GENERAL SEMANTICS VS. "THE ENTIRE WESTERN SYSTEM OF RATIONALIZATIONS"[1]

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In 1988, at the International Conference on General Semantics held at Yale University, Allen Walker Read (1906–2002) invited me to tell the other participants "What I Have Done to Language." In this paper, I tell what I have done with, to, and for general semantics in particular, and to human symbolizing in general.

Introduction

Some while ago, I read an account that posed a question. To me, the question seemed original, insightful, important, and, in my opinion today, still not publicly answered. The questioner, treated as male but not named in the writeup, asked:

> Has anyone published studies which apply general semantics to hard science, physics in particular?

The reporter writes that the caller's father had studied with Alfred Korzybski (1879–1950), but had warned him (the questioner) that the field of general semantics had fallen away from hard science, and that psychologists and teachers had pre-empted it.

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I found that I could not ignore this question and remark. I had recently completed some fifteen years criticizing and proposing revisions to relativity and quantum theory from a Korzybskian frame of reference. Furthermore, I got most of my proposals published in physics journals, including at least one refereed one (Hilgartner, Harrington, & Bartter, 1984, 1989; Hilgartner & DiRienzi, 1995). But I felt that I may not have communicated my findings to non-physicists, including persons or groups within the general semantics community who perhaps should belong amongst my primary audiences. To fill that gap, I have composed the following commentary.

Answering the Query

According to the account, the questioner framed his initial question around the notion of "*HARD science.*" As I understand that phrase, it designates those branches of science which their exponents express primarily in the mathematics of the **western Indo-European** (WIE) tradition. Most people, I gather, regard the "hard" sciences as "really rigorous," and, therefore, as "better" than the life-sciences. The higher status which the "hard" sciences enjoy seems to follow from the aura of "certainty" which most people grant them; and withhold from the "mushy" or "soft" sciences.

The cavils of (mainly) twentieth-century workers such as Gottlob Frege, Bertrand Russell, Kurt Gödel, Morris Klein, and many others, suggest, more and more clearly and convincingly, that "certainty," in one sense after another, appears unattainable. However, SOMETHING about the Western logics and mathematics convinces most members of the currently dominant world culture, scientists as well as lay-persons, to regard "absolute certainty" as an acceptable construct, and to believe that the methods of the Western logics and mathematics can attain it—at least in the form of 'certainty of inference.'

Similarly, a number of mainly twentieth-century workers report that the **logical construct of *identity*** leads to myriad difficulties. But Western logicians, mathematicians, etc., still resolutely rely on the modern **logical axiom of identity**[2] as their most central construct—the keystone of their theories. As they do with "*certainty*," most workers continue to rely on *identity*, despite the criticisms.

I regard that clinging to the constructs of "*certainty*" and *identity* as evidence that most Western workers have unawarely committed themselves to **fundamental theoretical errors** (Perls, Hefferline, & Goodman, 1951, pp. 243–244[3]), which remained utterly unknown and unsuspected until I disclosed them (Hilgartner, 1977/78). I get the impression that few, if any, workers from

the Western tradition have found, or even sought, significant connections between the notion of "*certainty*" and the logical construct of *identity*.

In my opinion, Korzybski does not base his general semantics on "hard" science or Western mathematics. As his initial breakthrough, working from his own personal experiencing, he rejects the "received wisdom" concerning "human nature" current in his (our) culture, and replaces it with his own carefully-crafted construct, which I often describe as "an operational definition for the species-term **Man**"—the construct of **time-binding** (Korzybski, 1921). In that construct, he posits that

a) Humans accumulate a **heritage** (composed, he says, of *human knowledge*; I prefer to say, composed of *tested guesses*); each person receives the heritage and assimilates some portion of it—a unique portion of it.
b) Each human **contributes** to this heritage (whether or not s/he can point out her/his contributions).
c) Each human **passes on** the enhanced heritage to peers, to progeny, and to the generations of humans yet unborn.

Then, using that construct as a frame of reference, Korzybski reviews what we humans, or at least, we Westerners, have learned since the era of Socrates, Plato, and Aristotle. He puts his findings together into a symbolic structuring so "big" that we have no adequate word for it. He ends up calling it **a non-Aristotelian system** (Korzybski, 1933). Then, in 1941, he discloses, and states in English, the most fundamental presuppositions that his non-Aristotelian system relies upon (Korzybski, 1941). These premises consist of three **undefined terms**: **structure**, **order**, and **relations**; and three **postulates**, now known as **non-identity**, **non-allness**, and **self-reflexiveness**. Korzybski expresses them in two wordings: in terms of the '*map*'-'*territory*' *analogy*, and using *word* vs. *referent*, or *language* vs. *referent*, terms:

Non-identity: "The map *is not* the territory," or "A word *is not* the fact, feeling, situation, etc."
Non-allness: "The map represents *not all* the territory," or "A word covers *not all* the characteristics of an object, fact, feeling, etc."
Self-reflexiveness: "The map is *self-reflexive*," or "Language is also self-reflexive, in the sense that in language we can speak about language."

More recently, I summarized these postulates: The "doings" or "happenings" (in Korzybski's terminology, the **abstracting**) of any organism-taken-as-a-whole-in-its-environment-at-a-date remain(s) intrinsically **inaccurate**, to some degree; intrinsically **incomplete**, to some degree; and unavoidably **self-referential.**

As another key innovation, in his 1933 book, Korzybski, alone (so far as I now know) among major twentieth-century innovators, declares *identity* **invalid**—incapable of surviving scrutiny. And, becoming radical indeed, he proposes that we not USE it—that we expel it from the roster of acceptable constructs, refusing to rely on it. (Within that rubric, he proposes that we reserve *identity* to designate **a human making a mistake**.)

But as I said, today, in the twenty-first century CE, Western logicians and mathematicians still resolutely and explicitly continue to posit *identity* as their most central construct. By rejecting *identity*, Korzybski violates the presuppositions that underlie Western (or WIE) languages and "disciplines," including the "hard sciences." No one should make the mistake of assuming that Korzybski bases his general semantics on the "hard" sciences, or on Western logics, mathematics, etc.

As for the remark attributed to the questioner's father, to the effect that the field of general semantics had fallen away from hard science and that psychologists and teachers had taken it over, I tentatively interpret the comment to mean that the father makes precisely the mistake of regarding general semantics as derived from the "hard sciences," rather than from Korzybski's original, novel synthesis and his non-Aristotelian premises. Western views posit a dualistic, non-living Cosmos, composed of "non-living matter" (and an equally non-living 'supernatural' or 'mystical' aspect, commonly called "spirit" or "soul" or "mind," etc.). In contrast, Korzybski's synthesis, and the premises which he first set forth explicitly in his 1941 paper, posit a Cosmos that HARBORS **living organisms**, including humans. Note that long before he set forth his premises in 1941, Korzybski (1921) had rejected the 'monstrous hybrid' version of the species-term **Man**, which the Western dualism requires.

I hope the caller gets to see this commentary. And if he does, I invite him to get in touch with me. I would feel pleased indeed to receive his responses to what I say here.

General Semantics and the "Hard" and "Soft" Sciences

I account myself a continuing student of and contributor to Korzybski's general semantics. I first started writing and publishing in the arena of general semantics in 1963. In 1965, I embarked on studies which used the methods of WIE mathematics—specifically, the mathematical theory of sets—to scrutinize general semantics (Hilgartner & Randolph, 1969). By stating the non-Aristotelian premises in the set theory notation that we used (a Bourbaki algebraic dialect), we showed these premises as acceptable, as judged by the logical standards of set theory. To state that in stricter terms: this study showed that Korzybski's premises appear not-discredited on logical grounds, and

free of self-contradiction (so long as we continue to regard set theory as free of self-contradiction). That study occupies only a small part of the first Hilgartner & Randolph paper. In the remainder of these four long papers, we examined (and extended) the Korzybskian "theory of human behaving-and-experiencing" which I had written (in scientific English)—and again, this doctrine appears not-discredited on logical grounds, and free of self-contradiction (so long as we continue to regard set theory as free of self-contradiction).

Later, I used my mathematical version of general semantics to scrutinize WIE set theory. Since set theory relies on the (according to my chosen premises, *non-valid*) modern logical axiom of *identity*, I infer that the premises of the WIE mathematical theory of sets violate the premises of non-Aristotelian systems—set theory does not and cannot survive general-semantics-based scrutiny. I can express these evaluations in terms of my version of the **logical criterion of generality** (see Appendix), by which I can show general semantics —a non-Aristotelian system—as **more general than** the currently-accepted WIE "hard sciences." That confers grounds for me to hold my doctrine (taken as a theory) in particular, and general semantics (taken as a theory) in general, as **preferable to** the WIE theories grouped together as the "hard sciences."

In Hilgartner (1978a), I performed two versions of demonstrating *generality*—one in words only (pp. 221–223), the other in notation (pp. 223–232)— in which I compare a version of the Laws of Thought of Aristotle, stated in our set theory language, with the non-Aristotelian postulates of Korzybski, stated in my non-standard notation (discussed below). As the **restricted and restrictive assumption**, I display the construct of **tacit *identity*** (discussed below). In half of the demonstration, by repeatedly introducing *tacit identity*, I convert the notational version of the non-Aristotelian postulates into a set theory approximation of the Laws of Thought, and in the other half, by repeatedly removing *tacit identity*, I convert the set theory statement of the Laws of Thought into a non-standard notational approximation to the non-Aristotelian postulates. From both the verbal and the notational versions of this demonstration, I conclude that the non-Aristotelian premises of Korzybski enjoy the advantage of generality over the Laws of Thought of Aristotle. At the very least, this result suggests that anything derived from the non-Aristotelian premises would enjoy a similar advantage over anything derived from the Laws of Thought (including the later developments in 'syllogistic reasoning' over the past 2300 years).

Below, at the end of section 2, I return to issues of generality. Then, in section 5, I address the impact which my mathematical general semantics has on relativity and quantum theory.

From the beginnings summarized above, I and my collaborators have conducted a total of more than forty-five calendar years of unexpectedly successful inquiry, and have written over a hundred papers. We still pursue such investigations. I take the liberty of mentioning here a few of the accomplishments of our long-term research project. Some of the papers I summarize directly address the questioner's concerns. Others lay the foundations for doing so. As you may notice, my understanding and 'perceptions' on the topics addressed here have changed as I've matured.

Although I did not explicitly say so until quite recently, this whole body of work, taken singly and/or collectively, discredits—and begins the task of replacing—that which the anthropological linguist Benjamin Lee Whorf (1897–1941) calls "the entire Western system of rationalizations."

1. Two Papers (Verbal Only, No Mathematics) (Hilgartner, 1963, 1965)

Korzybskian general semantics has much to say about details of human behavior, but does NOT present a **theory** of human behavior. In the two papers listed here, I DO propose such a theory, explicitly based on the non-Aristotelian premises of Korzybski. In my opinion, these premises posit a novel Cosmos—which, so far as I know, Korzybski did not explicitly discuss—radically different from the various versions posited over the millennia by workers within WIE traditions.

WIE versions of "Cosmos" or "Universe" unavoidably exclude living organisms from consideration. Over the years, the exponents of Western scientific theories seem to have seen no reason to develop terms to account for synaptic or other organismic delays—in effect, even their recent models posit that nerve-currents, or other forms of excitation (a.k.a. 'mind'), propagate at "infinite velocities." They treat the construct of *the observer* not as signifying an organism, but rather an instrument (mechanism) or a photographic emulsion.

In contrast, the Korzybskian Cosmos HARBORS organisms, including humans; and within that animate setting, Korzybski's premises expel the logical construct of *identity* (the notion of **absolute sameness in all respects, or negation of difference**) from the roster of acceptable constructs.

The alternative theory I propose rests upon these premises and posits that the organisms living in the biosphere of Planet Earth live under conditions of **radical uncertainty**. They survive in the biosphere by simulating a **self-correcting system**. Organisms generate **survival-oriented 'guesses'** (hypotheses); then, by using these as guidance, they **act** on them, in the process **putting their 'guesses' to test**; and at the **outcome** of the encounter, they can **judge** the

'guesses' they started with against '**how things turned out**.' In particular, I compare the behaving of non-human organisms to a self-correcting system that functions only on **non-verbal** "logical levels"—generating only **non-verbal** 'guesses.' I further compare HUMAN **behaving-**and-**experiencing** to a self-correcting system which functions on both non-verbal and **verbal** "logical levels"—generating non-verbal and/or verbal 'guesses,' tests, and judgments.

Humans can also generate **restricted and restrictive** assumptions, which lead them to **interrupt** their own self-correcting, and to perform actions that lead to undesirable, painful, ultimately self-defeating or self-destructive outcomes—but which they still persist in performing. Some psychotherapists take on the task of guiding their clients or patients to generate one or more **therapeutic insight(s)** that allow the client to restore more comfortable, effective functioning. Viewed from the present frame of reference, I see this process as equivalent to setting up and performing a **critical experiment** to select between two rival theories. In effect, the patient functions as trainee. Displaying his special skills in experimental logic as both precept and example, the therapist guides the patient to design and execute her/his own critical experiment, to analyze her/his own situation for her/himself.

In these papers, I end up testing my doctrine concerning human behaving-and-experiencing in two different ways—one empirical and the other logical. The empirical study has two parts. In the first part, I USE the suppositions encoded in my doctrine, summarized above, to examine in detail a *bona fide* example of a situation in which a human achieved a therapeutic insight. I use an example from my own personal behaving-and-experiencing. According to the notes I wrote immediately afterward, this episode occurred on Thursday 22 June 1961, prior to 5 AM. I describe the setting, the details of my recurring "psychological symptom," how it recurred on this occasion, and the actions I took which made this occurrence of that "symptom" into a life-changing episode. I disconfirmed the assumptions underlying the previously hidden 'theory' that led me repeatedly to generate that "psychological symptom." By the action I took, I tested, disconfirmed, and rejected that 'theory.' The "symptom" disappeared—as of this date, it has not recurred. And that left me able to generate an explicit, awarely-held, self-affirming theory with which to replace the rejected self-defeating one.

In the second part, I TEST the suppositions encoded in my doctrine by presenting the notes I had made in 1961 at the conclusion of the therapeutic experiencing. In writing the 1963 paper, I make explicit the logical structuring of the two rival 'theories' at issue here: the one which would lead to uncomfortable, self-defeating experiencing, such as the "symptom" I had repeatedly

produced in myself; and the other, by which I can explain how the kinds of actions I took could enable me to reject the self-defeating 'theory' and its underlying assumptions, and replace it with a 'theory' that could enable me to generate for and in myself more comfortable, effective, self-affirming functioning. The results of this scrutiny, this live and unrehearsed self-analyzing—the first-hand experiencing I recount—fulfill the pattern: they show the activities by which I generated a therapeutic insight as equivalent to "setting up and performing a critical experiment to select between two rival theories." This testing does not disconfirm the suppositions which I summarized above—does not disconfirm the theory of human behaving-and-experiencing, and the model for how psychotherapy works, which I present in the 1963 paper.

In 1967, I re-wrote the first half, the theoretical part, of my 1963 paper. Work begun late in 1965 turns out to have tested my doctrine concerning human behaving-and-experiencing on grounds entirely different from those of the nested empirical testing. I and the mathematician John F. Randolph, then Fayerweather Professor of Mathematics at the University of Rochester, performed a **logical analysis** of the doctrine concerning human behaving-and-experiencing set forth in the 1963 and 1965 papers. We framed the results of this analysis as an axiomatic system, explicitly based on the non-Aristotelian premises of Korzybski (1941), and stated in a mathematical language of known structure—an algebraic dialect of the WIE mathematical theory of sets. I re-wrote the 1963 paper to reflect the improved understanding of our theoretical constructs.

I discuss this study more completely in the next section. Here, I point out that, from its very beginnings, I and my collaborators have framed the alternative frame of reference which we have generated so as to make our proposals, our innovations, subject to both experimental (empirical) and logical testing. From their very beginnings, these theories have survived such testing as they have received. Earlier students of human behavior, for example, WIE practitioners such as Sigmund Freud, Abraham Maslow, the earliest Gestalt therapists (Perls, Hefferline, & Goodman, 1951), etc., appear not to have recognized, or at least, did not discuss, their own premises, nor the logic of their own formulations. I did and do.[4]

FOCAL ISSUE: Can we humans structure our theories of human behaving-and-experiencing so they FULFILL a specifiable logical pattern, starting with premises?

ACCOMPLISHMENT: In these two papers, I begin the process of providing a strict basis—premises—for theories both of non-human behaving and of human behaving-and-experiencing.

In these two papers, I believe, I set forth a breakthrough. I discuss them here partly because they provide the first step, the foundations, for just about everything I have done since; and partly because they bridge from the numerous previous, un-formalized and (in my opinion) un-formalizable studies of "human behavior" to our own formalized theory. Our theory:

a) Transcends traditional "mushy" viewpoints such as the Western dualism, e.g., the version framed in terms of 'mind' vs. 'matter';

b) Sets forth its own standards of rigor, and demonstrably meets them; and

c) Rejects the reliance on *identity* and on "*certainty*" intrinsic to the currently-accepted standards of rigor encoded in contemporary "hard science," as upheld by WIE workers.

I imagine that, upon reflecting on the evidence presented in these two papers, most readers would deem our general-semantics-based theory of human behaving-and-experiencing more general than the WIE-based theories of human behavior.

2. First mathematical[5] papers (Hilgartner & Randolph, 1969)

Over about the past century-and-a-third, workers within Western logics and mathematics have strengthened Western **standards of rigor**, making them increasingly strict. Significant developments in the mathematical theory of sets have catalyzed this process.

Between roughly 1900 and 1960 CE, WIE logicians/mathematicians have both revised the foundations of the mathematical theory of sets, and then performed a set theory analysis of every other known branch of WIE mathematics. Today, although certain kinds of difficulties abound, most mathematicians still take set theory as the paradigm and exemplar of "a mathematical language of known structure." Further, they regard it as the foundation of all other branches of WIE mathematics. Most people fluent in even one WIE mathematical language still feel convinced that, as W. Ross Ashby (1903–1972) puts it, "all mathematics, and therefore all products of accurate thinking, can be based on set theory" (Ashby, 1962, p. 83a).

Such workers would probably agree that the process of successfully stating a doctrine in set theoretic terms suffices to demonstrate that it satisfies the logical standards of the WIE mathematical theory of sets. And that, in turn, suffices to show this doctrine as RIGOROUS, by WIE standards. That, in turn, requires us to regard the doctrine as "hard science."

Conversely, if someone can demonstrate that a doctrine DOES NOT and CAN NOT satisfy the standards of modern set theory, the proponents of that

doctrine may or may not abandon it. But other workers might well conclude that the doctrine does not merit their close attention.

Prior to these developments in set theory and its logical standards, workers throughout the WIE tradition had freely accepted **purely verbal 'reasoning'** as valid. Over the past half-century, more and more workers have come to accept the revised standards of rigor. Nowadays, it seems that—at least, in "hard" scientific circles—many, perhaps most, workers hold that if you can not state what you want to say in (WIE) mathematical terms, you need not bother to say anything at all.

In the 1930s, as I sense it, the newer developments in set theory remained mainly inaccessible, and few subscribed to the revised standards which I just mentioned.

About 1936 (as I infer), the philosopher Max Black read Korzybski's *Science and Sanity*, and published a commentary. Black's commentary seems to me to be one of the few mainly sober, more or less responsible and somewhat respectful treatments that Korzybski's work received. At that point, Korzybski had not disclosed and explicitly stated his non-Aristotelian premises (as noted above, he published them in 1941). In his essay, Black allowed that exponents of general semantics might end up making some useful contributions. But he considered (intuited) the premises which seemed to him to underlie what the book says—and declared them "LOGICALLY INCOHERENT and in need of thoroughgoing revision" (Black, 1949, p. 246; emphasis mine). Most of the critics of general semantics have shown less care than Black did in just how they dismiss it (and Korzybski).

In 1965, when I presented my second verbal-only paper on human behaving-and-experiencing, I made logical claims for the doctrine I had set forth in those two (verbal) papers: I claimed **self-consistency** (or, freedom from self-contradicting) and **parsimony** (Occam's Razor). Before I left that conference, however, I had figured out that as long as I left my doctrine stated only in scientific English, I could not back up those, or any other, logical claims. For I came to recognize that one cannot 'know'[6] a doctrine any better than one 'knows' the language in which one has stated it. And, as I already 'knew,' linguists and other workers regarded discursive languages, including English in any of its dialects, as "languages of unknown structure."

As the only way to go further in developing a full-fledged theory of human behaving-and-experiencing, I inferred, I must learn some mathematics, use it to perform a logical analysis of my own doctrine, and end up framing the previously verbal-only doctrine as an axiomatic system stated in a mathematical language of known structure. I found ways to carry out such studies.

Continuing to collaborate with John Randolph, I performed a logical analysis on the verbal doctrine presented in my 1963 and 1965 papers. Randolph had advised using the WIE mathematical theory of sets to conduct this analysis. We framed the results as an axiomatic system stated in an algebraic dialect of set theory (a variant of that of N. Bourbaki, as summarized by Ashby, 1962).

Focal Issue: Can general semantics claim any logical coherence at all?

Accomplishment: The Hilgartner & Randolph studies show (in set theoretic terms) the premises of general semantics—the non-Aristotelian premises proposed by Korzybski—as logically satisfactory, as judged by the standards of the mathematical theory of sets. This finding refutes the (verbal only) considered opinions of Max Black and of other critics.

a) We stated the non-Aristotelian premises in a set theory notation. That suffices to show them as free of self-contradiction, as long as its exponents continue to regard set theory as free of self-contradiction.

b) We generated a fully-fledged axiomatic system explicitly based on the non-Aristotelian premises, stated in a set theory notation, which with some success describes human behaving-and-experiencing. This amounts to mathematizing the previously unformalized viewpoint which I call (*standard* or *Aristotelian*) *general semantics*. According to the terminological usages that surround the WIE mathematical sciences, I may designate my revised (now-axiomatic) system as a **mathematical theory**—**mathematical general semantics**. I demonstrated that, as judged by the standards of the WIE mathematical theory of sets, my mathematical version of general semantics survives scrutiny—we must judge it as a theory and as free **of self-contradiction**, as long as its advocates continue to regard set theory as free of self-contradiction.

Furthermore, this theory of human behaving-and-experiencing explores topics not customarily addressed by or considered parts of Western science. For example, Sigmund Freud discusses what I call **unaware projecting**, and classifies it as "pathological." Indeed, Freud and his peers and rivals, successors and critics, have precious little to say about "non-pathological" human 'behavior.' In these papers, I explore what I call 'unimpaired' and 'impaired' behaving-and-experiencing. In the process, I address **aware** projecting (definitely not "pathological")—and numerous other innovative topics that appear to extend our theory-based understanding of human behaving-and-experiencing. So far as I know, few if any WIE workers have found it feasible (or even possible) to use modern mathematics to extend our theory-based understanding of what they call "human behavior"—much less of the holistic topic which I call *human behaving-and-experiencing.*

3. The General Semantics of Set Theory (Hilgartner, 1974)

In 1970, I presented a paper before a joint conference sponsored by the Institute of General Semantics and the Society for General Systems Research, "The General Semantics of Set Theory." In that paper, I begin by performing a set theory analysis of general semantics. As before, my mathematical variant of general semantics survives this kind of scrutiny.

Then, I perform a mathematical general semantics analysis of set theory. In the process, I encounter, and disclose, an **untenable assumption** encoded in the WIE mathematical theory of sets. In other words, set theory FAILS to survive scrutiny, as judged by the standards of mathematical general semantics. In particular, the demand of set theory to rely on *identity* at the most fundamental levels (rely on *the modern logical axiom of identity*) conflicts profoundly with the premises of my Korzybskian general semantics.

FOCAL ISSUE: Can we humans generate a frame of reference **more general than** that encoded in the mathematical theory of sets?

ACCOMPLISHMENT: The finding that

a) Mathematical general semantics qualifies as acceptable as judged by the standards of set theory

coupled with the finding that

b) The mathematical theory of sets fails to survive scrutiny as judged by the standards of mathematical general semantics

appears to me to suggest that 'MATHEMATICAL' GENERAL SEMANTICS DOES SATISFY THE STANDARDS AS *MORE GENERAL* THAN SET THEORY.

4. A DERIVED Grammar, and a Non-Standard Notation
(Hilgartner, 1977/78, 1978a,b)

In what follows, I take an "outrageous" position. I treat the Western notations —symbolic logics and set theories, analysis, matrix algebra, topology, etc.—as **non-transparent**. "Received wisdom" to the contrary notwithstanding, I maintain that the WIE notations encode **restricted and restrictive** assumptions or presuppositions, as do the WIE discursive languages. In the phrase of Wilhelm von Humboldt (1767–1835), "every language sets certain limits to the spirit of those who speak it; it assumes a certain direction and, by doing so, excludes many others" (**VII**, 621 in the German original; Humboldt, 1963, p. 245).

In his 1940 paper, "Science and Linguistics," the anthropological linguist Benjamin Lee Whorf sharply sets the context for my stance—he starts by discussing the fallacies of what he calls "natural logic."

Natural logic holds that different languages are essentially parallel methods for expressing this . . . rationale of thought [a rationale which natural logic regards as the same for all observers of the universe . . . whether they speak Chinese or Choctaw] and, hence, [languages] differ really in but minor ways which may seem important only because they are seen at close range. It holds that MATHEMATICS, SYMBOLIC LOGIC, PHILOSOPHY, AND SO ON ARE SYSTEMS contrasted with language [WHERE THESE SYSTEMS] DEAL DIRECTLY WITH THIS REALM OF THOUGHT, not that [these systems] are themselves SPECIALIZED EXTENSIONS OF LANGUAGE. (Whorf, 1956, p. 208; emphasis mine)

In what follows, I discuss how and why I derived a rudimentary "grammar" from Korzybski's (1941) premises, and on that grammar built up a "Let's Keep Track of What We Say" notation. With that experiencing behind me, I felt no temptation to maintain that notations differ from languages in some basic way, nor to pretend that they do not stem from assumptions or presuppositions.

Prompted by my findings concerning set theory and mathematical general semantics, I scrutinized the premises of the set theory calculus of human behaving-and-experiencing that I had devised with John Randolph. To my distress, I found what looked, on the surface, like a NEW KIND OF CONTRADICTION: one which arises between the premises underlying the findings of my investigations into human behaving-and-experiencing—the non-Aristotelian premises proposed by Korzybski, which DISALLOW *identity*—and the premises which underlie the WIE mathematical theory of sets (in which I had expressed my findings), which explicitly INCLUDE as valid the logical construct of *identity*, in the guise of the *modern logical axiom of identity* (cf. note 2). I assign this suspected contradiction to "the surface" because, during that period, I had no notation in which I could EXPRESS this suspected contradiction, without begging the question by presupposing *identity* as valid and acceptable.

After some months contemplating this difficulty, I came to realize that the contradiction which I suspected (but could not express in notation, much less prove or disprove) did not arise until, on advice, I had chosen to frame the novel axiomatic system—to express my findings—in set theoretic terms. I could eliminate it completely if I found some way to **reject and abandon** the mathematical theory of sets, and all other discursive and notational languages of the WIE family.

Another several months contemplating this necessity convinced me that I DID NOT KNOW HOW TO ABANDON—STOP WRITING in—WIE languages.

Then, I stumbled across, and disclosed, another untenable assumption, previously **unknown** and **unsuspected**. It looks to me like another variant of *identity* (Hilgartner, 1977/78), an un-spoken one, which I came to call **tacit identity**. This I found encoded in the generalized grammar which underlies WIE discursive languages (such as English, French, German, Greek, Sanskrit, etc.) and WIE notational languages (such as those mentioned above). To display this hidden untenable assumption, I need to state the most rudimentary generalization about WIE languages and, then, to ask a difficult question (which I then intend to answer).

The generalization: In order to generate a "complete," or **well-formed**, sentence, one must place at least one **noun** or **noun-phrase** or noun-surrogate next to at least one **verb** or **verb-phrase** or verb-surrogate. In a simple notation, using S to signify *sentence* and NP and VP to signify *noun-phrase* and *verb-phrase*, respectively, I can indicate this pattern as

$$S = NP + VP$$

Consider two test sentences:

> *The cat grinned.*   (Intransitive sentence-form)
> *The cat wagged his tail.*   (Transitive sentence-form)

The question: Never mind the "received wisdom." Ignore the grammarians, the logicians, the philosophers, etc. Operationally speaking, how do we tell the *nouns* from the *verbs*?

My answer: We tell the *nouns* from the *verbs* (along with the other "*parts of speech*") by generating for ourselves some **tacit "rule"** by which to consider-and-treat the *nouns* as **identical with themselves**, and to consider-and-treat the *verbs* (etc.) as **not-identical with themselves**.

Thus we regard and treat the noun *cat* as identical with itself:

> *The cat is the cat*, or
> *Cat identical with cat.* (Or, in a simple notation, *cat ≡ cat*.)

Further, we regard and treat the verb *grinned* as not-identical with itself: No speaker/writer of a WIE language would say or write,

> **Grinned is grinned*,   nor
> *Wagged his tail is wagged his tail,

nor would s/he spontaneously notice that s/he did not and would not generate such locutions.

This pattern holds also within WIE notational languages. I maintain that almost any mathematician or logician would accept the spoken or written locution

$$1 \equiv 1,$$

but none would say or write

$$\equiv \ \equiv \ \equiv.$$

— nor would s/he spontaneously NOTICE that s/he did not and would not generate such locutions.

Inference: The way we speakers-and-listeners, writers-and-readers of even one WIE language build our sentences **depends upon**—REQUIRES—that we rely on the (untenable) logical construct of *identity*.

I came to regard-and-treat that untenable assumption (and the usage of *identity* which it embeds) as the "keystone" of the WIE grammar. This inference amounts to a standpoint, a "lily-pad" floating on a sea of radical uncertainty, and allows me to proceed along a number of different 'chains-of-inferring.' These include:

(a) When I systematically eliminate that keystone assumption, the WIE grammar COLLAPSES. (In other words, I found that, if I eliminate the special, tacit usage of *identity* concealed within any noun or noun-phrase, I thereby eliminate my criterion, and can no longer tell the *nouns* from the *verbs*. Therefore I can no longer generate even one complete sentence or well-formed formula which satisfies the WIE patterns. As I said, the WIE grammar collapses.)

(b) That insight "cleared the decks," so to speak, leaving me free to sweep the rubble out of the way, and then,

   i) to DERIVE a grammar from my chosen premises (the non-Aristotelian premises of Korzybski); and, on that derived grammar,

   ii) to generate an alternative, completely non-traditional notational language of the "Let's Keep Track of What We Say" type (Hilgartner, 1978a,b)—one structured on principles entirely different from those underlying set theory, or other WIE languages.

These claims—that I have DERIVED a grammar from known, novel premises and that, on that DERIVED grammar, I have built up a notational language structured on principles entirely different from those underlying WIE languages—highlight the difficulties of carrying on a discussion with people most of whom have not seriously questioned the assumptions underlying WIE languages.

For example, I find I must distrust not only the closely related WIE constructs of *certainty* and *identity*, but also other close relatives: *proof* (*logical*, *scientific*, etc.), *reality*, *rigor* (and *rigorous*, etc.), *truth*, and so on. Do you? Do you distrust those terms?

Focal Issue: Can humans devise ways to 'chain our inferring' (or in more nearly standard English, to generate 'chains of inference') that neither assume *identity* nor aim for nor claim to attain "*certainty,*" nor otherwise pretend to unattainable *assurance*?

Over the centuries—millennia—WIE philosophers,[7] logicians, mathematicians, etc., have acted on the unstated assumption that the WIE linguistic specializations give the only complete and accurate picture of "reality," and so provide the only acceptable way to pursue "truth." Recently—in the twentieth century CE up to today's date—certain workers have expressed this opinion explicitly, subscribing to the belief framed by Ashby and quoted above in section 2.

But (I protest) surely the WIE tradition does not provide THE ONLY way to generate articulated notational sub-languages which follow strict rules!

Can humans devise new or alternative '**standards of rigor**' and USE them over and over again so as to generate analogues of what WIE workers call "chains of 'reasoning' "? Can we do so WITHOUT relying on the logical construct of *identity*?

Can humans generate other strict frames of reference—even frames of reference which explicitly disallow and reject and disbar *identity* from the roster of acceptable constructs (and so, disallow WIE set theory)?

Accomplishment: I consider that, in light of the notational language alluded to above, I must answer such questions in the affirmative.

I write that inferential sentence on my own authority, generalizing from my own behaving-and-experiencing. The non-Aristotelian premises, which I take as my own, teach me not to blindly trust such inferences, even when I make them myself—not to claim "certainty" for them.

5. Criticizing and Rejecting Relativity and Quantum Theory, and Beginning to Replace Them with a More General Theory
(Hilgartner et al., 1984, 1989; Hilgartner & DiRienzi, 1995)

A century ago, physicists noticed that when they observed (e.g., measured, to within the limits of experimental error) certain kinds of experimental systems, such observing altered what they set out to observe. They waxed ingenious, and found ways to measure some of the alterations they induced—and doing so provided a kind of "correction factor" that made it possible for them to

account for some of their findings. They came to call this whole process—observing, inducing changes, measuring some of the changes—"taking the observer into account."

However, neither the exponents of relativity nor those of quantum theory found ways, in any WIE notation, adequately to represent the notion of "the observer" whom one can variously "take into account" or "eliminate from consideration"—much less to give notational accountings for the alternative 'processes' of "taking the observer into account" versus "eliminating her/him from consideration." WIE exponents could account in notation for some EFFECTS of "observing," but the construct of *the observer* (and these various transforms of this construct—if considered at all) remained restricted to metaphor and verbal imagery, not mathematical representation or description. Where this difficulty seemed most to matter, the exponents found that, as the best they could do to approximate "a human viewpoint" in the mathematical notations available to them, they could make do by using a **coordinate system** (often, Cartesian coordinates).

In 1958, Marjorie Swanson examined the known details of human anatomy and physiology that go into producing what we colloquially call "a human viewpoint." In the process, she showed that, in light of what humans DO when we construct notions such as '*space*,' '*time*,' '*dimensions*,' etc., the three-line framework which we call *Cartesian coordinates* appears not entirely arbitrary, but at least partially dependent on human physiology.

> (1) Consider yourself standing quietly, your arms extended straight out before you. This demarcates one line of orientation, and it feels as if one set of muscles is in tension while another set is relaxed. The direction of your neck, trunk, and legs gives an up-and-down line, which intersects the line of point by a 90 degree angle. Now extend your arms straight out from your sides. This gives you a line in another direction, at 90 degrees from the first two, and requires another set of muscles to attain. It is somewhat cumbersome at times, but you can describe most of your own complicated motions in terms of those three lines. However, an articulate starfish might require seven—one for each arm in addition to up-down and parallel to the floor.

> (2) Besides the grossly visible structure of our bodies, we have other good reasons. Our eye muscles are so arranged that our eyes make motions which feel straight up and down and straight left and right. The motions are not exactly straight, but we are hardly aware of the difference. It is easy to assume that our eyes move as directly as our arms can. We get the

sense of third direction by following our line of sight straight out in front of our noses. That is, when all the eye muscles are balanced in tension.

   (3) As part of the structure of the inner ear, we have a set of semi-circular canals so arranged with respect to each other that three mutually perpendicular lines can be drawn through them. These canals are filled with a fluid which moves when the position of the head changes. The motions of the fluid set off nerve impulses from which the brain evaluates the relative position of the head. Therefore, considering our own structures the Cartesian co-ordinate system seems very logical and 'natural' to us. Other reference systems can be devised and have been, but for many purposes the three line system is quite adequate. (Swanson, 1958, pp. 36a–36b)

However, when compared to the details of human anatomy and physiology, Cartesian coordinates provided the physicists with only a crude approximation.

As relativity and (perhaps to a lesser degree) quantum theory developed, the metaphorical senses of "the observer" and of "taking the observer into account" (and the associated "correction factors") became a prominent feature of the meta-languaging associated with these growing theories. In reaction, these meta-usages of the term *observer*, etc., came to elicit much dis-esteem. In some quarters, that dis-esteem took form in sustained efforts to make *observing* into something done not by a human, but by something non-living—an instrument or some other kind of machine, or even merely photographic film.

But, as a key point of my criticism, the physicists of a century ago did NOT notice the transactional structuring of their professional activities. A hundred years have passed, and today's physicists STILL have not noticed that when a human observer observes some "observed," that observing alters the OBSERVER as well as the "observed."

I infer that the fact that our physicists have not noticed a need for this particular "correction factor" means that, in the early days of relativity and quantum theory, the originators of these theories relied on assumptions that eliminated the "observer-altering" aspect of "the observer" from consideration—and that the exponents of current versions of WIE physics still subscribe to such assumptions, and so still continue to eliminate that aspect. In my opinion, that bespeaks some fundamental theoretical error(s) in both yesterday's and today's relativity and quantum theory. In other words, today's workers make errors of magnitudes at least as great as those which prevent exponents of Newtonian physics from accounting for relativistic and quantum theoretic "doings" or "happenings" (Hilgartner, Harrington, & Bartter, 1989, pp. 134b–136a).

So what traps the WIE physicists into tacitly eliminating the observer-altering aspects of observing so completely that they still haven't noticed that such altering does occur? Not knowing of—not having devised, or not having available to them—any alternative premises and alternative notation based on such premises, perforce they still rely on the WIE logics and mathematics. Above, in section 4, I point out what I call the "keystone" assumption of the WIE grammar and associated frames of reference: In building their sentences, native speakers of WIE languages—notational as well as discursive—rely on the logical construct of *identity*. They distinguish between *noun* and *verb* by considering, and treating, any *noun* as IDENTICAL WITH `ITSELF, and considering-and-treating no *verb* (or any other of the "parts of speech") as satisfying that condition.

$$\text{Noun}_1 \equiv \text{Noun}_1. \tag{1}$$

As the main point here, locution [1] expresses the important relationings here. Or, to language this point in tamer terms: From within a frame of reference that disallows the logical construct of *identity*, I cannot take [1] at face value. I find there three expressions of "absolute sameness":

a) "Same name" in the right-most and left-most terms (NB: Noun_1 stands in for the *identity*-sentence, $N_1 \equiv N_1$);
b) the triple-bar "identity" symbol in the middle; and overall,
c) the linguistic form of a WIE sentence.

For the sake of this discussion, I'll ignore (c).

6. The Main Trouble with the Construct of *Identity*

To drag the hidden relationings out into view, I alter (b), obtaining an (acceptable) statement of non-identity (symbolized as $\not\equiv$)

$$\text{Noun}_1 \not\equiv \text{Noun}_1.$$

But what might that 'mean'?

To show that I do actually consider the left-hand and right-hand terms as DIFFERENT, I shall give them different designations. I borrow terminology from Gottlob Frege:

$$\text{Name} \not\equiv \text{Thing Named}. \tag{2a}$$

or, more generally—switching to (my version of) Korzybski's terminology,

$$\text{'Map'} \not\equiv \text{'Territory'}. \tag{2b}$$

Ignoring their WIE sentence-form, I provisionally accept expressions [2a] and [2b] as possibly valid. But I can only wonder whether WIE workers, including Western mathematicians and physicists, who usually do accept *identity* as valid, can and will credit this way of 'demonstrating' as convincingly showing that [1] HIDES the relationings stated in [2a] and/or [2b].

Possibly, we face a genuine difference of opinion here. And I, after Korzybski, take what I regard as a strong position—which should have consequences: I contend that (in a Cosmos that harbors living organisms, including humans) *identity* cannot survive scrutiny. How might I show that, here in this context? Let's look carefully at what I regard as an absurdity.

As a "contra-positive" suggestion, for the moment, accept provisionally first,

$$\text{Noun}_1 \equiv \text{Noun}_1. \tag{3}$$

and, then, a transform of that *identity*-sentence, replacing "look-alikes" ($\text{Noun}_1{}^{\text{Left}}$ and $\text{Noun}_1{}^{\text{Right}}$) with Korzybskian terms—"*Map*" and "*Territory*," enclosed in double-quotes to remind us of their false pretenses—for the two usages of *Noun$_1$*:

$$\text{"Map"} \equiv \text{"Territory"}. \tag{3a}$$

As I said, please provisionally take that sentence seriously. If someone—say, if I—actually could GENERATE a "map" identical with its "territory"—one in which every point of the "map" represented one and only one point of the "territory," with no error in the "map" and with no aspect of the "territory" left out—I would find myself possessed of **"absolute certainty"** on any topic covered by that "map" (WITHOUT HAVING EVEN TO LOOK at the "territory"). Further, the "map" would have no ROOM in it for the kind of "correction factor" provided by including some kind of representation of the "map" itself, or of the "map"-maker—nor any need for such. Instead, it would remain UNCON-TAMINATED by any self-reflexiveness—entirely "objective." Such a "map" would completely violate Korzybski's premises—we would have to regard it as **entirely accurate**, as **exhaustively complete**, and as **entirely** "**objective**."[8]

The most comprehensive and general imaginable "map" would give a point-for-point perfect, diachronic representation of the entire sidereal Cosmos. WIE physics, I contend, purports, implicitly and without acknowledging it, to provide such a "map."

At the level of my most fundamental premises, I deny the possibility of such a "map" on any scale whatsoever. But I do acknowledge the possibility of PRETENDING to have such a "map." Those still trapped within WIE frames

of reference engage unawarely in precisely that pretense when they rely on the *noun-verb* distinction, as described in section 4, above. From my point of view, I call that pretense **unawarely projecting one's grammar onto the Cosmos**. In postulating *identity* tacitly, via the *noun-verb* distinction, those who still rely on WIE frames of reference—including those who rely on the mathematical languages which underlie the "hard sciences"—cannot avoid doing exactly that.

The construct of *projecting one's grammar onto the Cosmos* goes a bit further. Relativity and quantum theory do acknowledge that 'actions' of a physicist—e.g., observing—alter the system, the observed. But they do NOT acknowledge that such 'actions' also alter the observer, the physicist. So, without explicitly saying so, such theories cast their practitioners as "**unmoved movers**," able to ALTER the Other, the world or Cosmos, without in the process undergoing any alteration themselves; and as able to KNOW the Other without in the process becoming themselves known.

Aristotle used (a Greek equivalent of) the term *unmoved mover* as a synonym for **god**. By relying on a grammar which hinges on "map"-"territory" identity, the members of the diverse speech communities of the WIE languages in general, and the practitioners of relativity and quantum theory in particular, unwittingly claim, for their theories (technical sub-languages) and themselves, **omnipotence** and **omniscience**.[9]

I contend that no human does or can wield god-like powers—we do not and cannot legitimately claim the powers that we call *omniscience* and *omnipotence*—and I further believe that most of my readers would find themselves obligated to agree—humans do not and cannot DO such things.

In operational terms, any theory, any hypothesis, that demonstrably presupposes—explicitly or tacitly— that its advocates do command the powers of full-fledged gods would turn out **disconfirmed** in every test of that presupposition. Because relativity and quantum theory tacitly claim such powers for themselves and for their advocates, I judge them as disconfirmed—warranting rejection and replacement.

Furthermore, I regard the theoretical-and-empirical developments summarized in this paper as offering a more general theory (or frame of reference) with which we have begun the process of replacing them.

Focal Issue: Using "mathematical" general semantics, I and my collaborators have disclosed an untenable assumption encoded in the generalized grammar common to the WIE languages, including the specialized WIE sub-languages—logics, mathematics, sciences, philosophies, jurisprudences, religions, etc. Can we humans frame linguistic specializations, e.g., a 'science' which includes a 'physics,' free of that untenable assumption?

ACCOMPLISHMENT: I maintain that the work summarized in this response answers that question in the affirmative.

Summary

In the terms proposed by the questioner, I and my collaborators have found it possible to "apply 'mathematical' general semantics to physics." In thus extending the 'fields' within which humans have applied Korzybski's Postulate of Non-identity, we appear to have eliminated the *noun-verb* distinction and the previously unsuspected untenable assumptions encoded therein, and to have framed the discipline in a non-standard, non-identity-based notation. By so doing, we re-draw the boundaries around the WIE "written disciplines"— including what our colleagues, the exponents of WIE frames of reference, have called "physics"—making each of them manifest human behaving-and-experiencing. This has the effect of altering each of them—including "physics"—so profoundly that we can scarcely grasp the alterations, or the scope of the alterations. Our work has of course only scratched the surface—if indeed we have succeeded in eliminating a previously unnoticed fundamental error (untenable assumption), we humans need for others to master what one small group has proposed, and to play with this altered theoretical system (frame of reference) enough to begin to understand WHAT DIFFERENCE these differences, which this small group has introduced, make.

Coda: You may download all four of the Hilgartner and Randolph (1969) papers at www.hilgart.org/research.html. Papers no. 007, 008, and 009 are in PDF format (54, 28, and 29 pages, respectively), courtesy of the successors to the original publisher, and contain the full text, equations, and references as published. The fourth, 010, unpublished to date, comes as a draft, and lacks final proofing of equations (particularly as to super- and subscripting), and as to a bit of the text. An alert reader may note that these early papers predate my adoption of E-prime, a convention/dialect to which I have adhered since 1968 (Hilgartner, 1997).

Each time I review this paper (or anything else I've written), I usually see it as INCOMPLETE, in some way or ways. But, at my most fundamental level, I have adopted as my own (and even paraphrased) the premises set forth by Korzybski (1941): whatever any human organism (myself included) actually DOES or SAYS remains INCOMPLETE (to some extent), INACCURATE (to some extent), and unavoidably SELF-REFERENTIAL.

Should I live long enough, I intend to remedy some of these omissions— for example, the "important problem" that the strong error of assuming 'identity' SOLVES for those who so assume—as mentioned in the comment

from Perls et al. (footnote 3). For now, I leave these as uncompleted tasks. And whatever I may complete will merely diminish, but not eliminate, what I have left uncompleted.

Appendix: Logical criterion of generality

The logical criterion of generality presupposes

a) A body of **observations**, and
b) Two or more **theories** which purport to account for these observations.

I can show that Theory 2 satisfies this criterion as **more general than** Theory 1 provided that I can

i) Display a **restricted** and **restrictive assumption;** and further,
ii) Show that this restrictive assumption forms an **intrinsic part** of the presuppositions of Theory 1, and **no part at all** of the presuppositions of Theory 2; and further,
iii) Show that by **introducing** that restrictive assumption into (the allegedly more general) Theory 2, I can **"collapse"** it into a doctrine logically equivalent to (the allegedly less general) Theory 1; and still further,
iv) Show that, by **removing** the restrictive assumption from the premises of Theory 1, I can **"expand"** it into a doctrine logically equivalent to (the allegedly more general) Theory 2.

I prefer theories which show the advantage of generality over their rival(s).

Notes

Orthographic conventions: Building on the extensional devices introduced by Korzybski, I use orthographic conventions to indicate distinctions (non-identities) not usually used in these ways by writers of English, but which I have found particularly useful:

Double quotes ("-"): I use these to indicate
- Colloquial or informal terms or phrases, which 'specialists' would probably not use without in some way indicating their skepticism (e.g., "absolute certainty").
- Direct quoting.
- A word or phrase used to gloss another word or phrase.

Single quotes ('-'): I use these to indicate
- Any noun or noun-phrase which I use as a key term, to say that I dissent from the usual assumings implied by the linguistic role of noun-forms, such as 'self-identity,' etc.

- Any traditional term I may use which symbolically and falsely divides or divorces non-verbal "happenings" which function only indivisibly.

Bold-face: To indicate
- Implicit defining of a term (usually, at first usage of that term).
- Captions (at some outline-levels, depending on the structure of the paper and the editorial conventions of the outlet).

Italics: To indicate
- A term used at a different "logical level" from the text written in ordinary roman. Usually, I mean that the italicized term occupies a 'higher' "logical level" than the term printed in roman: e.g., to indicate 'name' rather than 'thing named,' 'map' rather than 'territory,' etc. Occasionally, I mean the reverse situation.

Small capitals: To indicate
- Emphasis.

Initial asterisk: To signal
- An unacceptable usage.

1. The anthropological linguist Benjamin Lee Whorf coined this useful phrase in the midst of a discussion of his **principle of linguistic relativity**, in which he uses this phrase while explaining "the unanimity of description of the world in the community of modern scientists" (Whorf, 1956, p. 214).

2. I gloss the logical construct of identity as "absolute sameness in all respects" (and sometimes add the phrase, "or negation of difference"). The logical axiom of identity USES that logical construct. It says, "For all elements, x, that belong to the delimited domain, D, x ≡ x."

3. In this passage, Perls et al. treat any fundamental error(s) of this kind as GIVEN in the experiencing of the person(s) who hold(s) them; and they do justice to—they avoid underestimating—the holders by recognizing that any strong error SOLVES an important problem for the holder.

4. In so saying, I do not mean to lose sight of the difference in presuppositions: the earlier workers accepted *identity* as a valid "relation," and I deny its validity (no matter what grammatical or other tags anyone puts on it), resting my case upon Korzybski's undefined terms and postulates.

5. When I refer to work I did using the WIE mathematical theory of sets (as here), I write the term *mathematical* WITHOUT any "print-enhancements." When I refer to work done with our **non-standard** "Let's Keep Track of What We Say" notation based on the non-Aristotelian premises, which does not rely on *identity* as a valid construct, I enclose it in double quotes, to warn my readers to take the term as referring to "the non-standard notation," not to a sub-language of the WIE family. (More customarily, I use

double quotes to enclose direct quotations and colloquial or otherwise informal expressions.)

6. In my opinion, the construct *to know* connotes certainty. I use single quotes around this term to signify that I reject the possibility of achieving certainty.

7. Parmenides of Elea (fl. 600 BCE) introduced the construct of *identity* into the vocabulary of ancient Greek philosophy. According to William C. Graham, Professor of Philosophy Emeritus, University of Toronto, the sentence-forms which Parmenides introduced and which Graham translates as implying *self-identity* (or its absence) look like a linguistic innovation. Such forms do not appear in older or contemporaneous texts (Graham, personal communications, most recently on 12 March 2009).

8. In others of my writings on the topic, I have found it convenient to paraphrase Korzybski's premises, so as to characterize **any abstracting** as "to some extent, **inaccurate, incomplete**, and **self-referential."** Here, we deal with the contradictories of Korzybski's premise: any abstracting as **entirely accurate** (instead of *to some degree inaccurate*), **exhaustively complete** (instead of *to some degree incomplete*), and as **entirely objective** ("free of any contamination by self-reference") (instead of **self-referential)**.

9. The late David Bohm (1917–1992), who worked with Einstein on the Einstein-Podolski-Rosen (EPR) hypothesis concerning the possible role of "hidden variables" in clarifying some of the unexpected implications of quantum theory, devoted the first three chapters of his 1980 book, *Wholeness and the Implicate Order*, to an effort to dis-establish nouns from their privileged place in the languages of science. Known as the Rheomode, this verb-based language appears pertinent to quantum observations, to Native American languages and world-views, to how language functions in science and in psychotherapy, etc. Bohm also speculated on how language could change as we develop cyberspace. So, even prior to some of the inferences that I and my collaborators have made, he expressed profound suspicion that the conventional operand-operator relationship harbored aspects inconsistent with experience.

References

Ashby, W. Ross (1962). "The Set Theory of Mechanism and Homeostasis." Technical Report No. 7, Electrical Engineering Research Laboratory, University of Illinois, Urbana-Champaign, Illinois.

Black, Max (1949). *Language and Philosophy: Studies in Method*. Ithaca, NY: Cornell University Press.

Bohm, David (1980). *Wholeness and the Implicate Order*. New York: Routledge. Paperback edition, 1981; revised 1985; pp. 1–64.

Bourland, D. David, Jr. (1965/1966). "A Linguistic Note: Writing in E-Prime." *General Semantics Bulletin* Nos. 32/33, pp. 111–114.

Bourland, D. David, Jr., & Paul Dennithorne Johnston, editors (1991). *To Be or Not: An E-Prime Anthology*. San Francisco: International Society for General Semantics.

Hilgartner, C. A. (1963). "General Semantics, Psychotherapy, and the Logic of Science." Unpublished ms; re-written, 1967. A truncated version appeared in *ETC: A Review of General Semantics* 25:315–324 (1968). Available at http://www.hilgart.org/research.html (paper no. 005).

Hilgartner, C. A. (1965). "Feelings, Orientation, and Survival." Presented at the Ninth International Conference on General Semantics, San Francisco State College, August 1965. Re-written, 1967. Available at www.hilgart.org/research.html (paper no. 006).

Hilgartner, C. A. (1974). "The General Semantics of Set Theory." Presented at the Joint Conference on General System Theory and General Semantics, University of Denver, May 1970. Printed in Donald E. Washburn & Dennis R. Smith, editors, *Coping with Increased Complexity*. New York: Gordon & Breach, 1974, pp. 31–68 (Digital copy available from author.)

Hilgartner, C. A. (1977/78). "Some Traditional Assumings Underlying Western Indo-European Languages: Unstated, Unexamined, and Untenable." *General Semantics Bulletin* Nos. 44/45, pp. 132–154. Available at www.hilgart.org/research.html (paper no. 028).

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

Hilgartner, C. A. (1978b). Appendix V to "'International' or 'One-World' Languages: 'You Can't Get There From Here'." *ECO-LOGOS: A Magazine of ONE-WORLD Environmental Concepts* 24(90). (Digital copy available from author.)

Hilgartner, C. A. (1997). "E-Prime and Linguistic Revision." D. David Bourland Jr. and Paul Dennithorne Johnston, editors. *E-Prime III! A Third Anthology*. Concord, CA: International Society for General Semantics, pp. 129–148. See especially pp. 130–132, 134–140.

Hilgartner, C. A., & Joseph DiRienzi (1995). "A Non-Aristotelian View of Quantum Theory." *Physics Essays* 8(4): 472–505. Available at www.hilgart.org/research.html (paper no. 072).

Hilgartner, C. A., Ronald V. Harrington, & Martha A. Bartter (1984). "A

Notational Physics with Physicists in It." Unpublished. (Digital copy available from author.)

Hilgartner, C. A., Ronald V. Harrington, & Martha A. Bartter (1989). "Anomalies Generated by Contemporary Physics." *Bulletin of Science, Technology & Society* 9:129–143. Available at www.hilgart.org/research.html (paper no. 061).

Hilgartner, C. A., & John F. Randolph (1969). "Psycho-Logics: An Axiomatic System Describing Human Behavior": "A Logical Calculus of Behavior." *Journal of Theoretical Biology* 23:285–338; "2. Structure of 'Unimpaired' Human Behavior." *Journal of Theoretical Biology* 23:347–374; "3. The Structure of Empathy." *Journal of Theoretical Biology* 24:1–29; "4. The Structure of 'Impaired' Human Behavior" (unpublished). Available at www.hilgart.org/research.html (papers no. 007–010).

Humboldt, Wilhelm von (1963). *Humanist without Portfolio: An Anthology of the Writings of Wilhelm von Humboldt*. Marianne Cowan, Tr. Detroit, MI: Wayne State University Press, p. 245.

Korzybski, Alfred (1921). *Manhood of Humanity: The Science and Art of Human Engineering*. New York: Dutton. 2nd edition (1950), M. Kendig, Ed., Lakeville, CT: Institute of General Semantics.

Korzybski, Alfred (1933). *Science and Sanity: An Introduction to Non-Aristotelian Systems and General Semantics.* Chicago: International Non-Aristotelian Library. 4th edition (1958), Lakeville, CT: Institute of General Semantics.

Korzybski, Alfred (1941). "General Semantics, Psychiatry, Psychotherapy, and Prevention." *American Journal of Psychiatry*, September 1941. Reprinted in M. Kendig, Ed., *Alfred Korzybski Collected Writings 1920–1950*. Englewood, NJ: International Non-Aristotelian Library/Institute of General Semantics. Printed by Town House Press, Pittsboro, NC, pp. 295–308.

Perls, Frederick, Ralph Hefferline, & Paul Goodman (1951). *Gestalt Therapy Excitement and Growth in the Human Personality*. New York: Julian Press. 2nd edition (1991), Highland, NY: Gestalt Journal Press.

Swanson, Marjorie (1958). "On Four Dimensionality: A Psycho-Physiological Analysis." *General Semantics Bulletin* Nos. 22/23, pp. 35–40.

Whorf, B. L. (1956). *Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf,* John B. Carroll, Ed. New York and London: Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, pp. 213–214.