

Being a Realist Without Being a Platonist

Dan Sloughter

Furman University

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Mathematical realism

- G. H. Hardy (*A Mathematician's Apology*, 1940):
317 is a prime, not because we think so, or because our minds are shaped in one way rather than another, but *because it is so*, because mathematical reality is built that way.
- Alain Connes (*Triangle of Thoughts*, 2001): Mathematical objects have an existence that is every bit as solid as external reality, and mathematicians bump up against it in somewhat the same way as one bumps into a material object in external reality.

Is there a dog?

- C. S. Peirce (*Collected Papers*, 8.12):
 - Objects are divided into figments, dreams, etc., on the one hand, and realities on the other. The former are those which exist only inasmuch as you or I or some man imagines them; the latter are those which have an existence independent of your mind or mine or that of any number of persons.
 - The real is that which is not whatever we happen to think it, but is unaffected by what we may think of it.
- We will return to explain what Peirce means by the latter statement.
- Nominalists hold that only individuals are real.
- Realists hold that generals are real as well.
- For example, nominalists hold that individual dogs exist, but there is no dog in itself.

Realism vs. nominalism in biology

- Benjamin Burman (“The species concept: a discussion,” 1949):

In some respects, it is extremely unfortunate that names are ever attached either to ideas or objects. The false attachment of names to ideas or objects similar but not identical with the original can work harm far exceeding the benefits conferred by having a convenient label. The name “species” has come to such a state. As we shall see, a species, be it plant or animal, is a fiction, a mental construct without objective existence.

Realism vs. nominalism in biology (cont'd)

- Ernst Mayr (“The species concept: a discussion,” 1949):

If a species were merely “a fiction, a mental construct without objective existence” one would expect under all circumstances the borderline between species to be exceedingly vague and subjective. However, if Dr. Burma should take make an excursion into the neighborhood of his home town, he will find that every species of birds and mammals is sharply separated from every other one.

There can be no argument as to the objective reality of the gaps between local species in sexually reproducing organisms.

Platonism

- A Platonist holds there exists a world of ideal forms, of which the objects of our world are imperfect copies.
- Gödel (“What is Cantor’s continuum problem,” *American Mathematical Monthly*, 1947):

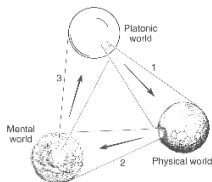
But, despite their remoteness from sense experience, we do have something like a perception also of the objects of set theory, as is seen from the fact that the axioms force themselves upon us as being true. I don’t see any reason why we should have less confidence in this kind of perception, i.e., in mathematical intuition, than in sense perception . . .

- Hardy (*A Mathematician’s Apology*, 1940):

I believe that mathematical reality lies outside us, that our function is to discover or *observe* it, and that the theorems that we prove, and which we describe grandiloquently as our ‘creations’, are simply our notes of our observations.

Platonism (cont'd)

- Roger Penrose (*Shadows of the Mind*, 1994):



In some way, each of the three worlds, the Platonic mathematical, the physical, and the mental, seems mysteriously to 'emerge' from—or at least to be intimately related to—a small part of its predecessor.

Universals

- A universal is a unity which may be predicated of many.
- The Platonic forms are one way to make universals real.
- That is, in Platonism:
 - Universals are real.
 - Individuals participate in the universals.
 - Universals exist independently of any instantiation in individuals.
 - Individuals are not fully real.
- But Platonism involves epistemological and ontological commitments which are hard to reconcile (as Plato himself realizes in, for example, the *Parmenides*).

Scholastic realism

- Scholastic philosophers developed a moderate, Aristotelian realism.
- Scholastic realism (13th and 14th centuries):
 - Universals are real.
 - However, universals do not have an independent existence.
 - Individuals are real and have existence.
- Thomas Aquinas (1225 - 1274):
 - An individual has matter and form.
 - The form is the common nature, a universal.
 - The matter is what makes a particular exist as an individual.
- Thought experiment:
 - What if there were creatures with form but no matter (such as angels)?
 - Then each angel would have to have a separate common nature (species).

Duns Scotus (1266 - 1308)

- Universals do not have existence independent of individuals.
- The common nature is formally different from the individuating principle, the *haecceity*.
- The mind abstracts the common nature, which has existence only in thought.
- But the common nature is nevertheless real as it depends on the individuals, that is, is independent of thought.
- That is, universals are real, but do not have an existence of their own.

Peirce and the real

- Peirce's review of Fraser's edition of the works of Berkeley (*CP*, 8.7-38):

All human thought and opinion contains an arbitrary, accidental element, dependent on the limitations in circumstances, power, and bent of the individual; an element of error, in short. But human opinion universally tends in the long run to a definite form, which is the truth.

There is, then, to every question a true answer, a final conclusion, to which the opinion of every man is constantly gravitating. He may for a time recede from it, but give him more experience and time for consideration, and he will finally approach it.

Peirce and the real (cont'd)

- From Peirce's review of Fraser's edition of the works of Berkeley
This final opinion, then, is independent, not indeed of thought in general, but of all that is arbitrary and individual in thought; is quite independent of how you, or I, or any number of men think. Everything, therefore, which will be thought to exist in the final opinion is real, and nothing else.

Pragmatism

- Pragmatism: A property is real if it *would* produce such-and-such an effect if it *were* to be subjected to such-and-such a test.
- Peirce's realism: Scholastic realism plus the experimental method.
- Example: Opium causes sleep, in a way that pajamas do not, because we can design experiments to test the sleep inducing hypothesis.

Mathematical objects

- For Peirce, the objects of mathematics come from *hypostatic abstraction*.
- That is, the process by which something that is in thought itself becomes an object of thought.
- For example (*CP*, 5.534),
 - a *collection* is an hypostatic abstraction, or *ens rationis*,
... [a] *multitude* is the hypostatic abstraction derived from a predicate of a collection, and ... a *cardinal number* is an abstraction attached to a multitude.
- The objects of mathematics are real, but have no existence on their own.

References

- *From Realism to “Realicism”* by Rosa Maria Perez-Teran Mayorga
- *Charles Peirce and Scholastic Realism* by John Boler