Lexicon

**Actualisation:** when a system realises its potential. The term is borrowed from Carl Rogers, the founder of the person-centred approach to psychotherapy, who used it to refer to human development. Henry has used it to refer to how the physical world takes form.

**Atom:** individual small particle. Frequently, used as a metaphor for the ‘building blocks’ of a larger whole.

**Atomism:** the world view that everything is built up from smaller particles. Close in meaning to materialist reductionism, where materialist reductionism places more emphasis on the possibility to explain higher-order phenomena in terms of their constituent elements.

**Classical (world) view:** the scientific paradigm on which most modern science is founded, where reality is assumed to consist of matter moved around by forces and matter is composed of particles. This view has been extended from physics and applied to most fields of science, including ones that cover more than the physical realm, such as biology, psychology, economics and social sciences generally.

**Coherence:** mathematically, (quantum) waves can be described as the sum of multiple waves. This is known as superposition. Coherence refers to a state when the resulting wave form is stable in time and space. Under normal circumstances, interaction with the environment (i.e. the addition of other waves) leads the system to lose coherence over time and collapse from its superposed state. This process is known as decoherence.

**Complementarity Principle:** principle from quantum physics that states that (quantum) particles have complementary properties that cannot be observed at the same time, such as wave and particle or position and momentum. Conceptually closely related to the uncertainty principle.

**Consciousness:** often used synonymously with awareness. There are many ways to define consciousness, and this book follows
Chalmers’ definition of the ‘hard problem’ of consciousness: why it is like something to be a self. Here, awareness is considered to be a graded phenomenon, where an insect, for instance, may have some level of awareness (it can detect a hand approaching to swat it), but is unlikely to have the ability of reflection. It is awareness with the ability to reflect that is referred to as (individual) consciousness here. Greater consciousness in Chapter 6 refers to a consciousness that transcends such individual consciousness.

**Constructivism:** the idea that International Relations are due to historical and social interactions, rather than inherent to human nature or the system. Compare Realism. In philosophy, the movement that (similarly) argues that knowledge is derived from interpretation and interaction between (human) consciousness and reality.

**Decoherence:** the tendency of quantum systems in superposition to collapse into a classical state as a result of interaction with their environment.

**Dualism:** see Mind/body problem.

**Emergence:** when a phenomenon is created by other phenomena in a manner that cannot be predicted from its constituent parts. In philosophy, strong emergence relates to phenomena where the constituent parts are not recognisable in the emergent phenomenon. For example, aspects of the physical brain (or body) are not recognisable in consciousness. Sand dunes are an example of weak emergence, where sand, water and wind come together to form patterns.

**Energy:** property of an object that can be transferred to another object or of a system to perform work (physics). Constant property of a closed system, regardless of the level of entropy in the system.

**Entanglement:** term from quantum mechanics, meaning that two quantum particles can be entwined in such a way that when a property of one of them is measured, the value for the other is simultaneously determined regardless of physical
distance. Einstein famously called this ‘spooky action at a distance’.

**Entropy:** the tendency of organised systems to return to chaos; opposite of formative (or teleological) tendency.

**Epistemology:** the branch of philosophy that deals with the nature of knowledge: what we do (or even can) know about the nature of reality. Contrast with ontology.

**Formative tendency:** the property of systems (with a certain degree of structure) to self-organise, to create more structure; opposite of entropy. Term borrowed from Carl Rogers.

**Horizon:** refers to the edge of our observation in cosmology. Black holes have a horizon beyond which we cannot observe what is happening inside them. But we also have a cosmological horizon, beyond which we cannot observe the universe.

**Information:** according to Erik’s theory, information is the fundamental property underlying reality (including consciousness).

**Materialism:** the view that reality is built up from material (concrete) building blocks and that all of reality can be explained in terms of these building blocks and their interactions. Compare Atomism.

**Meaning:** the significance or worth attributed by an observer to something (an event, object, abstraction, etc.). Can be incorporated in the new understanding of reality, whereas it is not accounted for in our traditional view.

**Mind/body problem:** the question how the mind and body (or brain) interact. The issue goes back to Descartes who first described that there are two realms of existence, the physical (or material) world and the spiritual, or psychological, world, a notion known as dualism. Descartes postulated that the physical and spiritual realms interact in the pineal gland of the brain.

**Neutral monism:** the philosophical view that the physical and psychological (i.e. consciousness) are two different expressions of the same underlying (neutral) reality. Sometimes also called dual aspect theory.
**Observer:** (conscious) system that has been suggested to be responsible for creating reality by making an observation.

**Observer effect:** principle from quantum physics that states that certain (subatomic) systems cannot be observed (measured) without affecting the system. Sometimes confused with the uncertainty principle.

**Ontology:** the branch of philosophy that addresses the nature of being and reality. It asks the question what the underlying structure of reality is. It could be argued to be the sole topic of this book. Contrast with epistemology.

**Panpsychism:** the idea that awareness is an inherent part of reality.

**Paradigm:** framework for thinking about the nature of reality.

**Possibility:** infinite range of observations of reality that might be made.

**Potentiality:** possibility. The term was first coined by Aristotle, who contrasted it with actuality: a potentiality is the possibility of a ‘thing’ to become something whereas an actuality represents the situation once it has become real. The concept of actualisation is derived from this dichotomy.

**Probability:** the chance that a given observation will in fact be made.

**Probability wave:** the distribution of probabilities along a continuum. Such waves collapse into a single expression of reality when an observation is made, according to Schrödinger's visual imagery.

**Rationalism:** following the traditional logic of the Newtonian, atomistic paradigm.

**Realism:** philosophical school of thought that asserts reality exists independently of mind. In Alex's field of International Relations, realism specifically refers to the idea that world politics are due to conflict among actors pursuing power, either resulting from human nature or as a result of the system. Compare constructivism.

**Reductionism:** the view that everything in reality can be explained in terms of their constituent (often materialist)
elements. This includes explaining higher-order and po-
tentially emergent phenomena, such as consciousness and
meaning.
**Reification:** making something real, or concrete. Bringing it
into being. Compare formative tendency, probability wave
collapse.

**Schrödinger equation:** in quantum mechanics, the state of an
atom is a ‘smear’ of all its possible states until it is observed.
The Schrödinger equation captures that smear in mathema-
tical terms.

**Semiotics:** the study of creating meaning. Traditionally the study
of sign processes in meaningful communication.

**Sufficient reason principle:** the idea that nature has a reason
to favour certain outcomes over others. According to Henry,
nature favours outcomes that are positive for the observer.
The notion is related to the idea of the formative tendency.

**Superposition:** term from quantum physics meaning that quan-
tum systems can be in two states (or locations) simultaneously
until measured when one or the other will be observed.

**Synchronicity:** when two (or more) meaningfully related
events occur simultaneously. Compare to quantum term
‘entanglement’.

**Teleology:** the property of systems to strive to greater complexity
(or put simply: to grow). Teleological theories are largely
ignored in science, as they are often assumed to imply the
role of a creator (e.g. God). This book follows Tomas Nagel in
asserting that teleology may be intrinsic to a system, and does
not require an outside force, such as a creator.

**Tipping-point theory:** the theory that in any given system, if
enough elements of that system have made a critical change,
they will cause a chain of effect where all elements in the
system transition to the new state.

**Uncertainty principle:** principle from quantum physics that
states that if one of two complementary aspects of a quantum
system is measured precisely, the other can only be determined
with a certain level on uncertainty related (mathematically)
to the Planck constant. The two best known complementary aspects of such quantum systems are position and momentum. Conceptually the uncertainty principle is closely related to the complementarity principle and sometimes confused with the observer effect.

**Zeno-effect:** the property of quantum systems that once an observation has been made and reality has taken a certain form, this form is maintained and carried forward as long as observations continue to be made in quick enough succession. If observation ceases its observation, its form recedes to entropy and infinite possibility.