

# Making Literature, Science—and Love?

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## *I. Strange Bedfellows*

*[T]he first criterion of success in any human activity,  
the necessary  
preliminary, whether to scientific discovery or  
artistic vision, is intensity  
of attention, or, less pompously, love.*

W. H. Auden<sup>1</sup>

**I**t's a provocative claim. Indeed, one might wonder why Auden, writing in *The Criterion* in 1933, didn't confine himself to that seemingly more appropriate phrase, 'intensity of attention,' or even 'fixity of purpose' as he characterizes it later in the piece, for which artist or scientist wouldn't concede the role of focus and determination in any breakthrough endeavour?

But love? 'The *first* [my emphasis] criterion of success' in 'scientific discovery or artistic vision'? Auden does not elaborate. He's unabashed. The word 'love' dangles like a showy upstart.

I'd like to explore at least something of that which Auden has left unsaid. How might love catalyse processes of creation, and specifically literary creation, my own area of interest, as well as scientific discovery? Could love really be *the* vital dynamic behind worlds as apparently disparate as art and science? Is love, along with those more familiar qualities of focus and determination, crucial to far-seeing vision?

In 1969, the iconic English novelist John Fowles described an image that 'rose in his mind' when he was 'still in bed half asleep<sup>2</sup>.'

*It corresponded to no actual incident in my life (or in art) that I can recall... These mythopoeic 'stills'*



*John Fowles (1926-2005) English novelist*

*(they seem almost always static) float into my mind very often. I ignore them, since that is the best way of finding whether they really are the door into a new world.*

*So I ignored this image; but it recurred. I began deliberately to recall it and to try to analyse and hypothesize why it held some sort of imminent power. It was obviously mysterious. It was vaguely romantic. It also seemed, perhaps because of the latter quality, not to belong to today. The woman obstinately refused to stare out of the window of an*

*airport lounge; it had to be this ancient quay—as I happen to live near one, so near that I can see it from the bottom of my garden, it soon became a specific ancient quay. The woman had no face, no particular degree of sexuality. But she was Victorian; and since I always saw her in the same static long shot, with her back turned, she represented a reproach on the Victorian age. An outcast. I didn't know her crime, but I wished to protect her. That is, I began to fall in love with her<sup>3</sup>.*

The woman was Sarah, the eponymous heroine of Fowles' most acclaimed novel, *The French Lieutenant's Woman*.

Reading the above, an apparent declaration of love for a fictional character, one would assume Fowles is merely employing a stock turn-of-phrase to make a point. He was, we understand, struck by a visual image. It was an inspirational moment, even a gift of a moment, but a moment that, in reality, had little to do with love. How could it? Perhaps we intuit that, even here in an essay about the making of a novel, the novelist cannot resist the dramas of storytelling, and we gladly forgive the fault, if fault it is. Later, he confesses, 'I loathe the day a manuscript is sent to the publisher, because on that day the people one has loved die...'<sup>4</sup>

But Fowles is not playing fast and loose with words. 'Characters (and even situations),' he explains, 'are like children or lovers, they need constant caressing, concern, listening to, watching, admiring. All these occupations become tiring for the active partner—the writer—and only something akin to love can provide the energy'<sup>5</sup>.



*Meryl Streep in the role of Sarah from the film version of The French Lieutenant's Woman*

At some level then, the character of Sarah is 'alive' as Fowles writes her, and, living being that she is, she makes demands:

*I was stuck this morning to find a good answer from Sarah at the climax of a scene. Characters sometimes reject all the possibilities one offers. They say in effect: I would never say or do a thing like that. But they don't say what they would say; and one has to proceed negatively, by a very tedious coaxing kind of trial and error. After an hour over this one wretched sentence, I realized that she had in fact been telling me what to do: silence from her was better than any line she might have said<sup>6</sup>.*

So 'love' for Fowles is not merely dedication to a project. It is *devotion* to a character or an imaginative situation that has arrived seemingly unbidden, an invaluable offering of the creative process. And in this devotion, as in all forms of devotion, there is an element of personal sacrifice, an almost literal giving-over of one's self to the 'life' of that creation. In the above account, it is indeed difficult to say where Fowles ends and Sarah begins. 'All natural or born writers,' Fowles writes, 'are possessed, and in the old magical sense, by their own imaginations...'<sup>7</sup>

The comparison of authorship to the state of possession is not, for Fowles, a casual one, nor is it without precedent. 'Madame Bovary, c'est moi,' Flaubert once famously and cryptically declared. Charlotte Brontë was more forthcoming. In the preface to the second edition (1850) of her late sister Emily's novel, *Wuthering Heights*, she offers a glimpse into the creation of the elemental, degenerate and now legendary character Heathcliff. Her remarks are a lightly veiled attempt to defend Emily Brontë and the novel against its numerous critics who objected to the characterisation of Heathcliff on moral grounds.

*Whether it is right or advisable to create beings like Heathcliff, I do not know: I scarcely think it is. But this I know: the writer who possesses the creative gift owns something of which he is not always master—something that, at times, strangely wills and works for itself. He may lay down rules and devise principles, and to rules and principles it will perhaps for years lie in subjection; and then, haply without any warning of revolt, there comes a time when it will no longer consent to 'harrow the valleys, or be bound with a band in the furrow'... Be the work grim or glorious, dread or divine, you have little choice left but quiescent adoption. As for you—the nominal artist—your share in it has been to work passively under dictates you neither delivered nor could question—that would not be uttered at your prayer, nor suppressed nor changed at your caprice. If the result be attractive, the World will praise you,*



*Left: Portrait of Gustave Flaubert (1821-1880) French novelist, Eugène Giraud c. 1856; right: Laurence Olivier in the role of Heathcliff from the 1939 film adaptation of Wuthering Heights*

*who little deserve praise; if it be repulsive, the same World will blame you, who almost as little deserve blame*<sup>8</sup>.

What Charlotte cannot say to the indignant reviewers of *Wuthering Heights* is that, for all his diabolical rage and evil-doing, Heathcliff is a compelling character, compelling not because he is monstrous, but because he is contradictory and complex. Grotesque in his demands, he is utterly human, blighted by loneliness and a gnarled longing for intimacy. Such subtlety of characterisation, I would argue, can only have been achieved through a constancy of attention—or, in Fowles' words through 'something akin to love.'

Re-reading Brontë's words ('As for you—the nominal artist—your share in it has been to work passively under dictates you neither delivered nor could question...'), I am reminded of Fowles the novelist as he is instructed by Sarah the character in what she will and will not say. I am reminded, too, of the contemporary novelist, D.M. Thomas's comment about his character Lisa Erdman, the heroine of his groundbreaking 1981 novel, *The White Hotel*: 'I kept discovering new things about Lisa Erdman.

Much that was in her letters [in the novel] to [the character of] Freud took me by surprise<sup>10</sup>.'

Who then is in control, author or character? 'A writer doesn't choose his subject matter,' argues D.M. Thomas, 'he submits to it.' How, after all, could a vicar's daughter leading a sheltered life in remote nineteenth-century Haworth 'choose' or decide upon the character of Heathcliff? The question is commonplace in literary-critical circles. In those same circles, of course, the notion of 'literary possession' is occult, in the sense that it is literally occluded from active critical discussion. In my experience, the only critic who explores this uncanny but vital dynamic of literary creation in general is the great Russian thinker, Mikhail Bakhtin<sup>11</sup>.

Perhaps the truth of Heathcliff's conception lies in the conclusion to Charlotte Brontë's preface. Here, in a passage that reads too passionately to be merely figurative, Charlotte evokes Emily's keenly felt sense of the 'spirit of the place'—the place in this case being the wild moorland that, even today, surrounds the Yorkshire village of Haworth, a landscape to which Emily, of all the Brontë children, was most devoted. 'As far as the scenery and locality are concerned, it could scarcely have been so



Left: Mikhail Bakhtin (1895-1975) Russian philosopher and literary critic; right: Haworth Moor, Yorkshire

sympathetic: [she] did not describe as one whose eye and taste alone found pleasure in the prospect; her native hills were far more than a spectacle; they were what she lived in, and by...’ And in Emily’s ‘hewing’ of the character of Heathcliff, the spirit of the place is made flesh: ‘With time and labour, the crag took human shape; and there it stands colossal, dark, and frowning, half statue, half rock; in the former sense, terrible and goblin-like; in the latter, almost beautiful, for its colouring is of mellow grey, and moorland moss clothes it...’<sup>127</sup>

Indeed, *could* the character of Heathcliff in some way be the manifestation of the spirit of that moorland? *Could* Emily Brontë, in her love for her native moorland, have been the devotee and medium through which the land ‘spoke’ or ‘thought’ itself<sup>15</sup>? Could she have, in some sense, *become* the spirit of that landscape as she wrote?

In a daring and poignant exploration of the life of the poet Walt Whitman, the writer Lewis Hyde makes a convincing connection between artistic creation, the state of possession—or ‘enthusiasm’ as he terms it—and love:

*To be ‘enthusiastic,’ originally meant to be possessed by a god or inspired by a divine afflatus. The bacchantes and maenads were enthusiasts, as were the prophets in the Old Testament, the apostles of the New, or, more recently, Shakers and Pentecostal Christians. Enthusiasts, having received a spirit into the body, have never been hesitant to speak of a ‘sweet burning in the heart’ or a ‘ravished soul’<sup>14</sup>.*

For Hyde, certain gifted writers or artists are also enthusiasts.

No one can speak for Emily Brontë, or testify to her precise experience as she wrote her novel, but certainly *Wuthering Heights* is aflame with that ‘sweet burning

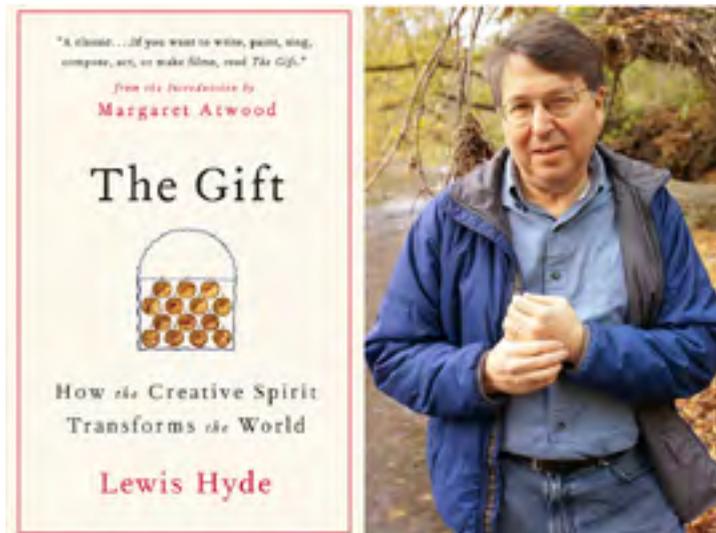
in the heart.’ ‘*I am Heathcliff,*’ declares its heroine, Catherine Earnshaw, —‘he’s always, always in my mind—not as a pleasure, any more than I am always a pleasure to myself—but as my own being<sup>15</sup>.’ As a writer, I cannot help but wonder if Cathy speaks not only for herself but also for her maker; if Emily Brontë was also and irrefutably Heathcliff; if she was an enthusiast of that ancient variety, possessed and impassioned by the *genius loci*, or animating spirit of the moorland she loved. Are the realities of creation more complex than we can usually articulate? In the words of the African-American novelist Toni Morrison, ‘Imagining is not merely looking, or looking at; nor is it taking oneself intact into the other. It is, for the purposes of the work, becoming<sup>16</sup>.’

## ***II. Science and the Unbidden***

It is possible that, in culture at large, we are not very surprised that artists seem privy to such mystery. Indeed, post-Blake, Coleridge and Wordsworth, perhaps we even expect a certain other-worldliness of our first-rate talent. It allows us to enjoy, if briefly and superficially, a very literal *je-ne-sais-quoi*. However, if we return again to W.H. Auden’s risky claim, scientists, we generally agree, operate very differently. Toni Morrison’s ‘becoming,’ Charlotte Brontë’s ‘possession,’ Lewis Hyde’s ‘enthusiasm,’ and John Fowles’ ‘love’ simply don’t come into it.

Or do they?

In 2001, I listened to an interview with Cambridge scientist John Sulston on BBC Radio 4’s *Desert Island*



*Lewis Hyde (1945-) American author and scholar*

Discs. Sulston was, of course, one of the leading figures in the recent turn-of-the-century race to map the human genome. Throughout the interview, his dedication to the project was clear. So too was what emerged as an early passion for science and a keen childhood curiosity about how the physical world worked. Yet it was a particular choice of words at one point, a particular emphasis, that struck me, in his description of a boyhood moment: 'I remember trying and trying to figure out how a transformer worked, how it changed electricity; converted it from here to here...' Standing in my Sunday-morning kitchen beside my radio and fruit bowl, I was fascinated as something unexpected and strange unfolded in Sulston's account: 'I looked and looked,' he explained, 'till I *became* the transformer, till I could *feel* the electricity, the voltage, the magnetism.'

'[T]ill I *became* the transformer...' He had chosen his words carefully. The moment was both long-ago and alive again as he described it. Somehow, under the rapt intensity of his boyhood gaze, in that flash of sudden knowledge, he and the transformer had apparently become one, even as Fowles and Sarah had become one, or D.M. Thomas and Lisa, or Emily Bronte and Heathcliff. At the age of 59, Sulston sounded like a boy who'd fallen in love again for the first time<sup>17</sup>.

In *The Gift: Imagination and the Erotic Life of Property*, [reissued in 2007 with the alternative subtitle, *Creativity and the Artist in the Modern World*] Lewis Hyde reminds us that *eros* is, first of all, the principle 'of attraction, union [and] involvement which binds together' and that it exists in opposition to *logos*, or 'reason and logic in general, the principle of differentiation in particular'<sup>18</sup>. In 21<sup>st</sup>-century Western culture, we tend of course to be more at ease under the directives of *logos*, and who would be without it? Which genuine artist or scientist

could spare this faculty which allows us to reason, to make distinctions, and to see the beautiful particular in the general? We are less comfortable, however, with the force of *eros*, that live current not only of human love, but, as Hyde argues, of wholeness too.

Is it then in the keenly desired union with something *other* than ourselves (the 'mythopoeic still' of Sarah, the Yorkshire moorland, the electrical transformer) that we experience that rare sense of unbidden wholeness? Is it only through this 'erotic' coupling of the passionate self and an other that we stumble upon the gift of holistic awareness?

John Milton wrote that the Muse 'dictated' to him the whole 'unpremeditated song' he would later entitle *Paradise Lost*. Samuel Taylor Coleridge famously woke from sleep with what he described as 'a distant recollection' of the whole of the poem 'Kubla Kahn.' Nor is this experience of 'wholeness' and certainty exclusive to artists. The mathematician Henri Poincaré recalled one such momentous experience:



*Sir John Sulston (1942-2018) Nobel laureate in Physiology or Medicine 2002, for his work on genome sequencing*

*The changes of travel made me forget my mathematical work. Having reached Coutances, we entered an omnibus to go to some place or another. At the moment when I put my foot on the step, the idea came to me without anything in my former thoughts seeming to have paved the way for it [my emphasis], that the transformations I had used to define Fuchsian functions were identical with those of non-Euclidean geometry. I did not verify the idea; I should not have had the time, as, upon taking my seat in the omnibus, I went on with a conversation already commenced, but I felt a perfect certainty<sup>19</sup>.*

And he wasn't wrong. In 1914, Poincaré made the breakthrough discovery of Fuchsian functions in mathematics.

Coincidentally, Friedrich Kekulé's fundamental theory of organ molecular structure also, famously, arrived on a London bus, the last night bus out of Islington:

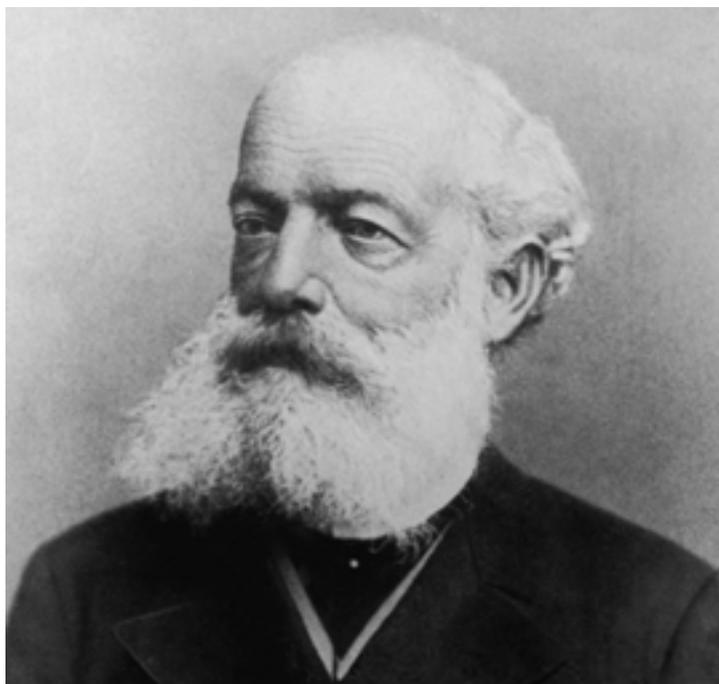
*I fell into a reverie, and lo, the atoms were gamboling before my eyes! Whenever, hitherto, these diminutive beings had appeared to me, they had always been in motion; but up to that time I had never been able to discern the nature of their motion. Now, however, I saw how, frequently, two smaller atoms united to form a pair; how a larger one embraced the two smaller ones; how still larger ones kept hold of three or even four of the smaller, whilst the whole kept whirling in a giddy dance. I saw how the larger ones*

*formed a chain, dragging the smaller ones after them but only at the ends of the chain... The cry of the conductor: 'Clapham Road,' awakened me from my dreaming...<sup>20</sup>*

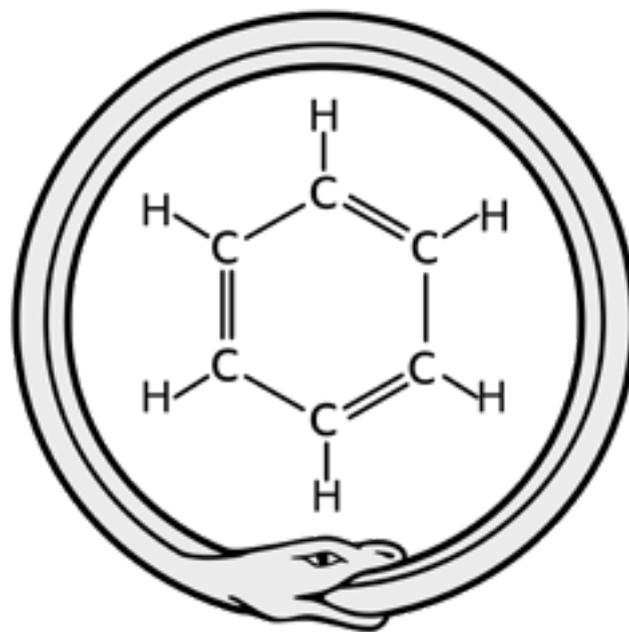
Kekulé awoke from his dream of this 'giddy dance' with the explanation of how carbon atoms link together to form chains, an explanation that would inspire his 1858 *Theory of Molecular Structure*.

Yet he was also aware that he'd failed to account for the whole of organic chemistry. For the next seven years he would labour over the puzzle of 'aromatic compounds,' trying to produce the structural formula that would account for their distinctive character. Then, one evening in Ghent, he dozed by a fire.

*...I resided in elegant bachelor quarters in the main thoroughfare. My study, however, faced a narrow side-alley and no daylight penetrated it. For the chemist who spends his day in the laboratory this mattered little. I was sitting writing at my textbook but the work did not progress; my thoughts were elsewhere. I turned my chair to the fire and dozed. Again the atoms were gamboling before my eyes. This time the smaller groups kept modestly in the background. My mental eye, rendered more acute by repeated visions of the kind, could now distinguish larger structures of manifold conformation: long rows, sometimes more closely fitted together, all twining and twisting in snake-like motion. But look!*



*Friedrich Kekulé, (1829-1896) German chemist*



*The 'ouroboros,' Kekulé's inspiration for the structure of benzene*

*What was that? One of the snakes had seized its own tail, and the form whirled mockingly before my eyes. As if by a flash of lightning I awoke; and this time also I spent the rest of the night working out the consequences of the hypothesis<sup>21</sup>.*

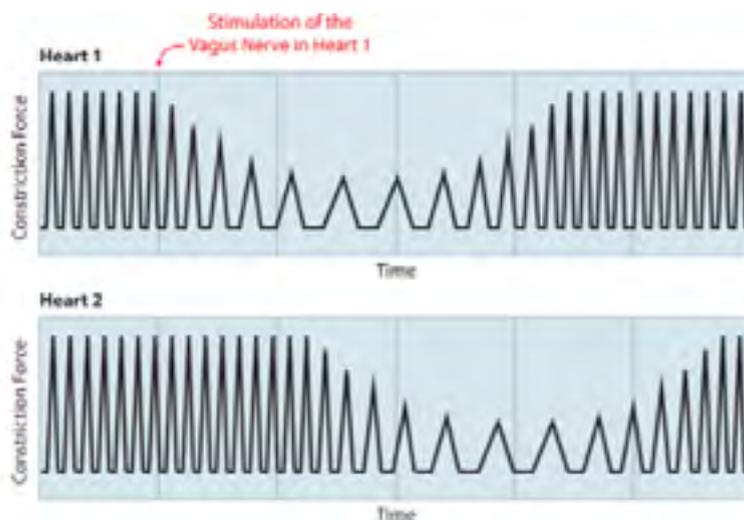
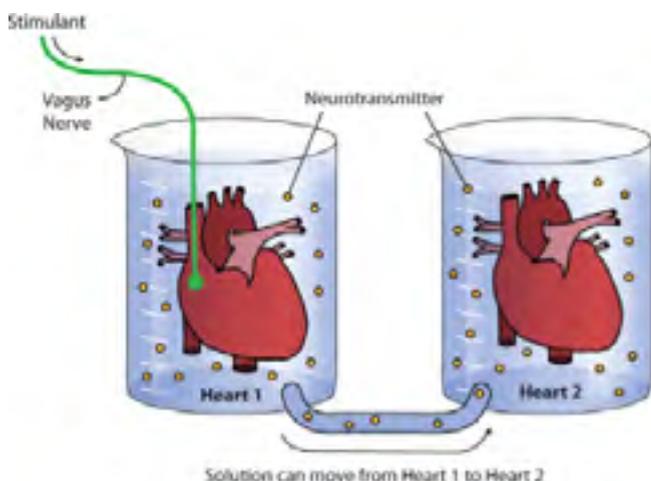
Kekulé’s insight that carbon atoms form rings as well as chains was published in 1866. As John Carey notes, nature is based on the carbon chain and the carbon ring, and ‘life itself relies on the capacity of carbon atoms to form molecular chains and rings as they did in Kekulé’s dreams<sup>22</sup>.’

In 1921, the states of sleep and waking were also crucial for the German American pharmacologist Otto Loewi. It would lead to his discovery that the transmission of nerve impulses to organs is chemical, not electrical.

*The night before Easter Sunday...I awoke, turned on the light, and jotted down a few notes on a tiny slip of paper. Then I fell asleep again. It occurred to me at 6 o’clock in the morning that during the night I had written down something most important, but I was unable to decipher the scrawl. The next night, at 3 o’clock, the idea returned. It was the design of an experiment to determine whether or not the hypothesis of chemical transmission [of the nervous impulse from nerves to their respective organs] that I had uttered 17 years ago was correct. I got up immediately, went to the laboratory, and performed a simple experiment on a frog heart according to the nocturnal design<sup>23</sup>.*



*Above: Otto Loewi (1873-1961) German-born pharmacologist and Nobel laureate in Physiology or Medicine 1936; below: Otto Loewi's classic experiment stimulating two frogs' hearts*



In 1936, Loewi was awarded a Nobel Prize for his discovery of the chemical transmitter acetylcholine, a discovery that would have an impact ‘on everything from our knowledge of brain function to the treatment of neurological disease<sup>24</sup>.’

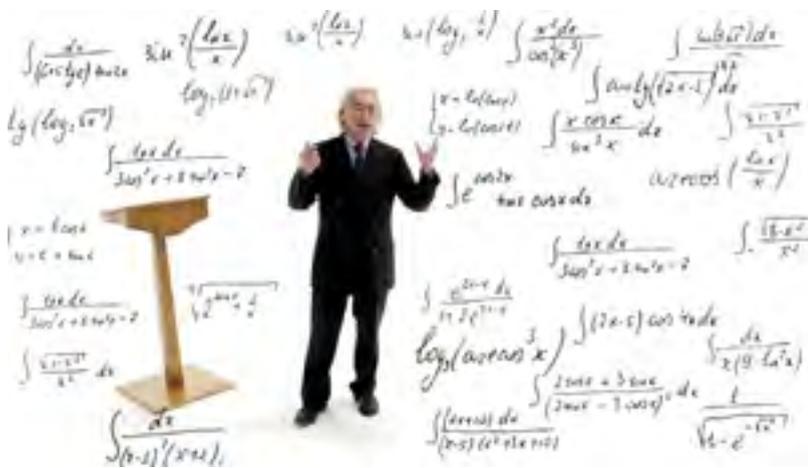
‘There are no logical paths to such natural laws,’ Einstein would say of his own discovery of Special Relativity, ‘only intuition can reach them.’ The ‘happiest thought’ of his life, he recollected, was a mental vision of a person falling off a roof in which came also the whole and sudden understanding that someone in this position was at rest *and* in motion at the same time<sup>25</sup>. There is now a small sign at a window in Einstein’s apartment through which one can look; the sign explains that through this very window, special relativity was born.

Likewise, string theorist Michio Kaku remarks, ‘I find myself spending most of my time staring out the window. I see blocks of equations dancing in my head, and I spend hours trying to fit them together<sup>26</sup>.’ A window is a dream-space, as was Loewi’s bed and Kekulé’s hearth. For the scientist too, dreams and mental visions are the spaces through which that force of sudden wholeness, love or *eros*, can enter, bringing with it living forms—Kaku’s dancing equations, Loewi’s fervent jottings, Kekulé’s gamboling atoms.

Yet the notion of *eros* and ‘living forms’ has no place of course in the Scientific Method. How can it? Its time-honoured standard procedures and criteria demand consistency, predictability and reproducibility. The brief testimonies of Sulston, Poincaré, Kekulé, Loewi and Einstein can only exist outside it as curiosities or anecdotal anomalies in a scientific tradition that first distinguished itself from centuries of superstition by spurning all claims to knowledge that were not directly attributable to recorded observation.

The Scientific Method is not the problem. Its success rate, across scientific disciplines, speaks powerfully for itself. But perhaps we need alternative questions and tools with which we can approach and, most importantly, engage with the physical world. For Wolfgang Pauli, one of the most respected physicists of the last century, the burning issue was ‘the lack of soul in the modern conception of the [physical] world.’ For ‘soul,’ we might also read ‘animating spirit.’ As physicist F. David Peat relates in his article, ‘Wolfgang Pauli: Resurrection of Spirit in the World,’ Pauli despaired, in both his personal and professional life, that ‘he continued to live in a world where there was a clear split between spirit and matter.’

Top right: Einstein’s house in Bern, Switzerland, where he and his family lived on the second floor from 1903-05. It was here he developed his theory of special relativity as recorded on the plaque; right: Michio Kaku (1947-) American theoretical physicist, futurist and popularizer of science



As Peat explains, Pauli was visited in his dreams on several occasions by a Persian stranger, a figure whom he believed ‘was tempting him to enter the world of the senses.’ If so, it would be fitting guidance, for is it not through a deep engagement with the sensual that reality comes most fully and vividly to life, as in John Sulston’s early experience of looking and looking at that transformer in all its transformer-ness? Significantly, in a letter to Carl Jung, who was counselling Pauli at the time, Pauli came to the painful conclusion ‘that the missing element was Eros<sup>27</sup>.’

Lewis Hyde would not be surprised.

But what does it mean to enter the world of the senses? The apprenticeship of the scientist and the poet is, in some ways, much the same; both disciplines demand that its initiates train themselves to be keen-eyed observers of the physical world. But potentially, it is in this most obvious and, in a sense, everyday of places that we experience what the writer James Joyce called ‘epiphany’; where we can grasp, as he put it, ‘the what-ness of the thing.’ Yet is it also at this junction between revelation and imaginative understanding that the poet and scientist must finally part ways?

Niels Bohr, father of quantum theory, didn’t seem to think so.

*‘We must be clear that, when it comes to atoms, language can be used only as in poetry,’ he told Heisenberg one day as they trekked through the German woods. ‘The poet, too, is not nearly so concerned with describing facts as with creating images and establishing mental connections.’ Then, Heisenberg asked, ‘how can we ever hope to understand atoms?’*

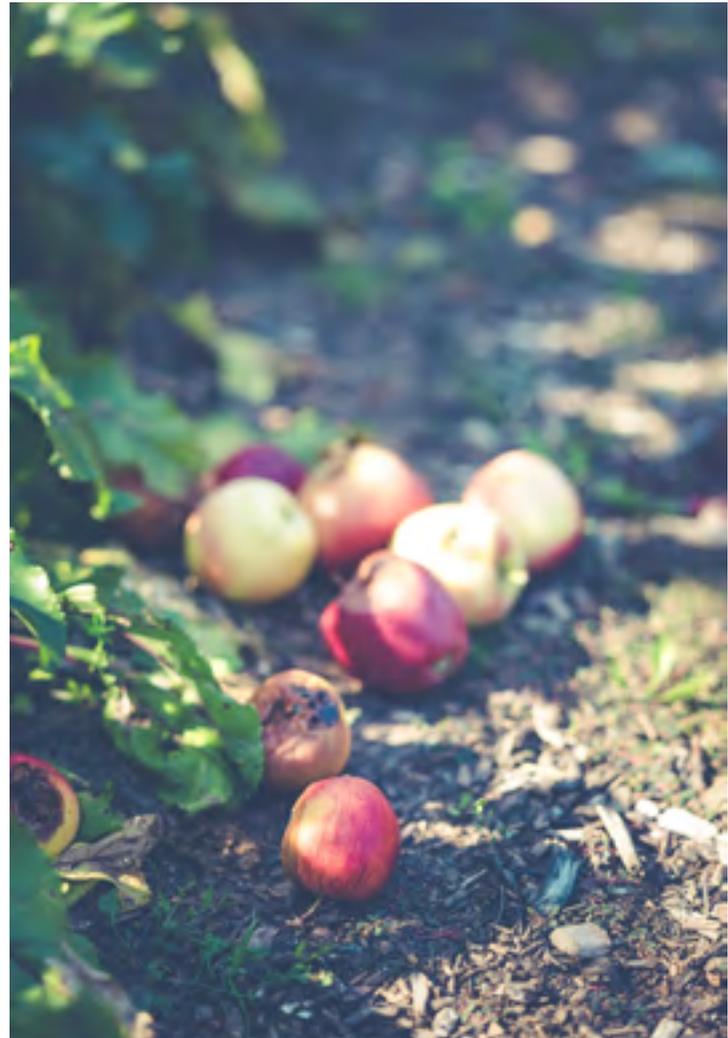
*‘I think we may yet be able to do so,’ Bohr replied. ‘But in the process we may have to learn what the word “understanding” really means<sup>28</sup>.’*

What *is* the essence of poetic understanding, and what might it reveal to the scientist and the layperson about the physical world?

The ‘atom’ of poetic reality is the metaphor. A metaphor of course is a ‘conjugation’ of two seemingly disparate images from which a fresh and undreamed-of ‘third’ is born. It is naturally ‘conjugal’; so, it’s a marriage of sorts or a coupling.

Ask yourself. What could a fallen apple possibly have to do with a slant of sunshine? Recall Dylan Thomas’ effortless image of ‘the windfall light.’ It seems at once surprising and inevitable. Yes, we say. Of course.

Metaphor allows us to break with habitual or received ways of seeing and knowing the world. What could a potato have to do with the moon? Yet the two become one as Thomas pulls back the curtain of the night to point to ‘the halfmoon’s vegetable eye.’ In this new coupling, both



potato and moon become, simultaneously, more vivid *and* more strange to us. They become, in other words, fuller, more striking versions of themselves.

Even in these very simple examples, one rides the life-force of language, and the drive toward connection is essentially erotic. Words unhitch themselves from fixed meaning; they go forth and multiply. Language (our categories, our classifications) slips and shifts, and with it, so too does perception. In the process, the world itself becomes seemingly mutable and abundant; something that exceeds our ability to define it; something bigger than we are. Something, in other words, that is alive.

We can feel the dizzying and lovely flux of the so-called ordinary world in the American poet Mark Doty’s poem, ‘Difference.’ Here, in a poem about the common jellyfish, he suggests that, in fact, *all* seeing is always ‘seeing like’ or ‘seeing as’; that all perception is always innately and helplessly metaphorical, because the physical world can never, at its most essential, be fixed; because it is always stubbornly myriad.

## *Difference*

*The jellyfish  
float in the bay shallows  
like schools of clouds,*

*a dozen identical—is it right  
to call them creatures,  
these elaborate sacks*

*of nothing? All they seem  
is shape, and shifting,  
and though a whole troop*

*of undulant cousins  
go about their business  
within a single wave's span,*

*every one does something unlike:  
this one a balloon  
open on both ends*

*but swollen to its full expanse,  
this one a breathing heart,  
this a pulsing flower.*

*This one a rolled condom,  
or a plastic purse swallowing itself,  
that one a Tiffany shade,*

*this a troubled parasol.  
This submarine opera's  
all subterfuge and disguise,*

*its plot a fabulous tangle  
of hiding and recognition:  
nothing but trope,*

*nothing but something  
forming itself into figures  
then refiguring,*

*sheer ectoplasm  
recognisable only as the stuff  
of metaphor. What can words do*

*but link what we know  
to what we don't,  
and so form a shape?*

*Which shrinks or swells,  
configures or collapses, blooms  
even as it is described*

*into some unlikely  
marine chiffon:  
a gown for Isadora?*

*Nothing but style.  
What binds  
one shape to another*

*also sets them apart  
—but what's lovelier  
than the shapeshifting*

*transparence of like and as:  
clear, undulant words?  
We look at alien grace,*

*unfettered  
by any fixed form,  
and we say: balloon, flower,*

*heart, condom, opera,  
lampshade, parasol, ballet.  
Hear how the mouth,*

*so full  
of longing for the world,  
changes its shape?<sup>29</sup>*

The 'its shape' of the final line is ambiguous. Does 'its' refer to the mouth changing shape in its longing to utter the world? Does the mouth become as mutable as the jellyfish it describes? For, paradoxically, isn't that mouth (and by extension, the poet) *also* part of the living flux of the created world it captures? Can anything ever stand outside it?



Or does 'its' refer to 'the world'? Is Doty suggesting that the physical world itself changes shape through the force of the poet's longing; through the force of his desire to hold it, fleetingly, with language? Does desire somehow catalyse a Heraclitian 'everything flows' transformation? Does it lay bare, or even engender, a flux that is perhaps the fundament of the physical world?

I suspect all of the above is possible. I also suspect that Niels Bohr, were he here, might be inclined to agree; that he, like Doty, understood the rich potential of images (those born of sharp observation) to capture reality at its widest and most unpredictable; that he, too, understood that words are, in fact, only marvellous images, and that tried-and-true facts, at some point, always become provisional. In Doty's poem, the living 'what-ness' of the jellyfish is revealed in a slipstream of images that are both recognisable and fresh; everyday ('balloon,' 'flower,' 'heart,' 'condom') and urgent; unassuming and incantatory.

Stanza by stanza, the poem rises to a final revelation of desire and longing, and it is this force of love, I would argue, that has allowed the poet to bring back from the inchoate sea of jellyfish facts and observations the *life* of his subject, and, with it, by implication, a sense of the full life of the wider physical world of which the jellyfish are but one detail. The metamorphosis of the final lines, in which both the poet's mouth and the world at large simultaneously begin to shape-shift, takes place not on the page itself, but finally in the mind of the reader. We too enter the slipstream, and become one with the poet, his mouth, the jellyfish, the purse, the lampshade and the condom. In this 'all's one' reality made accessible to us by the poet, the world is met and held, *alive* in our own mind's eye.

Perhaps, for these reasons, the scientist, too, needs literature and art, not just as an outlet from the demands of *logos*, but as a bridge, a point of contact, to a wider experience of the real. Perhaps every scientist should also learn, firsthand, something of the craft of the poet.

### III. On The Wave Theory of Angels

To be honest, I'd never given much thought to angels. If anything, outside of certain artistic traditions, I found the subject faintly embarrassing, the stuff these days of cheesy Christmas calendars and television phone-ins.

Wim Wenders' 1987 film, *Wings of Desire*, had long been an exception. Here, two male angels dressed in sober black overcoats, walk (and occasionally hover over) the streets of a war-scarred Berlin, until one of them falls helplessly in love with a circus girl and longs to be human.



Poster for Wim Wenders 1987 film *Wings of Desire*

He yearns to leave footprints in the snow, to crunch on an apple, to see red, to make love; to be more, in short, than a divine abstraction. As he stumbles into mortality, the film flickers from black-and-white into Technicolor, and we see our world through his fresh eyes. The cityscape of Berlin unfolds, and we remember all over again how distinctive the ordinary world is, even in the dirt of a broken post-war city; even in the spit and sawdust of a bankrupt circus. Indeed, the dirt, spit and sawdust are also somehow illogically beautiful<sup>50</sup>.

In Wenders' film, the angel's physical transformation is born of his longing. His desire catapults him into mortality. Yet the mythic (or psychical) connection between desire and transformation is age-old. In Ovid's *Metamorphoses*, as the poet Ted Hughes once remarked, mortals and gods spontaneously combust, mutate or levitate under the terrible pressure of their own desires<sup>51</sup>. Hughes was right. As readers, we can only watch in wonder, amusement and sympathy as their assorted longings bear down on them with an emotional g-force the physical world itself cannot resist.

*The Wave Theory of Angels* began, long before it began, when I stumbled upon and fell in love with a very brief

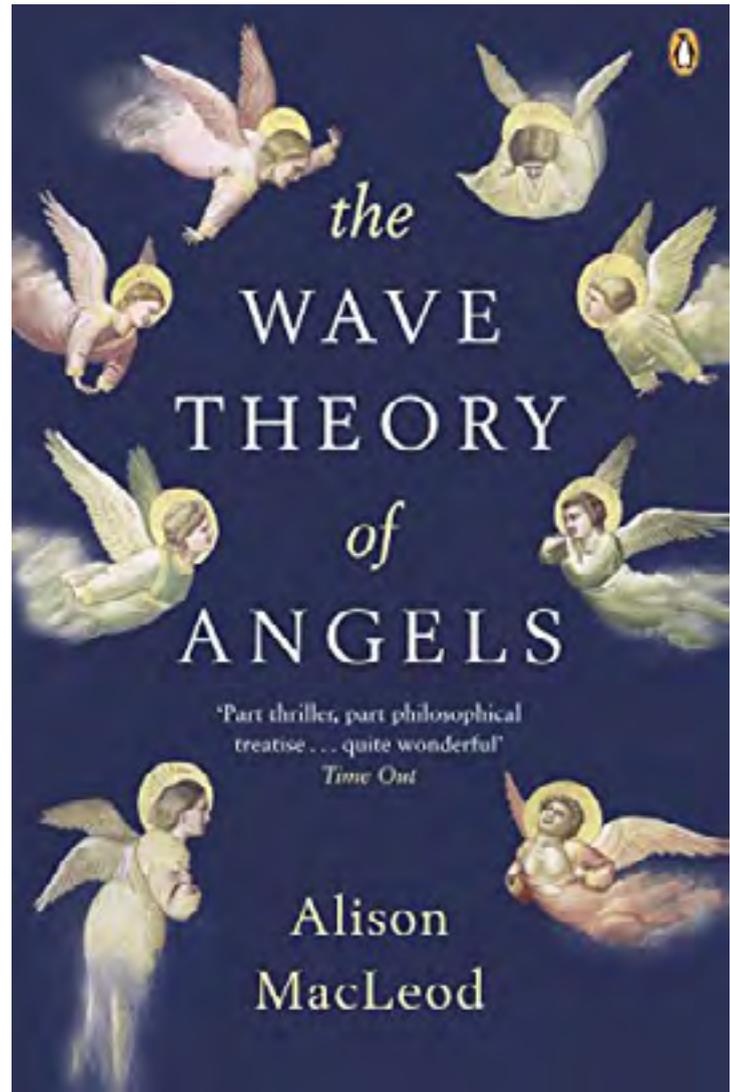


*St Christina the Astonishing (Mirabilis) a patron saint of psychiatrists, psychologists and those suffering mental illness*

account of an apocryphal medieval saint. Christina the Astonishing died while still a young woman, and, in a startling reversal of all expectations, sat up on the bier during her own funeral mass. When she soared to the rafters of the church, the congregation, understandably, fled. Only her sister stayed and tried to talk her down.

The Church had long ago wiped her from its calendar of feast days, but that only recommended her to me all the more. She was transgressive. I loved the fantastic, Ovidian quality of Christina's flight from death. I loved the image of that sudden and defiant surge of life. What desire, I asked myself, could have fuelled so powerful a change? What longing could have catalysed such a return to life?

I wanted to create a story and a space in which a modern reader might suspend disbelief just long enough to wonder—in both senses of that word: i.e., to marvel and to ask questions. I wanted to evoke a fleeting sense that, even in the 21<sup>st</sup> century, reality still resists our efforts to pin it down. Ours is the Information Age, and at times there has seemed little that rational enterprise cannot know or accomplish. Indeed, were it not for the horror of our most rationally executed disasters (the Final Solution, Hiroshima, Nagasaki, Cambodia, Sept. 11th), the twentieth and twenty-first centuries might even have been mistaken for the flowering of the eighteenth-century



Enlightenment Project. But imbalance is invariably a dangerous thing.

In highly rational times, we necessarily sacrifice those experiences of the 'irrational' that renew us: that's to say, our ability as a culture to wonder, to marvel, to receive mystery, and to make leaps of faith or intuition. A small price, many would argue. Yet the upshot is, that without it, we, arguably, make ourselves vulnerable to the dark flip-side of the irrational: that's to say, to superstition, to religious hatred and to brute fundamentalism—radical Islam's fervour, Bush's war-on-terror 'Crusade,' and Blair's zealously moral high ground.

*The Wave Theory of Angels* unfolds in the years 1284 and 2001. Both the medieval and the modern-day storylines explore this dark potential of the irrational that now, tragically, seems as much a hallmark of the 21<sup>st</sup> century as it was of the 13th. In fact the novel was already, almost independently of me, running toward these ques-

tions, when, all too terribly out of the blue, Flight 11 and Flight 175 hit the World Trade Center.

In August 2000, immersed in my research into 13<sup>th</sup>-century life, culture and thought, I came across a phrase that struck me as interesting if tangential at best: 'Fear of the Angel.' My source referred very briefly to a controversy that had nearly brought down the University of Paris in the early part of the 13<sup>th</sup> century. The work of the Islamic (or so-called 'Arabist') philosopher Avicenna had suddenly been banned. I knew nothing of his work, but I chased up a title, *Avicenna and the Visionary Recital*<sup>52</sup>, quickly added it to a list of some twenty seemingly more pertinent titles, and forgot about it.

That night, I did what I sometimes do; on the brink of sleep I, rather madly and not a little desperately, asked my dreaming mind for help with my still very tentative novel. If I'm honest, it's not quite as mad as it sounds. Sometimes, I seem able to direct myself toward useful information or insights in dreams that will conveniently wake me with the sharp nudge of their own relevance. At this point in the process, I was certainly feeling stuck. I had a few vital elements for the novel, but I had little idea of how to make the story 'go.'

That night, however, the experience was both decisive and, for me profound.

*I'm at Yaffles, though the house is very different. Jill tells me she is getting rid of lots of books; she has stacked them in the corridor. Do I want any?*

*The upstairs corridor is very long and narrow, unlike the actual corridor I remember well. It's really more of a passageway. I say I will look at the books, really only to be polite. I lift one from the stacks. As I do, its cover starts to glow. I look more closely. It's covered in wings. As I look, they move and fill with light. I realise it's an angel on the front. I look at the title: Avicenna's Visionary Recital. It's pure pleasure to see it, to hold it. 'It's so funny,' I say to Jill, 'because I ordered this through inter-library loan only today.'*

When the books arrived, it was the first I turned to. Perhaps the dream's alteration of the wide corridor of the family home I had once known into something I could identify only as a 'passageway' was significant; for it was to emerge as perhaps *the* vital passageway through what had been a very tight spot in my writing process. The controversy known as 'Fear of the Angel' offered me the way forward.

Once upon a time, the Christian West had taken its cues from Islamic scholars. Avicenna was an 11<sup>th</sup>-century physician, philosopher, and a respected authority on Aristotelian logic, metaphysics, psychology and the natural sciences. Yet, in the 13<sup>th</sup> century, the question of Avicenna's 'tenth angel' would bring uproar to the University of Paris.

Suddenly, nine archangels were deemed sufficient; a tally of nine meant there was one angel to oversee each of the heavenly spheres. Avicenna, however, counted ten, and his tenth angel was not celestially remote. On the contrary, this angel occupied the sphere between the heavens and our earth, and, more surprising still, he was open to union with each mortal. Human longing was the catalyst. The plain of the imagination was the meeting place<sup>53</sup>. The beloved detail of the ordinary physical world was the shared language. Communication and revelation took the form of images, not speech. Through this loving union, the physical detail of Creation was renewed. Through this imaginative collaboration, Creation also evolved.



*Islamic angel from a Persian miniature  
from the 16th century*

So the tenth angel was trouble. Not only was he awash in all that desire, not only did the concomitant notion of an evolving universe threaten the status quo, but the tenth angel also meant that we ordinary humans could participate *directly* in the divine cosmos; that the Church's intercession was not strictly necessary.

I realised that Christina's father—the 'imaginator,' or sculptor, Giles of Beauvais—was who he was, above all because he stood for the potential of the imagination. As my novel took life again, I knew I had to locate him at the University of Paris in his youth; that he'd been a student who had argued passionately for the importance of the tenth angel. For Giles, the stakes would have been high, for in those days, metaphysics was *also* physics; angels were also the very atoms of the universe, and physics was a reading of the mind of God. Giles, then a student philosopher arguing against the ban on the 'Arabist' philosopher, could only have been branded a heretic and cast out. Indeed, he would have been lucky to escape Paris with his life.

Ultimately, Avicenna's tenth angel is perhaps nothing more (and nothing less) than an embodiment of the principle of Eros, that force of connection and wholeness in the world. Angel or principle, we seem to be talking about a live force in the world, odd as that, admittedly, does sound. Yet with Fowles' loving creation of the 'living' character of Sarah, or Brontë's creation of the strangely wilful Heathcliff, in Doty's rapt rendering of the shifting jellyfish, and in Sulston's own transformation through the transformer, perhaps we *do* actually see the world evolve, detail by surprising detail.

I recorded two such moments in my journal, moments in which 'reality' seemed transfigured. Each was brief, no more than a few minutes, yet each was also quietly extraordinary. The first came in April 2000, a few months before my discovery of the tenth-angel controversy.

*I wake and see above my head a small flying thing, hovering very bright in the darkness. It is hard to name at first because it is so much in motion. Like a butterfly, only the size of a small bird. It glows red and blue, as if made of neon or a naked flame. I try to focus. I can make out an electric blue body and wings, with edges of red... A quick vision but much more than a dream. I have the sense that I am actually watching a living thing that I might easily have reached out and touched had I dared.*

The second came some six months later:

*A night vision again. I am awake, eyes open to the night; am watching a huge pair of wings, sometimes black and sometimes blue, flapping high overhead, some 10 feet up, near the top of my big Edwardian wardrobe at the far end of my room. I can only stare, mesmerised and a little frightened, until they disappear.*



*Ibn Sina (Avicenna) (c. 980-1037) a Persian polymath who is regarded as one of the most significant physicians, astronomers, thinkers and writers of the Islamic Golden Age*

Looking back, it seems only natural that I should have been 'visited' by wings, or at least by the image or vision of 'winged-ness'; the force of 'uplift,' both liberating and dark, would be vital to *The Wave Theory*.

Yet involved as I was in the tenth-angel 'Arabist' controversy, I couldn't rest in the medieval world alone. I was writing for a modern readership, and while the 13<sup>th</sup>-century setting and characters provided a very natural launch for questions about imagination and belief, I was loathe to leave my story there. I was concerned it would be too easy to dismiss images of mystery as the by-products of medieval ignorance and spectacle. I needed to transplant these images and questions to the here and now. What sort of modern-day world could provide the vital backdrop?

Where could the story of Christina and Giles find a home in the year 2001? Anything that smacked of New Age mysticism was out. I needed a world that would seem reasonable and credible to the reader.

I had just finished reading Danah Zohar's *The Quantum Self* (1991). Over the next five years, I would come to love quantum theory's reluctant notions of indeterminacy, uncertainty, complementarity, non-locality and entanglement. I would immerse myself in the philosophers of the new physics. I would book myself on courses, and chase after an understanding of String Theory and M-Theory. I would fly to Chicago to visit Fermilab, the renowned physics laboratory—and the workplace, I would soon realise, of my 21<sup>st</sup>-century character, Giles Carver. Like his medieval counterpart, Dr Giles Carver would also wrestle with the mysteries of the invisible world, even as the mystery of his sleeping daughter would frustrate his abilities to explain it.

Once again, here at the quantum frontier, was the world in flux; here, too, the boundaries between dimensions seemed to give way; here, too, there was the ghost of a suggestion that we might co-create the world; that ours, like Avicenna's, might be a participatory universe. For this reason, the Observer Effect of quantum theory was hard to resist. Here, human consciousness is posited as *the* force that collapses quantum wave function into the fixed and real; in other words, the force that sieves physical reality from the flux of sub-atomic possibilities. The idea excited me, verifiable, accurate or not. The debate was enough—great novels have been based on far less. If human consciousness could act on the physical world, by implication, so could the imagination, including the reader's own.

From page 72, the reader is him- or herself invoked, as a witness to the novel's events, and more specifically, as the catalytic Observer of the Observer Effect. Of course, the reader is always involved in the creation of any novel, but with *The Wave Theory*, I wanted the power of the imagination to feel real, active, firsthand, and not merely a literary given. I wanted to create an experience of the novel as something alive and unfolding. I wanted to involve the reader directly in its page-by-page evolution; to make it somehow co-creative. I wanted the reader to want.

It was only at this point—desiring more for the sake of my novel than I could perhaps deliver—that I returned to page one, knowing what the first lines must now be:

The world yearns. This is its sure gravity: the attraction of bodies. Earth for molten star. Moon for earth. A hand for the orb of a breast. This is its movement too: the motion of desire, of a longing toward.

Or, as even Auden might have it, the motion of love.



*The E989 storage-ring magnet at Fermi National Accelerator Laboratory (Fermilab) near Chicago which specializes in high energy particle physics*



## Endnotes

- <sup>1</sup> Auden, W.H./Mendelson, Edward (ed). (1988) *The English Auden: Poems, Essays and Dramatic Writing, 1927-1939*. London: Faber, p. 319.
- <sup>2</sup> Fowles, John/ Bradbury, Malcolm (ed). (1977) 'Notes on an Unfinished Novel,' *The Novel Today: Contemporary Writers on Modern Fiction*. London: Fontana, p. 147.
- <sup>3</sup> *ibid*, pp. 147-48
- <sup>4</sup> *ibid*, p. 160
- <sup>5</sup> *ibid*, p. 148
- <sup>6</sup> 'Notes on an Unfinished Novel', pp. 158-59
- <sup>7</sup> *ibid*, p. 148
- <sup>8</sup> Brontë, Charlotte (ed)/ Brontë, Emily. (1965) 'Editor's Preface to the New [1850] Edition of *Wuthering Heights*,' *Wuthering Heights*. London: Penguin, pp. 40-41.
- <sup>9</sup> Thomas, D.M. (1989) *Memories & Hallucinations*. London: Abacus, p. 47.
- <sup>10</sup> Nicol, Bran. (2004) *D.M. Thomas*. Liverpool: Northcote House Publishers, p. 8.
- <sup>11</sup> See, for example, Bakhtin's discussion of the 'autonomous hero.' See also Morson, Gary Saul. (1994) *Narrative and Freedom: The Shadows of Time*. New Haven, CT: Yale U.P.
- <sup>12</sup> Charlotte Brontë, 'Editor's Preface,' p. 38 and p. 41.
- <sup>13</sup> I am reminded here of Cézanne: 'The Landscape becomes reflective, human and thinks itself though me. I make it an object, let it project itself and endure within my painting.... I become the subjective consciousness of the landscape, and my painting becomes its objective consciousness.; (See 'David Bohm, Paul Cézanne and Creativity,' F. David Peat, Pari Center website)
- <sup>14</sup> Hyde, Lewis. (1999) *The Gift: Imagination and the Erotic Life of Property*. London: Vintage, p. 167.
- <sup>15</sup> Emily Brontë, Chapter 9, *Wuthering Heights*.
- <sup>16</sup> source now unknown; citation noted in my journal
- <sup>17</sup> Sulston's experience is an interesting echo of one of Einstein's boyhood moments of inspiration. According to Michio Kaku, Einstein recalled that he read 'with breathless attention' Aaron Bernstein's *Popular Books on Natural Science* in which the author asked children to visualise riding alongside an electrical signal inside a telegraph wire. (Michio Kaku, 'The Power of Staring', *New Scientist*, 16 April 2005), p. 48. Here, too, there is a suggestion that Einstein was willing, imaginatively, to take on new form as he tried to understand the nature of the electrical signal.
- <sup>18</sup> Hyde, Lewis. (1999) *The Gift: Imagination and the Erotic Life of Property*. London: Vintage
- <sup>19</sup> From 'The Foundations of Science' by Henri Poincaré, first published in Paris in 1908.
- <sup>20</sup> Kekulé, F.A./Carey, John (ed). (1995) 'Chains and Rings: Kekulé's Dreams,' *The Faber Book of Science* London: Faber, p. 137.
- <sup>21</sup> *ibid*, p. 138.
- <sup>22</sup> *ibid*, p. 138.
- <sup>23</sup> Lightman, 'Alan, 'Moments of Truth', *New Scientist* (19 November 2005), p. 36.
- <sup>24</sup> *ibid*, p. 36.
- <sup>25</sup> source now unknown; citation noted in my journal.
- <sup>26</sup> Michio Kaku, *New Scientist*, op. cit., p.48.
- <sup>27</sup> See F. David Peat, 'Wolfgang Pauli: Resurrection of Spirit in the World.'
- <sup>28</sup> Johnson, George. (1996) *Fire in the Mind: Science, Faith, and the Search for Order*. London: Vintage, p. 146.
- <sup>29</sup> Doty, Mark. (1995) *My Alexandria*. London: Jonathan Cape, pp. 44-46.
- <sup>30</sup> Wim Wenders is by no means alone in his vision of beautiful dross. Take J.M.W. Turner, for example, and his remarkable paintings of the radiant haze of pollution over the Thames in the 1830s.
- <sup>31</sup> Hughes, Ted (trans.) (1997) 'Introduction,' *Tales from Ovid*. London: Faber.
- <sup>32</sup> Corbin, Henry. (1960) *Avicenna and the Visionary Recital*. Princeton, NJ: Princeton U.P.
- <sup>33</sup> I'm reminded here of William Blake's view 'in which the visionary sees the whole visible universe transfigured, because he has; put on Imagination uncorrupt.' In this state of lucidity, symbol and reality, Nature and Imagination, are seen to be one... 'I knew that this world is a world of imagination and vision.' See Evelyn Underhill on Blake in *Mysticism: The Nature and Development of Spiritual Consciousness* (Oneworld, 1999).
- The thoughts of artist and sculptor Antony Gormley also seem relevant. He comments on the influence of the French phenomenologist, Merleau-Ponty, on his art: 'Imagination, he believed, can have privileged access to the hidden dimensions of Being—to what, in his later writings, he calls 'the invisible.' This, he said, can be imagined but not seen; it is not non-existent but pre-exists the visible. Every 'visible' dimension of being... is correlatively connected to an invisible or imaginary dimension; he sought to establish the real and the imaginary as two separate but corresponding realms: separate on the level of ordinary being but corresponding on the level of fundamental Being. Such correspondence even applied to the human body—'It is not the utilizable, functional, prosaic body which explains man: on the contrary, the body is precisely human to the extent that it discovers its symbolic and poetic charge.' *Antony Gormley* (Phaidon, 1995).

'Difference' from *My Alexandria* ©1995 by Mark Doty. Used by permission of the poet and the University of Illinois Press.



**ALISON MACLEOD'S** new novel, *Tenderness*, was a *New York Times* 'Best Book of 2021,' a 'Book of the Year' for *The Spectator*, a 'Best New Book' for PEOPLE Magazine and *The Sunday Times*' 'Historical Fiction Book of the Month.'

MacLeod's last novel, *Unexploded*, was long-listed for the Man-Booker Prize for Fiction and The Walter Scott Prize for Historical Fiction, and named one of the *Observer's* 'Books of the Year.'

Her most recent story collection *All the Beloved Ghosts* was shortlisted for Canada's national Governor General's Award for Fiction and named one of the *Guardian's* 'Best Books of 2017.' It was shortlisted for The 2018 Edge Hill Short Story Prize for best single-author short story collection in the UK and Ireland.

**“N**othing is original. Steal from anywhere that resonates with inspiration or fuels your imagination. Devour old films, new films, music, books, paintings, photographs, poems, dreams, random conversations, architecture, bridges, street signs, trees, clouds, bodies of water, light and shadows. Select only things to steal from that speak directly to your soul. If you do this, your work (and theft) will be authentic. Authenticity is invaluable; originality is non-existent. And don't bother concealing your thievery—celebrate it if you feel like it. In any case, always remember what Jean-Luc Godard said: 'It's not where you take things from—it's where you take them to.'”

**Jim Jarmusch**