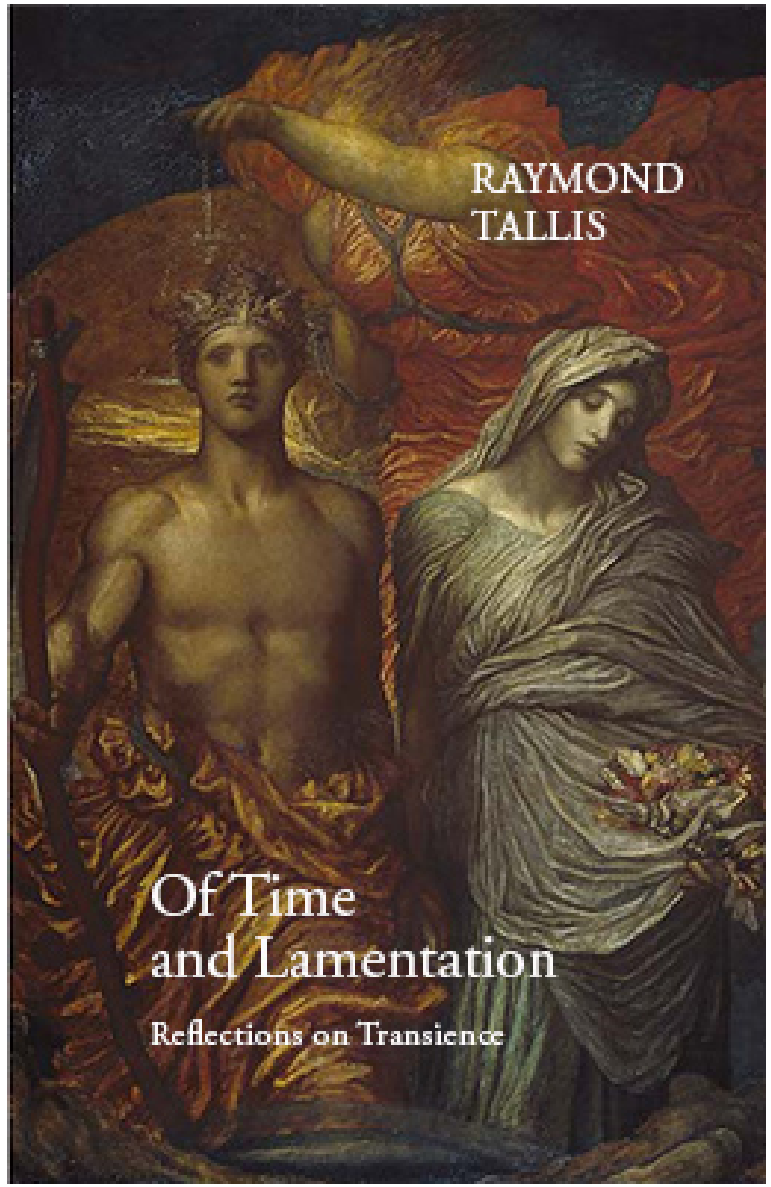
The Philosophy of Time: Does Physics Have the Last Word?
Gresham College

Raymond Tallis


RAYMOND
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Of Time
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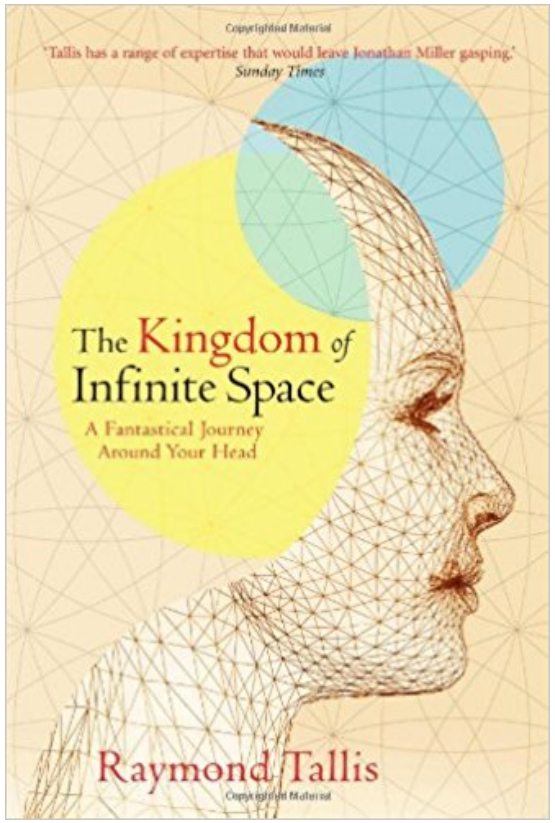
Reflections on Transience

Sir Hermann Bondi

Naturalism

- Human beings are pieces of nature
- Subject to and explained by the laws revealed by the natural sciences
- The only alternative to supernaturalism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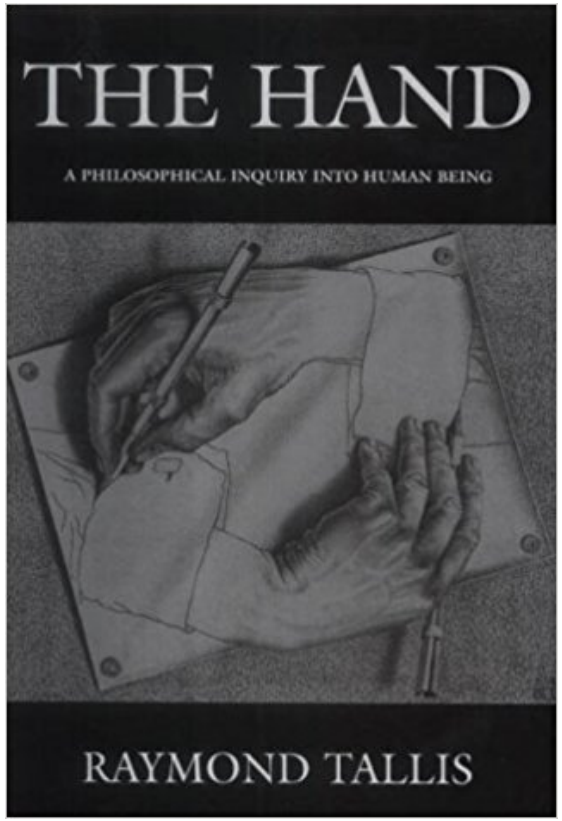
THE HAND
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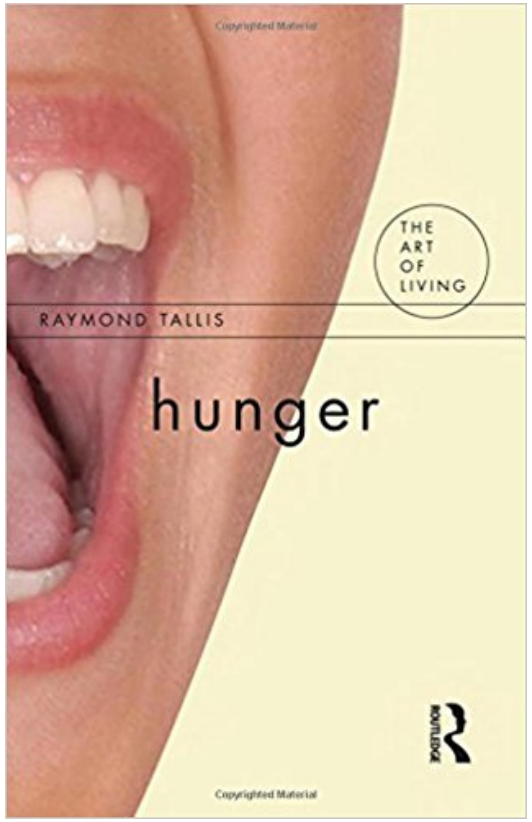
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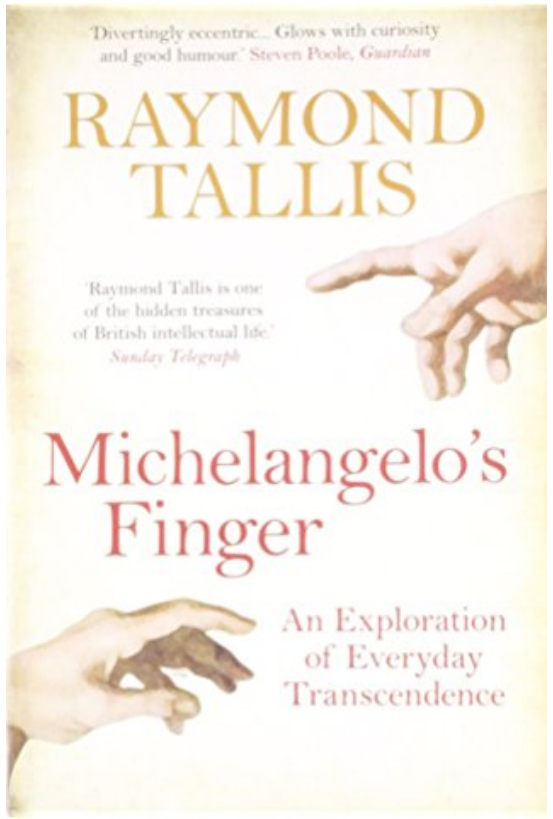
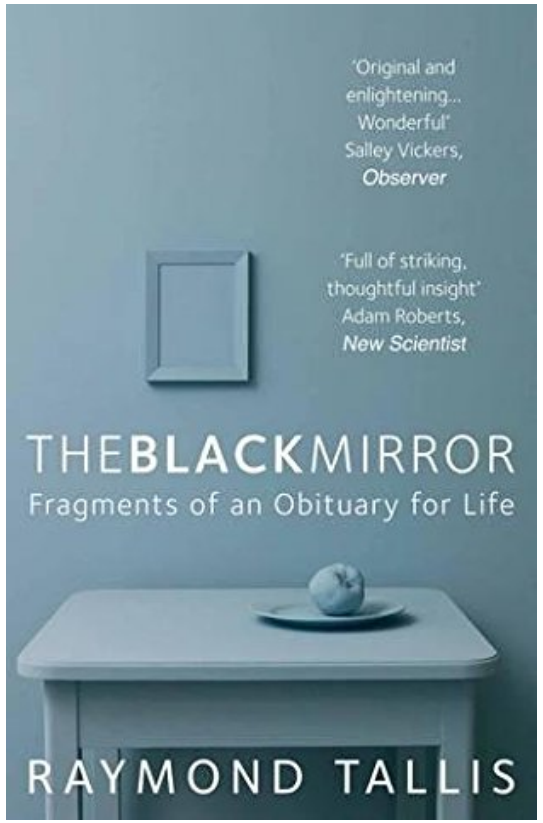

'Divertingly eccentric... Glows with curiosity and good humour.' Steven Poole, *Guardian*
RAYMOND TALLIS
'Raymond Tallis is one of the hidden treasures of British intellectual life.' *Sunday Telegraph*
Michelangelo's Finger
An Exploration of Everyday Transcendence


'Original and enlightening... Wonderful'
Salley Vickers,
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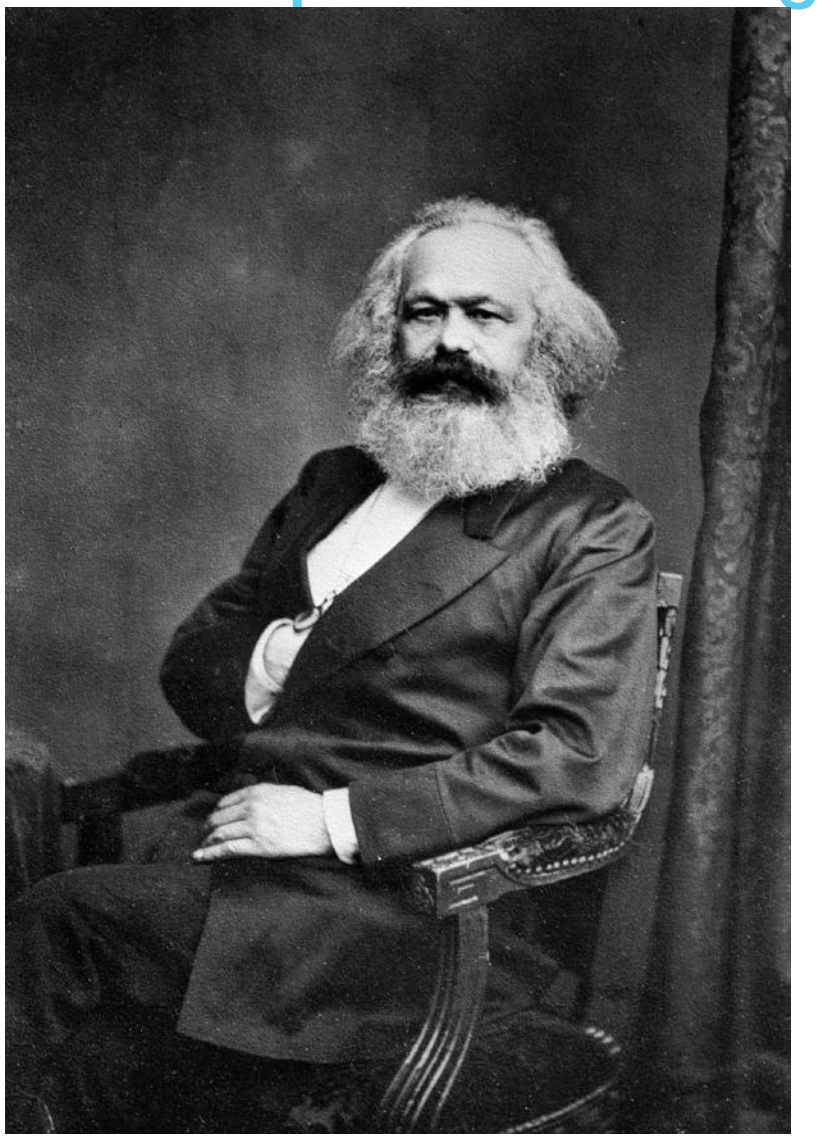
‘Man’s Species Being’

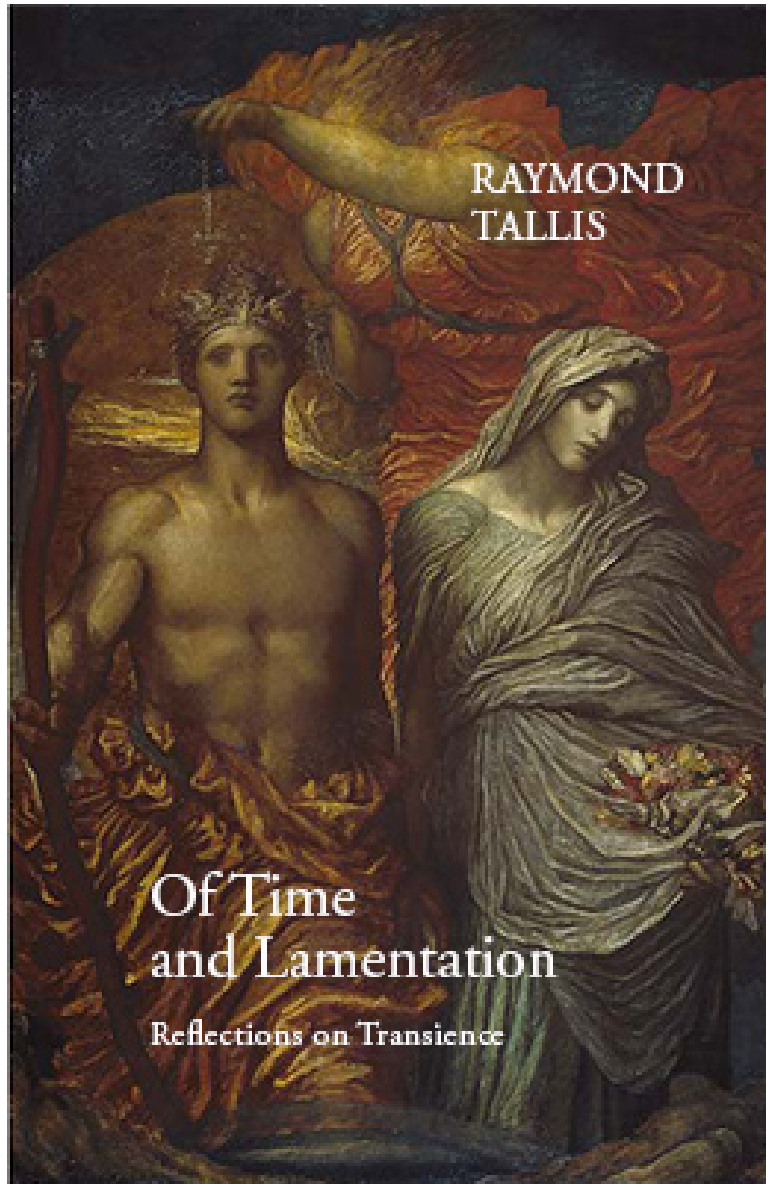


Scientism in Action

- The explanatory arrow points downwards from societies to people, to organs, to cells, to biochemistry, to chemistry, and ultimately to physics. Societies are explained by, people, people by organs, organs by cells, cells by biochemistry, biochemistry by chemistry, and chemistry by physics. Steven Weinberg

The Consequences of Scientism

- The more we know of the universe, the more meaningless it appears. Steven Weinberg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TALLIS
Of Time
and Lamentation
Reflections on Transience

Of Time and Lamentation

- Part 1 Killing time
- Part 2 Human time
- Part 3 Finding time

Part 1: Killing Time

- Reduction of time to little ‘t’
- Time as the fourth dimension
- The world reduced to ‘a system of magnitudes’
- Mathematics and reality

Part I Killing Time: Tasty Questions

- Why do we think of time as space-like?
- Does time flow?
- Is there an arrow of time?
- Is time travel possible?
- Are the paradoxes of relativity theory real?
- What do clocks do?

What Do These Really Do?

The Authority of Clocks

- Increasing consistency: atomic clocks are more in synch than pendulum clocks
- The discovery of laws that enable periodicities to be predicted independently of direct measurements

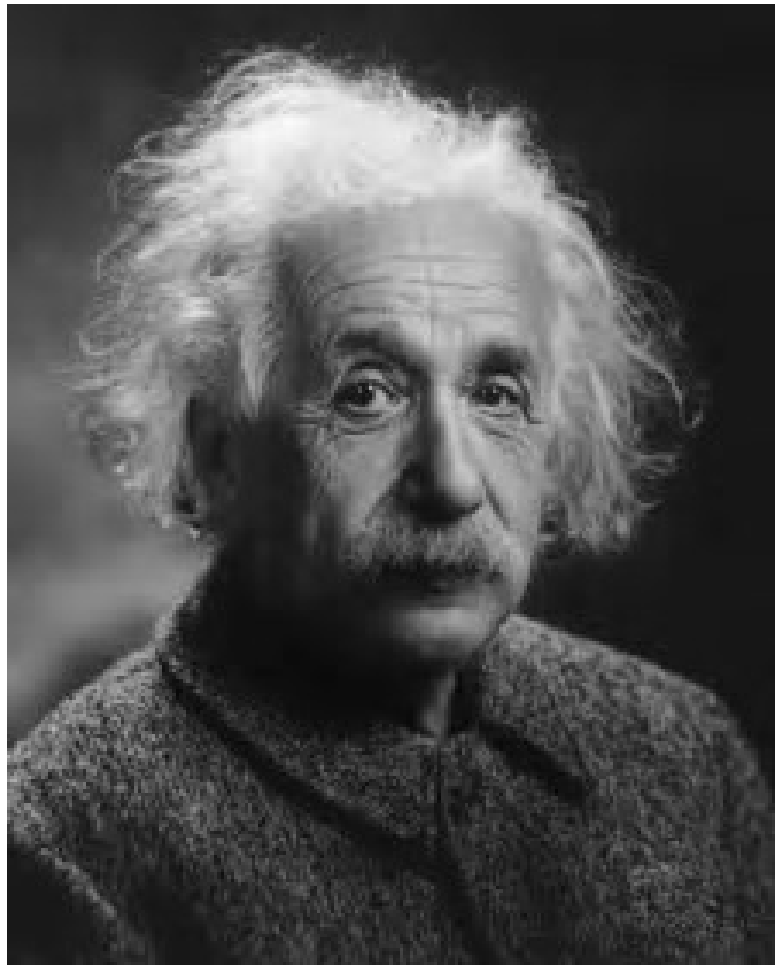
Newton’s Law of Gravity

- Verified to an accuracy of 4% by Newton
- Recently verified to be accurate to less than 1/10,000 %
- Time measures are embedded in fundamental laws of mechanics
- Time is reduced to pure quantities, to little t, as part of a ‘system of magnitudes’

Of Time and Lamentation

- Part 1 Killing time
- Part 2 ***Human time***
- Part 3 Finding time

The Prophet of Tenseless Time



Mr and Mrs Besso

Letter to Mrs Besso

- Now Besso has departed from this strange world a little ahead of me. That means nothing. People like us, who believe in physics, know that the distinction between past, present, and future is only a stubbornly persistent illusion. Albert Einstein

Einstein's Tension over Tenselessness

Once Einstein said that the problem of Now worried him. He explained that the experience of the Now means something special for man, something essentially different from the past and the future but that this difference does not and cannot occur within physics.

Rudolf Carnap

Einstein's Tension over Tenselessness

- That this experience cannot be grasped by science seemed to him a matter for painful but inevitable resignation. Rudolf Carnap

Part 2 Human Time

- The Present ‘Living time: Now’
- The Past ‘Locating the Snows of Yesteryear’
- Future ‘Concerning Tomorrow (Today)
- Beyond Time: ‘Temporal Thoughts on Eternity’

Part 2 Human Time

- **The Present ‘Living time: Now’**
- The Past ‘Locating the Snows of Yesteryear’
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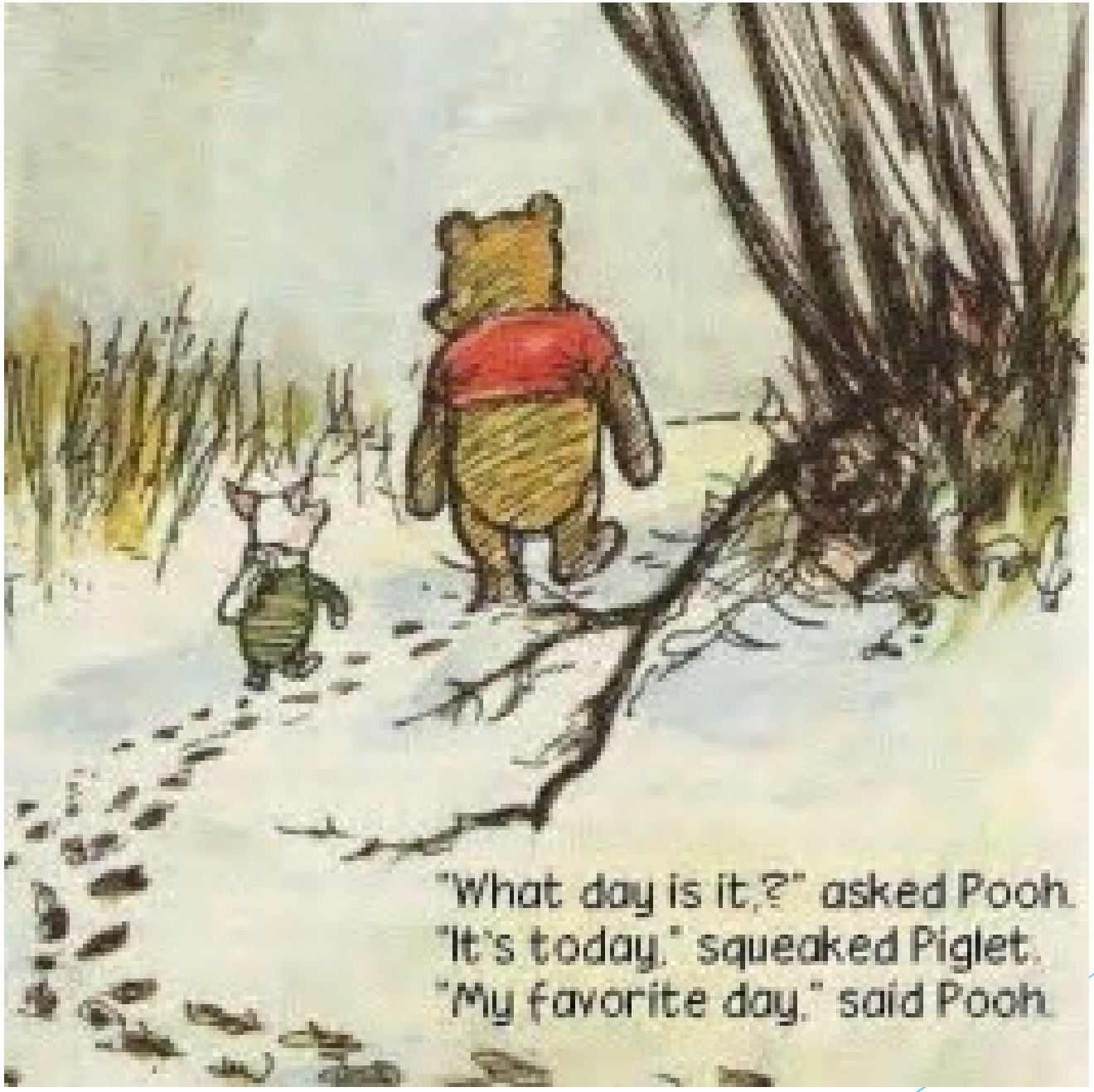
The Paradox of the Present

- Elusive
- Inescapable
- You can’t grasp hold of it and you can’t get away from it

The Elusive Present

- [The present] is a point of time so small that it cannot be divided into even most minute particles or moments…Such a time must fly so rapidly that it has no duration and no extension. St Augustine


"What day is it?" asked Pooh.
"It's today," squeaked Piglet.
"My favorite day," said Pooh.

Part 2 Human Time

- The Present ‘Living time: Now’
- **The Past ‘Locating the Snows of Yesteryear’**
- Future ‘Concerning Tomorrow (Today)
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‘Where are the snows of yesteryear?’

The Double intentionality of Memory

- Memories are about or of experiences
- Experiences are about events or states of the world

Presentism

Only what is present exists or is real. The past and future and past and future entities are not real.

The Presence of the Past

- The presence of the past lies in its consequences, including records of it
- Those consequences are traced to their origin in the past by human consciousnesses and that past is thus resurrected.
- No such resurrection is possible in the physical world; only in human are those long-completed causes also present as objects of memory and record.

Part 2 Human Time

- The Present ‘Living time: Now’
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- **Future ‘Concerning Tomorrow (Today)**
- Beyond Time: ‘Temporal Thoughts on Eternity’

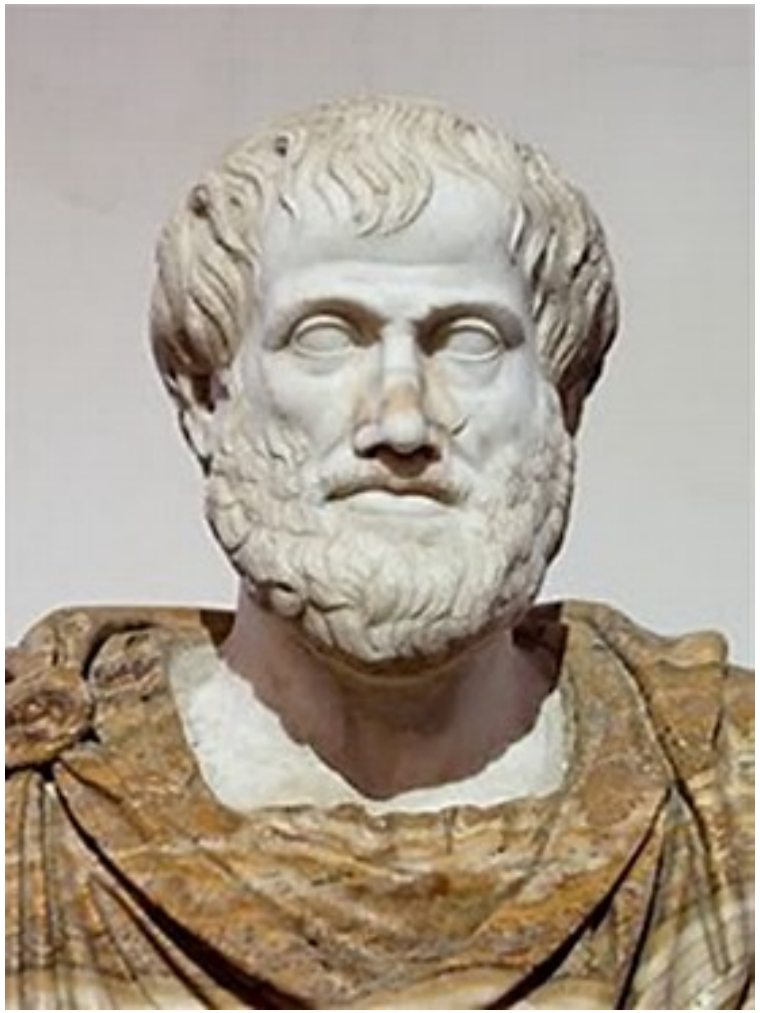
The Future

- What is tomorrow today?
- Is the future predetermined?

How We Shape Our Own Future

- We turn time round on itself
- We reach for causes to bring about effects
- The present is shaped by possibilities which we envisage happening in the future
- We make this envisaged future drive the present

Logical Fatalism: Aristotle's Tease



Logical Fatalism

- Either a sea battle will take place tomorrow
- Or a sea battle will not take place tomorrow
- One of these must be true now
- The future is therefore predetermined

Part 2 Human Time

- The Present ‘Living time: Now’
- The Past ‘Locating the Snows of Yesteryear’
- Future ‘Concerning Tomorrow (Today)
- **Beyond Time: ‘Temporal Thoughts on Eternity’**

Of Time and Lamentation

- Part 1 Killing time
- Part 2 Human time
- Part 3 ***Finding time***

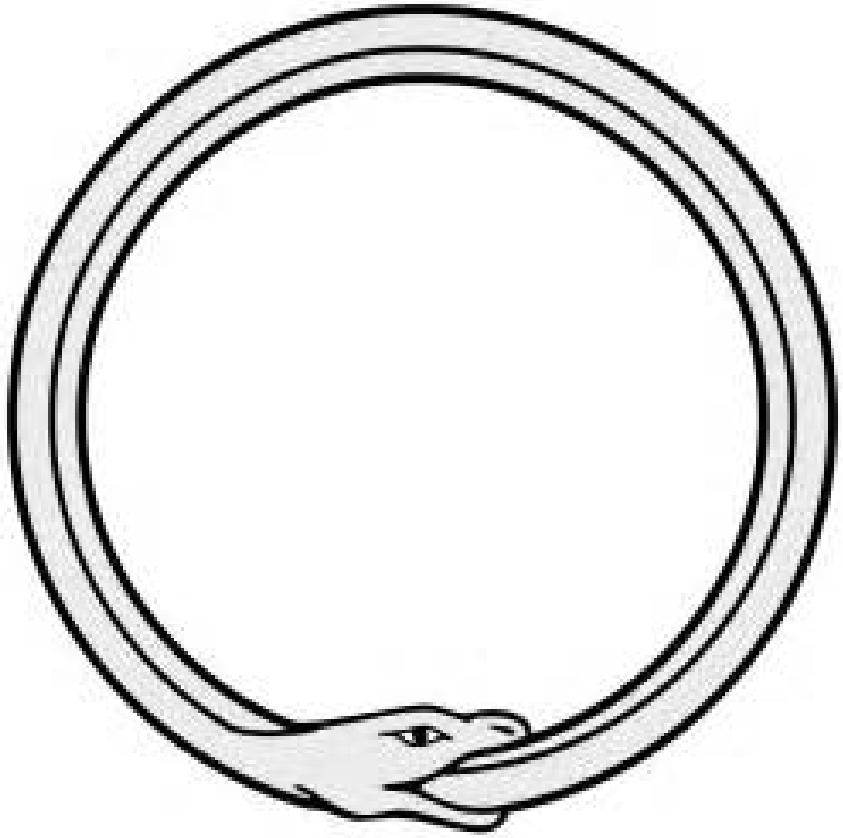
Finding Time

- (What) is time?
- Time and causation
- Time and human freedom

Finding Time 1 (What) is Time?

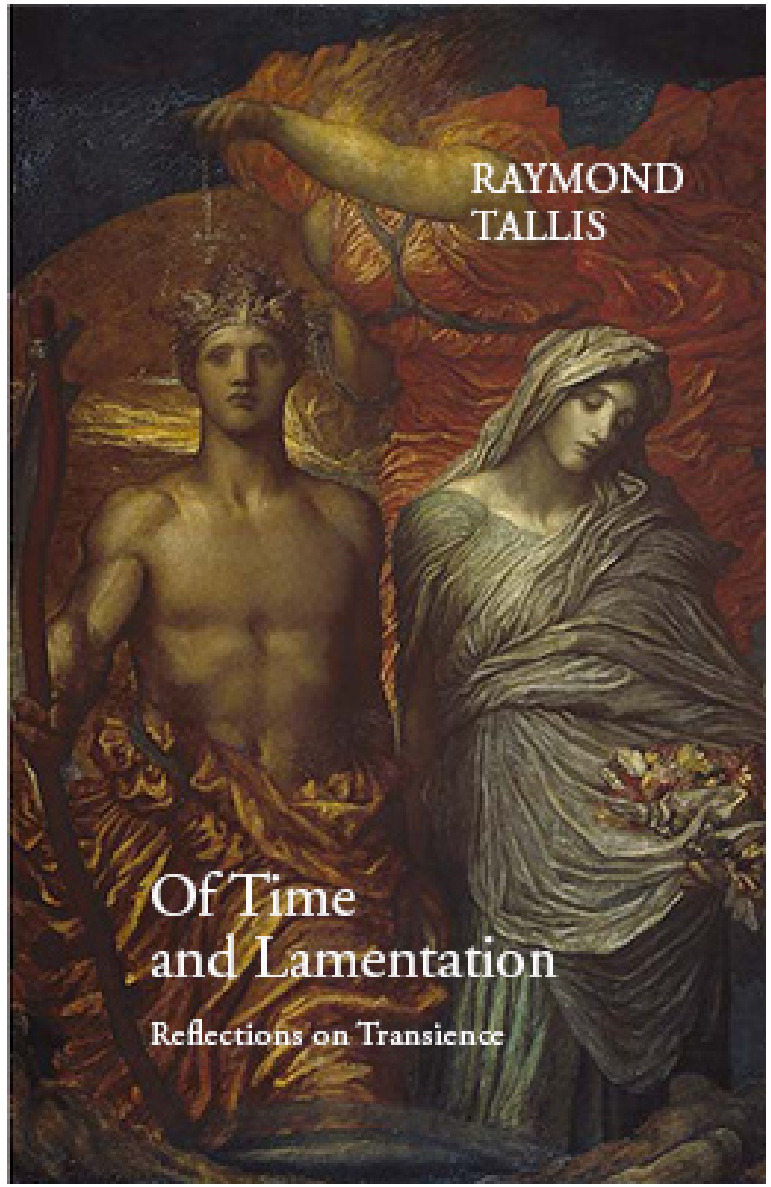
- Defining time
- The stuff of time
- Time and change
- Objective and subjective time

The Ouroboros: Human and Physical Time



Finding Time 2

- Time and causation
- Human freedom
- Tensed time (unknown to physics) enables us to turn events into handles so that we can manipulate the world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Some Themes

- What is time?
- Time as a fourth dimension
- The (Seductive) Myth of Time Travel
- The ‘flow’ of time

Bill of Fare

- **What is time?**
- Time as a fourth dimension
- The (Seductive) Myth of Time Travel
- The ‘flow’ of time

What is Time?

- Location – when?
- Order – before and after
- Duration – how long?
- Tense – past, present, and future.

What is Time?

- Time is our perception of the sequence of events
- Time is what stops everything happening at once.
- Time allows change without contradiction
- Time is the causal dimension of space-time
- Time is what happens when nothing else does
- Time is the Direction of Becoming (Time's Arrow)

The Direction of Becoming: The Thermodynamic Arrow of Time

- Increasing entropy – disorder
- Dropping an egg
- The messes happen but do not unhappen
- They do not tidy themselves up

Irreducibility of Time

- Time is neither causation, change, perception of events, nor anything else. Time is time. Time is a series of items related by *primitive* and *irreducible* relations of earlier, later and simultaneous.

  Quentin Smith

Getting Clear About Time

In philosophy, time has always been an especially challenging topic. At root, the problem is the quintessential difficulty that so often motivates philosophical discussion: the problem of disentangling the nature of the entity from the features that we happen to attribute to it. Craig Callendar

Bill of Fare

- What is time?
- **Time as a fourth dimension**
- The (Seductive) Myth of Time Travel
- The Flow of Time

Time as the Fourth Dimension

1. x up-down
2. y side-to-side
3. z back-front
4. t time

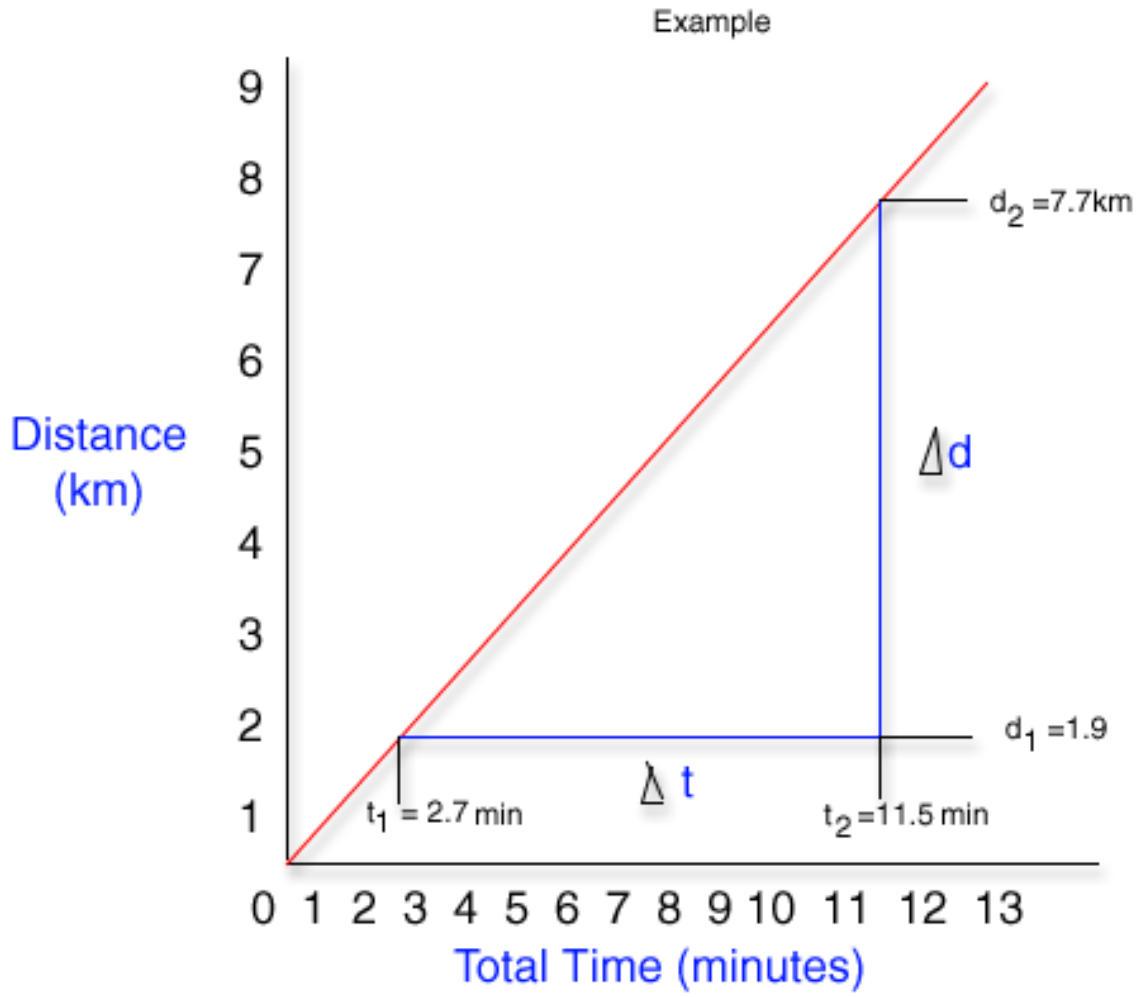
Abusing Time Reduced to Little ‘t’

- Multiplying time by itself: t^2
- Placing it under space to get velocity: s/t
- Multiplying it by the speed of light: $c.t.$

Time as Little ‘t’ and Lived Time Taste the Difference

- Try multiplying a night with a crying baby by itself, putting a Bargain Break Weekend in Bruges under some spatial distance, or multiplying the duration of a medical career by the square root of minus one.

Time Spatialized and Lost



Time Represented by Space

Non-Analogy Between Time and Space

- [Time flows and space doesn’t]*
- [Time has a direction and space doesn’t]*
- Time has only one dimension and space has three
- It is not possible to travel in time while is it possible to travel in space

*Fake news

Travel

- I can travel from Stockport to Keswick
- I can choose my ‘here’
- I cannot travel from now to 2019
- I cannot choose my ‘now’.

Bill of Fare

- What is time?
- Time as a fourth dimension
- **The (Seductive) Myth of Time Travel**
- The Flow of Time

The Prophet of Time Travel

The Possibility of Time Travel

"Clearly", the Time Traveller proceeded, "any real body must have extension in *four* directions: it must have Length, Breadth, Thickness, and – Duration....There are really four dimensions, three, which we call the three planes of Space, and a fourth, Time.... *There is no difference between Time and any of the three dimensions of Space except that our consciousness moves along it".* HG Wells *The Time Machine*

‘Admissible’ Time Movement

- Change of time: going ‘forward’ from 12 noon Monday to 12 noon Tuesday in 24 hours.
- Mental time travel: remembering something that happened yesterday

Real Time Travel

- Discrepancy between personal time and the world's time

Problems with Time Travel

- The troubled journey
- The difficult arrival
- The impotent arrivee

Problems with Time Travel

- **The troubled journey**
- The difficult arrival
- The impotent arrivee

The Troubled Journey

- One-dimensional movement through space-time
- Breaking with causal connectedness
- Going in the opposite direction to causal connectedness
- Re-connecting with causation

Problems with Time Travel

- The troubled journey
- **The difficult arrival**
- The impotent arrivee

The Difficult Arrival

- Arrives nowhere in particular
- Target is an infinitely thin time slice

Problems with Time Travel

- The troubled journey
- The difficult arrival
- **The impotent arrivee**

The Impotent Arrivee

- Not permitted to interfere with the world
- Not permitted to eat, drink, breathe
- Not permitted even to be aware of what is happening at the destination

Bill of Fare

- What is time?
- Time as a fourth dimension
- The (Seductive) Myth of Time Travel
- **The Flow of Time**

Does Time Flow?

- In what does it flow? – Hypertime?
- How fast does it flow? – One second per second?

Other Images of Dynamic Time

- Moving spot
- Growing block

Time's Disappearance

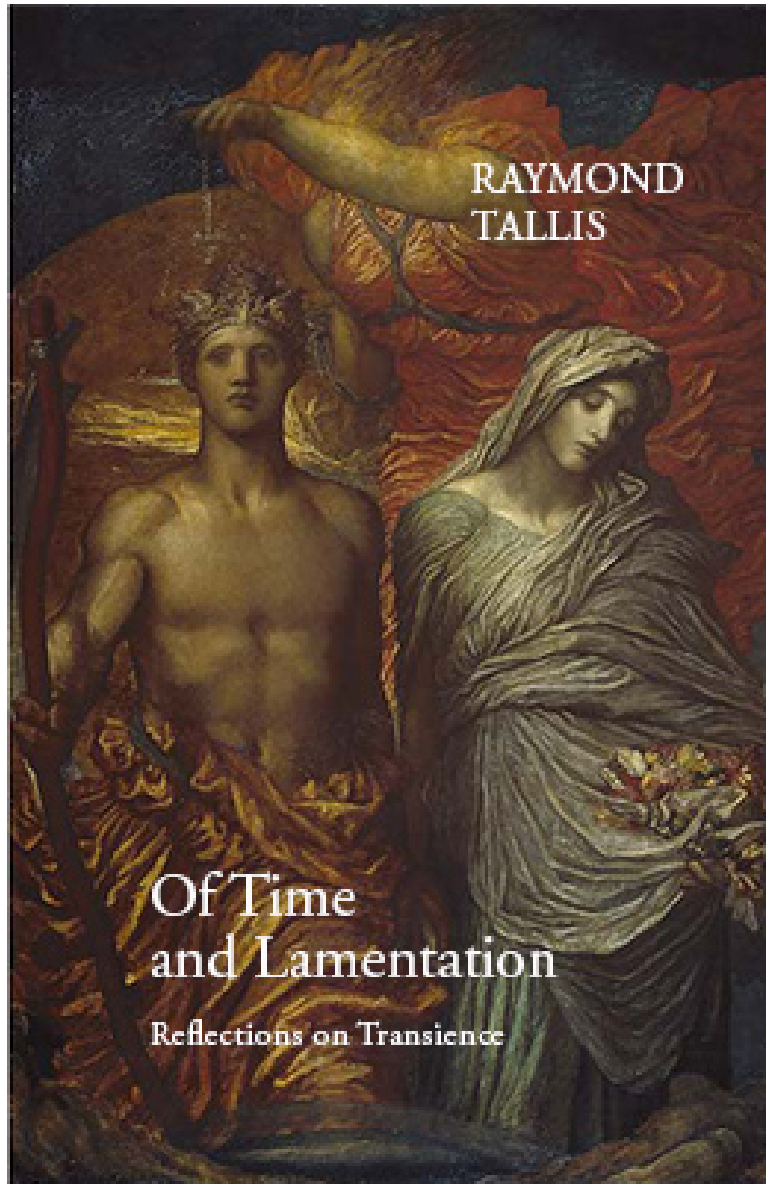
- The whole history of physics has been a history of diminishing the nature of time and diminishing the role of time. Lee Smolin

Time and Cosmology

Cosmology is presently in a crisis and the essence of this crisis is in the understanding of the nature of time Lee Smolin *The Age of Uncertainty 2017*

Spatialized Time: A Frozen Universe

- The objective world simply *is* , it does not *happen.* Only to the gaze of my consciousness, crawling upward along the lifeline of my body, does a section of this world come to life as a fleeting image in space which continually changes in time. Herman Weyl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‘I hear the tortoise of time explode in the micro-wave of eternity’