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Berkeley's Account of Scientific Theories

One of the most important advances of the Renaissance Period was the scientific method, an incredibly structured system of procedures aimed at determining the nature of the universe via inductive reasoning and collecting knowledge over time. Scientific knowledge by definition accumulates collectively throughout history. George Berkeley, a Scottish philosopher of the early 18th century, believes that scientific theories are valued based on the accuracy of their predictions. However, scientific theories are not entirely dependent on prediction – theories can be categorized as descriptive or predictive, with the former not being concerned with predicting outcomes, just describing natural phenomena. Berkeley's early modern period was still the infancy of descriptive scientific theories. Prior to the Protestant Reformation, promoting descriptive science was practically illegal in Europe. Berkeley may not have lived to witness the power of inductive reasoning as a tool to uncover the mysteries of nature. Nonetheless, the value of scientific theories is far more nuanced than merely predictions; perhaps their true meaning lies in their capability to describe natural phenomena.

Descriptive theories for scientific theories that have been verified as far as perception is capable provide a valuable way to document and describe the accumulation of knowledge. To begin, the scientific process consists of making a prediction (hypothesis) and conducting experiments to determine the reliability of that prediction. Over time, better predictions are

upheld and form the basis for scientific theories. It appears that the descriptive portion of scientific theories is just the malleable surface level that changes depending on how its predictions are repeated through experiments. However, scientific predictions have limited practical consequences for the lives of people. For example, Copernicus' Heliocentric Theory made more accurate predictions, but its true meaning was the controversial account of the nature of the solar system that is true. My confidence in saying that Heliocentrism is true is the same confidence I have that this essay will be read and graded – that is just how things work. Thinking about "settled" scientific theories in terms of predictions is trying to reinvent the wheel every generation. We have stopped conducting experiments to verify heliocentrism long ago because we have formed a proper descriptive theory of it. While it may appear that the descriptive aspect of science is too variable, the majority of society-changing scientific theories today are essentially settled and have far-reaching descriptive capabilities.

It may be helpful for this analysis to list several of these far-reaching descriptive theories. The most obvious example that comes to mind when the word "theory" is brought up is the Theory of Evolution by Natural Selection. Darwin developed this theory in order to unify what he saw on the Galapagos Islands with Gregor Mendel's advances in Genetics. But as evolution has held up in the past two centuries, it now serves a role in describing our history, and is generally regarded as fact today, God-guided or not. The Theory of Evolution was not world-changing because it accurately predicted where certain fossils would show up when archeologists dug them up – it was world-changing because it described an origin story that challenged established institutions. For example, laws in the United States that prevented the teaching of evolution in public schools existed until they were overturned by the Supreme

Court in 1987[1]. Another perhaps less controversial theory that exists to describe is that of Cell Theory, which is a general term for our scientific knowledge on the structure of cells, cell reproduction, and how cells make up living things. It seems odd to describe this collection of scientific knowledge as anything other than descriptive. Nonetheless, Cell Theory described living things well enough that it had incredible implications for the fields of biology, genetics, and medicine. On the contrary, String Theory is in its infancy and currently only seeks to make predictions that will hold up experimentally. Whenever a cohesive predictive theory is repeated enough times to be considered true beyond a reasonable doubt, it gains descriptive capabilities and potency for the real world.

Berkeley's account of science through inductive reasoning is that human perception is not able to distinguish causation. Since we are not able to determine causality, scientific theories are merely organized and methodical means to predict outcomes in the natural world. This notion is almost pointless to argue with – it did not matter to our early ancestors if they could prove that lions were scary or that thirst was caused by not drinking water. Through the scientific method we now know that thirst is a neurological reaction caused by a lack of hydration to the same level of confidence that we know the Earth revolves around the Sun or that pregnant women do not give birth to cats. Berkeleyan idealism is not even concerned with the truth of the laws of nature, just that they enable us to predict the results of experiments with generality. Sure, this applies to Newtonian physics where accuracy breaks down as objects approach the speed of light, but such is the progress of science. Perhaps a similar problem will arise in the Theory of Evolution that will break down towards some limit that makes way for a

[1] Edwards v. Aguillard SCOTUS Case: https://www.oyez.org/cases/1986/85-1513

newer, truer theory. Seems unlikely. Even so, there are still countless examples of scientific innovations that can really only be valuable if they are treated as truth. Overall, George Berkeley's account of inductive reasoning may be useful philosophically, but cannot be applied to human behavior and the natural world due to the necessity of scientific inductive reasoning for our brains to function and form connections.

Furthermore, the Problem of Induction is a philosophical concept that appears to contradict scientific theories as descriptors of the natural world. The problem of induction was originally proposed by David Hume, who denounces reasoning gained from the senses as logically unsound. From this, it would appear that all of the natural sciences are "bullshit" (you said it in class!) Similar to the argument from Berkeleyan idealism, it is essentially pointless to argue with the idea that inductive reasoning cannot produce anything certain. However, knowledge does not need to be certain in order to be potent and have consequences for the real world. There is no reason to think that the Sun will not rise tomorrow. There is no reason to think that objects will not fall if they are dropped. Benedict de Spinoza's argument that all things must have a cause may have some value here – there must be a cause to the Sun rising, there must be a cause to the Earth revolving around the Sun and rotating on its axis, and so on…. Humanity over the millennia has sought to find the causes for natural phenomena and adequately describe them. While the Problem of Induction does object to the meaning of scientific theories as ways to understand the universe, we are better to throw out this objection than to throw out the value of science in today's society.

Another potential objection to science for description instead of prediction is that the difference between the two is semantics. Cell Theory describes the nature of cells in biology,

but it also predicts how cells will reproduce or use energy. If a new species of plant is discovered and biologists examine closely to find their cells lack a nucleus, then the predictions made by Cell Theory would be inaccurate and the theory would be rejected. Of course, it would be overwritten by a theory that makes more accurate predictions and can withhold the unique species of plant that challenged our old theory. What would not happen is the rejection of the medical and technological advances that occurred by treating Cell Theory as fact. There is some value to putting our faith in scientific knowledge if there are tangible positive outcomes. Of course, the early modern philosophers such as Berkeley were concerned with the truth instead of the practical. However, in some ways, using contemporary scientific theories as accurate descriptors of nature is sufficient. Religion is sufficient to produce happiness and meaning in the lives of billions without any deductive proofs backing up the accuracy of any religion. Overall, predictions made by scientific theories are only meaningful in the instantaneous; general knowledge that compounds over the eons requires accepting principles that are determined through inductive reasoning.

In conclusion, scientific theories that are assumed to describe natural phenomena accurately allow humanity to move forward, while focusing on verifying predictions leaves little room for innovation. Science should not be concerned with seeking the truth – there is very little that can be done inductively if the problem of induction is taken to the most literal degree. Science should instead be concerned with producing tangible outcomes – including even the most theoretical sciences. Quantum mechanics leaves the positions and state of particles to be determined probabilistically? Physicists and computer sciences should assume certain things to be true and attempt to design a computer to exploit this. Any scientific knowledge that is

gained should be applied to the physical world to attempt to improve the lives of humans. We are stuck with faulty inductive reasoning, but the scientific method provides the most meaningful way to analyze nature and garner anything practical out of knowledge.

Works Cited

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