



Chapter 19



Determinism

The “problem of determinism” looms large in philosophy, where it appears as the powerful alternative to libertarian freedom in the “problem of free will.”¹

But determinism is equally powerful in physics today. It appears to be the logical, the rational, even the metaphysical foundation of classical Newtonian physics. The alternative of chance is thought to be irrational. Chance cannot be a “reason” or an explanation, which the Greeks called a “logos.” Chance is “alogos,” illogical. An uncaused cause has long been considered oxymoronic by analytic language philosophers who, to be sure, placed too much explanatory power in words.

Despite the fact that quantum physics seems to have shown that the microscopic world at least is ontologically indeterministic, the critics of quantum theory, who have developed several alternative “interpretations” of quantum mechanics, are equally divided into those who accept the indeterminism and those, following ALBERT EINSTEIN, ERWIN SCHRÖDINGER, and many others, hope to show that determinism can be restored to quantum theory by discovering “hidden variables,” forces coming in “from outside space and time,” or that there is only the “appearance” of randomness.

Determinism is the philosophical idea that every event or state of affairs, including every human decision and action, is the inevitable and necessary consequence of antecedent states of affairs. There is but one possible future.

More strictly, determinism should be distinguished from *pre-determinism*, the idea that the entire past (as well as the future) was determined at the origin of the universe.

Nor should determinism be confused with determination, the idea that events (including human actions) can be adequately determined by immediately prior events (such as an agent’s reasons, motives, desires), without being *pre-determined* back to before the agent’s birth or even back to the origin of the universe.

1 See chapter 4



Since modern quantum physics shows that the universe is indeterministic, with profound effects on microscopic processes at the atomic scale, we will find it valuable to distinguish pre-determinism from the adequate or *statistical* determinism that we have in the real world. Adequate determinism, which may be *arbitrarily close to and indistinguishable from certainty*, is the basis for the classical physical laws that apply in the macrocosmos.

Determinism is a modern name (coined in the nineteenth-century) for the ancient idea of DEMOCRITUS that causal deterministic laws control the motion of atoms, and that everything - including human minds - consists merely of atoms in a void.

Democritus' mentor and fellow materialist LEUCIPPUS said absolute necessity leaves no room in the cosmos for chance.

“Nothing occurs at random, but everything for a reason and by necessity.”

Determinism, especially the variation of “soft” determinism (cf. WILLIAM JAMES) or *compatibilism*, is supported as a theory of free will by a majority of philosophers, each with special vested interests in one or more of the many determinisms.

Compatibilists accept determinism but argue that man is free as long as his own will is one of the steps in the causal chain, even if his choices are completely predetermined for physical reasons or preordained by God.

And fatalism is a special form of determinism where every event in the future is fated to happen. Fatalism does not normally require that any causal laws or higher powers are involved. *Que sera, sera*.

The core idea of determinism is closely related to the idea of *causality*. But we can have causality without determinism, especially the “soft” causality that follows an “uncaused” event (a *causa sui*) that is not predictable from prior events.

ARISTOTLE called such events *archai* (ἀρχαί) - starting points or “fresh starts” in new causal chains which break the bonds of determinism.



Despite DAVID HUME's critical attack on the necessity of causes, many philosophers embrace causality and determinism strongly. Some even connect it to the very possibility of logic and reason. And Hume himself believed strongly, if inconsistently, in necessity. "'tis impossible to admit any medium betwixt chance and necessity,"² he said.

BERTRAND RUSSELL said causation may be *a priori*,

"The law of causation, according to which later events can theoretically be predicted by means of earlier events, has often been held to be *a priori*, a necessity of thought, a category without which science would not be possible."³

Indeterminism

The idea of indeterminism appears to threaten causality and the basic idea of causal law. But it does not.

Indeterminism for some is simply an occasional event without a cause. We can have an adequate causality without strict determinism. Strict determinism means complete predictability (in principle, if not in practice) of events and only one possible future. Adequate determinism provides statistical predictability, which in normal situations for physical objects approaches statistical certainty.

An example of an event that is not strictly caused is one that depends on chance, like the flip of a coin. If the outcome is only probable, not certain, then the event can be said to have been caused by the coin flip, but the head or tails result itself was not predictable. So this causality, which recognizes prior events as causes, is undetermined and the result of chance alone.

We call this "soft" causality. Events are caused by prior (uncaused) events, but not determined by events earlier in the causal chain, which has been broken by the uncaused cause.

Determinism is critical for the question of free will. Strict determinism implies just one possible future. Chance means that the future is unpredictable. Chance allows alternative futures and the

2 *Treatise of Human Nature*, Book I, Part I, Section XIV, p.171

3 *Our Knowledge of the External World*, p.179



question becomes how the one actual present is realized from these alternative possibilities.

The departure required from strict determinism is very slight compared to the miraculous ideas associated with the “*causa sui*” (self-caused cause) of the ancients.

Even in a world that contains quantum uncertainty, macroscopic objects are adequately, statistically determined to an extraordinary degree. The macroscopic “laws of nature” are just statistical laws that “emerge” when large numbers of atoms or molecules get together. For large enough numbers, the probabilistic laws approach practical certainty.

*Determinism is an emergent property.*⁴

Newton’s laws of motion are deterministic enough to send men to the moon and back. Our two-stage model of free will⁵ is large enough to ignore quantum uncertainty for the purpose of the reasoning will. The neural system is robust enough to insure that mental decisions are reliably transmitted to our limbs.

We call this determinism, only ineffective for extremely small structures, “adequate determinism.” It is adequate enough to predict eclipses for the next thousand years or more with extraordinary precision.

Determination

Unlike his compatibilist predecessors, R.E.HOBART (the pseudonym of Harvard philosopher Dickinson S. Miller, a student of WILLIAM JAMES) explicitly does not endorse strict logical or physical determinism. He uses the word “determination,” not determinism. And he explicitly endorses the existence of *alternative possibilities*, which can depend on absolute chance. Hobart is writing about six years after the discovery of quantum indeterminacy.

He says:

I am not maintaining that determinism is true...it is not here affirmed that there are no small exceptions, no slight undetermined swervings, no ingredient of absolute chance.⁶

4 See chapter 26.

5 See chapter 4.

6 *Mind*, Vol XLIII, No. 169, January, 1934, p.2



“We say,” I can will this or I can will that, whichever I choose “. Two courses of action present themselves to my mind. I think of their consequences, I look on this picture and on that, one of them commends itself more than the other, and I will an act that brings it about. I knew that I could choose either. That means that I had the power to choose either.⁷

Much later, PHILLIPA FOOT argued that because our actions are determined by our motives, our character and values, our feelings and desires, in no way leads to the conclusion that they are pre-determined from the beginning of the universe.

For instance, an action said to be determined by the desires of the man who does it is not necessarily an action for which there is supposed to be a sufficient condition. In saying that it is determined by his desires we may mean merely that he is doing something that he wants to do, or that he is doing it for the sake of something else that he wants. There is nothing in this to suggest determinism.⁸

The presence of quantum uncertainty leads some philosophers to call the world undetermined. But indeterminism is somewhat misleading, with strong negative connotations, when most events are overwhelmingly “adequately determined.” Nevertheless, speaking logically, if a single event is undetermined, then indeterminism is true, and determinism false.

There is no problem imagining that the three traditional mental faculties of reason - perception, conception, and comprehension - are all carried on more or less deterministically in a physical brain where quantum events do not interfere with normal operations.

There is also no problem imagining a role for randomness in the brain in the form of quantum level noise. Noise can introduce random errors into stored memories. Noise could create random associations of ideas during memory recall. This randomness may be driven by microscopic fluctuations that are amplified to the macroscopic level.

Our macro mind needs the micro mind for the free action items and thoughts in an *agenda* of alternative possibilities to be de-liberated by the will. The random micro mind is the “free” in free will and the source of human creativity. The adequately determined macro

7 ibid, p.8

8 “Free Will as Involving Determinism,” *The Philosophical Review*, vol LXVI, (1957), p.441



mind is the “will” in free will that de-liberates, choosing actions for which we can be morally responsible.

Determinism must be disambiguated from its close relatives causality, certainty, necessity, and predictability.

The Emergence of Determinism

Since the physical world is irreducibly indeterministic at the base level of atoms and molecules, there is actually no strict determinism at any “level” of the physical world.

With random motions at the base level, what emerges at the higher level of the macroscopic physical world and the human mind is adequate determinism. Determinism is an abstract theoretical idea that simplifies physical systems enough to allow the use of logical and mathematical methods on idealized abstract “objects” and “events.” The apparent “determinism” of classical physics is the consequence of averaging over extremely large numbers of microscopic particles.

Adequate determinism “emerges” when we have large enough objects to be averaging over vast numbers of atoms and molecules.

Determinism is an emergent property, just as the concept of determinism emerged historically.

The History of Determinism⁹

The term (sic) determination is first attested in the late fourteenth century, “to come to an end,” also “to settle, decide,” from O.Fr. *determiner* (12c.), from L. *determinare* “set limits to,” from *de-* “off” + *terminare* “to mark the end or boundary,” from *terminus* “end, limit.”

Its sense of “coming to a firm decision” (to do something) is from 1450. Determination as a “quality of being resolute” dates from 1822.

Before the nineteenth century determinists were usually called Necessarians. WILLIAM BELSHAM contrasted them (favorably) with the “incoherent” Libertarians in 1789. This was the first use of Libertarian. Libertarians were thought incoherent because liberty was

9 Sources, OED, Webster's Third International



thought to be unruly, random, unlawful, and - in a related term of the day - libertine.

The noun “determinism” appears first in 1846 in Sir WILLIAM HAMILTON’s edition of THOMAS REID’s works as a note on p.87.

“There are two schemes of Necessity - the Necessitation by efficient - the Necessitation by final causes. The former is brute or blind Fate; the latter rational Determinism.”

At about the same time, determinism is used by theologians to describe lack of free will.

In 1855, WILLIAM THOMSON (later LORD KELVIN) wrote,

“The theory of Determinism, in which the will is determined or swayed to a particular course by external inducements and forced habits, so that the consciousness of freedom rests chiefly upon an oblivion of the antecedents of our choice.”

ERNST CASSIRER claimed (mistakenly?) that determinism in the philosophical sense of a “doctrine that everything that happens is determined by a necessary chain of causation” dates from the work of EMIL DU BOIS-REYMOND in 1876.

Note that many ancient philosophers worried about this causal chain (ἄλυσις), but those philosophers who allowed the existence of chance, (ARISTOTLE, EPICURUS, LUCRETIUS, and ALEXANDER OF APHRODISIAS), denied such a causal chain, while maintaining that human decisions were caused by neither chance nor necessity but by a tertium quid - our autonomous human agency.

The adjective “determinist” appeared first in the *Contemporary Review* of October 1874 - “The objections of our modern Determinists.” In the *Contemporary Review* of March 1885, R. H. Hutton described “The necessarian or determinist theory of human action.”

WILLIAM JAMES’s essay on “The Dilemma of Determinism” appeared at about the same time, in 1884. In it he coined the terms “soft determinism” (today’s compatibilism), and “hard determinism” (strict determinism, indeed, pre-determinism from the beginning of time).

