

An Experiment in Learning



I wrote the section on ontogeny in the previous chapter because I see myself as an evolutionary pioneer whose ontogeny is a recapitulation of the whole of evolution from beginning to end. Most particularly, I have already passed through the discontinuity in evolution that I foresee happening to humanity as a whole. Not that this process of cultural transformation is necessarily as dramatic as it was in my case. The diagrams of René Thom's catastrophe theory in mathematics illustrate that such radical changes can be gradual as well as catastrophic.

Nevertheless, perhaps describing my own experiences can help here because I already know what the tsunami feels like that is about to burst through humanity as whole. It is this tumultuous experience that has led me to see what I can see today, and to write about it in this book.



Passing through a discontinuity in evolution is a little like Alice passing through the looking glass in her home into the world of paradoxes on the other side of the mirror. But

this mirror is not a normal mirror: it is a two-way mirror. When we are inside the room, all we can see is our own reflection. We are unaware of a world beyond the confines of the room.

But if we pass through the looking glass, as Alice did, we can see not only into the room that we have come from, but also the wide open spaces outside, in which everything is possible. We are totally free, without any restrictions.

In specific terms, what happened is that between 1977 and 1983 I went through a death and rebirth process. The breakdown happened in January 1977 when I did not get promoted to second-line manager in an IBM sales office in London as had been tacitly agreed with my career manager the year before.

This life-changing event marked the end of a twelve-year period, which was the only time in my life that I felt reasonably assimilated into the culture I was born into. For this experience followed a pattern of events that were familiar to me from childhood, all of which were intended to lead me Home to Wholeness, free of the delusions of the seven pillars of unwisdom.

It was not until the late 1970s that I had enough life experience to investigate the root causes of my behaviour throughout my life. Most particularly, this crisis led me to look deeply into why my managerial career had come to an abrupt end, an inquiry that led me to begin investigating the long-term psychological and economic implications of society's growing dependence on information technology.

This showed me quite clearly that both capitalism and communism are incompatible with the invention of the stored-program computer. I came to



this conclusion after puzzling over whether the claims of computer scientists that they could create artificial intelligence, artificial consciousness, and even artificial life were realizable or not.

There were just two possibilities. First, if computers would one day develop an intelligence that exceeded human intelligence, then it was quite clear that computers could potentially replace almost any job being performed by human beings today. As computers became cheaper and cheaper compared with human labour, unemployment would thus rise higher and higher, to 10, 30, 50 per cent, and even higher. Who knows where the theoretical limit might lie?

The fact that unemployment in the world has not yet generally reached these figures is circumstantial evidence that this possibility is not the true one. For computers today cost a tiny fraction of the cost of human labour. And it is the economic imperative of our time that if there is a cheaper way of doing a job, then businesses should follow this path regardless of the ecological and psychological damage that might be caused by this policy. Information systems designers and computer programmers have all the skills and tools they need to replace all the cognitive jobs being performed by human beings, including both their own and those of the accountants running businesses today, were this theoretically possible.

If, on the other hand, computer technology were limited in some way, technological development would not drive economic growth indefinitely. One day, technological growth would reach the top of the S-shape of the growth curve, and hardware and software companies would no longer be able to sell enhancements to their products, which would have reached the peak of their capability. This scenario would thus have a similar effect to its alternative. The economy would go into permanent recession, causing unemployment to rise higher and higher. It is this scenario that is beginning to become manifest in the business world today.

So, as I realized back in 1979, it is quite irrelevant whether artificial intelligence is possible or not. In either case, the basic assumptions of the global economy are clearly unsustainable. Follow-

ing the invention of the programmable computer, it will shortly no longer be true that human beings are both workers and consumers in the economy, as articulated by Adam Smith in the opening words of *The Wealth of Nations*, the book that laid down the foundations of capitalism:

The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes, and which consists always either in the immediate produce of that labour, or in what is purchased with that produce from other nations.

It was thus abundantly clear that the invention of the stored-program computer would necessitate us in making fundamental changes to the work we do and the way we run our businesses. But what changes, and how could they come about?

Well, the answers to these questions began to form in my mind as the result of a breakthrough that happened at 11:30 a.m. on Sunday 27th April 1980, as I was strolling across Wimbledon Common in London to the pub for lunch. Puzzling over what is causing the pace of change in society to accelerate exponentially, I suddenly realized that there are nonphysical energies at work in the Universe as well as the physical ones that I learned about at school.

Specifically, as the creative thinking and knowledge of scientists and technologists, like myself, aided and abetted by the corresponding data constructs in computers, are driving evolution forward, they must be energetic, rather like kinetic and potential energy in mechanics. I knew immediately that this idea would enable me to answer every question that I had ever had about the meaning of life, and would therefore enable me to realize my fullest potential as a human being.

It was also quite clear that accepting the existence of nonphysical energies would enable us to create the Theory of Everything that Albert Einstein had postulated in 1925 as the unified field theory. By unifying the physical and nonphysical energies at work in the Universe, we would be able to discover the laws of motion of

society, just as Isaac Newton had discovered the laws of motion of physical bodies by unifying the terrestrial and nonterrestrial forces known at his time. We would thus be able to refute the claim made by Karl Marx that he had derived the laws of motion of society from Hegel's dialectic. This single idea would thus tell us what life would be like after capitalism and communism collapsed.

It was a very exciting time, leading me to abandon my business career. I felt as if a dam had burst in my psyche, releasing thirty years of pent-up energy, which the culture I was living in did not want me to express. Just three weeks after this eureka! experience, which I now see as the beginning of my spiritual awakening, I resigned from my job marketing decision support systems with IBM, and set out to conduct an experiment in learning that would verify the hypothesis that there are nonphysical energies at work in the Universe.

Business modelling

Developing the laws of motion of society is a natural evolution of the enterprise-modelling methods used by information systems architects in business. The word *architect* comes from the Greek *arch*, meaning 'chief', and *tekton*, 'builder'. So an information systems architect is the master builder, someone who can see the big picture: how all the parts of a system fit together to form a coherent whole.

The principal modelling method that forms the framework for the laws of motion of society being outlined in this book is the relational model of data introduced by Ted Codd of IBM in 1970. This has been augmented by object-oriented modelling methods, which had their origin in the programming language Simula, introduced by the Norwegian Computing Center in 1965. Because of these progenitors and because this universal framework has arisen through the action of what Heraclitus, the mystical philosopher of change, called 'the Logos', the rational organizing principle of the Universe, I call the framework *relational logic*.

Ted Codd's seminal paper, 'A Relational Model of Data for Large Shared Databanks', was the most important I read in my professional career. Because it had evolved from the mathematical theory of relations and first-order predicate logic, it provided, for the first time, a mathematical representation of the basic resource of the data-processing industry: data itself.

It is crucial to note that this paper provides a model of the data in an enterprise independent of any technological or organizational issues. Because the modelling techniques that arise from this paper are of the utmost abstraction, they apply equally in every type of enterprise, whether this be banking or manufacturing, retail or government, educational or medical, or whatever.

The relational model of data has given rise to a multibillion-dollar industry. For instance, companies like Oracle, Sybase, and FileMaker (a subsidiary of Apple Computer) owe their origin to this fundamental theory of data processing. And both IBM and Microsoft have major products in this field. Indeed, you could not order a book or an airline ticket on the Internet without the relational model of data.

Object-oriented technology evolved in the early 1980s into the desktop interface of the Apple Macintosh, later mimicked by Microsoft in its Windows operating systems. Today, object-oriented programming languages such as Smalltalk, C++, and Java are being used by virtually all professional programmers, which is one of the reasons why the rate of technological development is accelerating so very fast. For programmers are using abstract constructs that are an expression of the underlying structure of the Universe.

From a business-modelling perspective, these methods evolved in the 1990s into the Unified Modeling Language (UML), developed by Rational Rose, now a subsidiary of IBM. The UML is the de facto standard modelling method today, being able to describe business processes, entities, and scenarios in a coherent set of models.

However, the fundamental weakness of the UML and all other business-modelling methods is that they do not capture the essence of everything taking place in business enterprises. What is missing

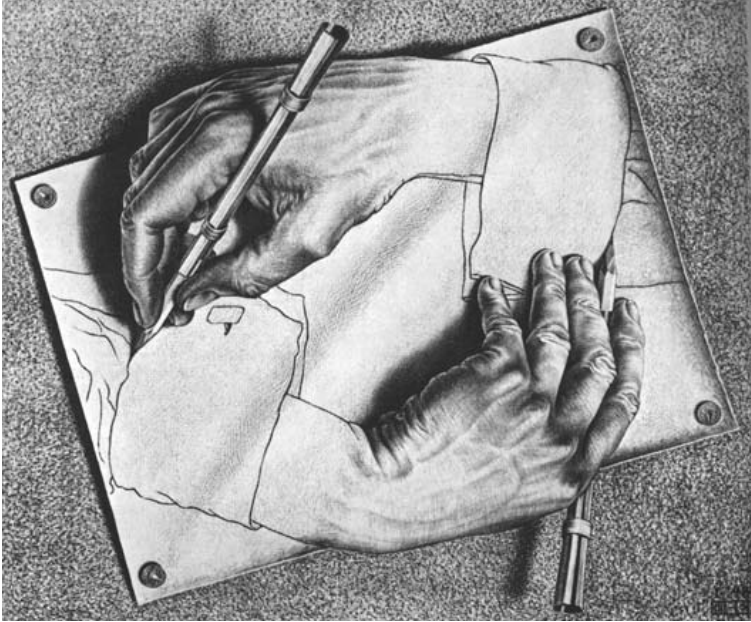
from these modelling methods is a satisfactory way of modelling the data-processing function, including personal computing, computer programming, and, above all, the process of developing the model itself. And unless this is done, we cannot build a comprehensive model of the whole of society and will continue to run our business lives blindfold, with inevitable disastrous consequences.



The experiment in learning that I am outlining here has been designed to rectify these omissions. Evolution has led me to learn to model the process of learning to model the Totality of Existence as a coherent whole, free of the notion, made famous by Alfred Korzybski in *Science and Sanity*, that the map is not the territory. If we are to understand what is happening to the human race at the present time, it is vitally important that we include our map-making activities in the territory being studied. The map of the territory being studied is an integral part of the territory. They are not separate from each other; the observer and observed are one, as physicists from Werner Heisenberg to David Bohm have recognized.

This process is a little like a television camera filming itself, or of a hand drawing itself, as in the lithograph, 'Drawing Hands', by M. C. Escher, which looks impossible to the dualistic analytical mind. But nothing less will do if evolution is to become truly conscious of itself. We can only fully understand evolutionary processes in general by studying our own inner learning processes, free of all conditioning and inhibiting belief systems.

If we are to understand how we think, we need to learn a skill that is a cross between cogitation, which literally means 'agitating together', and the Buddhist meditation technique of *vipassana*, also known as Insight Meditation. I call this self-reflective way of learning *collumination*. Collumination, which is associated with *illumination*, is the coherent light of Consciousness that enables us to see the Totality of Existence holographically, rather like the coherent light of a laser beam.



When colluminating, rather than allowing thoughts to dissolve by watching the breath, as in *vipassana*, the practitioner uses divine Intelligence, the eyesight of Consciousness, to watch the way that thoughts arise from their divine Source, allowing them to become organized into a coherent whole. So what is being cogitated is all our thoughts and ideas, rather like shaking a kaleidoscope, revealing a never-ending series of beautiful patterns. In an ever-changing world, there is no room for any fixed ideas. Everything needs to be shaken up if we are to dispel what an anonymous fourteenth-century English mystic called the ‘cloud of unknowing’.

But could a machine learn to colluminate? Well, in order to test my hypothesis that machines can never possess artificial intelligence, consciousness, and life, I assumed the opposite, a well-known technique in mathematics for proving theorems, described by George Polya in a delightful little book called *How to Solve It*.

Using the method of *reductio ad absurdum*, I began a thought experiment in which I imagined that I was a computer that switched

itself off and on again so that it had no programs within it, not even a bootstrap program to load the operating system that manages the resources of the computer. In this way, I started afresh at the very beginning, free of the seven pillars of unwisdom, all assumptions about God, the Universe, Life, reason, money, justice, and what it means to be a human being that I had been taught by the culture I was born into. There were thus no external authorities to tell me what or how I should learn. My only guru, which means ‘dispeller of darkness’, was my own immediate experience.

I did this because I knew that if I were to unify the nonphysical and physical energies at work in the Universe, I would need to abandon all the assumptions of science today. For if science could accommodate nonphysical energies, it would long ago have told us what is causing the pace of change to accelerate exponentially. So I realized that I needed to demolish the tower of Babel that represents the world of learning today and start afresh at the very beginning, not unlike the way René Descartes had done 361 years before me.



I then imagined that this computer had the task of programming itself to organize all knowledge in all cultures and disciplines at all times, past, present, and future, into a coherent whole. We could say that this experiment is rather like a computer designing and implementing the Internet, which is, today, the repository of a vast array of human knowledge.

By starting afresh from the very beginning in this way, I have been able to integrate all knowledge into a coherent whole using just four principles: conceptual clarity, simplicity, integrity, and consistency. These four principles are fundamental to sound information systems design. For instance, in *The Mythical Man-Month*,

Frederick P. Brooks, the project manager for IBM's System/360 in the mid 1960s, which *Fortune* called 'IBM's billion-dollar gamble', contended "conceptual integrity is *the* most important consideration in systems design."

It took me from April 1980 until October 1983 to develop the framework for this synthesis of everything. The last significant piece of the jigsaw to fall into place was the concept of the absolute Whole, which came to me when I was once again strolling across Wimbledon Common, but from the opposite direction. It is very simple. To deny the existence of the Absolute is like saying that human beings consist of atoms, molecules, cells, organs, thoughts, skills, feelings, emotions, and so on, but they do not exist as a unity, as the integral aggregation of all these parts. Having established the conceptual existence of the Whole, it then became possible to investigate the qualities of the Absolute in exactly the same way as I investigate anything else in my experience.

I had thus found God through reason, healing the great schism that exists between science and religion today, an experience that led me into the most magnificent state of Cosmic Consciousness. By establishing God as a scientific concept, I had proved to my satisfaction that human beings are not just machines: we are cosmic creatures, at no moment in our lives separate from the Divine.

Establishing the foundations and framework

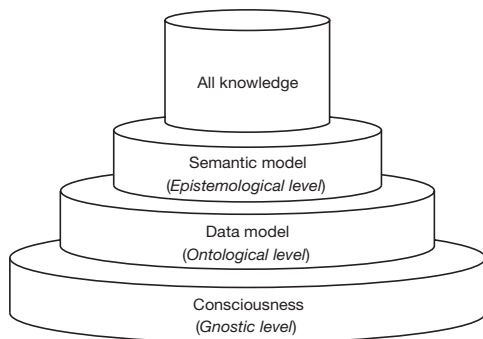
With this gnostic foundation, we can now start to build the framework for panosophy, the Theory of Everything we need to manage our business affairs with full consciousness and intelligence. The gnostic foundation for the union of East and West is well familiar to those who look deeply into themselves, as the mystics through the ages have taught. It is Consciousness, and Consciousness is the Absolute, Consciousness is God, and God is Love. This is something that all of us can know with absolute certainty. It is the solid rock on which we can build our lives, knowing that it is beyond time and immortal.

Consciousness is like a *tabula rasa*, Latin for a scraped tablet from which all the writing has been erased. Consciousness is thus a seamless continuum out of which everything in the relativistic world of form arises, including our knowledge of both this world and its opposite, the Absolute.

Starting afresh at the very beginning in this way is somewhat like the ontogenetic process described by Ken Wilber in *The Atman Project*. It is a process of dissociation, transcendence, and integration. First we adopt an attitude of the utmost scepticism and dissociate ourselves from everything that has ever been learnt in human history. Being thus free from all traditions, from all external authorities, we can then follow our own inner guru to transcend our conditioning and move to a much higher level of consciousness. From this heightened level of consciousness, it is then possible to integrate all knowledge into a coherent whole, giving rise to a state of Cosmic Consciousness. This, in turn, leads to Unity Consciousness, and to the realization that Consciousness is all there is.



To integrate all knowledge, we need two metaphysical levels of foundations resting on top of Consciousness: ontological and epistemological. These form the framework or skeleton for a coherent body of knowledge that corresponds to all our experiences, from the mundane to the mystical. These levels, which are reflected in the business-modelling methods I outlined in the previous section,



are not as well known as the gnostic level of the foundations, although they are implicit in us all.

The distinction between the ontological and epistemological levels is similar to the distinction made between meaningless data and its interpretation as information and knowledge in the data-processing industry, and to that between the meaningless symbols of formal mathematics and their metamathematical interpretation in some particular domain. For information is data with meaning.

I look at the Totality of Existence as a collection of data patterns prior to interpretation. I use the word *data*, which means 'that which is given', as an uncountable, collective noun, as is common in the data-processing industry, because the data patterns in the Universe are innumerable. The one exception to this is that I refer to the Absolute as the Datum of the Universe, for ultimately it is the Datum that is given.

To lay down the ontological foundation for the Theory of Everything, we need a symbol for everything of the utmost abstraction. For human learning has progressed over the years by developing concepts of greater and greater abstraction, most particularly in mathematics and computer science. So the ultimate theory of science can only be based on a concept of ultimate abstraction.

The symbol I use for this purpose is naturally *being*, for *ontology* means 'the science or study of being, the essence of things in the utmost abstraction'. I use *being* much as a mathematician might use the symbol x to represent a number taken from the domain of complex numbers. For me, *being* represents any object, event, process, system, organism, state, feeling, form, structure, relationship, field, concept, class, character, symbol, religion, discipline, ism, ology, osophy, theory, language, culture, civilization, or any other entity that I, or any other knowing being, can perceive, conceive, or imagine.

The word *being* also denotes the Supreme Being, which I refer to simply as Being. It is vitally important to recognize here that Being is not a separate entity, like the Christian concept of God.

Being is all beings; Being is everything. God is in everything and embraces everything, as the Christian hymn ‘God be in my head’ illustrates very well. So panosophy, the Theory of Everything, is as much theology, ‘the study of God’, as science. There is no separation between them.

Being thus denotes Wholeness. It is like a tiny seed that can divide into parts but in which all these parts are constantly integrated, not unlike the development of the human body from a single fertilized egg. In this way Wholeness begets Wholeness, along the lines described by Christopher Alexander in *The Timeless Way of Building*. To change the metaphor slightly, whether or not this seed can grow into a mighty oak is dependent on whether it is planted in fertile ground or whether it will be choked to death by weeds inhibiting its growth. The seven pillars of unwisdom are those weeds in Western civilization today.

Being is the same concept that formed the basis of Aristotle’s *Metaphysics*. This is what Aristotle wrote about being:

There is a science which studies Being *qua* Being, and the properties inherent in it in virtue of its own nature. This science is not the same as any of the so-called particular sciences, for none of the others contemplates Being generally *qua* Being; they divide off some portion of it and study the attribute of this portion, as do for example the mathematical sciences. [translator’s capitalization]

Panosophy is not a particular science, so it is entirely in the flow of Western tradition to begin with the concept of being. Furthermore, this concept of being is the simplest possible application of Ockham’s razor, known as the “principle of ontological economy, usually formulated as ‘Entities are not to be multiplied beyond necessity’”, as Antony Flew tells us in *A Dictionary of Philosophy*.

Being is the superclass in relational logic, similar to the **object** class in Smalltalk, in the class frameworks of other object-oriented programming languages such as Java, and in the Arena Class Model, which forms the framework for FRONT ARENA, a software application developed by Front Capital Systems in Sweden. All other catego-

ries are subclasses of the **being** superclass, which is like the universal type described by John Sowa of IBM in *Conceptual Structures*.

We can thus correct the mistake that Aristotle made in developing his logic. For he began with ten different categories—Substance, Quantity, Quality, Relation, Place, Time, Posture or Position, State or Condition, Action, and Affection—not just the one of his *Metaphysics*.

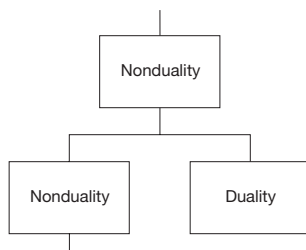
René Descartes, sometimes regarded as the founder of modern philosophy, was the next man to attempt to create a philosophical edifice *de novo*, described in the *Discourse on the Method of Properly Conducting One's Reason and of Seeking the Truth in the Sciences*, to give his epoch-making work its full title. But even though he adopted a principle of utmost scepticism, he too made a fundamental mistake in beginning his reasoning with the statement “*Je pense, donc je suis*,” writing in French, the language of his countryfolk, rather than in Latin, the language of academia at the time. In a similar fashion, I am endeavouring to write in clear, simple English, in contrast to the opaque style beloved by the universities.

In modern times, the abstract concept of being corrects the mistakes being made by those attempting to develop the Theory of Everything. For instance, Brian Greene tells us in *The Elegant Universe* that physicists are attempting to develop this ultimate scientific theory on the concept of vibrating strings, the fundamental building block of matter in the physical universe. And Ken Wilber's far broader approach still has its limitations. For his three eyes of knowing, the eyes of flesh, mind, and contemplation, first described in *Eye to Eye: The Quest for the New Paradigm*, are not sufficiently abstract to unify reason and mysticism. All these eyes are subclasses of **being**, as is Intelligence, the divine Witness, the eyesight of Consciousness.

The ontological level describes some simple structures that are independent of any interpretation; they apply to data patterns in every culture and academic discipline at all times. Indeed, this level is not even anthropomorphic: a hypothetical extraterrestrial being would recognize the universal truth of these structures.

The key structure is called the Principle of Duality, which, without using the language of mathematics, states the universal truth: *Wholeness is the union of all opposites*. The Principle of Duality is irrefutable because those who attempt to refute it are the opposite of those who recognize its universality, thus confirming its truth. This statement is the closest we can come to expressing the absolute Truth in words.

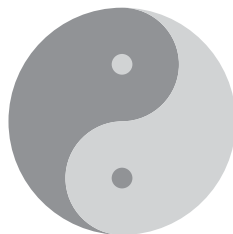
We can use the Principle of Duality and Hegelian logic to see how we can unify dualistic Western science and nondualistic Eastern mysticism. If nonduality is the thesis and duality is the antithesis, then the synthesis is nonduality, as this diagram illustrates.



There is thus a primary-secondary relationship between nonduality and duality. The Eastern world-view regarding Consciousness as Reality is thus primary to the Western world-view, which regards reality as the physical universe. We can thus see why Marx was mistaken in believing that Hegel's dialectic is the basis of social change.

The Principle of Duality also unifies the principal paths of Christian mysticism, *via negativa* and *via positiva*, and the yin-yang principle of Chinese philosophy. In panosophy, there is no separation between the ineffability of God and God made manifest in the magnificent world of the senses. Furthermore, God is both immanent and transcendent relative to all beings in the world of form. Similarly, the cosmic feminine and masculine principles are intertwined in panosophy, as this classic *T'ai-chi-t'u* symbol, or 'Diagram of the Supreme Ultimate' indicates quite clearly.

The Principle of Duality gives rise to three structures relating to duality: the *circle of duality*, which deals with Aristotle's Law of Excluded Middle, the *triangle*



of *duality*, which deals with Aristotle's Law of Contradiction, and the *cross of duality*, which depicts situations where we are handling multiple dualities, such as Carl Jung's psychological types and Ken Wilber's anthropocentric four-quadrant model of the Universe, first described in *Sex, Ecology, Spirituality*. It is important to note on this last point that Ken's model is just a special case of one of the data structures in relational logic. It is thus extremely limited, falling far short of providing the necessary framework for the Theory of Everything.

The meaningless ontological level also shows that the Universe has an underlying unifying structure described as *an infinitely dimensional network of hierarchical relationships*. This statement thus answers a question that I posed as a sixteen-year-old: "What can we know about knowledge that we do not yet know, which is beyond the frontiers of science at any one time?" The answer is that we can know its inherent structure.

So the Universe does not have the four dimensions of Minkowski and Einstein, or the ten or twenty-six dimensions of string theory mentioned by Stephen W. Hawking in *A Brief History of Time*. In the abstract, there is no limit to the number of extents that can be measured either qualitatively or quantitatively, as the concept of domain of values in relational theory shows quite clearly.

The unified structure of the Universe might appear as old hat and logically empty, as Arthur Koestler observes in *Janus: A Summing Up*. But, as he says, "if you handle it with some affection, it can produce quite a few lively rabbits." For this unifying principle applies to whatever domain of discourse we might examine. It thus possesses the property of self-similarity, giving rise to a holographic view of the Totality of Existence, exquisitely expressed by William Blake in the first stanza of *Auguries of Innocence*:

*To see a world in a Grain of Sand,
And a Heaven in a Wild Flower,
Hold Infinity in the palm of your hand,
And Eternity in an hour.*

So every part of the Universe, viewed as an aggregate, has exactly the same underlying structure as every other part, each of which is actually a whole, a notion denoted by Arthur Koestler's concept of holon, made much of in Ken Wilber's later work. It is this property of the Universe that gives it its holographic character. Just like a hologram, when I look at any part of the Universe, I can see the Whole. That is why fractals are able to produce such beautiful pictures, mimicking the world around us. Relational logic is thus the simplicity theory that underlies complexity theory.



It is by interpreting the meaningless data patterns of the ontological level that we can build the epistemological level, the science or study of knowledge. This is very simple. All we do is look at the similarities and differences in the data patterns of our experience, putting those that are similar in one set and those that are dissimilar in different sets. This is just like a child sorting blocks of various shapes and colours into groups. Giving attention to similar differences and different similarities is the essence of bringing order to our lives, as David Bohm pointed out in *Wholeness and the Implicate Order*. And when we apply this principle to everything we do, we can bring the Cosmos into universal order, which is the meaning of the Greek word *kosmos*. So relational logic is also the orderliness theory that underlies chaos theory.

There are two basic diagramming techniques in relational logic for displaying information and knowledge in symbolic form. The first is a table, such as the extract from a telephone directory on the next page. Mathematically, such tables are called 'relations' in the relational model of data.

Organizing our knowledge in tabular form has a long history. For instance, pictorial tablets from 3100 BCE found in Uruk (Erech) in Mesopotamia contain cuneiforms in the Sumerian language that have been interpreted as "lists or ledgers of commodities identified by drawings of the objects and accompanied by nu-

Class name	Telephone subscriber		
Attribute name	Name	Address	Phone
Attribute values	Anne Potter	72 Grove Road	624 4582
	Fred Wheeler	4 Meadow Walk	982 3356
	Richard Cooper	31 Beech Boulevard	104 3911
	Elizabeth Tanner	7 Chestnut Avenue	310 4574
	Jackie Butler	25 Orchard Way	955 4395
	David Butcher	67 Willow Crescent	109 2661
	Jenny Cutler	22 Heather Drive	893 2748

merals and personal names”, as *Encyclopædia Britannica* tells us.

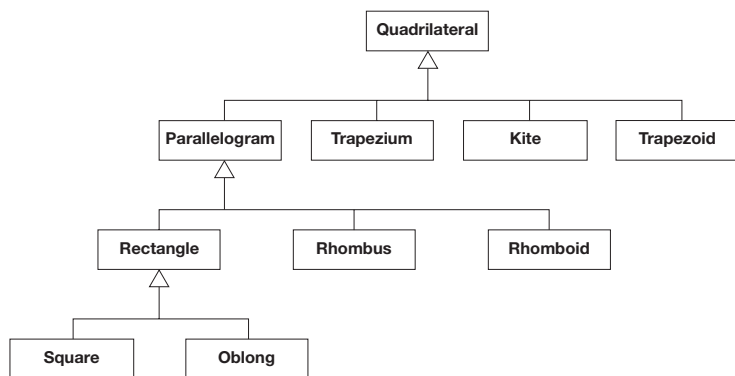
The rows in tables represent entities in relational logic. Entities are beings that have various attributes that distinguish them from each other, for *entity* is cognate with *ontology*. There are five basic attribute types in relational logic: identifying, defining, nondefining, prototypical, and derived.

Identifying attributes are such things as names and ISBN references. A defining attribute is one that determines the characteristic of the entity, such as the number of angles in a polygon. A nondefining attribute is one that an entity just happens to have, such as a person’s height. A prototypical attribute is one that most entities in a class possess, but not all, such as the assertion that birds can fly. Derived attributes are ones that can be calculated or deduced from other attributes. For instance, the cost of a bag of potatoes can be calculated from the price per kilogram and the weight of the bag. Or, if we know that all primates are mammals and all humans are primates, we can deduce that all humans are mammals through the rules of Aristotle’s syllogism.

While tables are a concise way of displaying the relationships between classes, entities, and attributes, they explicitly capture neither all the relevant information and knowledge within a relation nor the relationships between relations. We need diagrams to display these relationships. There are many such diagramming techniques and products in the world today, from Tony Buzan’s

mind maps, through conceptual modelling tools like ConceptDraw and OmniGraffle, to advanced systems design tools such as Popkin Software's System Architect and Microsoft's Visio, incorporating Terry Halpin's highly explicit Object-Role Modeling.

However, there is no formal diagramming technique in relational logic, for a conceptual model showing all the relationships in all knowledge would be incomprehensible to the human eye. It can just be visualized with the inner eye, allowing all these relationships to dissolve in Consciousness, when sheer joy and bliss arises. I only draw a diagram to illustrate a point. For instance, the relational model of data in its original form doesn't satisfactorily capture generalization relationships. This can be done in a diagram like this, using UML notation.



The distinctions between the various types of quadrilateral, parallelogram, and rectangle are determined from defining attributes: the number of pairs of parallel sides, the equality of adjacent sides, and the angle between adjoining sides. (This is the British version of this diagram, using the words *trapezium* and *trapezoid* in the original meanings given by Proclus in the fifth century. In the late eighteenth century, the meanings of these two words were confusingly transposed, and they still are in US English.)

However, it is knowledge in tabular form that best illustrates the distinction between metaknowledge and knowledge in rela-

tional logic. The class name and attribute names in the table on page 77, which are italicized, constitute a part of the epistemological foundation in relational logic, knowledge about knowledge. This corresponds to the system catalogue in IBM's DB2, where I first came across this idea. This is the semantic level in relational logic, similar to what are mistakenly called 'data models' in business modelling. This metaknowledge is not knowledge itself. The epistemological level shows the semantic relationships between our concepts, depending on how we interpret the data patterns of our experience. So this level can change from time to time and from person to person. The attribute values in such tables as the telephone directory on page 77 constitute information and knowledge, themselves.

Metaknowledge and knowledge can thus be depicted in exactly the same constructs. There is no need for metameta- or metameta-meta- levels in relational logic, any more than there is in database design. So relational logic neatly avoids the problem of infinite regress, which normally disturbs considerations of metalevels of knowledge and language.

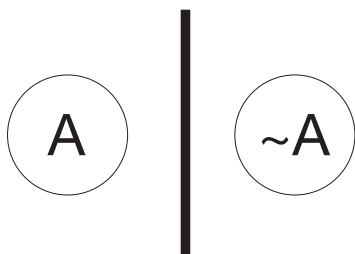
Dualism, duality, and nonduality

As relational logic provides the foundations or framework for all knowledge, it lies beneath the foundations of mathematics. The discovery of paradoxes in Georg Cantor's set theory at the end of the nineteenth century led to a major crisis in mathematics, because set is such an elementary concept, vital for bringing order to our lives. And if axiomatic mathematical reasoning is to lead to true theorems, paradoxes must be eliminated from mathematics and deductive mathematical logic. If the axioms are inconsistent, it is possible to prove any theorem from them.

So mathematical reasoning must obey Aristotle's Law of Contradiction, described in his *Metaphysics* (not the *Organum*, which outlined the basis of syllogistic reasoning). This is how Aristotle stated the seventh pillar of unwisdom: "It is impossible for the same

attribute at once to belong and not to belong to the same thing and in the same relation.”

This unstated axiom of mathematics is an example of dualism, illustrated in this diagram. This shows two opposites, A and $\sim A$,



with a thick wall between them, where A is any being whatsoever, rather like the way x represents a number in mathematics. In dualism, there is thus a separation between opposites. In Western philosophy, dualism most commonly means mind-body dual-

ism. But dualism is far more pervasive than this: it goes to the root of the Western mind.

This is essentially a psychological problem. What we tend to do in a dualistic mode of living is to identify with A , regarding $\sim A$ as other, maybe even as an enemy, to be afraid of. We are thus unable to see the other person's point of view, or, in the case when $\sim A$ is God, God's point of view. There is thus a tension or conflict between opposites; in dualism, opposites are regarded as being contradictory.

We can most clearly see our dualistic behaviour when countries go to war. When politicians believe that God is on their side, they are unable to see the point of view of the people they regard as the enemy. An obvious example of this is the phrase 'God bless America', with which some American presidents end their speeches. Why not 'God bless everybody'? Doesn't everyone on this planet deserve God's blessings, whatever they might be?

Yet there is an alternative to war, which we can illustrate with a well-known psychological test. An infant is first shown a card painted yellow on one side and blue on the other. Then the card is held in front of the infant so that she or he can see only the blue side, with the yellow side facing the tester. The tester then asks the infant, "What colour can I see?"

At six years of age, the infant generally answers “Blue”. He or she cannot see the other’s perspective. Yet at about eight years of age, the answer is “Yellow”. The infant has grown into childhood.

Because this tension of opposites can make us feel uncomfortable, and because mathematical reasoning, which dominates the world of science, is linear, not nonlinear, formal Western reason is still at an infantile stage of development. This situation has not been helped by the introduction of computer science. For a program is essentially a sequence of instructions, not unlike linear reasoning. It is amazing that few seem to be able to see that semantic business modelling, which truly reflects the way that we human beings think, is nonlinear, giving us a more accurate view of the world we live in than mathematics does.

Developing sound foundations for mathematics was the second of twenty-three unsolved mathematical problems defined by David Hilbert in a famous address to the International Congress of Mathematicians in Paris in 1900. However, Kurt Gödel showed in 1931 that not only is it not possible to prove the axioms of arithmetic consistent, it is also not possible to prove all the theorems of arithmetic to be true by mechanistic reasoning. (He actually proved the first result from the second, which is known as the Incompleteness Theorem.) Gödel did this by proving the true, paradoxical statement, ‘This formula of arithmetic is not provable’, expressing it in the vernacular. Thus the concept of truth, which human beings can see with intelligence, is stronger than that of mechanistic proof in mathematics.

Gödel’s theorem exposed another significant limitation of linear reasoning. As there are assertions in mathematics that can neither be proved nor be disproved, is it possible to determine through a mechanistic decision procedure whether a particular assertion can be proved or not? In 1936, Alonzo Church proved, using the concept of recursive functions—functions that refer to themselves—that it is not possible to find an algorithm to determine whether a specific assertion is provable or disprovable.

In the same year, by developing the notion of what is now called the Universal Turing Machine, Alan Turing independently proved a similar result. He introduced the notion of computability, showing that there are computing tasks that a machine cannot perform. So there is an inherent limitation in mechanistic computability, provability, solvability, and decidability, which we can transcend when we focus attention on the capabilities of human beings vis-à-vis computers.

Bertrand Russell observed that paradoxes arise in mathematics when totalities are considered, like the set of all sets, and through self-referencing statements, like 'this sentence is false'. So he sought to eliminate totalities and self-references through his cumbersome, unnatural theory of types. Russell's major work on the foundations of mathematics, the indigestible *Principia Mathematica*, which he wrote with Alfred North Whitehead, sought to establish mathematics on sound logical premisses.

But this logistic school was but one way in which mathematicians sought to give their discipline a sound foundation. Morris Kline tells us in *Mathematics: The Loss of Certainty* that mathematics is founded today on four different schools: the logistic, intuitionist, formal, and set theoretic. These address the issue of avoiding paradoxes in different ways, none of which can be regarded as fundamental.

Relational logic overcomes all these difficulties; it regards all these different schools of foundational mathematics as subclasses of **being**. Because relational logic is a nonaxiomatic, noninferential science of reason, it does not need to obey the seventh pillar of unwisdom, Aristotle's Law of Contradiction. This means that in relational logic we can regard the concept of set as being more fundamental than that of number. In attempting to establish mathematics on a sounder foundation, Gottlob Frege took a similar approach until Bertrand Russell pointed out to him in a famous letter written in 1902 that regarding sets as fundamental could not be permitted because set theory contains paradoxes.

What then does consistency mean in relational logic? Well, the *Concise Oxford Dictionary* provides two definitions of *consistent*. The first is 'not contradictory', *contradictory* meaning 'mutually opposed'. It is this definition that mathematicians and logicians use today. The second definition is 'consonant to the same principles of thought and action'. It is this definition that I use in relational logic.

What I mean by this is that I form all concepts in exactly the same way, by examining the similarities and differences in the data patterns of my experience. So the concepts of space, time, God, Universe, human being, paradox, truth, falsity, and so on are all formed identically. None is regarded as being special, needing to be treated in a different way from the others. Wholeness means that all beings are worthy of attention, including all sentient beings, human or otherwise.

If Western civilization could adopt such a holistic approach to life, it would grow out of infancy into childhood and thence into full maturity as a community of divine, liberated, conscious, loving beings.



The first step in freeing ourselves of the egoic mind, which keeps us separate from God, Nature, and each other, and thereby in healing our troubled society, is to remove the barrier between the opposites, as in this diagram.

We then move from dualism to



duality. Duality recognizes the fundamental fact of existence that opposites can never be separated; they are like the two sides of a coin. Contradiction has become complementarity.

From the point of view of ourselves as individuals or groups, we can thereby see both our own and the other's perspective. It is in duality that compassion arises. A familiar example of this is John Gray's best-selling book *Men are from Mars, Women are from Venus*, helping women and men to understand their differences and so live more harmoniously together.

Not only this. It is widely recognized today that we human beings are not exclusively masculine or feminine. We all display characteristics of these opposite tendencies in some proportion or other. Psychologists recognize many other opposites, both of which are present within us, of which Carl Jung's concepts of extravert and introvert are perhaps the best known.

The fact that the Law of Contradiction is not universally true led the physicists to great consternation in the first half of the twentieth century. For, as is well known, they discovered that light, in particular, and electromagnetic radiation, in general, display contradictory properties. Sometimes light behaves as a particle, existing in a small region of space, and sometimes it behaves like a wave, spread out in space.

To overcome what looked like an absurdity, Niels Bohr introduced the notion of 'complementarity'. As Fritjof Capra tells us in *The Turning Point*, Bohr "considered the particle picture and the wave picture two complementary descriptions of the same reality, each of them only partly correct and having a limited range of application."

But there is an even more fundamental contradiction in physics, which was partially resolved by David Bohm. For the theory of relativity and quantum theory display opposite characteristics, the former having the properties of continuity, causality, and locality, with the latter being characterized by noncontinuity, noncausality, and nonlocality.

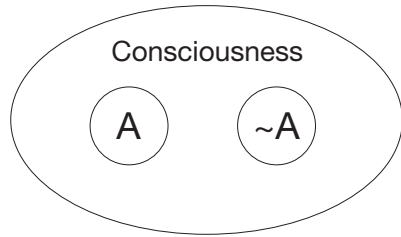
David Bohm showed that these contradictions could be reconciled by recognizing that relativity and quantum theories are abstractions of a deeper underlying reality, which he called the 'holomovement'. As he said in *Wholeness and the Implicate Order*, "everything is to be explained in terms of forms derived from this holomovement," which he likened to a flowing river. It is these forms that are manifest in the explicate order, like the waves and ripples on the surface of the river, these superficial phenomena having no independent existence of their own. The river itself, in the implicate order, is the underlying reality, whose "totality is unknown (and, indeed, probably unknowable)".

These opposites of the implicate and explicate orders lead us naturally to ineffable, nondual Wholeness, the union of all opposites. For the relativistic world of form is the opposite of the formless absolute Whole. But it is impossible to escape opposites in the world of form; it is, by its very nature, dual. On the other hand, the Absolute is nondual: it transcends all opposites.



This third situation is illustrated in this diagram, showing nondual, limitless Consciousness embracing all opposites, including nonduality and duality, and science and spirituality. Two have become one, the unity in diversity.

Compassion has now become Love, which has no opposite. It is in this nondual state that Intelligence can function without impediment.



We are now looking at the Totality of Existence in a self-reflective, self-referencing manner, which inevitably leads to paradoxes and self-contradictions, as Bertrand Russell pointed out. But rather than rejecting them, as is normal in the West, I welcome them. For paradoxes are inherent features of the Universe. And unless we accept them, our map-making cannot possibly produce a true picture of ourselves and the world we live in. Studying panosophy thus requires us to follow the fundamental maxim of map-making stated by E. F. Schumacher in *A Guide for the Perplexed*: “Accept everything; reject nothing.”

To continue with this map-making metaphor, when I walk or cycle in the wilderness of Norway and Sweden, I use maps that assume that the Earth is flat. So it is with all the maps of particular localities in the world. But if we try to fit all these local maps together assuming that the Earth, as a whole, is flat, it doesn't work. A similar situation arises when developing the Theory of Everything. But we need to make even bigger changes to the world-view

that we have been taught by our teachers than our ancestors made when they visualized the Earth as a sphere rather than a flat disk with heaven above and hell below.


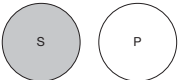
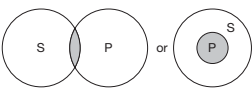
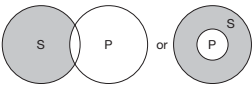
To change the metaphor, integrating all knowledge into a coherent whole is a little like doing a gigantic jigsaw, but with just one problem: the sets of pieces that represent the different cultures and academic disciplines come from different boxes. So when you try joining all the pieces together, they do not fit. To get them to fit, we need to make some fundamental changes to the pieces in each box. In practice, this means changing the meaning of words, as I am doing in this book, like information systems architects do when they are developing integrated information systems in business.



In summary, relational logic is not only an either-or logic, it is also a both-and and a neither-nor one, covering all possibilities, dualism, duality, and nonduality. In contrast to traditional mathematical logic, which is mathematics run wild without a firm foundation, relational logic is simple common sense based solidly on the Truth. There is nothing mysterious about this holotropic, noninferential system of thought, for we all use it every day in our creative organizing activities.

This is most simply illustrated with Molière's *Le Bourgeois Gentilhomme*. M. Jourdain asked his philosophy teacher, "What? When I say: 'Nicole, bring me my slippers, and give me my nightcap,' is that prose?" to which the philosopher replied, "Yes, Sir." "Good heavens!" exclaimed M. Jourdain, "For more than forty years I have been speaking prose without knowing it."

As it is with prose, so it is with relational logic. For many thousands of years we have all been using relational logic without knowing it. Even Aristotle used relational logic in developing syllogistic reasoning. He could not have done otherwise. This is simply illustrated by this table, which shows the four types of proposition that Aristotle considered.

Class name	<i>Syllogistic propositions</i>		
Attribute name	<i>Name</i>	<i>Form</i>	<i>Euler-Venn diagram</i>
Attribute values	A	All S are P	
	E	All S are not P	
	I	Some S are P	
	O	Some S are not P	

All the other concepts that Aristotle considered in developing the rules of the syllogism can be arranged in tables in a similar manner. This principle can be applied to all our reasoning, for all that relational logic does is make explicit what is implicit within each of us. It is simply a way of describing the way we organize our ideas through classification and association. Relational logic is the taxonomy that underlies all taxonomies.

Some may see this approach to learning as a form of idealism, postulated by such philosophers as Berkeley, Kant, and Hegel. That is, nothing exists except the ideas in our minds. The Berkeleian approach is splendidly encapsulated by these two limericks, the first by Ronald Knox and the second an anonymous reply:

Ronald Knox

There once was a man who said "God
 must find it exceedingly odd
 if he finds that this tree
 continues to be
 when there's no one about in the Quad."

Anonymous

Dear Sir, your astonishment's odd:

I am always about in the Quad.

And that's why the tree

will continue to be

since observed by, yours faithfully, God.

The New Age movement tends to adopt such a solipsistic way of life, saying that we all create our own reality. So we hear such phrases as “we choose our parents” or even “we can choose to live forever”, a notion called ‘physical immortality’, popular in some circles in the 1980s, and maybe even today.

But the mystical approach to human learning is quite different. For in mysticism, all forms dissolve in Consciousness, when even the experiencer, the knowing being, disappears. So God cannot observe anything any more than a knowing being can. For human beings are not created in God's image, as the Christians believe, which we realize when we are in union with the Divine. And then we can sense (I have to use *some* word here) that only ineffable Consciousness is real.