

Gresham Lectures 2017-18

Divinity Lecture 3

The Clockwork God: Isaac Newton and the Mechanical Universe

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Alexander Pope on Newton

Nature and Nature's Law lay hid in Night
God said, let Newton be, and all was Light

The Apple Tree at Woolsthorpe Manor



John Conduitt

“In the year 1666 [Newton] retired again from Cambridge to his mother in Lincolnshire. Whilst he was pensively meandering in a garden it came into his thought that the power of gravity (which brought an apple from a tree to the ground) was not limited to a certain distance from Earth, but that this power must extend much further than was usually thought.”

William Stukeley

“After dinner, the weather being warm, we went into the garden and drank tea under the shade of some apple tree . . . He told me, he was just in the same situation, as when formerly the notion of gravitation came into his mind. Why should that apple always descend perpendicularly to the ground, thought he to himself; occasioned by the fall of an apple, as he sat in contemplative mood. . . .

William Stukeley

“Why should it not go sideways, or upwards? But constantly to the Earth's centre? Assuredly the reason is, that the Earth draws it. There must be a drawing power in matter. And the sum of the drawing power in the matter of the Earth must be in the Earth's centre, not in any side of the Earth.”

The Law of Gravitation

Any two material bodies, P and P' , with masses m and m' , attract each other with a force F , given by the formula

$$F = Gmm'/d^2$$

where d is their distance apart, and G is the Constant of Gravitation.

The great cathedral clock of Strasbourg



Newton argued that the regulation and maintenance of “this most beautiful system of the sun, planets, and comets, could only proceed from the counsel and dominion of an intelligent and powerful Being.”

Johannes Kepler (1619)

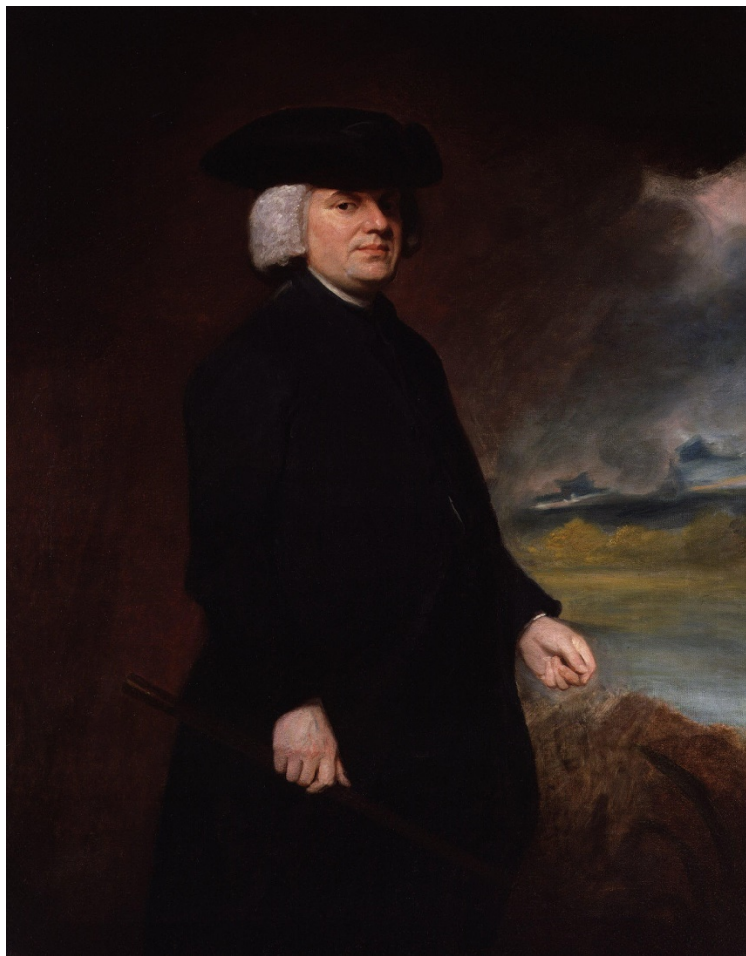
“In that geometry is part of the divine mind from the origins of time, even from before the origins of time (for what is there in God that is not also from God?) has provided God with the patterns for the creation of the world, and has been transferred to humanity with the image of God.”

Deism

The term “Deism” (from the Latin *deus*, “god”) is widely used to refer to a view of God which maintains God’s creatorship, but denies a continuing divine involvement with, or special presence within, that creation.

In *The Principal Deistic Writers* (1757), John Leland grouped a number of writers – including Herbert of Cherbury, Thomas Hobbes and David Hume – under the broad and newly-coined term “Deist”.

William Paley



William Paley

Natural Theology; or Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature (1802)

William Paley



William Paley

In crossing a heath, suppose I pitched my foot against a *stone*, and were asked how the stone came to be there: I might possibly answer, that, for any thing I knew to the contrary, it had lain there for ever; nor would it perhaps be very easy to show the absurdity of this answer.

William Paley

But suppose I had found a *watch* upon the ground, and it should be inquired how the watch happened to be in that place; I should hardly think of the answer which I had before given, – that, for any thing I knew, the watch might have always been there.

William Paley

“This mechanism being observed (it requires indeed an examination of the instrument, and perhaps some previous knowledge of the subject, to perceive and understand it; but being once, as we have said, observed and understood), the inference we think is inevitable, that the watch must have had a maker.”

William Paley

“... that there must have existed, at some time and at some place or other, an artificer or artificers who formed it for the purpose which we find it actually to answer, who comprehended its construction and designed its use.”

William Paley

“It is a happy world after all. The air, the earth, the water, teem with delighted existence. In a spring noon, or a summer evening, on whatever side I turn my eyes, myriads of happy beings crowd upon my view.”

William Paley

Contrivance proves design: and the predominant tendency of the contrivance indicates the disposition of the designer. The world abounds with contrivances: and all the contrivances which we are acquainted with, are directed to beneficial purposes.

William Paley

Evil, no doubt, exists; but is never, that we can perceive, the *object* of contrivance. Teeth are contrived to eat, not to ache; their aching now and then is incidental to the contrivance, perhaps inseparable from it: or even, if you will, let it be called a defect in the contrivance: but it is not the object of it.

Tennyson's *In Memoriam*

Man . . .

Who trusted God was love indeed

And love Creation's final law –

Though Nature, red in tooth and claw

With ravine, shrieked against his creed.

John Ruskin

It is a little valley of soft turf, enclosed in its narrow oval by jutting rocks and broad flakes of nodding fern. From one side of it to the other winds, serpentine, a clear brown stream, drooping into quicker ripple as it reaches the end of the oval field, and then, first islanding a purple and white rock with an amber pool, it dashes away into a narrow fall of foam under a thicket of mountain-ash and alder. ...

John Ruskin

Beside the rock, in the hollow under the thicket, the carcase of a ewe, drowned in the last flood, lies nearly bare to the bone, its white ribs protruding through the skin, raven-torn; and the rags of its wool still flickering from the branches that first stayed it as the stream swept it down.

...

John Ruskin

At the turn of the brook, I see a man fishing, with a boy and a dog – a picturesque and pretty group enough certainly, if they had not been there all day starving. I know them, and I know the dog's ribs also, which are nearly as bare as the dead ewe's; and the child's wasted shoulders, cutting his old tartan jacket through, so sharp are they.

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