comparing English and Korean acquisition patterns with respect to space and spatial reference - emphasizes that "it is striking how quickly and easily children adopted language-specific principles for categorizing. There was little evidence that they had strong prelinguistic biases for organizing space in a particular way". See also Choi, Bowermann (in press). For an interesting contribution on early prefigurations of spatial cognition see Steiner (1991).

semantic universals within lexical systems, Denny (1978, 78) states the following::

Certainly, our examination of the English, Kikuyu and Eskimo lexicons for spatial deixis indicates that whole systems are not universal. Nor are most of the semantic variables within the system universal. At best we find the one defining variable, +/- speaker's location, as a universal. Nonetheless, there is one striking indicator of universality, i.e., all the variables in the Kikuyu system are found in the larger Eskimo system. This suggests that we may have something like the structure described for color terms by Berlin & Kay (1969): as the system expands in number of variables, new variables enter it in a certain order, so that there is a universal hierarchy of semantic variables. Some caution is in order, however, when we have only examined three languages...

In the following two sections of this paper I would like to present some further data on space concepts and verbal spatial reference we find in languages of Oceania and in Mayan languages.

3. Space and spatial reference in some Oceanic languages

In 1957 (=1969) Einar Haugen discussed two articles by Stefán Einarsson in his paper on "The Semantics of Icelandic Orientation". He emphasized Einarsson's findings that the Icelanders use cardinal terms (see Brown: 1983) for orientation that are sometimes "approximately correct" and sometimes "incorrect" according to the actual compass directions. The paper shows that there is no contradiction within this system of orientation: each of the cardinal terms has

"two...semes: one used in proximate orientation (corresponding reasonably well with the cardinal directions) and one used in ultimate orientation (for travelling, based on the four quarters of Iceland and their extreme extension in the cardinal directions). Since these two are in complementary (social) distribution and show a semantic relationship (one-to-one correspondence of orientation), they constitute only one sememe... in land or coastwise travel the existence in most places of only two possible directions of travel reduced the possibilities of land-wise orientation to two, and these were chosen not in terms of the celestially observable direction of travel, but in terms of the ultimate destination of the road, as moving towards one of the four orientation areas".

(Haugen: 1969, 339)

Thus, the Icelandic system of orientation uses cardinal terms, the usage - and the meaning - of which is dependent on a social situation (in the paper described as *ultimate orientation*) and on environmental factors. This system of orientation in a speech community the language of which belongs to the Indo-European language family demonstrated that with respect to orientation we find some "exotic" concepts that do not correspond with the well described and analyzed systems of spatial reference in other languages of the same family. If - on closer inspection - we find such exotic systems in a what we may call "familiar" Indo-European language (see also McCormack: 1991, 13, 59, 136), then we must expect to find more of these - with respect to our standards - "exotic" systems in more "exotic", i.e., non-Indo-European, languages. As we will see, Oceanic languages meet this expectation.

Most of us know that the Australian Aborigines have very sophisticated means to find their way in the Australian Deserts. As Lewis (1976), e.g., could document, we observe with Aboriginal route finding and spatial orientation "ecological and spiritual behavioural determinants...inextricably intermingled into a single spiritual/physical conceptual entity" (Lewis: 1976, 254); Aborigines use cardinal points and "combine directional terms with location terms", they can visualize themselves "at some (often distant) point of reference from where directions are given (Lewis: 1976, 255) on the basis of a "kind of dynamic image or mental 'map' which (is) continually updated in terms of time, distance and bearing..." (Lewis: 1976, 262).

As already indicated in the preceding section, Anderson and Keenan emphasized that there are many languages that have much more complex systems of spatial deictic terms than our Indo-European languages (see also Levinson: 1983, 81f.). Dixon (1972, 262ff)), e.g., showed for the Dyirbal language of North Queensland that its system distinguishes "the three dimensions of space, having demonstratives that gloss as 'the one above the speaker', 'the one below the speaker', 'the one level with the speaker' as well as distinguishing relative distance from participants" (Levinson: 1983, 82). Dyirbal also uses the additional deictic parameter "upriver/downriver from the speaker" in its array of demonstrative terms (see also Brown: 1983, 137).

Haviland (1979) showed that Guugu Yimidhirr - besides a rather simple system of four deictics indicating "here, there, yonder" and "there, that's the way" (Haviland: 1979, 72f.) - has a spatial system which is not egocentric at all, but which is "absolute" (- as Isaac Newton called these systems -), using a "four-term system of roots" the meanings of which "correspond roughly to the English compass points" (Haviland: 1979, 74; 1992; for a very minute analysis of the system of cardinal categories in Kayardild, another Australian Aboriginal language, see Evans: 1991). Levinson and Brown found a similar "absolute" spatial system for Tzeltal, a Mayan language (we will discuss this research below); emphasizing the parallels between the Tzeltal system and the system of Guugu Yimidhirr they nicely summarize the essence of these so-called absolute systems:

The...[Tzeltal]...system of cardinal 'edges...replaces all (or nearly all) the relative spatial reference encoded for example in the English prepositional phrases 'to the left of', 'to the right of', 'in front', 'behind', 'across from' etc. For English, our space is centred, and the relative positions of objects to one another and to the speaker are coded in such locutions. In Guugu Yimidhirr, objects and vectors are to the North, South, East or West, as it were, absolutely, or relative to other reference points, which may or may not be ego. Such a system replaces a system of relative spatial description with a system of absolute angles.

(Levinson, Brown: 1990a, 1f.)

Thus, as Levinson and Brown (1990a, 1) point out, this language is an excellent example to show that the egocentric spatial system of our Indo-European languages is not the only natural linguistic system (for a language and culture where cardinal points are virtually absent see Gimán (Teljeur: 1987, 348); we will discuss the Gimán system of spatial orientation below).

Ozanne-Rivierre (1987, 129) mentions a similar absolute system in another Oceanic (Austronesian) language: "...En malgache (langue austronésienne), on utilisera un seul système quelque soit l'échelle envisagée: le système fixe des points cardinaux. On y référera aussi bien pour situer un objet sur une table qu'un pays par rapport à un autre". She, too, explicitly contrasts this system with the anthropocentric system in French, emphasizing that it is quite possible and natural to define an origo for a spatial reference without any reference whatsoever to the "ego" of the

speaker. In her excellent overview, Ozanne-Rivierre mentions a number of other linguistic systems developed for spatial orientation that use and utilise geographic, especially topographic, facts for spatial reference (another more general overview with excellent literature for further investigation is provided by Barnes (in print)) . Thus, we find Oceanic languages where the following differentiations are essential for their system of coordinates used for spatial reference:

- "- vers la mer / vers l'intérieur des terres
- en aval / en amont (axe de la vallée)
- vers le large / vers la cote
- vers l'extérieur / vers l'intérieur
- dans le vent / contre le vent (axe des vents dominants)
- dans le courant / contre le courant"

(Ozanne-Rivierre: 1987, 130)

Some of these systems, like the system of Ouvean on Ouvea Island (New Caledonia), subcategorize their directionals in a quite sophisticated way into ten different specifications (see Ozanne-Rivierre: 1987, 137f). However, Ozanne-Rivierre (1987, 144) also points out that many Oceanic languages show features similar to Indo-European languages: "La plupart des langues océaniques ont un système de deictiques exprimant trois degrés de proximité relative par rapport au locuteur et correspondant aux trois modalités personnelles: je, tu, il. On trouve en espagnol un système analogue avec les trois degrés: este/ese/aquel". For more details I refer the interested reader to this excellent contribution to the field.

In her study of Tolai, an Austronesian language of Papua New Guinea, Mosel (1982, 112) emphasizes that "the Tolai system of deictics is bound to the natural environment of the Tolai people". Tolai local deictics do not only distinguish between "here" and "there", "but are also marked for:

1. the level at which the indicated place is located relative to the speaker's position...
2. whether the indicated place is:
 - (a) a place at which an action takes place...
 - (b) a place where something or somebody is found...
 - (c) the goal of an action...
 - (d) the source of an action...

3. Whether or not the place pointed at is known to the hearer." (Mosel: 1982, 111). In her minute analysis of local deixis in Tolai, Mosel (1982, 119ff) shows that we first have to distinguish two classes of deictics, namely deictics indicating the speaker's position and deictics indicating some place which is not the speaker's position. The second class of deictics can be subclassified into 15 hierarchically ordered subclasses, that express concepts like "+/- remote (with respect to 1st, 2nd and 3rd person), +/- action, location, goal, source", etc. Thus, we find a rather sophisticated system of local deictics that "consists of various hierarchically ordered subclasses which show different degrees of complexity (Mosel: 1982, 129).

Heeschen (1982) starts his analyses of some systems of spatial deixis in Papuan languages with the following two general statements:

First, "anthropological and linguistic studies of small, illiterate communities sometimes suggest that space is of much more importance in ordering experience than it is in the speech communities of Western civilisation" (Heeschen: 1982, 82)¹⁰. Thus, we find that "in some Papuan languages reference to space and direction ... and to the relative position of the referent to the speaker or hearer, is built into the verbal morphology...that, in narrative texts, the spatial as opposed to the temporal axis is predominant in non-literature cultures...(and that) movements in space are in themselves significant; they are plans of action...(Heeschen: 1982, 82).

Second, "an inspection of...Papuan languages ...suggests a distinction between two systems of spatial deixis: (a) those which have an unspecified *here*, but which do specify the generalized *there* known from most European languages, and (b) those which also specify the *here*...The following features can be added to the notion of "there": spatial direction (up, across, seawards, mountainwards), relative proximity to speaker and/or hearer, visible to speaker and/or hearer, present or not, previously mentioned in discourse. Where the generalized *here* of European languages is specified as well, we find the same features as those

10 This observation comes close to Denny's hypothesis quoted above (Denny: 1978, 80); note that Heeschen himself refers to Denny in this context. See also footnote 5.

realized in the system of *there*... *...here* never exhibits a greater number of features than *there*..." (Heeschen: 1982, 83).

On the basis of these two general insights, Heeschen analyses the systems of local deixis in the Eipo, Yale and Angguruk languages of Irian Jaya (for the details I refer the reader to Heeschen's interesting paper). Especially with respect to the Eipo and Yale systems Heeschen (1982, 96) realizes that "speakers constantly point in the direction of things meant. The deictics are mere stand-ins...for real place names, and their use presupposes a common knowledge of what events are likely to happen at what places...More than in our societies does the use of deictics presume a shared geographical and cultural context". With these systems that highly reflect the speaker's concrete environment, speakers get into difficulties if problems of identification and coordination arise between speaker's "here" and hearer's "there" (Heeschen: 1982, 96ff). However, whenever these problems arise, the "languages fall back on the intrinsic systems of reference"¹¹ (Heeschen: 1982, 106).

Dirk Teljeur (1987) analyzed spatial orientation among the Gimán of South Halmahera in the Moluccas (Indonesia). Gimán (also Gane) is an Austronesian language the orientation system of which is not "neutral" from a cultural point of view, "but functions in 'placing' basic concepts of a culture together in a more or less coherent symbolic system" (Teljeur: 1987, 348). The Gimán system of orientation is dependent on the local landscape, as Teljeur points out; however, it can be used to refer to the whole known world. The system "is composed of three more or less discontinuous levels or rather scales localizing a person or an object (1) in a house within a very short distance, (2) in a village, or (3) in the world. Change of scale is often indicated by a change of spatial categories" (Teljeur: 1987, 348). Teljeur found that the Gimán system differentiates the following 6 spatial categories, "sea, land, up, down, yonder" and "here". He emphasizes that the

11 In connection with the problem that arises if two referents in the same referential area must be identified by means of "up, down", and "across" (Heeschen: 1982, 98ff) - speakers of Eipo and Yale solve this problem by falling back on the intrinsic system - Heeschen notes that "from the Papuan perspective", he finds it "rather tantalizing that European systems like here/there are based solely on the feature of relative proximity" (Heeschen: 1982, 100).

exact meaning of these categories can only be established in their local context - and provides the reader with illustrative examples. Teljeur documents that the Giman orientation system is purely conventional (Teljeur: 1987, 359) comparing the "world-scale orientation" with the Pulilo "village-scale orientation" and this system with the "home-scale orientation". Especially his comparison of the home scale with the Pulilo village scale orientation results in some interesting findings: For the Giman, 'land'/'sea' are the dominant directions; 'up'/'down' have only vertical meaning, and 'yonder' is used instead of horizontal 'up'/'down' (see Teljeur: 1987, 351ff). Although Teljeur states that in Halmahera "cardinal points are even virtually absent", that "persons and objects are localized with terms that bear no relation at all with our north, south, east and west" (Teljeur: 1987, 348), he concedes that the "majority of the Giman" possesses "some knowledge of the compass points through navigation and through Muslim orientation, all Giman being Muslim believers" (Teljeur: 1987, 361). Thus, to recite the Muslim prayer in the prescribed direction, to built the niche in the back wall of the mosque so that it faces Mecca, and to orient the rectangular grave in the prescribed direction, it is necessary to know about compass points, for otherwise the Giman could not define the meaning of the respective terms used to refer to these orientations. Moreover, there are certain taboos that have to be observed with respect to the spatial orientation of cooking places and banquets. The term most important here is "kiblat", and Teljeur (1987, 361 ff) gives a comprehensive analysis of its usage. After his discussion of the Giman system of orientation from the point of view of its cultural aspects, Teljeur provides us with a linguistic survey of the Giman orientation terminology. Again, I must refer the interested reader to Teljeur's paper for the details.

Teljeur's work is a rather good example to emphasize that the analyses of space concepts and spatial reference in various cultures and languages must consider not only the linguistic context of an utterance, but also the paramount cultural context in which such an utterance is produced and adequately understood. In his analysis of the "Demonstratives in the Blagar Language of Dolap", Steinhauer (1991) demonstrates how linguistics can meet

these admittedly high standards of a sound and satisfying description of such a reference system. Contributions like these mentioned in this section of the paper clearly reveal that meaning is manifested in usage only!

I would like to finish this section with a summary of the main ideas John Bowden (1991) expresses and discusses in his excellent Masters-thesis on the grammaticalization of locatives in Oceanic languages.

Bowden examines the grammaticalization processes which led to the development of locative expressions (in, on, behind, etc.) in more than 100 Oceanic languages (for a comparison of Bowden's data with data from African languages see Heine: 1991). Bowden shows that expressions which are used to describe spatial relationships derive almost exclusively from body part nouns or from nouns referring to environmental landmarks such as 'earth' and 'sky' (Bowden: 1991, v). He (1991, 4) emphasizes at the very beginning of his study that "locative concepts usually encoded formally by prepositions in English, will not normally find their semantic counterparts in the languages of other parts of the world". This observation is nothing new: Wilhelm von Humboldt (1822 (=1963), 51f.) notes:

...Man kann daher mit Recht bezweifeln,...dass es ursprünglich Praepositionen...im wahren Sionne des Wortes gegeben habe. Alle haben vermuthlich, nach Horne Took's [!] richtiger Theorie, ihren Ursprung in wirklichen, Gegenständen [!] bezeichnenden Wörtern.

And Bowden refers to Ray who notes in his description of the Baki language published in 1926 that "some words used as prepositions and adverbs are probably nouns" (Ray: 1926, 255); with respect to compound prepositions in To'aba'ita Ray (1926, 511) observes that they "consist of local nouns preceded by the locative prepositions". A number of grammars of Oceanic languages indeed tend to avoid the term "preposition", but - as Bowden (1991, 5) also mentions - "there is no real consensus on which labels should be applied". However, as a general finding we may note that in Oceanic languages many locatives - to use the probably most neutral term to describe a functional category¹² - share some

12 See Bowden (1991, 8): "I will use 'locative' as a description of a functional category. Anything that is used to mark a locative

characteristics with nouns - especially with nouns that refer to the human body or to body parts. This is no surprise, either, because our body and "the relationships between different parts of the body, have an important role to play in the way people understand a talk about spatial relationships" (Bowden: 1991, 6). Thus, we find the adoption of a concept like "face" to express the locative concept "front" - and this is indeed similar to what happened with the English item "front", too: it has its origin in Latin "frons", i.e. "forehead" (see e.g. Svorou: 1986, 523; Hill: 1978, 533; Vater: 1991, 44). These concepts undergo a process of "grammaticalisation" (Meillet: 1912, Kurylowicz: 1965, see Bowden: 1991, 13ff) that changes their status from initially being members of open grammatical categories - with less grammatical status - into members of closed class categories with more grammatical status. With the systems of locatives in Oceanic languages we do not only find the body, but also e.g. the house as a deictic centre (see Bowden: 1991, 104ff) - and this is another good example to prove that "although there might be some very strong principles of cognitive salience which lead to the predominance of the human body as a reference point, languages do leave room for culturally determined principles of selection to work alongside them" (Bowden: 1991, 107; see also Brown 1983, 146) . Moreover, we also find locatives that express the metalinguistic concepts "sea" and "land" that seem "to have been culturally and geographically determined" (Bowden: 1991, 107). In connection with these findings, Bowden emphasizes the following:

In Oceania, SEA and LAND are the most striking examples of non-universal locative adpositions, but in other geographic or cultural environments there are other locatives which can also serve crucially important functions. One of the best known examples is the use of grammaticalised forms for 'up-river', 'up-valley', and 'down-river', 'down-valley' in some languages. Such adpositions are usually found in the languages of people who live in the valleys of interior regions, such as the languages of many people who inhabit the highlands of Papua New Guinea...Although a core set

relation, whether it is a noun, adverb, preposition, affix or anything else will be called a 'locative'".

of locative concepts is destined for grammaticalisation in all languages, particular languages can leave slots for other grammaticalised markers of location, as long as those locations are particularly important to their speakers.

(Bowden: 1991, 109)

As we will see in the following subsection, in some Mayan languages, like in some Oceanic languages, the existence of grammaticalised terms like 'uphill' and 'downhill' also points to this "ability for culture and geography to determine what can be linguistically significant" (Bowden: 1991, 131).

4. Space and spatial reference in some Mayan languages

At the beginning of the previous section we mentioned the absolute system of spatial reference in Guugu Yimidhirr. Now Tzeltal, a Mayan language spoken in Chiapas, Mexico, "makes some, much more limited, use of an absolute system, too", as Levinson and Brown (1990a, 3ff) point out. Although there is a deictic system in Tzeltal, it is preferably not utilized for spatial description in ordinary everyday communication; Tzeltal emphasizes intrinsic description as its primary mode of spatial reference and therefore has developed

"such a rich vocabulary of descriptors that unique reference can be efficiently achieved even within a field of view of near identical objects. This allows Tzeltal speakers to minimize the use of relational descriptions, and when employing such relational descriptions of one object vis-a-vis another, to minimize the use of deictic relata. In line with this, Tzeltal speakers do not use expressions glossing 'to the left of' or 'to the right of', and expressions glossing 'in front of' and 'behind' have highly restricted uses, while vertical 'up' and 'down' appear to be derivative concepts ...It is as part of this tendency to 'decenter' spatial description, away from an egocentric reference point, that the absolute system of spatial reference...seems to make best sense...The Tzeltal expressions that are used in an absolute sense are, especially, the terms *ta alan* and *ta ajk'ol*, that one would...gloss as 'downhill' and 'uphill' respectively...

(Levinson, Brown: 1990a, 4)¹³

13 On the basis of their cooperation with Haviland and de León who do research on Tzotzil, another Mayan language which is also spoken in Chiapas, Mexico (see e.g. Haviland: 1990; de León: 1990), Levinson and Brown (1990b, 31) emphasize that Mayan

There are a number of different uses of the notions of, and terms for, 'uphill' and 'downhill', as Levinson and Brown document (1990a, 16; see also Brown: 1991, 37ff; also Brown: 1983, 134f.); but one of the central uses refers to the general inclination of the territory from highland South to lowland North.

As the authors work out, this inclination becomes conceptually central, so that one can use the terms 'uphill/downhill' not only with respect to the horizontal but also with respect to the vertical dimension. The use of these expressions "to locate entities on an idealized South/North inclined plane constitutes an 'absolute' mode of description. For the terms label angles, fixed without reference to the orientation of ego or another human body, with which one can describe relative positions" (Levinson: Brown: 1990a, 6).

With Tzeltal we can shake a number of claims with respect to the universal validity of findings and insights in human conception of, and reference to, space. Thus, as Levinson and Brown also document (1990b, 5ff) their Tzeltal data falsify Talmy's universals, i.e., his generalizations about how language structures space (Talmy: 1983):

- Contrary to Talmy's claims, in Tzeltal the Figure's geometry in spatial descriptions is more complex than the Ground's.
- Contrary to Talmy's claim that only topological properties are encoded, Tzeltal encodes exact shapes, sizes and contours, fixed angles, and other locative expressions.
- Contrary to Talmy's claim, Tzeltal locative descriptions do not generally equate long static figures with the paths described by point-like moving figures.
- Contrary to Talmy's claim, stative dispositionals are at least as basic as pathway-descriptions, which are conceptually and linguistically distinct in Tzeltal.

languages make most extensive use of intrinsic description in spatial reference: "rich object-characterization is the dominant Mayan solution to referent selection". This explains why Mayan languages have what Brown (1990, 1, 4) calls "highly... hypertrophic...linguistic resources for handling spatial concepts", namely "existential locative expressions with ay...deictics... positional adjectives .. .body-part locatives ... motion verbs, directionals and auxiliaries"; (see also Haviland: 1990).

(see Levinson, Brown: 1990b, 5ff; Levinson: 1991a, 6; Brown: 1991, 29f., 57, 61f.). The authors concede that "Talmy's generalizations hold well for 'Standard Average European'" but "they fail to describe the Mayan case because there spatial description follows a fundamentally different strategy...In Mayan (certainly Tzeltal), the strategy is to provide a rich characterization of the Figure, from which its location, and thus its disposition with regard to the Ground, can be inferred" (Levinson, Brown: 1990b, 18f.).

As already indicated in the beginning of this section, Levinson and Brown (1990b, 28) also find that there is no left/right and only a rather weak front/back coordinate in Tzeltal¹⁴ and infer that this finding implies the weakness if not the absence of deictically established angles. This weakness or absence of deictically established angles is compensated by resorting to a system of absolute angles which are not egocentrically determined but fixed by the terrain. Although Tzeltal disposes of a system of deictic expressions (see Brown: 1991, 7ff), the authors show that deictic expressions have sociocentric rather than purely egocentric relata; moreover, the usage is suppressed because it does not agree with the requirements of Tzeltal "polite style" of speech - for the details I refer the reader to this provoking paper (see Also Brown: 1991, 7ff, 35, 57, 61ff). With this Mayan language we also find a number of body-part metaphors and "relational nouns" (Dürr: 1990, 8f.) that are used to describe and to refer to parts of things. However, as the authors show, these body-part metaphors characterize objects in and of themselves and not regions around them; moreover, the frequently used relational terms cannot be used in references to the human body. Thus, Levinson and Brown (1990b, 28) infer that with respect to the body-part metaphors "the anthropomorphism is detached from almost all vestiges of

14 This absence of the left/right dimension, the impossibility to distinguish verbally between two sides of an object has far reaching consequences: As Brown (1990, 34) reports, Tzeltal speakers playing a photograph description test-game "failed to verbally distinguish objects displayed as 'mirror images'". Thus, there is a gap in Tzeltal spatial concepts, and Brown (1990, 35) notes "The most fascinating evidence that there is such a gap was informants' complete bewilderment when faced with the request to distinguish verbally two configurations that to them looked identical". See also Levinson (1991b, 19), Brown (1991, 35, 59ff).

egocentricity". Tzeltal clearly disprefers egocentric descriptions in spatial reference.

With Tzotzil, the closest Mayan neighbour to Tzeltal, Lourdes de León found a system in between an "absolute" and an "ego-centered" system, "a 'mixed' system of deictic and non-deictic resources which intersect with stasis and motion" (de León: 1991, 2f.). This system uses:

- a.) body part terms as locatives (see also Mac Laury: 1989); the body part terms are assigned to objects intrinsically - not projectively in relation to the observer,
- b.) "geographic locations, landmarks and the coordinate...up/down East/West" that "provide an anchor based on a system of absolute coordinates for locative descriptions", and
- c.) an "ego-centric coordinate" that is encoded in demonstratives and in the deictic directionals *tal* (towards "here") and *ech'el* (away from "here") that are "generally associated with motion events" (de Leon: 1991, 2).

De León's research on first language acquisition processes of locatives in this Mayan language clearly reveals that for Tzotzil speakers of Nabenchauk space is socially conceptualized. As de León (1991, 19) shows, the Tzotzil speakers of Navenchauk "use the "absolute" coordinates 'olon (downward, West) and ak'ol (upward, East) or their corresponding motion directionals: *yalel* (going downwards) and *muyel* (going upwards)" as a locative strategy besides the use of body parts, directionals and positionals. The East/West coordinate "roughly verlaps with the inclined topography of the region, for this reason E(ast) corresponds to the Highlands and W(est) to the Lowlands". However, the terms for "upward" (*akól*) and "downward" ('olon) may also be used instead of the names of two towns (Jobel (San Cristobal) and Tuxta (Tuxtla Gutierrez)). Besides the central East/West coordinate and names of towns we also find other salient geographic locations - as e.g. mountains, roads, houses, etc. - that provide a set of fixed landmarks for orientation. Referring to this set, de León concludes that her informants "navigate with a local map anchored through the absolute coordinate 'olon/ak'ol and a constellation of local landmarks"¹⁵. She points out that this "geo-centered system

15 For a purely anthropological study of "maps" of movement in connection with his research on the Ongee hunters and gatherers of

of location and orientation is acquired through the social acquisition of Tzotzil. The geo-centered system...maps terms into locations of a socially shared map which is socially acquired" (de León: 1991, 27).

All the findings of Brown and Levinson with respect to Tzeltal, but also de León's (1990) and Haviland's (1990) research on Tzotzil as well as Dürr's (1990) research on colonial Quiche show that the data from Mayan languages disagree with the general and generalized view that spatial conception is egocentric and organized according to the coordinate system with its three reference planes our body provides us with.

5. What do we know about space and spatial reference?

Concluding remarks...?

If we now compare our knowledge about space and verbal spatial reference which is based on research in Indo-European languages and which most of us thought (or think) to be of universal status with the data and findings documented in the research on this topic in some Oceanic and some Mayan languages, we must give up almost all our ideas and notions of universals with respect to space and spatial reference. Moreover, a closer inspection of the literature reveals that Zola-Morgan and Kritchevsky (1988, 420) are right stating that "there is not yet a comprehensive theory of spatial cognition". We certainly do know much about the topic in many languages, but to reach at a description and analysis of the semantics of space and spatial reference, we must know much more about this topic - and our knowledge must be based on research in many more languages! I assume that one of the prerequisites for further studies - in non-Indo-European languages and in Indo-European languages - is to consider not only the "basic meanings" of spatial expressions - more or less neglecting their realization in context, but to put some more emphasis on the context in which spatial expressions are used in speech. I strongly support the idea that meaning is only manifested in usage; however, I do

Little Andaman see Pandya (1990) who comes to the conclusion that for the Ongees, "movement alone defines and constructs space" (Pandya: 1990, 793).

realize that our linguistic description of the semantics of expressions must result in the description of something like a "basic" meaning of a given expression. What I would like to propose here is to tackle this problem starting from the "meaning in context" side trying to reach the "basic meaning" end - thus reversing the order of research strategies that to my mind have been dominating most of the studies in this field. I have proposed such an approach in my attempt to describe the semantics of classifiers in Kilivila, the language of the Trobriand Islanders - (Senft: 1991a,b) and therefore I presume I am familiar with all the problems that arise here. Nevertheless, it may be worth trying. Such an attempt that puts stress "on real life utterances... on dialogues and ... conversational exchanges" - as Heeschen (1982, 107) demanded with regard to the European system of local deixis - will also consider the fact that "reference is a collaborative task" (de León: 1990, 13) - another aspect that has been neglected so far in most studies on verbal reference in general.

In 1985 Karen Ebert finished her review of Weissenborn's and Klein's anthology "Here and there - Crosslinguistic Studies on Deixis and Demonstration" with the conclusion that the group of researchers dealing with deixis can be compared to hunter and gatherers. I think she is still right - with respect to all of us doing research in the field of verbal reference. Thus, I think it justified to finish this paper with another cryptic example for reference I "gathered" in an anthology of contemporary nonsense verse:

seit goethe rund ist
ist die erde quadratisch

Gerhard Rühm

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