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Article: Genius, Self-Taught Lee Humphries, president, ThinkingApplied.com

Few people remember Elmer Gates (1859–1923), but his electric iron and fire extinguisher make our lives better. His magnetic-separation technology sifts our trash. And his educational box entices our children to push geometric blocks through matching holes. Gates's inventive output was extraordinary. His patents include innovations in alloys, climate control, combustion, mining, and X-ray technology. Yet, amazingly, he saw himself as a psychologist whose life work was "the experimental study of mind and the most successful ways of using it." Elmer Gates invented to study his own creative process.

Seeking insight, he conducted experiments in sensory discrimination, neural plasticity, metabolic cycles, and the chemistry of emotions. He distilled his findings into a method for increasing originality and innovation. Challenged to prove his method successful in an area unfamiliar to him, Gates chose weaving as a test. First, he made a systematic search of the literature. Then he spent six weeks observing looms and weaving methods, organizing the empirical data into a taxonomy. Finally, he applied his principles, creating twenty-two inventions in three weeks (later increased to forty-two). His fundamental innovations concerned shedding-mechanisms, jacquard-mechanisms, reeds, and shuttle-motion (U.S. patents 565,446–49).

Gates intended to publish a comprehensive account of his "mind art," but new aspects continued to emerge and he never finished it. Nevertheless, its principles can be pieced together from his articles, manuscripts, and journals.

In Gates's view, the proper ordering of the scientific data is *psychotaxic*--the natural classification of sensations, images, concepts, ideas, and thoughts as determined by consciousness itself. To discover the taxonomy of a phenomenon, he directly experienced every *sensation* physically derivable from it, making each one alternately dominant and equally vivid in his mind. These sensations, recalled in rapid succession, would fuse into an *image* of the phenomenon.

Any sensation missing from his image left it incomplete and could cause his mind to misclassify it at the next level, where different images coalesced into a concept. Gates regarded a concept as "the most important invention ever made," a labor-saving device that synthesizes groups of images (and their details) into one nameable mental integrant.

Having "achieved" a concept, Gates was equipped to discover--by observation or introspection--an idea, the relationship between two concepts. An idea had to emerge before two concepts could be syntactically organized into a sentence. Between his new idea and his previous ideas, additional relationships could be discovered. A truth common to multiple ideas was a *thought*, a generalized law. A truth common to multiple thoughts was a *second-order thought*, "where most sciences end."

Armed with his discovered taxonomy, Gates systematically recalled each sensation, image, etc. Recall increased the blood flow to the corresponding neural structures. The structures became dominant, facilitating new connections and expanding the taxonomy. Mentally reconstructing it at the same time each day established *metabolic periodicity*, which accelerated connectivity and, thus,

invention.

Elmer Gates dreamed of a "museum-laboratory" where future innovators could experience--in psychotaxic order--all the phenomena of a science. He carried his dream to an unmarked grave in Glenwood Cemetery in Washington, D.C.

Lee Humphries is an interdisciplinary research analyst and president of ThinkingApplied.com. With the generous cooperation of Elmer Gates's granddaughter, Dr. Mary P. Gardner, and her children, he maintains [a website devoted to Elmer Gates work and life](#). The Elmer Gates Papers were donated by Gardner and Humphries to the National Museum of American History Archives Center in 2008; [a finding aid is available](#) on the Lemelson Center's website.

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