

Service

The Human Brain

Roger K Howe – 2011-08-21

Chalice Lighting: Please hear these words written in 2004 by Diane Ackerman:

Shaped a little like a loaf of French country bread, our brain is a crowded chemistry lab, bustling with nonstop neural conversations.

Imagine the brain, that shiny mound of being, that mouse-gray parliament of cells, that dream factory, that petit tyrant inside a ball of bone, that huddle of neurons calling all the plays, that little everywhere, that fickle pleasuredome, that wrinkled wardrobe of selves stuffed into the skull like too many clothes into a gym bag.

This morning we light the chalice, the constant flame of our ministry, to honor our presence in this hall, our community, and our brains.

Opening Words: For our opening words, and at two other points in the service, we will be sharing several short quotes about the brain. Two members of this congregation will join me in reading them.

Hippocrates: Men ought to know that from the brain, and from the brain only, arise our pleasures, joy, laughter and jests, as well as our sorrows, pains, griefs, and tears.

Aristotle: The seat of the soul and the control of voluntary movement - in fact, of nervous functions in general, - are to be sought in the heart. The brain is an organ of minor importance.

Douglas Tweed: Present-day knowledge of the brain resembles in some ways earlier Europeans' knowledge of Africa. Explorers have mapped the coastline in detail, but the interior is mostly uncharted.

Opening Hymn: A Firemist and a Planet – verses 1, 3, 4

Thoughts about the brain

Jack P. Shonkoff and Deborah A. Phillips: The brain is the ultimate organ of adaptation. It takes in information and orchestrates complex behavioral repertoires that allow human beings to act in sometimes marvelous, sometimes terrible ways.

Kurt Vonnegut, Jr.: I was taught that the human brain was the crowning glory of evolution so far, but I think it's a very poor scheme for survival.

Daniel C. Dennett: The juvenile sea squirt wanders through the sea searching for a suitable rock or hunk of coral to cling to and make its home for life. For this task it has a rudimentary nervous system. When it finds its spot and takes root, it doesn't need its brain any more so it eats it.

Sharon Begley: With modern parts atop old ones, the brain is like an iPod built around an eight-track cassette player.

Hymn: Spirit of Life - 123

More Thoughts about the Brain

Francis Crick: It is essential to understand our brains in some detail if we are to assess correctly our place in this vast and complicated universe we see all around us.

Carl Sagan: We are an intelligent species and the use of our intelligence quite properly gives us pleasure. In this respect the brain is like a muscle. When we think well, we feel good. Understanding is a kind of ecstasy.

Wilder Penfield: The brain is the organ of destiny. It holds within its humming mechanism secrets that will determine the future of the human race.

Pinckney J. Harman: It is not unreasonable to expect that man's brain will continue to study itself so long as *Homo sapiens* shall last.

Sermon: The Human Brain – Roger K Howe

One of the fascinating aspects of being human is the nature of the physical being into which we are born, and what effect that nature has on us over the duration of a lifetime.

Today I will consider the human brain, a fascinating organ, difficult in so many ways to understand except by analogy. Overall, the brain can best be analogized to a computer, despite the fact that we think of a computer as being an assembly of hardware, and we think of the brain largely in terms of the end result of its operations – the thoughts it has and how it expresses them in art, language, emotion and action. However, both brain and computer have hardware – a basic anatomic structure that allows some activities, does not allow others, and is linked within itself and to the world in particular ways. Both brain and computer require some basic built in instructions to allow them to operate, and on top of that, both learn new programs or incorporate new software and both produce results that are based on the interplay of hardware, basic instructions, software and data input.

These parallels between brain and computer are not today's conversation, but it is important to recognize that the function of the human brain – of the human mind – is governed by its structure and basic instructions. That structure is the result of a long process of evolution; the human brain itself represents an assembly of elements evolved sequentially, each adding something new to the earlier pieces and modifying their operations, but never canceling or removing older anatomic structures and their functions.

Michael Dowd, previously a born-again fundamentalist Christian minister who now classifies himself as an evolutionary evangelist, wrote a most interesting and instructive book entitled: **Thank God for Evolution**. His book is not my primary background material– I learned much of this material as a medical student in the 1960s– but his way of characterizing that knowledge and bringing relevance to it is unique and compelling. I will use much of his language, which is more evocative than the “archencephalon,” “telencephalon,” “neoccephalon” and “neocortex” I learned in my neuroanatomy class.

The oldest part of the brain is the brain stem and the cerebellum. On the front of your order of service, the brain stem is indicated by P and Mo, and the cerebellum by CM. The brain stem controls many physiologic functions like breathing, heart rate, blood pressure, intestinal activity, and shunting of blood during physical activity; it controls the appetites, both sexual and nutritive; it controls many basic physiologic responses, such as the well known fight-or-flight response to danger. The cerebellum is a body movement coordination center which, unlike the brain stem, actually learns things – you taught it how to walk when you were a baby and it retains that knowledge to permit you to walk without having to pay attention to each muscle movement entailed in doing so. Michael Dowd refers to this part of the brain as the “Lizard Legacy” – and lizards do not seem to have much in the way of more advanced functions.

The next oldest part of the brain is what Michael Dowd calls the “Furry Li'l Mammal” – it is the limbic system and some other deep brain structures having a lot to do with paying attention, emotions and attachments. On a picture of the outside of the brain, these structures are not visible because they are deep inside the brain. Our need for love and acceptance and for sleep and dreams flows from the limbic system. The “Furry Li'l Mammal” takes the raw urges of the “Lizard Legacy” and turns them into emotionally enhanced drives, charging our lives with the

emotional context that makes urges into needs – but it, like the “Lizard Legacy” lives only in the here-and-now. It pushes us to society, to charity, to nourish and nurture our young, and to compete with one-another. The “Furry Li'l Mammal” not only needs, but is capable of love – both Eros and what the Greeks called agape – a form of love not associated with sexuality.

The largest part of the brain you can see in the picture on your order of service is the cerebral cortex, much of which forms Michael Dowd's “Monkey Mind”– the place where we do much of our thinking, calculating, worrying about the past and future. The “Monkey Mind” is the chatterbox mind, constantly spewing forth thoughts about this and that, distracting us from what we are doing, creating looking-over-the-shoulder commentaries about our lives, and occasionally helping us to work through problems. This is the part of the brain where language and symbolic logic reside. Here we see cause and effect; we create scenarios and follow them to their consequences. Here we adjudicate between competing drives as they well up from the “Furry Li'l Mammal.” Here we develop and refine our use of tools, our love of knowledge (called philosophy by the Greeks) and our ability to pass knowledge to others and to receive knowledge from others. The “Monkey Mind” can plan for the future but has limitations in its ability to overcome the immediacy of the “Lizard Legacy” and the “Furry Li'l Mammal” to achieve delayed gratification.

Finally, there is the prefrontal cortex – the newest brain area – where so-called executive functions reside. On your picture, it is the part to the left of the dot. Here is the place where we are able to transcend the chatterbox of the “Monkey Mind,” establish long range goals and evaluate courses of action as to their applicability to the long range goals. In a moment of levity, Michael Dowd refers to this part of the brain as the “Higher Porpoise,” but that name is not an inappropriate one – here reside the functions that allow us to defer gratification for an ulterior purpose, to sacrifice personal well-being or personal survival for a greater cause.

If you are thinking that I have just described the locations of the id, the ego and the superego, you have not missed a thought I had in 1964, despite the silence of my neuroanatomy and neurophysiology professors on the topic. Does that mean Freud was right? Well, really, that is another question for another day. The point is that we can define these functional elements of the brain; we can look at how the functions interrelate; we can look at the control mechanisms; we can learn from this about why we human beings are the way we are and what we might have to do to become better in the future than we have been in the past.

But there is one more aspect to brain function that I have not yet discussed: the sea of chemicals in which the brain is bathed. There is no addictive substance, no mind-altering substance known to man, which does not have effects that replicate those of some substance we make inside of ourselves, in which we are capable of bathing our own brains. Our physiology uses those substances to assist us in surviving – but in surviving a world we have long left behind as our social systems have evolved much faster than our genetics can keep up with. Nonetheless, it is possible to “get high” from internally manufactured psychoactive substances, and to become “addicted” to the effects we feel from them.

Perhaps you are a runner and you have experienced the sublime feeling that runners get after running a certain distance in which running suddenly becomes less difficult, less of a drudgery, and becomes exhilarating, providing a feeling that we could run forever. We cannot run forever, of course; in fact, we have to run farther and farther over time to generate enough adrenalin and endorphin to get the feeling.

Alan Alda, many years ago, spoke in a graduation speech of a syndrome he called testosterone poisoning. We often think of testosterone poisoning as being a disease of young men – resulting in a shift away from rationality to an obsession with sexuality. Michael Dowd and I would point out that testosterone is a powerful mind altering substance present in both males and females and that it has a lot to do with sexual aggressiveness, competitiveness, power and fame; interestingly, winning and elevation of social or economic status result in increases in circulating testosterone.

Where do endorphins, adrenalin, testosterone come from? Their secretion is largely controlled by the “Lizard Legacy.” These are examples of ways in which the “Lizard Legacy” can continue to exert control over what we do and think. Under the influence of such chemicals, we can convince ourselves that something false is really true, and can convey that falsified information to others with all the hallmarks of truth-telling. And we can be led off into spasms of behavior that we would otherwise condemn.

It is not that SOME of us are like this. We are ALL like this. We all have these components of our minds working. Some of us have well formed, strong “Higher Porpoises” that help to keep us behaving as we feel we should. No matter how strong our “Higher Porpoise,” all of us are subject to dark and dangerous impulses that may push us to do things we would otherwise find abhorrent. We are all subject to the reactionary urges of what Nonviolent Communication refers to as “the jackal.” Given enough stimulus, we are all capable of behaving in ways we abhor – disrespecting our fellow beings, being unkind, mean, breaking our vows or violating our covenants.

If we do not understand the power of the Lizard Legacy, we are subject to its whims. As I pointed out earlier, the “Furry Li'l Mammal” and the “Monkey Mind” are not capable of fighting off the Lizard Legacy, though they can modify its effects if they are alert and ready to do so. But here comes the “Higher Porpoise” to the rescue. Able to see past short-term gratification to long-term goals, our “Higher Porpoise” can supervise, warn the “Furry Li'l Mammal” and the “Monkey Mind,” and use conscious measures to reduce physiologic stimuli, to reduce the levels of endogenous psychoactive substances, to help keep our minds and motives clear. In essence, the “Higher Porpoise” can support the “Monkey Mind” and the “Furry Li'l Mammal” to convince the “Lizard Legacy” that all is well, that we don't need all that extra testosterone or adrenaline. “It's OK little lizard, all is well. Go to sleep now.” The calm of Buddhist meditation, letting go of all the things that matter to the “Lizard Legacy,” can help keep the “Lizard Legacy” quiet, and keep the “Monkey Mind” and especially the “Higher Porpoise” in control.

Fortunately, we are also all capable of compassion, an element of the “Monkey Mind,” that allows us to understand that others are subject to the same problems of brain anatomy and physiology that we are. In the language of Nonviolent Communication, we can all manifest our “giraffe” nature. We can understand and help one another. By pulling together to help one another to confront a common weakness, we can develop mutual understanding and compassion, strategies for overcoming our own weaknesses, strategies for helping others to overcome theirs. And the “Higher Porpoise” can help us to call on others for help in moments of crisis, when it looks like our control may be slipping.

Michael Dowd believes that the most important understanding is that our evolution has given us this legacy of brain structure and function, that our darkest innermost thoughts are likely shared by the rest of humanity in one way or another. If we understand, we have taken the first step toward being able to ask for help – and if we can ask for help, we are on the way to control.

A continuing topic of religious discourse is the dual nature of man. That dual nature – whether it is the ability to do good or bad, or thoughts versus emotions, or divine versus mundane – is captured, it seems to me, in the duality of the “Lizard Legacy” and the “Higher Porpoise.” Grace is an understanding of that duality with a forgiveness of self that allows the “Higher Porpoise” to dominate. The traditional Christian concept is grace through faith – I offer the alternative of grace through science and understanding evolution – whence Michael Dowd’s title: **Thank God for Evolution**.

Our social systems, our cultures, our world, have evolved much faster than our genes. We have mismatches between what our “Lizard Legacy” is programmed to do and what our daily life demands. But there is cause for optimism. Gandhi, Mother Theresa, Martin Luther King, Jr., Winston Churchill, Socrates, Buddha, Lao Tse, Jesus, Mohammed – all these people had the same underlying brain structure and physiology that we have. Whether we like, honor or abhor any particular one of them, one must acknowledge that it is possible to soar, using just the equipment each of us was born with. But it helps to understand, to have an operating manual, and to have strategies for coping with the inevitable “break downs.”

Addiction support groups, like AA, around the world have discovered that there is nothing more powerful in helping us to “stay on the wagon” than having a buddy to call to provide us with support when we feel we are slipping. Most of the rest of us – who do not think we are addicted to anything – have paid scant attention to how important this recognition is. Since we ALL share a “Lizard Legacy,” we are all in danger of “falling off the wagon” of our good behavior, our honesty, our fidelity, our kindness and behaving like a lizard, or a jackal. We could all use a buddy.

Look about you. Look how many potential buddies there are sitting around you in this room this morning. What does it take to have a buddy? You must acknowledge your own vulnerability and forgive yourself in advance for being vulnerable, for having a “Lizard Legacy.” And your buddy must do the same. Then you can forgive one-another for what you have already

forgiven yourself for. You must be able to receive your buddy's call for help without judging your buddy for needing help, just as you must be able to call for help without judging yourself or expecting judgment from your buddy.

We won't be able to get rid of our "Lizard Legacies" – but that is not the point. We can march together, as compassionate buddies, helping one-another to keep our lizards under control. And that control is what we need.

Closing Hymn: *Come Sing a Song With Me - #346*

Closing Words

I invite you to join hands. This church is dedicated to the proposition that behind all our differences, beneath all our diversity, there is a unity that makes us one and binds us forever together, in spite of time and death and the space between the stars. We pause in silent witness to that unity.

We came into this place today to bear witness to the nature of our brains. The complex human brain has evolved over countless millions of years, progressively adding new functions but never deleting old ones; indeed, our past can be told in the structure and function of our brains. With that evolution clearly comes the burden of brain functions, now represented by emotions and thoughts, that no longer have positive survival value; the good news is that in recognizing those inherent weaknesses in our make-up, there is hope that we can deal with them using techniques that are currently known and available.

Peace be with us.