Guide to Responding


Directions: In lieu of highlighting, copied here are sections of the reading important to understanding the meaning of the essay. Following each excerpt will be an explanation of the section and its importance relating to the overall idea. Read the sections in context with the rest of the essay. Remember that highlighting and/or taking notes while you read paired with later outlining and paraphrasing is an excellent method to ensure comprehension and retention of difficult or highly detailed material. Make sure you use a dictionary to look up difficult words and words that seem to make no sense in context. Adams was a linguist and often used the original Latin meanings of words.

Main Point Summary/Background: Although James refers to himself in the third person, this is a chapter from his autobiography. In “The Virgin and the Dynamo,” Adams reflects on the motivational power of technology in building modern urban civilization as similar to the power of the cult of the Virgin Mary to inspire the building of medieval cathedrals. The dynamo (symbolizing technology) has become the new icon to which shrines are built and dedicated.

Every selection below should be predicated with “According to Adams.”

The pace of scientific discovery in America’s second industrial revolution was so rapid that, for many, society had been destabilized by the new wonders. Adams, visiting the 1893 World’s Columbian Exposition in Chicago (celebrating the 400th anniversary of Columbus’s voyage to the Americas), where all nations displayed the best of human achievement, was moved to ponder the nature of grand forces in human history. Religious faith had powered the nations of Europe, but that faith had become diluted in America through its founding as a Protestant nation and especially so in the industrial revolution.

Related Readings:

This essay is related to readings in subunit 5.3, especially in 5.3.1. In The University of Virginia Crossroads Project’s “Re-viewing Nature; Machines and Industry; Greek Revival Architecture,” the author discusses how the
mythical idea of pastoralism in America was disturbed by technology and how artists tried to find an imagined European divine past to counter the “threat” posed by technologies to the American idea of a pastoral nation. Also, the fact of the Columbian Exposition should be read as an ongoing part of the Columbian Exchange as discussed in subunit 4.1.2, especially in Alfred Crosby’s “The Columbian Exchange: Plants, Animals, and Disease between the Old and New Worlds”

UNTIL the Great Exposition closed its doors in November ... (p. 1)

Adams refers to the 1893 World’s Columbian Exposition and Fair in Chicago, also known as “The White City.”

Adams had looked at most of the accumulations of art in the storehouses called Art Museums; yet he did not know how to look at the art exhibits of 1900. (p. 2)

The newest inventions were displayed at the Exposition. Adams had traveled extensively in Europe and was well-versed in the history of European and American art. So many technologies were so new in 1893 that they appeared magical. Adams understood art in the context of display, but the idea of viewing machines not as design but as practical technology was a new experience for many at the Expo. The machines were meant to generate awe not aesthetic appreciation, yet Adams saw them through the lenses of aesthetics, history, and philosophy. “The art of 1900” was machines. Art is also the Latin root of the word artifice and can mean anything created by humans.

Langley, with the ease of a great master of experiment, threw out of the field every exhibit that did not reveal a new application of force, and naturally threw out, to begin with, almost the whole art-exhibit [meaning artistic works]. Equally, he ignored almost the whole industrial exhibit. He led his pupil directly to the forces. (p. 2)

Aeronautical pioneer Samuel Pierpoint Langley guided Adams through the Expo. Adams acknowledged the scientist’s ability to focus on the heart of the matter and guided Adams to only the exhibits that pertained to the creation of physical power. Traditional aesthetics held no interest for the scientist. Newness and power became the sole measures of worth.

To him, the dynamo itself was but an ingenious channel for conveying somewhere the heat latent in a few tons of poor coal hidden in a dirty engine-house carefully kept out of sight; but to Adams the dynamo became a symbol of infinity. (p. 2)
A dynamo was an early device to conduct a huge amount of electricity, much like a transformer today. Coal is dirty and fouls the air. One lesson of the White City was cleanliness and urban order. Hiding the source of the energy—then, coal—and concentrating on the medium of its being delivered—electricity—effectively disconnected urban citizens from the fact of destruction required to generate energy (as opposed to capturing it, as in solar power). Solar, wind, water, and animal were the sources of power before the industrial revolution. Coal was burned for heat, but the dynamo allowed the heat generated by coal to be “channeled” for the purpose of exerting force. Langley saw convenience and order; Adams saw a metaphor. Filth hidden is filth forgotten.

As he grew accustomed to the great gallery of machines, he began to feel the forty-foot dynamos as a moral force, much as the early Christians felt the Cross. (p. 3)

Adams saw in the huge machines as icons in his society. People would pray to the machines as they once prayed to icons of religion. Rather than only treating technology as convenience, he saw profound implications for the new gods in human society. The industrial revolution was epochal, a shift in moral perspective.

Before the end, one began to pray to it; inherited instinct taught the natural expression of man before silent and infinite force. (p. 3)

Technology appears infinite because it is so formidable. Burning coal in a locomotive was loud and dirty, but dynamos ran quietly. Awe for miraculous, quiet power and seemingly inexhaustible (since one did not see the burning of coal) electric power, turned into near-religious belief.

Yet the dynamo, next to the steam-engine, was the most familiar of exhibits. For Adams’s objects its value lay chiefly in its occult mechanism. Between the dynamo in the gallery of machines and the engine-house outside, the break of continuity amounted to abysmal fracture for a historian’s objects. No more relation could he discover between the steam and the electric current than between the Cross and the cathedral. The forces were interchangeable if not reversible, but he could see only an absolute fiat in electricity as in faith. (p. 4)

Despite its newness, Adams recognized the expression of power as an object of curiosity and wonder, something that was familiar to him from his travels in Europe and experience as a historian. Burning coal in an engine house supplied the dynamo with the watts it eventually distributed, eventually to other noisy machines. Seeing the distributive dynamo connected to the source of its energy
inspired in Adams a greater metaphor of the seen and unseen and how they work together ("occult" is Latin for hidden, unseen, or secret). "Abysmal" also means very deep (as in an abyss). The break of continuity between generator and dynamo, "abysmal fracture for a historian’s objects," means a deep gulf in the concepts explored by this historian. One powered the other over a wide and salient gap, even though the relationship between the two was made plain by proximity.

For Adams, the relationship between steam and current—one is turned into the other—is the same relationship between the Cross and the cathedral. The Cross, as a symbol, represents faith in the Christian God. As steam, religious faith is a by-product of raw materials. As electrical current, the cathedral is the product of a faith-powered reaction. The steam/faith/Cross is the source of energy, the current/cathedral is the product (interchangeable forces). The current goes on to power even more, which is also the meaning of the cathedral.

A “Fiat” is a proclamation or order, from the Latin meaning “Let it be done.” An absolute fiat is one that cannot be changed. The steam commands the electricity as faith commands the actions of the faithful.

... but Radium denied its God,—or, what was to Langley the same thing, denied the truths of his Science. The force was wholly new. (p. 4)

Science is godless, or it has become a god in its own right. Radium and radioactivity, also sources of power, defied the science of power generation. Even the mighty dynamo could become extinct in the face of new sources of power and new technologies. [Note: In an interdisciplinary course such as HIST 364, the student should be aware of a specific source of bickering between the sciences and humanities, the cause being that neither side understands the other. Scientists react to humanities types pointing out that nearly all ideas that once carried the weight of scientific “truth” have since been disproven. They ask whether one can talk in terms of scientific “truth” at all?] Adams was alluding to the impermanence in scientific discovery; something else may come and along and dislodge one’s absolute faith in one’s conclusions.

... but X-rays had played no part whatever in man’s consciousness, and the atom itself had figured only as a fiction of thought. In these seven years man had translated himself into a new universe which had no common scale of measurement with the old. He had entered a supersensual world, in which he could measure nothing except by chance collisions of movements imperceptible to his senses, perhaps even imperceptible to his instruments, but perceptible to each other, and so to some known ray at the end of the scale. Langley seemed prepared for anything, even for an indeterminable number of universes interfused,—physics stark mad in metaphysics. (p. 5)
Adams is commenting on the newness of scientific discoveries and the impact on how new and previously invisible processes will have on the human relationship with the divine.

Historians undertake to arrange sequences,—called stories, or histories,—assuming in silence a relation of cause and effect. These assumptions, hidden in the depths of dusty libraries, have been astounding, but commonly unconscious and childlike; so much so, that if any captious critic were to drag them to light, historians would probably reply, with one voice, that they had never supposed themselves required to know what they were talking about. (p. 6)

History writing relies on deductive and inductive logic. Not all of the pathways are visible, and human nature can be relied upon to not change drastically despite the enormous cultural differences over long periods of time. Science is provable.

Satisfied that the sequence of men led to nothing and that the sequence of their society could lead no further, while the mere sequence of time was artificial, and the sequence of thought was chaos, he turned at last to the sequence of force; and thus it happened that, after ten years’ pursuit, he found himself lying in the Gallery of Machines at the Great Exposition of 1900, his historical neck broken by the sudden irruption of forces totally new. (p. 6)

Reflecting on the imprecision of history writing, Adams was inspired to consider how human motivation (another kind of force) worked. Historical forces took on a new intellectual dimension when expressed so immediately as in the mechanical. Forces would need to be reinterpreted.

The year 1900 was not the first to upset schoolmasters. Copernicus and Galileo had broken many professorial necks about 1600; Columbus had stood the world on its head towards 1500; but the nearest approach to the revolution of 1900 was that of 310, when Constantine set up the Cross. (p. 7)

New information had disrupted society’s assumptions before, but the only historical intellectual revolution that was as powerful and ground shaking, in Adams’ Eurocentric view, was when the Roman Empire became officially Christian.
The rays that Langley disowned, as well as those which he fathered, were occult, supersensuous, irrational; they were a revelation of mysterious energy like that of the Cross; they were what, in terms of mediaeval science, were called immediate modes of the divine substance. (p. 7)

Much of the substance of scientific discovery was not plain to senses. The microscope, telescope, and other ways of measuring the unseen had opened a new world of discovery. Since these discoveries could not be perceived by the average person, they were not all that different from the uninitiated methods by which priests would describe the working of God’s will in the medieval world. Medieval scientists would use “God” as a hypothesis, a first mover of ideas. Both relied on faith on a “priest” class, those individuals who are skilled at interpreting the unseen world for the lay person.

Clearly if he was bound to reduce all these forces to a common value, this common value could have no measure but that of their attraction on his own mind. He must treat them as they had been felt; as convertible, reversible, interchangeable attractions on thought. He made up his mind to venture it; he would risk translating rays into faith. (p. 8)

Adams is using “rays” as shorthand for the seemingly invisible forces of nature, the existence of which requires belief in someone else’s knowledge.

Such a reversible process would vastly amuse a chemist, but the chemist could not deny that he, or some of his fellow physicists, could feel the force of both. (p. 8)

Scientists are going to balk at the idea that science, an empirical process, could be part of an analogy to faith. But, both science and religion are motivating forces; the effect each has on society can be measured. History is not rendered irrelevant by scientifically accrued knowledge.

When Adams was a boy in Boston, the best chemist in the place had probably never heard of Venus except by way of scandal, or of the Virgin except as idolatry; neither had he heard of dynamos or automobiles or radium, yet his mind was ready to feel the force of all, though the rays were unborn and the women were dead. (p. 8)

Not knowing specifics of something powerful does not denigrate its power to other communities or in human history. One does not need to have first-hand
knowledge of the forces that move human history in order to be affected by them
(most Bostonians were Protestant before 1845 and the mass immigration of Irish
Catholics during the potato famine).

*The force of the Virgin was still felt at Lourdes, and seemed to be as potent as X-rays;
but in America neither Venus nor Virgin ever had value as force;—at most as sentiment.
No American had ever been truly afraid of either.* (p. 9)

Neither the gods of Greece and Rome nor the cult of the Virgin Mary were very
popular in the early to mid-19th century in America. The power of the gods of
other cultures failed to frighten or inspire.

*The Woman had once been supreme; in France she still seemed potent, not merely as
a sentiment, but as a force.* (p. 10)

In Catholic countries like France, and especially at the Lourdes shrine to Mary
(whom he conflates with Eve), the power of religious faith was absolute.

Adams was also contemplating the recent suicide of his wife.

*All this was to American thought as though it had never existed. The true American
knew something of the facts, but nothing of the feelings; he read the letter, but he never
felt the law.* (p. 10)

Americans did not feel the force of Catholic devotion. Their religion was America
itself.

*On one side, at the Louvre and at Chartres, as he knew by the record of work actually
done and still before his eyes, was the highest energy ever known to man, the creator
four-fifths of his noblest art [intentionally conflating aesthetics and the knowledge of
artifice needed to create them], exercising vastly more attraction over the human mind
than all the steam-engines and dynamos ever dreamed of; and yet this energy was
unknown to the American mind. An American Virgin would never dare command; an
American Venus would never dare exist.* (p. 10)

The human mind was inspired for 1600 years to create artistic works, especially
in the cathedrals of France, by faith.
The idea survived only as art. (p. 11)

The unseen (the “occult”) in medieval science and society was imagined, expressed, and preserved in artistic works. The artist could not capture the sense of force that belief had on society. All that was left was artifacts [the remnants of human technology] of the feeling.

He liked the stately monuments much more than he liked Gibbon or Ruskin; he loved their dignity; their unity; their scale; their lines; their lights and shadows; their decorative sculpture; but he was even less conscious than they of the force that created it all,—the Virgin, the Woman,—by whose genius “the stately monuments of superstition” were built, through which she was expressed. He would have seen more meaning in Isis with the cow’s horns, at Edfoo, who expressed the same thought. The art remained, but the energy was lost even upon the artist. (p. 14)

Conceptualizing the invisible does not preserve the force of the inspiration that created it. The Virgin Mary had become a trope of the sacred female expressed in all religious art, again contemplating his wife’s place in his own artifice of writing.

To Adams she became more than ever a channel of force; to St. Gaudens she remained as before a channel of taste. (p. 15)

Artists in the late 19th century only cared for the artistry and aesthetic value of medieval art. Adams saw the inspirational force of faith.

For a symbol of power, St. Gaudens instinctively preferred the horse, as was plain in his horse and Victory of the Sherman monument. Doubtless Sherman also felt it so. The attitude was so American that, for at least forty years, Adams had never realised that any other could be in sound taste. (p. 16)

The horse (as in horsepower) was more immediate and conceptually available to creative minds in America’s period of modernity.

but otherwise one must look for force to the Goddesses of Indian mythology. The idea died out long ago in the German and English stock. (p. 16)
Protestantism diluted the power of the divine in society. In Hinduism, the gods and goddesses are real and part everyday life.

They felt a railway train as power, yet they, and all other artists, constantly complained that the power embodied in a railway train could never be embodied in art. All the steam in the world could not, like the Virgin, build Chartres. (p. 16)

The crux of the matter: machines could power machines but could never create or express an abstract thought. Faith built the great cathedral at Chartres.

Yet in mechanics, whatever the mechanicians might think, both energies acted as interchangeable force on man, and by action on man all known force may be measured. ... The symbol was force, as a compass-needle or a triangle was force, as the mechanist might prove by losing it, and nothing could be gained by ignoring their value. Symbol or energy, the Virgin had acted as the greatest force the Western world ever felt, and had drawn man’s activities to herself more strongly than any other power, natural or supernatural, had ever done; the historian’s business was to follow the track of the energy; to find where it came from and where it went to; its complex source and shifting channels; its values, equivalents, conversions. It could scarcely be more complex than radium; it could hardly be deflected, diverted, polarised, absorbed more perplexingly than other radiant matter. Adams knew nothing about any of them, but as a mathematical problem of influence on human progress, though all were occult, all reacted on his mind, and he rather inclined to think the Virgin easiest to handle. (p. 17)

Whatever inspires creativity should be counted as a human force. Both faith and science can be measured in the impact it has on human society. The historian’s job is to measure those forces that spur human “progress” (remember that progress is a term relative to the one using it).