

XI. The Association Cortex: Staging Area for Academic Understanding

According to the Scripture, the only means by which divine truth can be so encoded into the brain is through the enabling power of the Holy Spirit functioning inside the divine power system. The Scripture refers to such wheel- tracks as *epignosis*.

Grace didactics has succeeded in placing divine thought into memory, referred to in Scripture by the word: *ginosko* - “to know” or “to perceive.”

Once in memory, the information can be recalled, an exercise mentioned throughout the New Testament under the root word, *mnemoneuo*.

manthano, “learning,” creates *ginosko*, “memory,” which makes *mnemoneuo*, “recall,” possible.

There is one passage of Scripture which brings all three of these concepts into view:

1. It takes us from the association cortex where learning occurs, through ...
2. the creation of a wheel-track in the electrochemical memory traces of the brain, to ...
3. recall under the enabling power of the Holy Spirit where doctrine is remembered and brought into “working memory.”

Colossians 1:3 - We give thanks to God, the Father of our Lord Jesus Christ, praying always for you,

Colossians 1:4 - since we heard of your faith in Christ Jesus [positive volition to academic understanding of the Gospel in the association cortex] and the love which you have for all the saints [problem-solving device #8 applied under recall of doctrine under the 3rd spiritual skill];

Colossians 1:5 - because of the hope laid up for you in heaven [the prerogatives of salvation, i.e., eternal life, resurrection body, escrow blessings], of which you previously heard in the word of truth [perception followed by positive volition, and a memory trace],

Colossians 1:6 - the gospel which has come to you, just as in all the world also it is constantly bearing fruit and increasing, even as it has been doing in you since the day you heard of it [association cortex] and understood [*epiginosko*: created as a wheel-track under the power of the Spirit] the grace of God in truth [knowledge of divine thought];

Colossians 1:7 - just as you learned it [*manthano*: positive volition at academic understanding] from Epaphras [pastor at Colossae], our beloved fellow bondservant, who is a faithful servant of Christ on our behalf,

Colossians 1:8 - and he also informed us of your love in the Spirit.

Colossians 1:9 - For this reason also, since the day we heard of it, we have not ceased to pray for you and to ask that you may be filled with the knowledge [*epignosis*: memory traces—wheel-tracks—established by the power of the Holy Spirit] of His will in all spiritual wisdom [learning of doctrine enlarges the dendrites and increases the number of synaptic connections by which doctrine is built on doctrine resulting in wisdom] and understanding [capacity for spiritual growth],

Colossians 1:10 - with the purpose that you may walk [peripateo: the Christian way of life which results from applying the wheel- tracks of righteousness] in a manner worthy of the Lord, to please Him in all respects, bearing fruit in every good work and increasing in the knowledge [epignosis] of God.

The word “*facilitation*” is defined as follows:

Webster's Ninth New Collegiate Dictionary, s.v. “facilitate”: “to make easier.”

facility: 1: the quality of being easily performed 4: something that makes an action, operation, or course of conduct easier.

facilitation: 2a: [increasing the efficiency of] a particular neural pathway especially from repeated use of that pathway. b: increasing the ease of a response by repeated stimulation.

Oxford English Dictionary, s.v. “facilely”:

1. With little exertion, labour, or difficulty; without effort or restraint.

facilitate: 5. Easiness to be led or persuaded to good or bad; readiness of compliance; pliancy.

“Facilitation” is a term is used in neurology to describe the enlargement of a memory trace into a path of least resistance. In order to understand how facilitation changes the path of least resistance from an old wheel-track to a new one, it requires us to review certain aspects of the electrochemical transmission of information at synapses.

(Transparency: Neuron Tangle) The way one neuron communicates with another is through synaptic connections. The most lucid description I've found of how the entire process works is by:

Johnson, George. In the Palaces of Memory: How We Build the Worlds Inside Our Heads. New York: Alfred A. Knopf, Inc., 1991, page 20:

As important as the neuron itself are the synapses that serve as junctions between the cells. While information is carried inside a neuron by electrical pulses, once the signal reaches the end of the axon it must be ferried across the synaptic gap by chemicals called neurotransmitters.

On the other side of the synapse, the dendrite contains structures called receptors, which recognize these transmitting molecules. If enough are registered, then the second cell fires. A neuron can be thought of as a cell whose specialty is converting chemical signals to electrical signals, then back to chemical signals again.

This electrochemical coding system can have only two results. It can excite the neighboring neuron, or it can inhibit the neighboring neuron. We will first observe what is called “synaptic excitation” and then subsequently its antithesis, “synaptic inhibition.”

First of all, a little review, plus the definition of a few new terms:

A synapse is really a contact point between two neurons through which information is relayed from one to the other. The information originates in the nucleus of the neuron and is transmitted down a special fiber called the axon. The axon has many branches each of which terminate at a synapse.

When the neuron fires, it electronically sends its message down the axon. This is called action potential. “Potential” since it doesn't cause an action unless it is strong enough to jump across the synaptic cleft and positively influence its neighboring neuron. Chemicals carry this message across the synaptic cleft and are called neurotransmitters.

The synapse has a transmitting terminal off the axon fiber. This contact point is called the presynaptic terminal. The synapse also has a receiving terminal off one of the neighboring neuron's dendrites. It is called the postsynaptic terminal.

Remember, the pre- and postsynaptic terminals do not touch. They are separated by the synaptic cleft which is about 20 nanometers wide. (That's 20 billionths of a meter.)