A Strictly Dynamic Notational Language For Science

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Abstract

By unawarely projecting the noun-verb form of the grammar common to the western Indo-European (WIE) languages as 'the structure of the universe', WIE scientists have not only prevented themselves from developing adequate theories, they have also failed to provide a basis for reliably predicting the effects of their own work.

In this paper, I demonstrate both a few of the problems intrinsic to WIE mathematics, sciences, etc., and a notation of known structure which can guide us to more rigorous and accurate scientific constructs.

Keywords: assumptions, epistemology, language, non-identity, self-referential systems.

1 Historical Overview

Over the last four to five hundred years, what we call **scientific knowledge** has grown immeasurably. The ways we have USED that knowledge have discernibly affected not just every human but every organism on Planet Earth. However, our science has only begun to come to grips with the threats to the survival of the biosphere which these activities pose.

Today's science arose within the speech-communities of the western Indo-European (WIE) family of languages, and the so-called Western cultures. During the twentieth century CE, certain workers began commenting on limitations intrinsic to those languages, and ways that these limitations impeded or prevented further developments in their fields. Alfred Korzybski (b. 1879, d. 1950) examined key assumptions encoded in the generalized grammar common to the WIE languages, and he said that those assumptions propel our science and our cultures into an impasse. He provided alternative assumptions (or **premises** — see Korzybski, 1941), which transcend those traditional limitations. I adopted Korzybski's premises, and in a collaborative setting, have developed them into the foundations of an alternative frame of reference, capable of supporting an alternative World-View and an alternative science.

As I can now show, the WIE languages (notational as well as discursive) consist almost entirely of **static** constructs, and generate a static World-View. In some 500 years of scientific investigating, no studies I know of have yielded evidence of a static Universe. The successes of WIE science have depended upon the ways in which the great innovators of the WIE tradition provided more and more tools for using static constructs to represent dynamic "doings" or "happenings". But over the last century,

that makeshift has begun to fail.

Scientists lacking ways of accounting for **living organisms** as dynamic and **transactional** will inevitably 1) make lethal errors, 2) remain powerless to abandon them, and 3) maintain that their way of accounting for organisms 'IS' RIGHT (free of fundamental error). Contemporary scientific "progress" risks **pan-biocide** — the annihilation of the biosphere of Planet Earth.

In this paper, I discuss some aspects of our alternative frame of reference, and disclose and discuss some of the catastrophic theoretical errors built into WIE frames of reference. Finally, I present a brief taste of our strictly dynamic notational language.

2   Lethal Errors

The firm determination to submit to experiment is not enough; there are still dangerous hypotheses; first, and above all, those which are tacit and unconscious. Since we make them without knowing it, we are powerless to abandon them.

H. Poincaré (1913)

Poincaré tells us little about these "dangerous hypotheses", other than that they remain "tacit and unconscious" and so leave us "powerless to abandon them".

I contend that we have a body of well-known and well-studied counter-examples, in which various workers have replaced specific instances of such tacit assumptions with explicitly-known, disconfirmable assumptions which they have then tested and, at need, revised or replaced. Indeed, most of the innovating in the science of the **western Indo-European** (WIE) tradition has come about when some person or small group has disclosed one or more of those "dangerous hypotheses", and has replaced it by explicitly **discriminating** or **distinguishing** between certain aspects of the topic of interest which earlier workers had somehow "lumped together".

But over that period, almost no one has had a clue concerning how such "dangerous hypotheses" arise, why we keep making them. Individually and collectively, however, these studies reveal both the general and the detailed structuring of the "tacit and unconscious" assumptions which prove so dangerous.

In my estimation, one class of those "tacit and unconscious" assumptions shows up as a widely shared, unexamined view or opinion, that we can know "the way things REALLY 'ARE'", with **"absolute certainty"**. I hold that the living organisms on Planet Earth live under conditions of **radical uncertainty**. We living organisms almost never operate out of "certainty", but we do not have to submit to radical, arbitrary **unpredictability** either. While we survive, we do so by finding ways to deal successfully with the unexpected. As our main way of doing that, we generate **'maps'** of that **'territory'** composed of "what goes on in and around us". Then we use our 'maps' to **predict** how to get what we need in order to survive, and how to avoid getting injured or killed. By **judging** our starting guesses against **how things turned out**, we can improve the accuracy of our subsequent predicting.

But when we pretend that we can and do know "the way things really 'are'", that pretense forces us to neglect and conceal the DISTINCTION between 'map' and 'territory'.

In so doing, we BLIND ourselves, make ourselves unaware that we predict. Then we lose any possibility of revising or correcting our 'map'. By eliminating the possibility that we might improve the accuracy of our predicting, we generate/introduce a **catastrophic theoretical error**.

In general, I treat such *failing to distinguish* as a **behavioral presupposition** — an **assumption** — which I indicate by the phrase **identifying (confusing) 'map' with 'territory'**, or *'map'-'territory' identity*. This construct expresses the central presupposition of **word-magic**. Its proponents posit that a necessary, intrinsic connection "exists" between Name and Thing Named; or between the 'maps' we generate and that 'territory' that we (should) infer that our 'maps' **refer to** or **designate**. (And, supposedly, "If we know the TRUE NAME of something, we have POWER over it.") I treat such *failing to distinguish* as SOMETHING SOMEONE DOES, and call it **the archetypal example of** A HUMAN MAKING A MISTAKE.

Please note that when I use one or the other pole of the paired constructs of *identity* and *non-identity*, etc., I do NOT presuppose an abstract "relation" which "exists" "out there" somewhere. Instead, I refer to **something someone DOES** (or does not do). Therefore, I paraphrase the **non-aristotelian premises** of Korzybski (1941) as saying that any 'map' we generate or can generate remains INACCURATE, INCOMPLETE, and SELF-REFERENTIAL.

3   Relating the WIE Grammar to Assumptions

As a corollary to his famous proof concerning undecidable propositions, Kurt Gödel (1931) (b. 1906, d. 1978) showed that **no one can see (understand) a system from within the system**. This suggests that exponents of the various WIE sub-languages cannot "see" the system within which they work. Since I speak from a frame of reference outside of and more general that any WIE frame of reference, I need to take some care to specify the perspective from which I view these matters.

Probably early in our evolution we humans began the process of generating our traditional discursive languages. More recently, we began devising writing. Even more recently, we started developing the first (written) axiomatic systems. From this chronology, I infer that over the long evolution of human languaging, none of the early originators tried to frame even one discursive language as a formal system based on specified presuppositions or premises. That long ago, no one had devised such constructs as *formal system*, *premises*, etc.

Furthermore, even today's linguists and logicians do not treat discursive languages as axiomatic systems, covert or overt. And most of our logicians, mathematicians, etc., deny that their formal systems or their notations have anything to do with 'language'.

In order to display how native speakers of WIE discursive languages and users of the WIE specialized sub-languages have structured their frames of reference and the World-Views encoded therein, I must:

(a) scrutinize the (generalized) grammar which underlies WIE languages;
(b) relate the WIE grammar to assumptions; and then

(c) ask some key questions.

3.1 "Parts of Speech"

Grammarians classify the "words" of their WIE languages into the traditional "**parts of speech**":

Most common: Nouns and Verbs
A minority: Adjectives, Adverbs
Few, and sharply restricted: Prepositions, Pronouns, Conjunctions, Indefinite and Definite Articles, etc.

3.2 Basic Sentence

To form the simplest of "complete sentences", place at least one noun, noun-phrase or noun-surrogate next to at least one verb, verb-phrase or verb-surrogate:

The cat grinned.	(Intransitive instance)
The cat wagged his tail.	(Transitive instance)
Not-C	('Intransitive' instance)
C subset of D	('Transitive' instance)

In general terms, a "complete sentence", according to WIE patterns, consists of a designator of **something fixed** (e.g., a noun) juxtaposed to a designator of **something more or less transient** (e.g., a verb). In mathematics, workers tend to use terms such as **operand** and **operator** in place of *noun* and *verb*. Readers should have no trouble drawing the parallels.

The more "parts of speech" you use, the more rules, often unnoticed, you invoke.

3.3 How do we Distinguish Between Noun and Verb?

Operationally speaking, **how do speakers of a WIE language distinguish the Nouns from the Verbs?**

I find that speakers distinguish between them, unawarely, by treating Nouns as "identical with themselves" or "self-identical" — symbolically,

$Noun_1$ identical with $Noun_1$;

and, equally unawarely, treat Verbs as "not identical with themselves" or "not self-identical".

Thus each speaker appears to have internalized or generated a tacit rule, of the form of Aristotle's "Law of Identity", by which to distinguish between these two main grammatical classes.

As Jevons (1883) puts it, Aristotle's "Law of Identity" says, in effect,

What is, is; or in other words, "Everything is identical with itself".

In symbolic form, using the letter B as a place-holder to signify "any noun or noun-phrase", we can state the "Law of Identity" as:

B is B or
$B \equiv B$.

To generalize my findings: Nouns (and/or their surrogates) fit into the blanks on either end of a statement of the "Law of Identity" (can replace the "place-holders"). In

general, verbs (and/or their surrogates) do not, cannot.

To test this generalization: Into a symbolic form of this "Law" such as *B is B,* substitute in turn the key words from each of our test-sentences above.

a) "cat":   *A cat is a cat.*   (Judged acceptable.)
b) "C", or "D":   C is C.   (Judged acceptable.)
c) "grinned":   *Grinned is grinned.* (Judged unacceptable, never used.)
d) "wagged": *Wagged is wagged.* (Judged unacceptable, never used.)
e) "not":   *Not is not.*   (Judged unacceptable, never used)
f) "subset of":   *Subset of is subset of.*   (Judged unacceptable, never used)

These tests do not cast doubt upon my generalization.

3.4   The Error Encoded in the *Noun-Verb* Distinction

The pattern by which those who language in a WIE tongue distinguish between their two most important and most numerous "parts of speech" depends on the archetypal example of "a human making a mistake". Precisely what mistake do they make?

In the last quarter of the nineteenth century CE, Gottlob Frege (b. 1848, d. 1925) gave us our first clue when he distinguished between **Name** and **Thing Named**, and called it a serious error to confuse them. Korzybski (1941) generalized that distinction somewhat when he proposed the 'map'-'territory' analogy, and pointed out that to fail to distinguish between them appears tantamount to positing them as **identical**.

The generalized grammar common to the WIE discursive and notational languages provides NO built-in way to MAKE such distinctions (non-identities). That grammar provides no special words from the traditional "parts of speech", etc., with which to distinguish Name from Thing Named, or 'map' from 'territory'. People may CLAIM that they make such distinctions, and may DO SO on occasion; but, with EVERY noun or noun-phrase that we use, we western Indo-European provincials tacitly TREAT Name as identical with Thing Named, or 'map' as identical with 'territory' — even though we "know better".

To understand what big error these seemingly small errors lead to, I invite you to go one step further. According to many variants of Western mythology, a **god** can and does "see all and know all" — or in the terminology developed here, can and does generate 'maps' identical with the relevant 'territories'. Any human who unawarely ASSUMES that s/he generates 'maps' identical with the relevant 'territories' unawarely assumes **god-like powers**. Since I find the assumption of 'map'-'territory' identity built into the grammar of WIE languages, in the guise of the *noun-verb* distinction, I must infer that anyone (including myself) who USES the *noun-verb* distinction tacitly makes that claim. Speakers of WIE languages, and practitioners of WIE disciplines, subscribe, for the most part unawarely, to the doctrine of word-magic — the idea that to know the True Name of something gives one power over it. But that amounts to claiming for ourselves the ability to move, alter, or otherwise command the Other, the world or Cosmos, without in the process getting altered — which means, we (tacitly) claim Omnipotence; and likewise, amounts to claiming for ourselves the ability to KNOW the Other without in the process becoming known — which means, we (tacitly) claim Omniscience.

3.4.1 Some Survival Consequences of Assuming 'Map'-'Territory' Identity

If someone actually COULD and DID generate a "map" identical with some "territory" — an ENTIRELY ACCURATE and EXHAUSTIVELY COMPLETE one — s/he would find her/himself possessed of "ABSOLUTE CERTAINTY" on any topic covered by that "map" (WITHOUT EVEN LOOKING at the "territory"). Furthermore, such a "map" would have no ROOM in it for the kind of correction factor provided by including a representation of the "map" itself, or of the map-maker ("observer") — nor any need for such. Instead, such a "map" would remain COMPLETELY OBJECTIVE (uncontaminated by any self-reflexiveness, thus fulfilling one demand of modern science).

At the level of my most fundamental premises, I deny the possibility that a human can or does generate such a "map". As the best we can do, we can generate 'maps' that yield predictions which SURVIVE TESTING. If and when that happens, we may (provisionally) regard that 'map' as **similar in structuring** to the relevant 'territory'. Korzybski states the issue clearly in at least three places in his *Science and Sanity*. For example, he writes, "Any map or language, to be of maximum usefulness, should, in structure, be similar to the structure of the empirical world." (Korzybski, 1933, p. 11)

But though I deny the possibility of successfully making a "perfect" map, I do acknowledge the possibility of "tacit[ly] and unconscious[ly]" **pretending** to have done so. When someone PRETENDS to generate a 'map' identical with the relevant 'territory', s/he generates a "map" similar to the structuring of NO 'TERRITORY' WHATSOEVER. To use such a "map" as a basis for predicting — in effect, directly to test *identity* as a postulate — yields predictions which predictably will not survive testing. Given the magical power of WIE languages and the "absolute certainty" they encourage, however, the speakers, and the practitioners of WIE disciplines, find such "maps" difficult to abandon. So our scientists, and the members of WIE speech communities and Western cultures, who continue to subscribe to this "dangerous hypothesis" of *identity*, look to me like they subscribe to a **delusion** ("belief held regardless of evidence"). A culture subscribing to such a delusion cannot survive for a geologically significant interval.

4   Non-aristotelian

Historically speaking, from 1963, when I first started writing theory, until 1971, I used already-available WIE languages (English and the mathematical theory of sets) to codify and present my findings. Late in 1971, I came to recognize that by using WIE languages, which start from assumptions incompatible with the assumptions I had chosen to rely on (the non-aristotelian premises of Korzybski), I had created an impasse. My research project would fail unless I found ways to abandon WIE languages altogether, and devise my own language(s), based (in a drastic sense) "from the very beginning" on my chosen premises. By the midpoint of 1972, I had disclosed tacit, unconscious assumptions by which I had held myself immobilized within WIE frames of reference. Once I could SEE them, I could abandon them. In 1972, I DERIVED a grammar from the non-aristotelian premises. Then over the period 1972-1974, on this derived grammar, the linguist Ronald V. Harrington and I generated our non-standard notation.

(Hilgartner, 1977/78, 1978) In the present paper, the title refers to this notational language. (To date, no one has yet managed to generate a DISCURSIVE language on this derived grammar.)

4.1   Disallowing The Usage of *Identity* Encoded in the Noun-Verb Distinction

In Section 2, I pointed out that any time a human uses the logical construct of *identity*, s/he makes a fundamental theoretical error — engages in the archetypal example of *a human making a mistake*. What happens if we reject that error — disallow that usage of *identity* encoded in the *noun-verb distinction*?

> a) Immediately, we lose the ability to tell Nouns from Verbs.
>
> b) That means that we lose the ability to generate even one complete sentence in a WIE discursive language, or even one **well-formed formulation** in a WIE notational language.
>
> c) In other words, the grammar COLLAPSES.
>
> d) That "catastrophe" provides an opportunity not available otherwise: That usage of *identity* appears to function as the keystone of the previously unnoticed, unsuspected assumptions encoded in the WIE grammar. By eliminating it, we eliminate those tacit and unconscious assumptions — and so provide a way to sweep aside the rubble of "dangerous hypotheses" or assumptions which we otherwise found ourselves powerless to abandon. I did exactly that, as I mentioned immediately above.

4.2   Non-verbal Basis for Languaging

We cut up and organize the spread and flow of events as we do, largely because, through our mother tongue, we are parties to an agreement to do so, not because nature itself is segmented in exactly that way for all to see. Languages differ not only in how they build their sentences but also in how they break down nature to secure the elements to put in those sentences.

<div align="right">Benjamin Lee Whorf, 1952, p. 240</div>

4.2.1   Testing These Hypotheses Against Personal Experiencing

When Whorf (b. 1896, d. 1941) writes of "cut[ting] up ..." or "break[ing] down nature to secure the elements to put in [our] sentences", few people take that as a description of direct experience. I propose to treat it as an explicit hypothesis.[1]

I find that when I look around, I see my surroundings as made up of "things", each of which seems somehow "right" or "complete", as if it had some kind of Outline around it. In other words, as if it satisfies some "expectation".

ILLUSTRATION: One of my colleagues once worked on a project to program computers to perform optical character recognition — to get such devices to classify each blob of pigment on the page in turn as either "some particular character or

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[1] Please do not misunderstand what I say here. I do NOT refer to the bogus "Whorf ..." or "Sapir-Whorf hypothesis", set forth by some of their detractors in order to discredit and dismiss their work, after the detractors found themselves otherwise unable to do so.

number," or else, "not a character at all (possibly a flyspeck instead)". They came to speak of, say, "the S-ness of an S" as verbal shorthand for a question such as, "How well does this blob fit the expected pattern which we call "S"?"

4.2.2   Sensing my Own Sensing

From moment to moment, I sense my own sensing. When I *notice a "visual object" in my surroundings*, I do so by means of activities of which I remain **focally** aware: (i) I feel myself make subtle, small, entirely non-verbal movements of my eyes, head and neck, and adjust my posture, etc. Neurophysiologists tell me (ii) I also engage in other activities of which I remain only **subsidiarily** aware, such as converging the optical axes of my eyes, changing the focus of my lenses, comparing the slightly different images on my two retinae, taking in what the semi-circular canals and other organs of balance in my inner ear tell about my present positioning in Earth's gravitational field; and so on. (Polanyi (1964, 55-8, 59) By such non-verbal, physiological means I "slice up the world" so as to make it seem familiar — which means, I generate "pieces" ("things" and "relations", which I can NAME with *nouns* and *verbs*) that will fit into the WIE grammar. But most of us screen such "doings" out of awareness, and posit that SUCH "THINGS" (or "processes") DO NOT OCCUR. That way we can PRETEND that "nature itself is segmented in exactly that way for all to see". (Whorf, op. cit.) To penetrate this "seal of silence", I showed you how I attend to HOW I ATTEND.

Every human who "has" at least one native language "has" a non-verbal search-pattern for "slicing up the world" in this sense. People with different native languages have DIFFERENT search-patterns and "slice up the world" in different ways.

I designate this general process by which a human "slices up the world" by the term **setting**. People with different native languages build up their different ways of languaging on different non-verbal settings.

4.3   Non-aristotelian Axiomatizing

When I disclosed in myself this non-verbal search pattern and set out to take it into account, I found that I had to revise completely the way I explain my theoretical constructs, including how I structure the explanatory protocol of *axiomatic system*. Since I find that I must regard that kind of systematic explaining as SOMETHING SOMEONE DOES, I propose to use the term **(non-aristotelian) axiomatizing**.

Exponents of WIE frames of reference, from Aristotle and Euclid up through Hilbert, Russell, Zermelo, and their successors, have held and still hold that any axiomatic system "exists" or "occurs" "Out There" somewhere, for humans to "discover".

I don't. The following comments, which amount to explaining **how I do my explaining**, illustrate one of my key points: What I call *axiomatizing* occurs ON MULTIPLE "LOGICAL LEVELS". For terms such as *to explain*, which we can USE on multiple "logical levels", Korzybski (1933, pp. 433-43) coins the term **multiordinal**. When someone applies a multiordinal term first on one "logical level" and then on another ("higher" or "lower"), WHAT IT MEANS will shift in ways that no one can in principle predict in advance. In accord with my chosen premises, I use the (multiordinal)

notions of *to assume, premises, conclusions, hypotheses, to test, outcome,* etc., as parts of an overall (multiordinal) construct by which I **account for** *how humans* ACCOUNT FOR *human (and non-human)* ACCOUNTING.

In the rest of what I say in this section, I express my own theory-driven view. What I experience, and report to myself-and-others, expresses WHAT I FOCALLY OBSERVE HAPPENING, the inferring I do to account for these "happenings", etc.; while I SUBSIDIARILY OBSERVE MYSELF OBSERVING the "happenings", inferring about them, etc.

As a part of every sentence that follows, I shall not say, "I assume" or "I hold that", but since a standpoint on a "higher level" forms an intrinsic part of every "lower level" construct I specify, I suggest that you SUPPLY a phrase of that sort for every sentence of the remainder of this section. That may help you to see that every statement, every "expressing" that comes out of this alternative frame of reference, represents the limited point of view of a designated observer who non-verbally slices up the world this way.

I assume that humans (and other organisms) non-verbally ASSUME, that indeed, we CANNOT NOT-ASSUME. Humans can also language their assumings. Sensing does not deliver "absolute certainties", it delivers **guesses** (*assumptions*). At least some portion of what ANY organism guesses or assumes (non-verbally and/or verbally) consists of predicting "how to get what I need in order to survive", and "how to avoid getting damaged or killed". In order to survive, we **guide** ourselves by these guesses, and in the process, we test them. Any encounter involving living organisms eventually reaches an **outcome**, at which point the organism has opportunities to judge her/his/its starting guesses against HOW THINGS ACTUALLY TURNED OUT. By analogy to the construct of (WIE) *self-correcting systems*, this judging in principle cannot "CONFIRM" a guess (that would yield "absolute certainty"); it can deliver only one or the other of two mutually-exclusive answers: **disconfirmed**, or else **not-disconfirmed**.

With human and non-human organisms, to describe *not-disconfirmed* often seems like a fairly simple task: that judgement designates situations in which the organism has indeed obtained what it needed to survive, and/or has avoided harm, and now finds itself ready and able to go on to the next encounter. *Disconfirmed* covers a more diverse range. At one extreme, if an organism's guesses concerning how to cross a busy highway end up disconfirmed, the organism may abruptly end up dead. A predator for whom *disconfirmed* means that s/he has missed making a kill will remain hungry, perhaps starving, but probably not dead yet. Progressively less drastic usages might include minor injury, discomfort, embarrassment, etc. Ultimately, if the organism MUST obtain what it seeks, or else perish, then it MUST revise, or reject and discard, at least part of its starting guesses, guess again, and try again.

5   Premises of a Non-aristotelian Frame of Reference

I structure *human languaging*, or better, *relating to self-and-environment*, as *axiomatizing*, and treat *axiomatizing* as SOMETHING SOMEONE DOES.

I regard *setting* as part of any axiomatizing. Beyond that, I use also the traditional terms: **undefined terms** (or *primitives*), **postulates**, **"rules of inference"**, etc. But I

found it necessary to re-work every one of those traditional terms, so as to make each one designate some aspect of THAT WHICH SOMEONE DOES.

Korzybski (1941) had set forth three undefined terms: **structure, order** and **relations** — and three postulates: **Non-identity, Non-allness,** and **Self-reflexiveness**.

5.1   Setting

In its general sense, the term *setting* designates SOMETHING EVERY USER OF A HUMAN LANGUAGE DOES, the entirely non-verbal pattern by which s/he "slices up the world" into "pieces" the designations for which s/he can fit into the grammar s/he uses.

As in the text of Section 4.3, in a non-aristotelian setting these "pieces" have at least two "logical levels", as does my multiordinal injunction, "Notice how you notice". To describe the "shape" of these non-aristotelian "pieces" more fully, I have often used a run-on phrase. My way of "slicing up the world" produces a non-verbal "shape" made up of lower-level and higher-level "pieces". Here, in parentheses, I label these: "(lower level) **one particular organism-taken-as-a-whole-dealing-with-"his"-environment-at-a-date**, as viewed by (upper level) a **designated observer adept with the non-aristotelian frame of reference**, who speaks, or writes out, a **representation** of what "she" observes, in a **code** of "her" own devising." Here I have appropriated the pronouns "he" and "she", in all their inflectional forms, to keep track of the "logical levels" involved. I use **"he"** (neither implying nor stating "male gender") to designate the "level" of *our organism under observation*; and use **"she"** (neither implying nor stating "female gender") to refer to the "level" of *our designated observer*.

5.2   Undefined Terms

When, about 300 BCE, Euclid wrote his summary of mathematics and geometry, he used a small number of terms for which he provided no verbal definitions (e.g., *point, line, parallel*, etc.). Over the succeeding couple of millennia, various workers tried to supply the missing verbal definitions; but logically speaking, every effort failed.

Hilbert (1897-98) argues that **to define** means "to replace something unfamiliar with something more familiar". At the beginning of the process of writing an axiomatic system, he points out, we don't HAVE anything "familiar". Therefore let us have a "rule" that requires us to set forth a small number of terms —"primitives" — for which we MAY NOT offer verbal definitions. (This "rule" both allows and requires us, however, to TELL HOW WE USE these undefined terms.) So in writing an axiomatic system, we must explain, or at least list, what we have left undefined. I both acknowledge and accept the contributions of my mathematician predecessors on the topic of *undefined terms*.

To this day, many mathematicians and logicians DENY that their disciplines satisfy the criteria as "languages" (or "sub-languages"), and further deny that we should consider even one discursive language as an example of an axiomatic system. Thus they recognize no undefined terms for a tongue such as English.

I say that the grammar of WIE languages uses at least three undefined terms: (a) a generic term which signifies the grammatical "part of speech" I call *noun*, and (b) another generic term for what I call *verb*, and (c) another construct, which remains

unacknowledged, un-stated and unnoticed — the hidden assumption which I designate as "failing to discriminate between "Name" and "Thing Named", or between 'map' and 'territory'." In this paper, I indicate that undefined term with the generic term *identity*.

As Korzybski (1933, p. 154) points out, undefined terms represent "blind creeds which cannot be elucidated further at a given moment." To paraphrase that insight, I hold an undefined term as a special kind of postulate, the CONTENT of which the person who subscribes to it cannot state in words. I maintain that the person generating a formalized axiomatic system relies on her/his undefined terms to provide a bridge between those non-verbal "doings" or "happenings" which the theory purports to describe or model and those verbal constructs that make up the actual theory. This person uses her/his undefined terms as the FIRST and MOST GENERAL locutions s/he can write or utter, and more than anything, needs for them to INCORPORATE the "shape" of the setting, the non-verbal search-pattern, which this person uses — (or, perhaps, has created for the very first time ever).

In principle, any human chooses her/his undefined terms — and in so doing, chooses to "slice up the world", and just how to do so. I take Korzybski's choices, *structure*, *order*, and *relations*, as verb-forms (something someone does), namely, to "slice up the world" into a two-level construct, such as what I describe above in 5.1.

5.3   Postulates

By the beginnings of the twentieth century CE, WIE logicians stated as a meta-rule that they should USE their undefined terms to state their postulates. I re-name Korzybski's postulates, converting the noun-forms which he chose into verb-forms, again in hopes of reminding readers/listeners that these postulates point to something someone does. Further, I enclose the text of each one within paired exclamation points ¡! (as in discursive Spanish), and address them as injunctions, addressed to me-and-my-readers. I state them using the undefined terms:

Non-identifying: ¡Presume that no structuring, ordering, or relationing satisfies the criteria as **identical with** any structuring, ordering or relationing (including itself)!

Non-alling: ¡Presume that no structuring, ordering or relationing can represent ALL aspects of any structuring, ordering or relationing!

Self-reflecting: ¡Presume that no structuring, ordering or relationing can occur free of aspects which refer to itself and/or to the organism which elaborates it.!

The first two of these postulates set forth a matched pair of constructs: *the certainty of uncertainty*, balanced by *the self-correcting structure of organisms*. The third postulate reminds us that any abstracting embeds the point of view of the organism that does the abstracting, and so consists of TWO inseparable components. One represents our organism's *environment*, and the other our *organism* herself.

6   Rudiments of a Non-standard Notation

Here I undertake to present JUST ENOUGH of the beginnings of my non-standard "Let's Keep Track of What We Say" notation to allow you to get the "feel" of it. I deem

that I will have done what I set out to do when each member of my audience, having succeeded in wetting the end of a figurative big toe in this "alien" doctrine and notation, SHOWS a felt-reaction to it — which you might verbalize as "Hey! — Neat!" or "Ooh — Weird!", or whatever.

Remember: I knew I needed to abandon WIE languaging, of both the discursive and notational patterns. But I hadn't known HOW. Then I did.

In the fragment of the notation I present here, I do not go far enough to state the postulates in notation.

6.1   Deriving a Grammar

Having collapsed the WIE grammar, I turned to Korzybski's undefined terms. I found that I DID understand, more or less, HOW I USE THEM.

SO — What did I DO that involved the undefined terms *structure, order, and relations*? I considered them sort of one-at-a-time, and then I found ways to combine them.

6.1.1   Taking the Undefined Terms Singly

a) I use the undefined terms to POINT TO examples of those "doings" or "happenings" which interest me — specific examples of what I might call the situation of **one-particular-organism-as-a-whole-dealing-with-its-environment-at-a-date (as viewed by a designated observer)**. Succinctly, **contacting** or **transacting** or **abstracting**, etc.

b) On a higher "logical level", I hold that the undefined terms held by any particular human function only (or mainly) in her/his own behaving-and-experiencing, where they serve to bridge between i) her/his non-verbal observings of this-organism-transacting-with-its-environment, etc., and ii) her/his verbal-level representings of these observings.

c) In the most general sense, I maintain that any undefined term I may subscribe to operates as a kind of postulate, a **silent** one, the tenets of which I cannot state in words at this date. (Cf. Korzybski, 1933, p.153)

d) When I want to represent these in notation, I use single letters: **S**, **O**, and **R** — and I treat these terms as "not-noun, not-verb".

6.1.2   Taking Them in Groupings

Korzybski suggested, in at least two places in *Science and Sanity* (1933, pp. 58, 161-2), that, given a specific usage of one of the undefined terms, you could perhaps say a bit more about it by COMBINING the other two terms — "structure" composed of "ordered relations" or of "related orders"; "order" composed of "structured relations" or "related structures"; and so on.

By translating Korzybski's discursive sentences into one-letter symbols, I obtained a pattern or "template": three undefined terms, one of them indicated by a plural form. In the vocabulary of "permutations and combinations", that means that to form a "complete sentence" **(expressing),** I must use one of our three symbols twice. For convenience, I chose to keep the two usages of one symbol together, flanked on one side by a single usage of one of the remaining symbols, and on the other side by a single usage of the

other.

In other words, I have a total of THREE symbols, which I take FOUR-AT-A-TIME. That yields six combinations. I can write these available combinations, as follows:

SOOR	ROOS	
SRRO	ORRS	
RSSO	OSSR	(1)

Initially, I see no grounds for differentiating among these expressings — they appear equivalent. However, in longer chains of 'reasoning', I may find it necessary or useful to develop some basis for choosing amongst them — e.g. given that I use one of the six to begin a "story", I may end up needing or wanting to develop rules concerning which one to use as the SECOND expressing of the "story"; and so on.

Take that as 'a first step' in actually deriving a grammar — the most rudimentary "complete sentence", analogous to the "noun-phrase + verb-phrase" formulation of WIE generative grammarians and other linguists.

Then how do we MAKE SENSE of these strings of letters (strings of undefined terms)?

6.1.3 Instructions to Readers:

(1) Take everything written in this notation as a report penned or dictated by some designated OBSERVER ("her", "our logician") OBSERVING some specific OBSERVED ("him", "our organism") — usually, "one specific organism-as-a-whole-in-her/his-environment-at-a-date". Consider the sample expressing SOOR .

(2) Let the initial term (e.g. S): signify our organism's TOPIC (as viewed by our designated observer).

(3) Let the remainder "say something about this topic" (as interpreted by our designated observer) — or in other words, take the remainder as signifying our organism's (presumed) COMMENT on that topic.

(4) Gestalt theorists infer that any *sensing*, any *feeling*, any *moving* (and I suggest, any *languaging*) done by an organism-in-its-environment-at-a-date looks (to a designated observer, a non-aristotelian Gestalt-theorist) as if it takes on the configuration of a Gestalt (a "figure of focal interest [to the organism], against a (back)ground relatively empty of interest")

(5) Then, given the organism's topic, let the remainder (what our designated observer interprets as his comment) specify a Gestalt on that topic.

(6) Finally. use punctuation marks (I call them **parenthings**, and use them as "written instructions to readers") — e.g.: <...> (signifying "Read this as ground") and {...} (signifying "Read this as figure") — to set off the terms I designate as <ground> and {figure} .

6.1.4 Assembling a First Sentence:

Initial term: (e.g. S) — signifies TOPIC
Second term: (e.g. O) — signifies the <(back)GROUND> of this Gestalt
Third term: (e.g. O) — signifies the {FIGURE} of this Gestalt
Ultimate term: (e.g. R) — signifies HOW FIGURE AND GROUND "HANG TOGETHER" in

this Gestalt

$$S <O> \{O\} R \tag{2}$$

6.1.4.1   Checkup

Do I have anyone in my audience who does NOT see this as the *anlage* (foundation) of an entire grammar?

6.2   Worked Example

Let me now put into that rudimentary notation the promised line from Yeats, which expresses a relationship similar to things we see as "weird" in quantum theory:

"How do we know the dancer from the dance?" ("Among School Children", William Butler Yeats, 1928)

6.2.1   First Pass: In Undefined Terms Alone:

In general, I maintain that, no matter what the "content" of the undefined terms of a formalized axiomatic system, the person generating it relies on them to bridge between those non-verbal "doings" or "happenings" which the theory purports to describe or model and those verbal constructs that make up the theory. This person uses her/his undefined terms as the first and most general locutions s/he can write or utter, and needs most for them to incorporate the "shape" of the setting, the non-verbal search-pattern, which this person uses.

S : the overall structure — the "doings" or the "topic" (in English, "TO DANCE):

First O: the JUST PRECEDING movements of head, arms, hands, trunk, legs, feet, facial expression, etc.

Second O: THESE movements of the body-parts.

R: How first O and second O "hang together": "Figure and ground shift from "then-to-now" and from "there-to-here" (a general relationing I call **spatio-temporally ordered**), and logically, shift from 'lower'- to 'higher' "logical levels" (and perhaps, back again). (a general relationing I call **hierarchically ordered**)."

Please notice how much SPACE ON THE PAGE it takes to write out these representations of "doings" or "happenings" as undefined terms:

$$S <O> \{O\} R \tag{3}$$

6.2.2   Second Pass: In Specified Words:

Notice also what happens when I "pretend" to have SPECIFIED some terms ("words"), and use those:

Motor abstracting <the PREVIOUS movements of body parts> {THESE movements of body parts} hierarchically ordered and spatio-temporally ordered.

6.2.3   Third Pass: In Specified Symbols

Now let me pretend to specify some one- or two- or three-letter symbols.

Abstracting: Abs

Moving: "motor-ing", indicated with on-the-line Mt or with subscript $_{Mt}$

Dancing: a specific kind of "motor-ing", indicated with subscript $_D$

"Intervals": indicated with right superscript ^{then} and/or right superscript ^{now}
Hierarchical ordering: indicated with O_h
Spatio-temporal ordering: indicated with O_t
   Now put this together:

6.2.4   Fourth Pass: Using Indexed Undefined Terms:
$$S_{Mt} <O_D^{then}> \{O_D^{now}\} \; R_h \; R_t \tag{4}$$

6.2.5   Fifth Pass: Using Indexed Specified Terms:
$$Abs_{Mt} <Mt_D^{then}> \{Mt_D^{now}\} \; O_h \; O_t \tag{5}.$$

7   Discussion and Conclusions

I set out to show how the construct of *identity* encoded in the *noun-verb* distinction used in the grammar of the WIE languages obliges its users to assume, unnoticed, a god-like certainty which most of us could not awarely subscribe to. I use Yeats's poem as an example of how, in WIE languaging, we slice up the world in ways not similar in structuring to what we encounter there. Yeats poses a paradox which I easily resolve:: *dancer, dancing* and *dance* do not name three different "things", they refer to a single sequence of "doings" or "happenings", considered on several different "logical levels". The rueful comment attributed to Alfred North Whitehead, that "All we can know about an atom is its vibrating — and there's no *thing* there vibrating," expresses a similar kind of linguistic discomfort.

In the notational statement (5), I describe the ongoing sequence of movements of *the-dancer-dancing-the-dance*. Please notice that, in accord with the setting and premises which underlie it, this notation also explicitly takes into account the personal, cultural and linguistic knowledge of the designated observer by which she "KNOWS" the-dancer-dancing-the-dance. (Within the constraints of this paper, I have no room to show HOW to show this.) Thus, in the domain of living organisms (including scientists doing science), this notation shows marked advantages over any WIE formalism, such as the mathematical theory of sets. For I show how to eliminate "absolute certainties": that we "know how things REALLY 'ARE'", and that we have "the one right way" to do science, and to live — the "dangerous hypotheses" we previously could not abandon.

References

Frege, Gottlob (1892). "Über Sinn und Bedeutung." *Zeitschrift für Philosophie und Philosophische Kritik*, N.S. 100, pp. 25-50. English translation, P. Geach & M. Black (1960). *Translations of the Philosophical Writings of Gottlob Frege*, 2nd edition. Oxford, pp. 56-78.

Gödel, Kurt (1931). "Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme I," *Monatschefte für Mathematik und Physik* **38**: 173-198.

Hilbert , David (1899). *Grundlagen der Geometrie*. Leipzig.

Hilgartner, C. A. (1977/78). "Some Traditional Assumings Underlying Indo-European languages: Unstated, Unexamined, and Untenable." *General Semantics Bulletin* Nos. 44/45, pp. 132-154.

Hilgartner, C. A. (1978). "The Method in the Madness of Western Man." *Communication* **3**:143-242.

Jevons, W. S. (1883). *The Elements of Logic*. New York & Chicago: Sheldon & Co.

Korzybski, Alfred, (1933). *Science and Sanity An Introduction to Non-aristotelian Systems and General Semantics*. Chicago: International Non-aristotelian Library Publishing Co. Fifth edition (1994), Institute of General Semantics, Brooklyn, NY 11209-4208, distributors.

Korzybski, Alfred (1941). "General Semantics, Psychiatry, Psychotherapy , and Prevention." *American Journal of Psychiatry* **98**(2):203-214. Reprinted in *Alfred Korzybski Collected Writings 1920-1950*. M. Kendig, editor. Englewood NJ: International Non-Aristotelian Library (1990), pp. 295-308. Institute of General Semantics, distributors. ISBN 0-910780-08-0. The passages on undefined terms, the *map-territory* analogy, and the non-aristotelian premises appears in the *AJP*, pp. 204-6, and in the *Collected Writings*, pp. 298-300.

Poincaré, H. (1913).*The Foundations of Science*. New York: Science Press.

Polanyi, Michael (1958). *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago: University of Chicago Press. Second edition, 1962. Paperback, New York: Harper Torchbook, 1964, pp. 55-8, 59.

Whorf, Benjamin Lee, (1956). *Language, Thought, and Reality Selected Writings of Benjamin Lee Whorf*. John B. Carroll, ed. New York & London: Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, pp. 240.