

Riddell, Newton N. *Method: The Riddell Lectures on Applied Psychology and Vital Christianity*. Chicago: The Riddell Publishers, 1913.

### *Experiments of Elmer Gates\**

\* The experiments of Professor Gates having been so badly misrepresented by unauthorized, sensational reports, we take pleasure in saying that the facts and experiments as here given are sanctioned by him, and are published with his permission.

The experiments of Professor Elmer Gates, in embodying new life and intelligence in various kinds of cells, will serve to make plain both the methods and possibilities of applied psychology.

Professor Gates has found that both the internal and external structure of a cell, its chemistry, size, and specific gravity, can be changed by special training. If a number of cells of like size and structure are divided into two groups, and one group compelled to respond to one sort of stimulus for several generations, and the other to another sort of stimulus, the two groups will become so differentiated as to be quite unlike. By this means cells of a given species can be evolved into different species of various sizes, various chemical elements, and different specific gravity. By psychologic cell stimulation and selective propagation, vegetable foods can be produced with any of their nutritive chemical elements augmented as desired.

### *Embodying New Intelligence*

Amoebas have been caused to embody a form of intelligence and sensibilities similar to the senses of taste and smell. By being compelled to respond frequently to different kinds of mind stimulation, they have embodied the result in higher forms of structure, and thereby acquired the capacity to manifest higher sensibility. When amoebas have thus been trained to respond to certain stimuli, such as odor and taste, or to certain tones, electric shocks, or light, for many generations, microscopical examination shows a marked change in their physical structure and an increase in chromatin filaments; in short, a complete reconstruction in the physical organism corresponding to the changed life, proving that mental functioning develops anatomic structure.

### *Brain Building in Dogs*

After attaining these results with cell life, Professor Gates applied his methods to various plants and animals. His experiments in cell building in the brains of puppies demonstrate

conclusively both the process and the possibilities of brain building. One of his experiments was as follows: Seven shepherd puppies were divided into three groups. Two of the puppies were kept in a dark room from birth, so that no light ever entered their eyes. Two were sent to a neighboring farmer and lived ordinary dogs' lives. The other three were put under special training to distinguish shades and tints of color, and were trained by various methods for two hours daily. One method used was this: A hall fifty feet long and three feet wide was carpeted with copper plates. These plates were of various colors, and were so connected with induction coils that a current of electricity could be passed through them. The electric current was then turned on so that all the plates were charged except those of one color. The dogs were now induced to go from one end of the hall to the other, and every time one stepped on a plate connected with the induction coil it received a shock. This caused the teachable ones to pick out and step on the color that gave no shock. Then a different color was selected to be free from shock, and they would soon pick out that color. By this effort to discriminate, and a number of similar kinds of training, they became able to distinguish hundreds of colors and shades, and to do so with a rapidity unknown to the normal dog.

After eleven months of training the dogs were killed by chloroform, and the sight regions of the brains examined. The sight regions of the dogs one year old, which had never seen a ray of light, did not have a greater number of well-developed ganglionic cells than puppies one day old. There were no more filaments or dendrites running out from the cells, and examination by means of photo-microscope showed that there was no greater internal nerve structure radiating from the nucleus than in puppies just born.

In the dogs that lived on the farm the sight regions of the brain were found to be much more highly developed than in those that had never seen a ray of light. The internal structure and external filaments of the brain-cells were more prominent; the chemical compounds were more complex and stained differently with reagents, while there was an average of eighty-nine well-developed cells per square millimeter.

The three trained dogs had their sight regions nearly as well developed as those of the human brain. There were from 1,200 to 1,400 cells per square millimeter of surface. Professor Gates gave these dogs more brain-cells, better brain-cells, and embodied more mind activity in these trained puppies in eleven months than nature has given the normal dog in thousands of years.

### *Experiments on Other Animals*

Guinea pigs, kittens, rabbits and other animals were trained by Professor Gates for the development of different senses. It was found that the development depended upon the number of taxonomically-grouped, discriminated, conscious experiences that were remembered; and that the experiences remembered depended on the intensity of the attentive effort to distinguish differences and likenesses between conscious states, and repetition of the sensations. These and similar experiments fully demonstrate that every conscious mental experience is anatomically and chemically registered in the brain as a memory.

### *Brain Building in Man*

Professor Gates has extended his experiments in brain building to the development of the senses and mental faculties in man; also to the treatment of vicious children and to curing the insane. He has proved that if any one of the senses is defective, it can be improved by increasing its activity and strengthening the brain-cells through which it is manifested. Even when a sense is atrophied, it can be revitalized by working with the other senses that are closely connected with it anatomically. Thus, a man so color-blind that he could not distinguish red from green was in a short time able, not only to distinguish these two colors, but a great many shades of red and green, through a course of training in distinguishing yellow and blue.

Another of Professor Gates' experiments was the rebuilding of the brain of a vicious child. At the age of three this child was so disobedient and destructive that it was unsafe to allow it to play with other children. It seemed actuated by an innate desire to kill and destroy. After five months of training the child was completely cured. The abnormal brain-centers were anatomically and physiologically rebuilt by compelling it to engage in mind activities that were the opposite of its evil tendencies.

### *Three Important Lessons*

Three very important lessons may be learned from these experiments. First, new forms of intelligence, emotion and volition can be embodied in brain-cells. Second, brain-centers can be built up or strengthened so as to increase their functional power by habitually expressing the sense, or element of mind, of which they are the physical basis. Third, all cell formation and development depends upon the effort to distinguish, whether it be a

distinction of sensations, ideas, images, thoughts, concepts, emotions, or states of consciousness. In other words, results are obtained by frequent, earnest repetition of a given stimulus.