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**Rejecting the “Commonsense” View
of Reading: A Perspective From the Sciences¹**
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When I first read the **Nation at Risk** report, I was struck by the following statement:

Some worry that schools may emphasize such rudiments as reading and computation at the expense of other essential skills such as comprehension, analysis, solving problems, and drawing conclusions. (p. 12)

What concerned me about this statement was the dichotomy between **reading** on the one hand and **comprehension** on the other—as if reading were somehow different from comprehension, analysis, solving problems, and drawing conclusions. Yet this simplistic “commonsense” notion of reading is all too typical among the general public, parents, administrators, and even teachers.

Therefore, I intend not to discuss the **Nation at Risk** per se, but to focus on the inadequacy and inaccuracy of the “commonsense” view of reading reflected in the **Nation at Risk** report, drawing upon parallels from modern science. The inappropriateness of this typical view of reading has been argued convincingly in the last two decades by scholars and educators like Goodman (1973), Smith (all ref.), and Rosenblatt (1978), who have demonstrated conclusively that reading involves an active search for meaning and therefore is virtually impossible without comprehension. Thus the reading process is said to be “psycholinguistic,” involving a transaction (Rosenblatt 1978) between the mind of the reader and the language of the text.

What I want to do here is discuss some of the parallels between this view of reading and the world view emerging in various scientific disciplines, such as physics, chemistry, and biology, but particularly quantum physics, that branch of physics that deals with particles smaller than the atom. The psycholinguistic view of reading is reinforced, I think, by the fact that its basic tenets are paralleled by the world

view emerging in a variety of other disciplines, especially modern science.

I. The “Old,” Mechanistic World View

For all too long, our methods of teaching reading have been based, perhaps unconsciously, upon a limited but pervasive scientific world view, the mechanistic view of the universe that has dominated Western thought since Descartes in the seventeenth century. Descartes assumed the universe to be a well-made machine, like a clock with perfectly synchronized parts. Just as the workings of a clock can be understood by taking it apart and putting it back together again, so the workings of the universe, Descartes thought, can be understood by reducing it—and everything in it—to its basic parts. Once these parts are understood, according to this world view, they can be reassembled into a functioning viable whole.

In reading, this world view has led to several misconceptions that typically pervade our educational practices, even when teachers’ understanding has progressed beyond such mechanistic thinking. First is the misconception that the whole (comprehension, for example) is simply the sum of separately identifiable parts (the words). Second is the misconception that the meaning of a text is contained within the text, without reference to the reader. Third is the view that reading is fundamentally a thing, comprehension, rather than a process, the process of comprehending. Entrenched in our educational materials and practices, these misconceptions encourage the false dichotomy between **reading** and **comprehension**, the dichotomy reflected in **A Nation at Risk**. Thus the mechanistic world view or “paradigm,” as it is often called, has typically prevailed in the teaching of reading.

Footnote:

1. This article is a slightly revised version of a paper presented at the International Reading Association convention in Atlanta, May 1984; see Weaver (1985) for a fuller version. This work was supported by a Fellowship from the Faculty Research and Activities Fund, Western Michigan University.

II. The “New” Physics . . . and a “New” Paradigm

Though the mechanistic paradigm that has led to such misconceptions still dominates our “commonsense” view of reality, modern physics has demonstrated the limitations of this view. In physics, the shift to an organic rather than a mechanistic paradigm began shortly after the turn of this century. Nearly a century before that, in 1803, Thomas Young had demonstrated that light has the properties of a wave. Then, in 1905, Albert Einstein “proved” just as incontrovertibly that light has the properties of a particle! Since no one has been able to disprove either conclusion, we are left with a paradox: light is **both** a wave and a particle. As Gary Zukav observes in **The Dancing Wu Li Masters**, “The wave-particle duality marked the end of the ‘Either-Or’ way of looking at the world” (1979, p. 65), at least for physicists.

Light, then, is both a wave and a particle. If we choose to observe light by means of the double-slit experiment that Young used, we find that light is a wave. If we choose to observe light by using the photoelectric effect that Einstein used, we find that light is a particle. Though light in itself is both a wave and a particle, at any given time we “make” light be either one or the other, depending on how we choose to observe it. Even scientists can never know light as it really is, but only as it appears to be as a result of their interaction, or rather **transaction**, with it (Zukav 1979, p. 93). To put it somewhat differently, we in a sense “make” light in particular and external reality in general what we observe it to be.

As one can see, conclusions like this differ markedly from the viewpoint of classical physics, which we have learned to accept as “commonsense.” Thanks in large part to Descartes, we have learned to think of objective reality, the external world of “things,” as separate from subjective reality, from mental activity: things are what they are, regardless of whether or how we observe them. Quantum mechanics, the study of subatomic particles and their behavior, challenges this view. Physicists assert that at least when studying subatomic phenomena, a human observer cannot observe or measure

anything without affecting its very nature. Classical physics spoke of interactions between separate, independently characterizable entities, such as an “observer” and the “observed,” but modern subatomic physics speaks of what Dewey and Bentley (1949, p. 108, *passim*) called **transactions** between entities, entities that are in some way defined through the act of relating to one another. Thus particles and waves are **events**, transactions between observer and observed.

The transaction between “observer” and “observed” results in the so-called “quantum leap,” the simultaneous actualization of one possibility and negation of others. For example: when a human observer intervenes to measure some aspect or quality of a particle, such as its position or momentum, the person **actualizes** one possibility (makes it happen) and collapses all the other possibilities (negates the possibility of their happening). Or as Robert Frost indicates in “The Road Not Taken,” if you take one road, you cannot simultaneously take another. This collapsing of possibilities, then, is the quantum leap.

Largely because of the inseparability of observer and observed, and because of the fundamental nature of the transactional process which unites these two, physicists investigating the subatomic aspect of reality typically reject the mechanistic paradigm, the metaphor of the universe as a clock or machine. While acknowledging that the mechanistic paradigm has led and will continue to lead to magnificent insights and achievements, such physicists believe that the mechanistic model does not accurately reflect the fundamental nature of the universe. Rather, they suggest that the universe is more like an organism, a process, with no clear separation between subjective and objective, observer and observed, mind and matter.

Thus several of the basic tenets of the organic model offered by quantum physics have, I think, particular relevance for our understanding of the reading process. First, the world cannot be analyzed into separately identifiable parts, elemental “building blocks” that can be recombined to produce the whole. There are two reasons for this. One is that the parts are not

separately identifiable: they are identifiable only in transaction with an "observer," and their very nature is determined by this transaction. A related reason is that the basic parts are not really parts anyway. They are events that persist only momentarily. No sooner do we identify a particle than it typically collides with other particles in its environment, transacting in a burst of energy that annihilates the original particles and creates new ones.

A related tenet of quantum physics is that the fundamental nature of the universe is activity, **process**. Zukav notes that "The search for the ultimate stuff of the universe ends with the discovery that there **isn't any**" (193). Particles **are** energy, energy in constant transformation. Fritjov Capra explains in **The Turning Point** that "Atoms consist of particles, and these particles are not made of any material stuff. When we observe them we never see any substance; what we observe are dynamic patterns continually changing into one another—the continuous dance of energy" (91). Or as Zukav says, "The subatomic world is a continual dance of recreation and energy changing to mass. Transient forms sparkle in and out of existence creating a never-ending, forever-newly-created reality" (197). "At the subatomic level," Zukav continues, "there is no longer a clear distinction between what is and what happens, between the actor and the action. At the subatomic level the dancer and the dance are one." Insofar as the rational mind has been able to determine, the universe is fundamentally "dancing energy" (193).

III. A New Paradigm in Reading Theory

These tenets of quantum physics are paralleled by key concepts in current reading theory. According to both disciplines, meaning is determined through transactions of various sorts; the whole is not the sum of "parts" which can be separately identified; and there is no sharp separation between the knower and the known. Reality in general, and reading in particular, are viewed as organic processes.

While Albert Einstein began challenging the foundations of classical physics with his discovery that light is a particle as well as a wave, Edmund Huey was conducting experi-

ments and gathering evidence that a mechanistic, "building block" theory of reading is not merely inadequate, but inaccurate (**The Psychology and Pedagogy of Reading**, 1908). Huey determined, for example, that four-letter and even eight-letter words can be identified almost as rapidly as individual letters, thus suggesting that word identification does not ordinarily proceed from the identification of individual letters.

In fact, words can be identified under conditions that make it impossible to identify individual letters, and letter identification can, and normally **does**, proceed from the identification of words. To get some idea of how letters transact in word identification and how the identification of words facilitates letter identification, suppose for a moment that you are at the ophthalmologist's trying to read the wall chart at the end of the room. Suppose you can tell that the first letter is either an **a** or an **e** and the next letter is either an **f** or a **t**. If the ophthalmologist were to tell you that the two letters make a common English word, you would immediately identify the **word** first. In this case, the information that the letters make a common English word stimulates the "quantum leap," the actualizing of the first possibility as **a** and the second as **t** (adapted from Smith 1978, p. 125).

With the aid of grammatical structure, words are similarly defined in transaction with one another. Think for a minute of how you would define the following words: **fire, part, baste, wash, oil, cook, coat, roast, sort**. Now see how appropriate your definitions are in the following contexts: **Fire the cook, Baste the roast, Coat the part with oil, Sort the wash**. In isolation, the words have potential meanings. Imposing a sentence structure on them actualizes one of their possible meanings and negates others, in a transaction that might again be viewed as a quantum leap. Notice, too, that a word may depend upon following words for its meaning. The word **fire** is not the same in **Fire the cook** as it is in **Fire the furnace**. Similarly, the **tear** in **Chris has a tear in her jeans** is not the same as the **tear** in **Chris has a tear in her eye**. The words transact with one another in non-linear fashion, with individual word meanings being determined through such transactions.

But of course it would be overly simple to say that meaning arises merely from a transaction among words. Rather, meaning arises in the transaction between the words and the person reading them. Louise Rosenblatt (1938) was the first to emphasize that meaning is an event, a transaction, a process, rather than a property of the text itself. This concept is clarified in Rosenblatt's **The Reader, The Text, The Poem** (1978). She explains that the Text itself is the word-symbols and patterns created by the writer; it is not yet a literary work. To this Text, the Reader brings what others have called the reader's schemata (Bartlett 1932, Ch. 10), his or her organized but ever-changing lifetime of knowledge and experience. The reader's schemata are as transitory as the physicist's particle, "a momentary state of the perceiver's nervous system" (Neisser 1976, p. 181).

During the reading of the text, the transaction between Reader and Text, the reader's ideas, beliefs, and feelings—his or her schemata—are modified, and the Poem (by which Rosenblatt means **any** literary work) is simultaneously created. Rosenblatt elaborates:

The poem, then, must be thought of as an event in time. It is not an object or an ideal entity. It happens during a coming-together, a co-penetration, of a reader and a text. The reader brings to the text his past experience and present personality. Under the magnetism of the ordered symbols of the text, he marshalls his resources and crystallizes out from the stuff of memory, thought, and feeling a new order, a new experience, which he sees as the poem. This becomes part of the ongoing stream of his life experience, to be reflected on from any angle important to him as a human being (p. 12).

To borrow terminology from the physicist/biologist David Bohm (1980), the Poem is **implicit** in the collocation of reader and text. The Poem is made **explicit**, is actualized, during the transaction between the two. In effect, the reader triggers a quantum leap: by interpreting the text in a particular way, by actualizing one particular way, by actualizing one particular "Poem," the reader simultaneously negates, for

that moment in space/time, all other possible "Poems."

IV. The "New," Organic World View . . . and the Dance

In summary, then, there are several ways in which the world view emerging in modern science, particularly subatomic physics, parallels and thus reinforces a psycholinguistic view of reading. In sharp contrast to the "common-sense" view of the universe and of reading, these disciplines assert, on the basis of concrete evidence, such revolutionary concepts as the following:

1. There is no sharp separation between observer and observed, reader and text, reading and comprehension.
2. The whole (universe, sentence, text) is not merely the sum of parts that can be separately identified.
3. Meaning is determined through transactions (between observer and observed, reader and text, and among textual elements on and across various levels).
4. The basic nature of the universe and of reading is process.

Clearly this organic view is in sharp contrast to the mechanistic model which is so widely accepted, in education as well as other aspects of our lives. The organic world view is not really new, of course, but centuries old. As Zukov says, "An ancient paradigm is [re]emerging, in which each of us shares in the creation of reality" (1979, p. 91). According to this ancient/new paradigm, "our commonsense ideas about the world are profoundly deficient" (Zukov 1979, p. 300).

To close, I will return to the dance metaphor adopted by certain quantum physicists. Just as the universe may be viewed as fundamentally a dance of transient forms that sparkle in and out of existence, so meaning, the Poem, may be viewed as an ever-fluctuating dance that occurs more or less simultaneously on and across various levels: letters, words, sentences, schemas; writer, text, and reader; the present reader with other readers, past and present; and so forth; all connected in an interlocking network or web of meaning, a synchronous dance in

which there is no clear distinction between what is and what happens. As Rosenblatt (1966, p. 1000) has noted, Yeats expressed it well in "Among School Children":

O body swayed to music, O brightening
glance,
How can we know the dancer from the
dance?

It is worth noting, I think, that a metaphor is more than a convenient way to visualize something. As Lakoff and Johnson (1980) point out, "Much of cultural change comes from the introduction of new metaphorical concepts and the loss of old ones" (144). In many disciplines, the mechanistic model, the metaphor of the world as machine, is losing ground to a new metaphor, that of the universe as a process, a dance, in which everything depends upon everything else. So it is with reading. The text does not mean in the absence of a reader, and—**A Nation at Risk** notwithstanding—reading does not exist without comprehension.

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