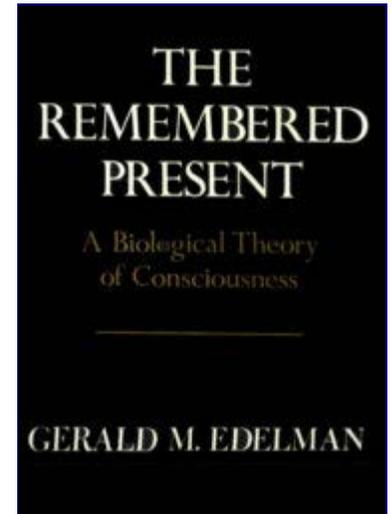


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The Remembered Present
by
Gerald M. Edelman
A Biological Theory of Consciousness
Published by Basic Books in 1989
Review by Bobby Matherne ©1997



This book by Gerald Edelman is a very comprehensive and difficult to read book, one I have been able to get through, not so much based on my sketchy knowledge of

neurology, but on my in-depth knowledge of real-time software design and recursive software. He uses his theory of neuronal group selection [TNGS] to create mechanisms for short term and long term memory storage.

In Roger Schank's *Tell Me A Story*, Schank offers a theory that all of our conceptual memory capability requires that we tell or relate the happening to ourselves or to another person. He makes a good case that, lacking such telling, the memory will be gone within weeks. That makes a lot of sense to me personally. As I try to recall specific episodes during a traumatic period of my life, when some things happened that I told no one, I find very little that I can recall. Only memories from that time are episodes of things I have since related to other people.

Edelman points out that memory is not placed in the brain as a content, but as a reentrant strengthening of synaptic connections, which by reinforcement during the re-telling, can come to the level of long-term potentiation (LTP) that would create what we call permanent memories. If a memory of an event is reinforced by relating it to others, it stays in the same *place*, but that *place* becomes easier to visit with each relating. That's why a District Attorney will question witnesses over and over again before the trial. It's so that what they say at the trial will be easier to recall if they repeat what they had said to the DA before the trial. The idea is to reduce the possibility of some unexpected memory coming up during the trial

In Edelman's TNGS the places or paths are the memories themselves. The content of the memories is the way to retrieve them [we call this: *associative memory*] and the process of retrieving the memories is the content of the memories. What happens as you begin to think of the memory is that your brain activates certain neuronal groups, which activation helps you to create the memory you desire. It also helps you to strengthen its later recollection.

The title *Recategorical Memory* would be more appropriate for this book which is filled with long strings of sesquipedalian phrases, such as *reentrant cortical integration*, *anatomically mapped reentrant connectivities*, and *interoceptive homeostatic regulation*. The title phrase "The Remembered Present" says it short and sweet: the biology that creates consciousness does so by recovering the past in the present, comparing the past with the present, and re-storing the modified conception. Note the way that Edelman says a similar thing on page 102:

Primary consciousness may thus be briefly described as the result of the ongoing discrimination of present perceptual categorizations by a value-dominated self- nonself memory.

Edelman says on page xvii, talking about his work leading up to the current book:

My main focus was on perceptual categorization as it related to memory and learning. I proposed that these functions could be understood in terms of "neural Darwinism" — the idea that higher brain functions are mediated by developmental and somatic selection upon anatomical and functional variance occurring in each individual animal.

Later, on page xviii, he adds:

I proposed that this ability depended critically on two of the most striking features of the brain, its variability and its reentrant connectivity.

These two features he has masterfully combined in his Theory of Neuronal Group Selection or TNGS, which is described in detail within this book. *The Remembered Present* gives a bio-theoretical basis for an insight that I had some twenty years ago as expressed by the following equation:

$$\text{Perception [now]} = \text{Function [Perception [now], Perception [past]]}$$

In this equation the term Perception [past] refers to the integrated sum of our past perceptions (created by using this same reentrant equation). The exact function is unspecified, but may be considered as a comparison of two memory traces: one accumulated over a long period of time and one generated from the instantaneous sensory input being received. Edelman refers to the Perception [past] term as *past categories*. He says that (also on page 102):

If no comparison took place between value and past categorizations to form a special memory, consciousness would not appear.

Value he defines on page 287 referring to: "evolutionarily or theologically derived constraints favoring behavior that fulfills homeostatic requirements or increases fitness in an individual species." Thus value is the "special memory" that was selectively laid down in neuronal groups in the past during comparisons of past values and past categorizations.

This process is easier to understand directly from my equation above. Our perception of the now is a function of our total past categorizations and our perception of the now. What we perceive now is a function of the perceptions made available to us now from our exterior surroundings (nonself) and the sum of our past perceptions stored in our interior self. What we perceive is influenced both by our individual past inputs and the inputs coming into us now. Think of a file that you keep in a drawer, and every time you take the file out to look at it, you make a note on it before you return it to the drawer. This will give you a sense for what happens when we perceive something: we change our ability to perceive.

The equation is reentrant because the result **Perception [now]** appears inside its own evaluation. Each time a new perception is received a slight alteration to the neuronal groups is laid down, and this alteration becomes the **Perception [past]**. When a **Perception [now]** comes in, the alteration to the neuronal group continues: it is added in with the new **Perception [past]** and creates a new resultant **Perception [now]**. In a sense, what we call *we* is the correct condition of our neuronal groups as they have integrated all our idiosyncratic experience for us since the moment of conception.

The Reader may wonder how it's possible for perception of the past to affect perception of the present. Given two good sets of eyes, two people looking at the same object will both see the same thing, won't they? Not necessarily so. When Charles Darwin's ship, the *Beagle*, anchored off South America, the native peoples there had never seen any boat bigger than a canoe. When asked by Darwin's men what the natives

thought about their big ship, the natives said, "What ship? That's a sea bird!" That was all their **Perception [Past]** allowed them to see.

When Virgil, a fifty year old blind man recovered his sight, he went from a competent sightless adult to a handicapped sighted person. [See ARJ: *An Anthropologist on Mars*] He spent hours turning over toy automobiles, skyscrapers, and animals, inspecting them from every angle, over and over again, like a toddler at play. What looked like child's play to others was a very serious endeavor on Virgil's part to be able to perceive the objects in his brand-new real-world visual environment. He needed, in order to become a normally functioning sighted person, to be able to separate objects from the camouflage mazes of background colors and patterns they were embedded within. His sister painted a white line through his living room so he could walk through with his eyes open. If Virgil followed the line the room looked normal -- if he deviated to one side or the other, the entire room collapsed into indecipherable mazes of patterns for him, and he would stumble and fall in a room which he could easily navigate with his eyes closed. He was, by playing with the miniatures, creating for himself a **Perception [Past]**, one which he had been deprived of by his childhood blindness.

The process described by the equation is important when one considers dogma, the accepted body of one's beliefs: it is also a **Perception [Past]**. The process is neuronal group selection all the way down, or rather all the way back to our conception. Each event after the initial fertilization of the egg that created us adds its spin on the evolution of our individual nervous systems, our individual perceptions, and our individual beliefs.

The sum of all these, we call, along with Edelman, consciousness. Lacking a **Perception [Past]**, animals lower than primates do not possess consciousness.

One key concept in the philosophy of mind when considering whether consciousness exists is called qualia. As he gives the definition on page 166, qualia are "the various subjective experiences, feelings, and sensations that constitute or accompany awareness." There are two parts to the qualia: feelings and sensations. 1.) Feelings are the re-triggered physical body states originally stored before the Memory Transition Age [about five years old]. This is a major tenet of the new science of [doyletics](#), the definitive book on which is yet to be written. [See ARJ: *PANACEA!, Emotional Intelligence, Passion & Reason, Emergence, and Thinking in Pictures.*] 2.) Sensations, as subjectively experienced, are not capable of being shared objectively, only correlated with our own and other's experiences. This can be stated simply: We do NOT see the same color red, and we are helpless to prove otherwise.

Let me explain how I arrived at my conclusion in 2.): I have four television sets in my Screening Room and have had the same video on the four screens many times. The color red is always different on each of the four TV's, and although **I** could make the red color get close on one or two of them, they were never the same color. Why? Differences in aging of the red phosphor in the screen, voltage differences between sets [high voltage supplies also age], and manufacturers' designs account for the differences in the red colors of the four sets.

It should be obvious that our eyes are subject to equivalent sorts of variation due to aging and manufacturers' designs [genetics] and that would cause each of us to experience a different subject color of an object that we would each agree to call red.

A TV camera points to a red object and displays the same object on four screens and we see four different colors we call red on the four sets. To do the same experiment with humans we place four people in a room to view the same red object. We can assume that each one of them sees a different shade of red. The insurmountable problem is that no one can see all four of the shades they see. There is no position from which we can view, like the TV sets, all four views of the object. Each person sees a different shade of red, each calls it red, and they all agree that they see the same shade of red as the others. But they are probably wrong and we can *never* prove otherwise. A moment's reflection will lead you to see that we cannot even say that each of the four people see a shade of what, if we could ever see it, we would agree

is red. One of the four might unknowingly have color blindness and be seeing green. But that is a form of color variance that can be tested for: one need only present information to them in which the context of the color is removed and they cannot make a distinction. The number charts do this quite well. There is no test for the variance in color perception I'm talking about because the person sees a given wavelength of light, perceives a color [whose shade we don't know and *can't* know], and calls it red. Everyone else who sees it calls it red, but we cannot compare what they are seeing from an objective point of view. We have only their report of their subjective experience. We do NOT see the same color red, and we are helpless to prove otherwise. The same helplessness applies to all of our other perceptions. We can describe them, but others cannot experience our perceptions, only their perception of what we describe.

Descartes viewed the world as two realms which he called *mind* and *matter*. In Descartes' view perceptions were stimuli from the world of *matter* that were presented to world of *mind* inside the brain. This view has had a long standing philosophical problem: it requires inside of the mind what it presumes to explain, that is, a fully functional human being looking at the perceptions being presented inside of the mind. This is the problem of the *homunculus*, a little man inside our brain. What Edelman has done is to create a biological theory of consciousness which eliminates the *homunculus* and its infinite regress. What he replaces it with is a biological level of recursion in which the infinite regress is replaced by an infinite progress, if you will. At each moment the perception of the now is compared to the perception of the past and a new perception of the past is laid down in one's neuronal groups. Edelman leads us to see that we live always in *the remembered present*.

