

The Problem of the Laws of Nature

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Abstract

The concept of natural law is central to modern science, yet when examined produces some philosophical difficulties. Do natural laws simply represent regularities in nature, as first Hume and then A.J. Ayer argue? Or are they metaphysically necessary features of our universe as Saul Kripke and Hilary Putnam hold in our text? Examine this issue and make a decision. Be sure to explain what you take to be the strengths and weaknesses of each approach.

Introduction

The problem of the laws of nature has been brought to the forefront by no less than David Hume himself. The skeptic that he was, Hume brought forth the regularity theory of laws, coined the Humean Theory. In the Humean Theory, Laws of Nature are statements of the uniformities (regularities) in the world. It denies the necessity of any objective causality appearing in a law. On the other hand, we have a metaphysical necessity put forth by Hilary Putnam which states that laws get their reference fixed in the actual work by means of archetypal specimens.

Regularities of Nature

In the Humean Theory, as stated before, Laws of Nature are statements of the uniformities (regularities) in the world. For example, laws of nature are mere descriptions of the way the world works. In this view, we are told that if it were logical that there's a causal relation from A's to B's then it would be known a priori. Hume insists that for any cause it's logically possible that its usual effect will not follow from it. Ultimately, it comes down to empirical experience; causal relations are observed and instantiated based on experience.

In a more narrow sense, the laws of nature are nothing more than true universal generalisations. For example, x is true because we have always observed that x happens. An example cited in the text: if it is a law that copper conducts electricity, then what makes it a law, is the fact that *all* pieces of copper (universally, across time and space) conduct electricity.

Weakness of Regularities of Nature Theory

The regularities of nature theory (RNT) is not, however, without some substantial flaws. The first problem of the RNT is what Ayer refers to as Vacuous Laws (VL.) The VL problem is a logical problem with universal existentials, or generalisations. Consider the following

(1) All A's are B's; logically: $(x)(Ax \supset Bx)$

(1') It is false that there is an A that is not a B; logically: $\sim (\exists x)(Ax \bullet \sim Bx)$

Both, (1) and (1') are equal. (1) states that for every x if x is A then x leads to B. (2) states that it is not the case that exists any x such that x has the property A and does not lead to B. The problem with this is that if there does not exist in any world x then it becomes true that (1'). In other words, because laws are universal generalisations, then it becomes automatically true (automatically true law) just because there are no instances of to negate the law. In plain English, one might be able to say that "all Martian have four knees" as a law *just because Martian don't exist!*

The way to patch this problem is to say that there must exist an x . With this ad hoc patch, however, one sees that it's too restrictive. Much like the Gettier problem in epistemology, it becomes to much of a restricted set of

qualifiers. Scientifically recognised laws like Newton's first law of motion would be weeded out under this new patch.

Another problem with the RNT is in the Generalisation of Fact. For example, if you observe continually a fact x occurring under certain conditions y by body b then you would generalise that a similar body b' will produce the same fact x when in the same conditions y . This is a problem because if say on all islands you see that when you plant sunflower seeds, and get sunflower plants, then RNT logic would state that it's a law that you get sunflower plants on all islands, *even if you plant walnut seeds*.

To patch these problems Ayer exposes his Epistemic Regularity Theory (ERT) which states the following

(2) Laws = universal truth + x

The x in this case can be one or more of the following:

1. Willingness to make predictions with the generalisation
2. our acceptance of the generalisation
3. the role that the generalisations play in the whole of the scientific domain.
4. our recognition that the generalisation explains its instances (in the sunflower analogy, for example, the generalisation doesn't explain instances of itself.)

Metaphysical Necessity

In the Metaphysical Necessity Theory, Laws of Nature are the 'principles' which govern the natural phenomena of the world. In other words, the natural world 'obeys' the Laws of Nature. Although Ayer does a pretty decent job of attempting to buckle down the RNT with his ERT, he seems to have conflated the difference between 'Why' we believe that something is a law, and 'What' indeed is a law.¹ What is important here is that there is a set of laws of nature that are metaphysically necessary. These laws are the ones that attribute essential properties to natural kinds. In other words, what makes water, always water universally.

¹This is indeed one of the Fred Dretsky's criticisms of A.J. Ayer

Hilary Putnam and Saul Kripke actually put forth the fact that there are essential properties of items. These essential properties *can* be known a posteriori, empirically, but that does not mean that the law is contingent, as Hume pointed out. Furthermore, that these essential properties are of a microstructure. So that, for example, H₂O is an essential property of what we commonly know as water. It is something that by its very nature has two hydrogen atoms and one oxygen atom in a particular spacial configuration. The natural law (of kinds) for water would be this very same atomic configuration. Clearly it would not be the same if it were H₂O₂ (or hydrogen peroxide, which is a poison to most biological life.)

Putnam assumes that these essential qualities are to be held across all possible worlds uniformly. “Thus not only are actual F’s all G’s, all *possible* F’s are...[emphasis added]” [I, p. 857] More importantly,

Weakness of Metaphysical Necessities

The problem is how do we *know* that all water is the same. Why must the different instances of natural kinds (like water) all have the same meanings. More so, *which* properties can be identified as the essential properties of any particular natural kind? These questions are critically raised by D. H. Mellor, who throws the ball into the court of the MN’s to uphold their theory against RNT’s.

Mellor states that their (natural kinds) meaning do not depend on the existence of archetypes. Furthermore, even if they did, archetypes still do not produce enough evidence for the existence of a natural kind’s essence (or essential properties.) For Putnam’s theory to produce an essence, the similarities among the natural-kinds must be transitive, so that all possible F’s share the same property G with each other. The problem is in two natural-kinds that are different, but one having *some* of the same *archetypal properties* with the other in the real world.

For further clarification of Mellor’s criticism, let’s go back to the example of water. We can say that water is this big clear, wobbly thing, that is reflective and gathers in large quantities like oceans and lakes. In another world, there might be a natural-kind (say alcohol) having the same *archetypal properties* as water on *this* world. So, in other words, they are not being compared directly, only through their archetypes.

Conclusion

It seem like once again, there are differences based on personal preference, and logical games. But to keep this from an ad hominem basis, I would tend to agree with a more *liberal* form of the regularities of nature theory. There tends to be order in the universe, which is not to say that there is some higher reason for order. Regularities are just ways for the human mind to understand the universe. We need particular causal connections &c. in order for us to cope with the universe around us. This does *not* mean that there is orderliness in the universe as a independent necessity.

References

- [I] Curd, Martin & Cover, J. A. *Philosophy of Science: The Central Issues*. W. W. Norton & Co: New York, 1998.