Medical Science, Paradox, and the Enchanted Year of 1900

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With reflections upon such disparate concepts as spirituality in medical science and the future well-being of Western civilization, the Dutch psychiatrist J. H. van den Berg applied an historical psychology of cultural change. His methodology offers a way to discern the development of discontinuity, paradox, and enchantment in the mathematics and science of the 20th century as they might inspire hope for a more holistic medical research and practice and for the healing of planet Earth.

The Dutch psychiatrist J. H. van den Berg developed his method of *metabletics*, or theory of changes, in the form of historical psychology, which included the concept that the psychology of individuals cannot be separated from the changing psychology of culture. He later applied his thinking to medical science in his books *Psychology of the Sickbed* and *Medical Power and Medical Ethics*, in which he indicated the need for a union of science and spirituality in the healing arts.

Van den Berg took great interest in the year 1900 in his book with the portentous title *Gedane Zaken*, or in English, *Done Deeds* (as in the old saying, "Gedane zaken nemen geen keer" or "Done deeds cannot be undone"). Van den Berg's interest in the year 1900 was to examine Modernism and its historical psychology of change, its emphasis upon powerful progressive trends in technology and science, as compared to the year 1700 with its psychology of Enlightenment in the Age of Reason. Though not one to believe in predicting the future yet aware that deeds done cannot be undone, van den Berg entertained the possibility that this psychological historical comparison might portend a catastrophe at or shortly after the end of the 20th century in which Western civilization would be threatened with destruction.

Viewed now from the early 21st century, how might we adapt van den Berg's methodology of historical psychology to evaluate his dreams for a more spiritual medical science and his concerns about future catastrophe? To begin with, we might notice that one symptom of the metabletic psychology of the year 1900 might be a kind of cultural exhuberance, a spontaneous and fanciful flight of ideas coupled with unconstrained and inflated expectations, which, if diagnostic criteria included a union of science and spirituality, might result in a cultural psychological syndrome called: *Enchantment*.

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It was, after all, the year 1900 in which L. Frank Baum published his enchanting story, *The Wizard of Oz*. In this story, Dorothy, an orphan, is carried by a cyclone on a fanciful flight to the wonderful Land of Oz. There, she soon meets Scarecrow who has no brain, Tin Woodman who has no heart, and cowardly Lion who has no courage. Together, they formulate a plan to follow the Yellow Brick Road to the Emerald City, where they hope that the Great Wizard will be able to replace their missing parts and get Dorothy back to Kansas. It turns out that the Great Wizard is nothing but a humbug and ventriloquist who has no realistic idea of how to get Dorothy back to Kansas. She magically returned home only by clicking the heels of her enchanted Silver Shoes.

This enchantment of the year 1900 was not limited to fanciful fiction. It was artfully exemplified in the spectacular events of *Exposition Universelle*, the Paris World's Fair. As so vividly described by the narrative historian William R. Everdell in his book *The First Moderns* (1997), the reigning spirit of the event was *Art Nouveau*. The new and exotic escalators, electric lights, and talking films were on display. W. E. B. Du Bois, who ten years later would found the NAACP, was there supervising a photo display of the prevailing conditions of African Americans. The International Congress on the Rights of Women was held at which more than 500 delegates passed 72 resolutions for a better world. In the physics department at the University of Paris, Marie Curie was about to change the concept of matter itself, while dancers like Isadore Duncan, Loie Fuller, and Zelle McCloud as Mata Hari, explored a new exhibitionism of the human body in exotic movement. Gertrude Stein arrived and was so fascinated she would later abandon her medical studies at Harvard to return for a lifetime of art and salon, and Paula Becker, the upcoming German modernist painter, became entranced with the world of color.

The *Enchantment* in Paris in 1900 was intense. Following the trend of the boundary-breaking symbolism and free verse of Whitman, Laforgue, and Rimbaud, the dashing Marie Ranier Rilke represented the transition from traditional to modernist poetry. Eric Satie was pounding out his arrangements of popular tunes on a piano in a cabaret in Monmarte and would soon join Claude Debussy and Maurice Ravel with innovative harmonies and intricate modulations of impressionistic music. The young writer Marcel Proust was translating foreign books into French, while Andre Gide had already published *symbolist* novels. There was an exhibit of the paintings of Georges Seurat, whose *Sunday Afternoon on the Island of San Jatte* was

perhaps the first modern painting, with its pointillism and depth-defying challenge to the linear perspective vision that had been the standard since the Renaissance.

The enchantment was not confined to Paris. In Germany, Ferdinand Zeppelin flew in the innovative flying machine named after him, and Alzheimer discovered the disease named after him. In Vienna, Bertha Pappenheim, known through Freud as Anna O, marched for women's rights, a woman named Bertha von Suttner campaigned for the elimination of war, while Arnold Schoenberg introduced a new atonality to music with his twelve-tone technique. In Dublin, James Joyce was writing for the *Irish Times*, and in London Virginia Woolf was already preparing her ideas of stream-of-consciousness literature. In Scandinavia, August Strindberg was writing dream theatre, Henrik Ibsen shocked all of Europe with his plays that questioned staid Victorian customs, and the paperclip was invented.

In the United States, in a play called *Sappho*, an actress named Olga Nethersole kissed another woman onstage and was promptly thrown into jail, Sergeant William Carney became the first African American to receive the Medal of Honor, Doctor Marion Potter became the first woman to be given privileges to practice medicine in a hospital, and a man-made Chicago River Canal was opened, reversing the natural flow of a river from north to south.

The historical and psychological syndrome of *Enchantment* manifested itself far beyond all these exciting events in the arts, crafts, and social movements in Western culture. Paradoxically, during that 1900 World's Fair, the most profound and mind-boggling enchantment was actually casting its spell upon the world of realistic intellectual ideas in the more studied, disciplined, and logical academic halls of Paris. In the Palace of Congresses at the 2nd International Congress of Mathematics, mathematicians presented the mathematics of philosophy, and in the lecture rooms of the Faculties of the University of Paris at the International Congress of Philosophy, the philosophers spoke about the philosophy of mathematics. In these chambers of higher learning, enchantment came to be expressed as paradox.

At the Mathematics Congress, David Hilbert, the most influential mathematician of the 19th century, brought the positivism of Vienna to its peak, unaware that it soon would be withered by paradox. In 1899, Hilbert had declared that there were no problems that mathematics could not solve, and in 1900 he presented the 23 remaining problems that had not been solved, offered theories of how they might soon be solved, and

thus persuaded many of the delegates that mathematics would soon attain absolute rigor and formality with no undefinables—that the path to truth was grounded in human reason.

However, at the Congress of Philosophy, Giuseppi Peano of Italy legitimately raised the question of whether or not it was even possible to define what is mathematically definable. Answers to paradoxical questions such as what is a number and what is the mathematical nature of infinity remained elusive. These ideas were disquieting to one young delegate, Bertrand Russell, who had nearly completed his *Principia Mathematica*, which he thought would be the final and defining treatise on the very essence of mathematics, the foundation of logic. After many months, Russell realized that his book contained an error that permeated the entire work. After clarifying it in mathematical terms, Russell also expressed it in the vernacular: What man shaves the barber in a town in which the barber shaves those men who do not shave themselves? It was a paradox that had puzzled thinkers since ancient Greek philosophers like Parminides of Crete and Zeno of Ilea, but which now bathed the modern foundations of mathematics and logic with enchantment.

In 1931, Kurt Godel, a twenty five year-old doctoral graduate at the University of Vienna, who had confronted the recursive paradox in his study of logical mathematics, published his Incompleteness Theorems, which proved that some mathematics cannot be proved and that there would always be some truths that could not be validated. Paradoxically, Godel had set out to make the recursive paradox go away but proved that paradox could never go away. Recursively, mathematics and logic proved that mathematics and logic would always be incomplete.

Those academic meetings in 1900 in Paris did not escape the scrutiny of Henri Poincare, mathematician, physicist, and philosopher of science, who had found this paradox in his own notion of *chaotic deterministic systems*, which contained the idea that outcomes of highly complex systems cannot be predicted by ordinary mathematics and science. Later, the mathematician and logician Alan Turing greatly expanded the paradox of Incompleteness by proving that not only are there mathematical problems that are unsolvable, there are an infinite number of such problems. Enchantment had expanded to infinity, and chaos theory was on the horizon.

Turing went on to become the father of modern computer science, and it was with a computer that Poincare's idea of chaos took form. In 1961, Edward Lorenz, a meteorologist at the Massachusetts Institute of Technology,

had developed a computer that was able to show the interactions between such complex weather related phenomena as easterlies and westerlies and their possible effects upon hurricanes. One day, entering data into a computer in order to identify emerging patterns, he accidentally entered numbers that were accurate but slightly less refined than the computer's capacity for intricacy. When he returned hours later, he discovered that the computer, after gazillions of series of computations, had invented its own entirely new arithmetical system. Lorenz's conclusion was that in highly complex systems tiny deviations in data can result in huge changes which spontaneously emerge and are beyond the prediction of ordinary science. Chaos and complexity theory had emerged from the recursive paradox.

A summation of all this complexity is offered by astronomist John D. Barrow in his book *Impossibility: The Limits of Science and the Science of Limits* (1998). Barrows notes that science proves that science cannot prove everything, and suggests that the recursiveness inherent in Godel's Incompleteness Theorems is, indeed, enchanted. He says, "That is why no non-poetic account of reality can be complete."

The poetic and enchanted also found meaning in studies of the human brain and mind. It was in the year 1900 that the Spanish neurohistologist, Santiago Ramon y Cajal, demonstrated that the billions of nervous tissue fibers in the brain and nervous systems of human beings are not made up of continuous fibers along which neuroelectrical impulses are transmitted, but, paradoxically, are separated by synapses, separations across which electrochemical exchanges occur in highly complex recursive patterns. Refinement of this neurophysiology has offered exciting attempts to apply emergent phenomena of chaos and complexity to human psychology, neuroscience, and the mind. In his book *Mind and Emergence*, Professor of Philosophy, Philip Clayton (2004), notices the transition from reductionism to the paradox of complexity and postulates that the human mind itself is an emergent phenomenon arising from the complexity of the material brain. Jungian Psychiatrist, Jeffrey Satinover, (2004), in *The Quantum Brain* notes that in a human neocortex, containing 20 billion neurons, each with thousands of connections that have zillions of recursive feedback loops, it is complexity that amplifies the electrochemical electron exchanges at the synapse upward to cause the *emergence* of consciousness. John Holland's (1998) book, *Emergence*, contains a whole chapter on metaphor and innovation, suggesting that the hole in mathematics and logic exposed by the recursive paradox is, indeed, the haven of human imagination. Out of all this complexity of the

human mind, Douglas Hofstadter (2007) has written a new book about recursive paradox. It's called *I Am a Strange Loop*.

Thus, it may be that the enchantment that became paradox at those International Philosophy and Mathematics conferences can be most aptly applied to the human experience. It was in 1900 that Sigmund Freud published *Interpretation of Dreams*, in which he exposes the unconscious, that non-rational realm that motivates human beings through enchantment, metaphor, and image. Of his work, Freud said, "The poets knew it long ago." It was also in 1900 that Carl G. Jung began his training in analytical psychology at the Burgholzli Clinic in Zurich, which would lead him to archetypal, imaginal, transcendent, and spiritual psychology. As though to provide a foundation for this enchantment in the psyche of individuals, mathematician and philosopher Edmund Husserl, the founder of phenomenology, published in 1900 the first volume of his seminal book, *Logical Investigations*, in which he explains the nature of human subjective experience in relationship to the objective external world. He may have noted the most fundamental recursive paradox of all: *The only way that we can study the mind is by using the mind*. Husserl formulated a concept of human subjectivity in relationship to objectivity that transcended the usual correlates of mathematics and logic to conclude that mental and spiritual realities are valid independent of the objects being observed. His later work stressed the imperative need in human reasoning for a science of spirit together with the established ordinary science of the natural world.

Thus we return to J. H. van den Berg, psychiatrist, philosopher, and at one point a teacher of mathematics, who, having been influenced by the work of Freud and Husserl, yearned to transcend theory by contemplating the possibility of spirituality and science in the healing arts. He might be saddened to note that the historical psychological symptoms of enchantment, recursiveness, paradox, and emergence are not included in present-day biomedical science. All things medical are viewed with reductionism—the ethic of *do no harm*, the standards of education and practice, and the laws of licensure demand that doctors and other health workers practice only with empirical reductive scientific methods.

Certainly there are efforts on the part of some conventional and alternative medical practitioners to bring spirit and metaphor into healing practices. Paradoxically, however, throughout the world such spiritual work is subsumed by a cultural psychological symptom of science, which demands data that purports to "prove" once and for all whether various

modes of healing "work." Thus, the poetic, enchanted, and spiritual are methodically excluded from the very scientific method used to measure them. For example, according to a recent meta-analysis of clinical studies on the efficacy of prayer in healing (Denney, 2007), scientific evidence indicates that prayer has no effectiveness in healing of the human body—and such a conclusion goes against the collective wisdom of human beings since the beginning of time.

Rather than excluding enchantment from our biomedical science, we might better conclude that our objective empirical scientific method is inadequate to measure such spiritual events as prayer for healing, or the full dynamics of any healing for that matter. We need a new methodology that includes enchantment with science. However, research grants for new discoveries are themselves caught in the reductionism of scientific "peer review," which ensures that our narrow empirical methodology is not going to change. Our biomedical science continues to function with an ordinary science that lost its exclusivity in the year 1900.

Understandably, J.H. van den Berg, who was also concerned about potential catastrophe, might be even more disappointed in the cultural psychology of the early 21st century. It seems that a mathematical and logical approach in economics, politics, technology, and science—having failed to include enchantment, incompleteness, and complexity—has been inadequate to cope with the vicissitudes of human organization and culture. Such cultural phenomena as nuclear energy, war, famine, terrorism, epidemics, consumerism, and individualism have proved to be far too complex to be measured, predicted, or applied by ordinary science.

One example of emergence out of complexity is called *The Butterfly Effect*. With an awareness of chaos, complexity, and spontaneously arising emergent phenomena unpredictable by cause-and-effect science, and focused upon the exceedingly intricate and complex interrelationships of all the material, plants, animals, and human beings on planet earth, one can surmise that a butterfly beating its wings in Beijing might result in a thunderstorm in Chicago. Yet, at the 2007 International Conference on the Environment in Indonesia, attended by delegates from two-hundred countries, the scientists offered predictions concerning global warming based upon ordinary science. They said that at the current rate the polar icecaps would melt by the year 2040. In our cultural psychology of positivism, we seem unaware that the future of our ecosystem, which consists of almost infinite complexity, the emergence of a tipping point for catastrophe is beyond predictability.

Where might we find hope for now and the future? We might remember that, in *The Wizard of Oz*, the way that Dorothy finally got back to Kansas was not through the linear logic of the Great Wizard. It was by clicking the heels of her enchanted Silver Shoes. The first thing that Dorothy noticed when she got home was that she was in her stocking feet. The enchanted Silver Shoes had fallen off in her fanciful flight through the air and were lost forever in the desert. Perhaps our first task is to recognize the limitations of our logic and science and begin to include enchantment together with science in our methodologies—to find Dorothy's magic Silver Shoes and put them on our feet.

Moreover, in our desire for a better biomedical science and our desperate need to avert global catastrophe and create a better world, we might do well to remember: *Gedane zaken nemen geen keer*—Done deeds cannot be undone.

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