

12-1-2015

How Much Is a Teacupful?

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Recommended Citation

Jackson, Jeremy A. (2015) "How Much Is a Teacupful?," *Gandy Dancer Archives*: Vol. 4: Iss. 1, Article 5.
Available at: <https://knight scholar.geneseo.edu/gandy-dancer/vol4/iss1/5>

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How Much *Is* a Teacupful?

I.

The fateful afternoon of December 13th, 1848 finds Phineas Gage, foreman of the Rutland and Burlington Railroad construction crew, proceeding as normal with the day's blasting. He stands among his men, his long steel tamping rod by his side, surveying the work. His mind wanders elsewhere, to his home, to his family, to his future. Another worker fills the hole carved into the rock with explosive powder and stands back, ready for detonation. Phineas is momentarily distracted, and without thinking, drops his tamping rod down onto the black powder, striking a spark on the rock and igniting the explosive. The pressure of the explosion rockets the rod upward, directly into Phineas's skull. The rod arcs away through the air, embedding itself into the ground some yards away as its owner crumples to the ground.

From here on out, Phineas Gage's story becomes rather...strange. For, rather than perishing on impact—as would be expected from having a three-foot, seven-inch rod of steel fly at high speed through his head—Gage remained conscious and was able to walk, with assistance from his fellow workers, to the road where he caught a passing oxcart that took him to a nearby hotel. There he sat, upright and lucid on the front porch, until Dr. Edward Higginson Williams arrived. According to Dr. Williams's personal statement, Gage was lucid enough to crack a joke, gesturing to his injury and saying, "Here is business enough for you." The doctor heard his story in full, but could not believe such an event had occurred, thinking that Gage must

have been somehow mistaken. Gage then got up to vomit, and the force of the expulsion caused “half a teacupful of the brain” to be expunged from the wound on his head, as recorded by Dr. Williams. Ordinarily, one would expect such a story to end with a coma or string of seizures, a very nicely worded obituary a few days later, and a weeping widow dressed in black. The tale of Phineas Gage, however, proves to be far from ordinary.

II.

I unearthed Phineas’s story while digging through old YouTube videos made by the “Vlogbrothers,” John and Hank Green. Researching and relaying odd tales such as Gage’s are common fodder for the pair, as their weekly videos have a wide scope of subjects, ranging from science to literary analysis. I’ve always appreciated this duality, for I often find myself similarly split as a scientist with a love of books—or a literary scholar with a passion for scientific study. Sometimes, these short videos uncover truths about the human condition, without really appreciating the level of thought that they invoke in the viewer. They usually present the pure facts, and let the viewers draw their own conclusions and create their own mythos. Hank’s video entitled “Stabbed in the Brain: Phineas Gage” begins with him saying, “Good morning, John. I’m a little worn out from philosophical musings...so today I’m going to just tell you the fascinating tale of Phineas Gage.” He seems to underestimate how resonant this event was, both for the history of science and for all who share a fascination with the human mind.

Upon first viewing Hank outline the specifics of Gage’s case, I was as baffled as Dr. Williams had been on that fateful day. Surely, the body cannot function after losing the majority of the left frontal lobe of the brain. The brain has always fascinated me, but less for its scientific qualities—biology was my worst subject in high school—than for the metaphorical resonances of its function. I have always pictured the brain as some sort of mysterious puppeteer of the body, electrical pulses sending signals down the strings of our nervous system and causing us to jump, run, or embrace. When the connection is cut or the brain is rendered inoperative (perhaps by a massive steel rod), the body should stop, correct?

The case of Phineas Gage proved that the brain is more than a simple powerhouse or on/off switch for the body’s actions. Its role in human life is more nuanced, more dynamic. After a few months of recuperation, Gage was reported to be strolling about his Vermont hometown, seemingly no worse off than before—beyond losing his left eye as the rod passed through, of course. If one can suffer such traumatic brain damage, does that mean that the brain has less control over our functions than previously assumed? Gage

sent the newly emerging science of neurology into a tailspin. Theories on the implications of the case—both reasonable and half-baked—flowed from neurologists' heads like that teacup of brain did from Gage's.

III.

After Gage's eventual death, twelve years later, his body was exhumed and his skull examined by several separate academic institutions, trying to squeeze as much information as they could from the dead man. Recently, computer simulations have recreated the blast, and speculations have been hurled regarding the unclear parts of his story. In fact, the majority of what has been said about Gage has been deemed false, either grossly exaggerating the effects of the accident, or spinning a tale of mysterious events that simply never occurred. Neuroscientists of the time used Gage's case as a kind of catch-all, touting him and his recovery as proof for nearly every theory under the sun. Phineas Gage became a miracle. Despite his miraculous persistence in living, however, the remainder of his mortal life smacked of anticlimax.

After his recovery Gage began exhibiting symptoms that seemed rather out of character for the hardworking, quiet man. Until the time of the explosion, Phineas prided himself on being a good man, a good husband, and a good citizen. Very little is known about Phineas pre-lobotomy beyond this simple summary of his character; more focus has, of course, been placed on Gage, post accident. One can assume, though, from what little we do know about him, that he was a hardworking, polite family man. He was considered one of the finest railroad foremen in the country, and was content to be such. However, after the accident, the man became crass, rude, and generally unpleasant. Vulgarity flowed from his tongue, of the sort never before heard coming from the mouth of this upstanding gentleman. This change in personality caused him to lose the job that the former Phineas had loved so much. He also became estranged from his family, moving to New York City and exhibiting himself and his tamping rod at P.T. Barnum's American Museum (a precursor to the Barnum and Bailey Circus). Gage later settled in Chile, where he drove a stagecoach from Valparaiso to Santiago, ferrying back and forth hundreds of Chileans to whom he was little more than a vaguely churlish man with one eye.

IV.

Here is a trifurcated man. Phineas before the accident: a hardworking, uncomplicated man. Gage after the accident: a sour, crass sociopath, as one scientist dubbed him. And finally, you have the mythical Phineas Gage, spawned not only from the tremendous events that took place that cold December afternoon, but from the reverberations of the blast through history.

This bizarre case proved once and for all that brain surgery could be possible, and a human could even be lobotomized without necessarily causing death. Gage's change in personality, too, led many researchers to delve into the mysteries that surround the different control centers of the brain. Hypotheses sprung up that pinpointed where the "personality center" of the brain might be. Phineas Gage became a common case study. According to foremost expert on Phineas Gage, Professor Malcolm Macmillan, Gage is included in about 60% of college neurology textbooks.

The uniqueness of his case allowed for many different and wide-ranging theories to flourish on the grounds that his head somehow proved them correct. His skull and his tamping rod, now immortalized in Harvard's medical school, were just bizarre enough to create a new face of neurology, a man who simply made a mistake while working at the job he loved so much. However, the widespread interest in his story has muddled his true story. Macmillan analyzed the average error in the facts presented about Gage, and said that "the most inaccurate components [of the stories] are those about his work before the accident, the details of the changes in his behavior, and his subsequent history." This indicates, then, that the threefold Phineas, in the eyes of the scientists, definitively proves absolutely nothing. No one, no matter how long they've studied his case, quite knows what is and what is not true about him.

V.

For one generally unconcerned with the jumbled mess of neuroscientific facts surrounding Phineas Gage, I am, nonetheless, presented with certain questions to be considered. What do we really lose when we lose our brains? Furthermore, what defines who we are, if the brain—and subsequently our personalities—can be altered in such a gruesome manner? Neither my scientific study nor my literary knowledge alone provides an explanation. I am left with the stark realization of how fragile the human mind is, regardless of how resilient the brain may be. One moment, this twenty-five-year-old man was going through the motions of a day's work, perhaps thinking of what sort of hot meal he would have waiting for him when he arrived home, and the next second, he became neuroscience history. This newfound significance forced him to uproot and dismantle the life he knew before, forced him to build a new life with a new brain wherein he had to strive for acceptance but ultimately find none, all because he had found he had become a new person. He changed utterly, and proved how fragile and mutable a human life can be.

What do we mean when we call something or someone human? It is the question that has inspired much of my research, in both literature and the sciences: what is the essence of being human? Certainly if you ask any biologist, you will be subjected to an interminable lecture on DNA, RNA, genes, and their functions. If the case of Phineas Gage teaches us anything,

however, it is that there is more to the human spirit than a sequence of microscopic proteins and electrical impulses. We are an amazing species, capable of incredible feats of strength, intellect, and—in Phineas Gage's case—survival. It is theorized that after Gage's move to Chile, he slowly began to return to his old self. I'd like to believe that he was able to regenerate into the same pleasant, hardworking man his family had loved and lost. Therein is proved the existence of some unconquerable something, be it a soul or spirit or what have you, which carries the essence of human consciousness, that not even a three-and-a-half foot metal rod moving at hundreds of miles per hour could eradicate.

I am perfectly content traveling with the triptych Gage as he was, is, and ever shall be, just as I am content to exist as a bifurcated being myself, as I seek to understand the universe through the narrow lenses of both human science and human creativity. If we take the amalgamation of our thoughts, our feelings, and our actions, we come close to understanding our own incalculable souls. I find myself content in the knowledge that the human body, with our mysterious brain at its helm, will never cease attempting to know itself.