their brains, eyes and spinal chords, and put them aside for microscopic and chemical examination. At the same time I had another group of puppies, which I allowed to lead the life of the ordinary dog, giving them no special attention. I chloroformed them when they were nine months old, and preserved their brains for examination. In addition to these two I had a third group of the same kind of puppies which I put through a course of training in seeing. I had one of the rooms of my laboratory covered with squares of metal, each square being insulated from the other. To some of the squares I attached an electric battery and arranged them so that the moment a dog touched one of them he would receive a shock.

"These squares had one color. The other squares which were not affected by the electricity, had another color. I soon taught the dogs to discriminate between the squares by the colors, and in this way actually taught them to know colors. For instance, I had one pan or pen, the bottom of which was covered with tin painted white. Around this I ran a black border of metal, which was connected with the battery. After a few days you could not get the dogs to touch that border or anything black, but you might lay a white strip across the black and they would walk over it. I also taught them colors by feeding them, placing the meat under pans of a certain color, scattered about among pans of other colors. All of the pans were rubbed with meat first to prevent the dogs from picking out those with the meat under them by the sense of smell. The dogs would go to the right colored pans every time. After a while I changed the meats to different colored pans on different mornings. The dogs soon learned to recognize the change, and there was one of the dogs who would turn over all the pans until he came to the first one having meat in it, and after that he would turn over only pans of that color. The dogs, in fact, learned to surpass many of our artists in their discrimination of colors. They could distinguish seven shades of red and about eight of green. Well, at the end of nine months I killed this set of dogs, and then compared the brains of the three sets. I found that the dogs who had been kept in darkness had no brain cells in the seeing areas of their brains. The dogs who had been allowed to run about, had well-developed brain cells, just as you will find in the ordinary dog of that age. But I also found that my trained puppies had a much greater number of such cells, and that their cells were more highly developed. I found, in short, that by educating the dogs I had added to their brains. I tried the same thing on other dogs as to hearing and also as to the training of the muscles by making the dogs produce certain leg motions, and found that this produced similar results on the brain. I practiced similar experiments on monkeys and rabbits as to colors, and I made a large number of experiments upon guinea pigs, running through several generations, to see the effect of heredity upon brain development. The result is that I have no doubt but that man can not only develop the brains he has, but that he can actually add to them and build up new brains along the lines as he desires."

"Have you evidence that any such work would really affect the brain of a human being?"

"Yes, I have tested it in many ways. I have a baby, for instance, who will discriminate more than a hundred thousand different shades of color, and who has been specially trained in seeing, feeling and in other ways. I believe that we have eight senses, you know, instead of five. We see, we hear, we smell, we taste, we touch. We also have a sense of cold and a sense of heat, and also a sense of muscular action. All of these senses are based upon thought. They are controlled by the mind. The use of them acts upon the mind. Every time you use one of them a certain set of cells in the brain is changed, and by their use you can build up a new set of brain cells. Unless all of these senses are used your brain will be unevenly developed, and some parts of it will not be developed at all. In training my child I tried to make him use all of his senses. I taught him the sense of heat and cold by the use of hot and cold baths, graduated from cool to warm. I also used rubber gloves, connected with the water supply, and as a result of this I believe his brain will be stored with memories of all the degrees of heat and cold he is likely to have in life, and I think he will be able to endure the differences of temperature. He is now two and a half years old, and he has never been sick but once, and then he had the measles."

Prof. Gates showed me the boxes or blocks with which he taught his child the different geometrical shapes. He has whistles with which he taught him sound, so that he can now distinguish between scores of different pitches. He has bottles containing different liquids, each having a different smell. These bottles number fifteen hundred, so that he may really be said to have fifteen hundred different smells bottled up. His baby at ten months could distinguish fifty different tastes and thirty different smells. While we were talking the baby came into the laboratory with his nurse. He looked to me as happy and healthy as any child could be. Prof. Gates tells me that his experiments in teaching him never last more than five minutes at a time, and that the child really likes them. He also said that a child who had been trained for six weeks after birth in the excessive use of the heat and cold senses was found, after dying of scarlet fever, to have in the temperature areas of the brain more than twenty-four times the average number of cells.

I asked Prof. Gates when brain building should begin.

He replied that it should really begin in the father and mother before the child was born, and that the child within a few weeks after birth should begin its brain development.

Prof. Gates says that his experiments show that men can really work their brains over and make them new. They can rebuild them, and can make them do original thinking for them along any line that they choose. I had my photographer with me during my call at the laboratory. Prof. Gates pointed to him and said: "I can take that man, and, within a year, if he will follow out my directions, I can have him make new discoveries and inventons in photography. I would first teach him how to control his mind and how to use it in the directon of his work. I would gradually lead him to original thinking, invention and discovery. I would have him take the sum of accurate human knowledge in photography and would teach him how to work from that on through to new ideas. He would first exercise every one of his thirty or forty mental functions upon each proposition of the science. This would keep each faculty active for a certain number of hours every day. The parts of his brain which he needed to deal with the subject would grow, his sub-conscious functions would become stimulated, and new ideas would dawn upon him. I have found that six months' practice along the lines which I lay down usually quadruples the mental capacity of a man, and more than quadruples the number of ideas gained each day. Of course, such ideas have to be tested by observation and experiment as to their correctness. Take this microscope, for instance. The wonderful thing about it is not the discovery, but it is the art of mind using and mind building which I have used which has resulted in the discovery."

During the hot weather of last August Prof. Gates put his brain to work on some way of reducing the temperature of his laboratory. The result was what he calls a cold air stove. This invention he has patented, and it may come into general use. It consists merely of a large tube of zinc, down which through a small pipe connected with the water works a spray continually falls, cooling the air within the pipe and driving it out into the room. The warm air in the room rises and goes out through the window, which is slightly lowered from the top. The pipe rests in a sort of a bucket of zinc, in the bottom of which there is a waste pipe to carry off the water, the machine being so made that the cool air rushes out into the room. Professor Gates says that during the hot spell in September, when the thermometer stood at 98, in his laboratory he reduced it to 69 in the course of an hour by using one of these stoves. He says a stream of water about as big around as a lead pencil will keep a room at that temperature throughout the summer. During my call the weather was cool. There was but little difference between the temperature of the air and water, so that a satisfactory test could not be made. I could see, however, how the air rushed out of the bucket when the water was turned on, and the stove will, it seems to me, be a great thing for those who wish a fresh breeze without going to the mountains or the seashore.

It is, however, along the lines of psychology rather than practical invention that Prof. Gates is working. He takes, he says, no scientific statements for granted, and tests everything according to the best instruments known. Among his most interesting studies have been those of cell life. All plants and animals are, you know, made up of cells. We are each composed of millions of cells, and Prof. Gates says that each of these cells has a certain amount of mind. He has discovered that microbes can feel. He took one of the lowest living organisms and laid it on a piece of glass. He then sent a strong ray of light so that it fell upon the organism, and within a few seconds it began to move, showing that it must have felt the light and wanted to get away from it. He has discovered, he says, that all animals in using their minds act to a certain extent upon all other animals. For instance, he found that when he put the ray of light on such an organism it required two seconds before it was affected by it. He again performed the same experiment with several men in the room, all of whom were thinking intently on a certain problem, and found that the mind waves, as they might be called, had so stimulated the little organism that it moved in half a second. Such mental action goes from us in waves, according to Prof. Gates, with a velocity of 186,000 miles a second, while the movement of feeling along the nerves of your body toward the brain is only ten feet a second, so that mentally you are nearer the emperor of China than you are to your big toe.

There were a number of other experiments which Prof. Gates explained during my call. In the most quiet way