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## SCIENCE REVEALED

Let us learn to dream, gentlemen,  
then perhaps we shall find the truth.<sup>1</sup>

Friedrich Kekulé,  
who discovered the benzene ring.

As the sun set over Central Park in Budapest in 1882, Nicola Tesla was strolling and reciting poetry with a friend, when he was suddenly frozen to the spot by a vision. A machine to generate a rotating magnetic field hung in the air before him, with all the clarity of a metal object. It was the AC motor, which powers our national grids today. It is difficult to imagine the planet without the hundreds of patents he took, and ideas including robotics, the Tesla coil in radios and televisions, and the AND gate. He demonstrated wireless electrical transmission by lighting lamps 25 miles away, and discovered both terrestrial standing waves and cosmic waves, which he claimed could be converted into free electricity. We may never know if the free electricity machine works because FBI agents raided his house days after his death, and confiscated enough notes to fill a railway cart. Most of the notes remain classified today.

Tesla's intricate and revolutionary machinery was invented and produced with neither blueprints nor calculations. He simply lay down on the couch:

I saw new scenes. These were at first blurred and indistinct and would flit away when I tried to concentrate my attention on them. They gained strength and distinctness and finally assumed the concreteness of real things... Every night, and sometimes during the day... I would start on my journeys, see new places, cities and

countries... I needed no models, drawing or experiments. I could picture them all as real in my mind<sup>2</sup>

This practice, which some call astral projection and others shamanic journeying, was not his only eccentricity. Tesla was the ultimate comic book mad genius, with an enormous *Back to the Future* style antenna growing out of his lab, and a talent for terrifying his neighbours with homemade electrical storms and explosions. He was also obsessive about the number three and in matters of hygiene, and compulsive, always eating at the same table in the same restaurant, with the same food and the same number of peas, cleaning his cutlery with 18 napkins.

Genius has long been associated with madness, and Dr. Lombroso apparently worked out why when he explained, in all seriousness, that 'genius is a symptom of hereditary degeneration of the epileptoid variety, and is allied to moral insanity'.<sup>3</sup> The classical conception was different. In Latin one's *genius* is the spirit who sends ideas from another plane. Everyone had their own personal *genius*, a distinct entity with its own personality, and on their birthdays Romans offered sacrifices to the spirits that made them think. It makes me think, anyway. It makes me wonder for whom are the candles on my birthday cake.

Genius often comes through when someone is dozing. For Poincaré, who laid the foundations of chaos maths, ideas came 'in the morning or evening in bed while in a semi-hypnagogic state'.<sup>4</sup> Kekulé discovered structure theory 'one fine summer evening as I was returning by the last omnibus':

I fell into a reverie, and lo, the atoms were gambolling before my eyes! ... I saw how, frequently, two smaller atoms united to form a pair; how a larger one embraced 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 train... The cry of the conductor: 'Clapham Road', awakened me from my dreaming; but I spent a part of the night putting on paper at least sketches of these dream forms. This was the origin of the *Structurtheorie*.

On another occasion:

I was sitting, writing at my textbook; but the work did not progress; my thoughts were elsewhere. I turned my chair toward the fire and

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<sup>i</sup> There are more crazy geniuses in *Neuro-Apocalypse 3: The Monkey Wrench*

dozed. Again the atoms were gambolling before my eyes. This time the smaller groups now kept modestly in the background... But look! What was that? One of the snakes had seized hold of its own tail, and the form whirled mockingly before my eyes.<sup>5</sup>

He published his famous findings on the circular structure of benzene shortly afterwards.

Leowi was a slower paced dreamer. In 1903, he discussed with a friend an idea that nerve impulses released chemicals from the end of neurones, carrying the impulse to the effector organs. He could not think of an experiment to test the hypothesis, and forgot about it until one morning in 1920, when:

It occurred to me at six o'clock in the morning that during the night I had written down something important, but I was unable to decipher the scrawl. The next night, at three o'clock the idea returned. It was the design of an experiment to determine whether or not the hypothesis of chemical transmission that I had uttered seventeen 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.... If I had carefully considered it in daytime, I would undoubtedly have rejected the kind of experiment I performed.... It was good fortune that at the time of the hunch I did not think but acted.<sup>6</sup>

Perhaps the most world-shattering slumber came after a day of brainstorming that left Einstein in despair. He retired in the state of nervous confusion that often haunted him for weeks, but awoke 'as if a storm broke loose in my mind.'<sup>7</sup> He scribbled frantically for a few weeks, mailed off his paper, and took to his bed exhausted, having dismantled the foundations of Newtonian physics with relative ease.

Inspiration once referred to a spirit 'breathing in' to a person (*in* 'in' and *spire* 'to breathe'). For Srinivasa Ramanujan, a completely uneducated mathematician, the spirit was his family goddess, who spoke to him in dreams. His (or her) theorems are still being worked through 90 years after his death, helping solve problems in string theory and spawning whole sub-disciplines of maths.<sup>8</sup> 'An equation for me has no meaning,' he once remarked, 'unless it represents a thought of God'.<sup>9</sup>

Inspiration comes to dozing artists as well. Wagner's masterpiece *Rheingold* was produced during an insomniac bout after a sleepless, feverish night. Mozart's genius worked best when he was:

entirely alone, and of good cheer - say, travelling in a carriage, or walking after a good meal, or during the night when I cannot sleep; ... Whence and how they come, I know not; nor can I force them ...

Nor do I hear in my imagination the parts successively but I hear them, as it were, all at once. All this inventing, this producing, takes place in a pleasing lively dream ... The committing to paper is done quickly enough, for everything is already finished; and it rarely differs on paper from what it was in my imagination.<sup>10</sup>

Whereas the rational mind plods along step-by-step, inspiration arrives either fully formed or in a continuous stream. Rossini wrote the six hundred pages of his opera *The Barber of Seville* in just thirteen days. Donizetti composed an opera in eight.<sup>11</sup> William Blake wrote 'from immediate dictation, twelve or sometimes twenty or thirty lines at a time, without premeditation and even against my will.'<sup>12</sup> Nietzsche describes how:

one is the mere incarnation, mouthpiece or medium of an almighty power. The idea of revelation in the sense that something becomes suddenly visible and audible with indescribable certainty and accuracy... it comes with necessity, unhesitatingly - I have never had any choice in the matter. There is an ecstasy such that the immense strain of it is sometimes relaxed by a flood of tears... There is the feeling that one is completely out of hand, with the very distinct consciousness of an endless number of fine thrills and quiverings to the very toes... There is an instinct for rhythmic relations... Everything happens quite involuntarily, as if in a tempestuous outburst of freedom, of absoluteness, of power and divinity.... everything seems to present itself as the readiest, the correctest and the simplest means of expression.<sup>13</sup>

Everything including the rhythm arrived as a complete package, seemingly from another intelligence, and this intelligence had a lot to say about conventional morality. The subject matter is in some ways the opposite of what one might expect from Nietzsche. He wrote with disgust about compassion for the weak, even though he himself was sick for most of his life. The first part of *Thus Spake Zarathustra* was written during his sickliest winter, during a fierce attack of influenza that often left him unable to walk. He wrote it in ten frenetic days, and wrote the second and third parts at the same pace.

The theory of evolution, which became the central assumption of biology, was also perceived from the sickbed, but not by Darwin. Darwin spent over twenty years refining his theory, studying animal husbandry and travelling widely to collect specimens, but he hesitated to publish something so antithetical to contemporary morals. His theory was finished but unpublished in 1858, when a package arrived from Alfred Wallace, a correspondent who used to send him specimens from his travels. This time, however, Darwin was horrified to find inside a theory almost identical to his. Wallace, who was fourteen years his

junior, had discovered the principle of the survival of the fittest, and understood its evolutionary consequences in three days during an attack malaria.<sup>14</sup> Darwin wasted no more time, and published the following year.

Certain important discoveries seem to have an impatient agenda, breaking through the veil simultaneously at different points. Darwin may never have published his theory without this shock. Newton kept calculus secret until Leibniz discovered it independently ten years later. Newton had already used it to make several discoveries in astronomy, but replaced it with conventional maths before publishing. The uncertainty principle at the centre of the wacky world of quantum physics occurred to both Heisenberg and psychologist Elton Mayo at the same time. Graham Bell took the patent for the telephone hours before Elisha Grey applied for it.<sup>15</sup> Whilst Erno Rubik was designing his cube in Hungary, similar objects were being designed by Terutoshi Ishigé in Japan and Larry Nichols in the US.<sup>1</sup>

The receptive state occurs, as Tennyson noted, when ‘individuality itself seemed to dissolve and fade away into boundless being’.<sup>16</sup> The key may be meditation, hypnogogic trance, or feverish delirium, but sometimes a place can be the trigger. Arnold Toynbee saw vivid visions at historical sites, including battles of which he had no prior knowledge, which he later confirmed in local histories. Inspiration also arrives completely unbidden and out of the blue. Botanist Melvin Calvin was waiting in a car park when:

suddenly ... in a matter of seconds, the cyclic character of the path of carbon became apparent to me... the original recognition of phosphoglyceric acid, and how it got there, and how the acceptor might be regenerated, all occurred in a matter of thirty seconds.<sup>17</sup>

The Calvin cycle is central to photosynthesis, and it earned him a Nobel Prize. Gauss’s inspiration also arrived out of nowhere. He had a hunch that any number can be represented as a product of its primes in one and only one way, but could not find the proof. The proof found him four years later:

but not on account of my painful efforts. Like a sudden flash of lightning, the riddle happened to be solved... For my part I am unable to name the nature of the thread which connected what I previously knew with that which made my success possible.<sup>18</sup>

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<sup>1</sup> Whilst the Rubik cube may not seem particularly world-changing, it develops both sequential logic and 3D visualisation, and has passed through one eighth of the hands in the world.

Ampère redefined the field of probability and earned himself a professorship after a similar experience:

It was seven years ago I proposed to myself a problem which I have not been able to solve directly... At last, I do not know how, I found it, together with a large number of curious and new considerations concerning the theory of probability.<sup>19</sup>

Boole was a child prodigy who apparently encountered God at the age of seventeen, and was given a mission to explain how the mind processes thought. Boolean algebra was the answer, a system representing logical processes as operations, which would be applied to the logic circuit the following century. It came to him in a flash as he was contemplating mysticism, 'from some source, invisible and undefinable', which today we might call the unconscious.<sup>20</sup>

Freud, who first described the unconscious, saw it as a sinister shadow responsible for neurosis, an unruly realm of the mind dominated by basic urges, where neither causality nor chronology, logic nor morality were respected. Freud was a scientist in the rationalist tradition, and he argued that the shadow needed to be brought out into the light, controlled, sublimated, and channelled into more civilised ends. Later psychoanalysts generally agreed that psychological health was achieved by 'making the unconscious conscious', but often disagreed about the nature of the unconscious. For Milton Erikson it was the creative, healing part of the mind, and he accessed it using hypnosis, shock therapy, and confusion. His own ideas, which form the backbone of neurolinguistic programming, often came to him in 'blinding flashes of light'.<sup>21</sup>

For Jung, the unconscious was both unlimited and collective, and expressed in dreams, behaviour, and in the patterns behind apparently chance events. He coined the term 'synchronicity' to describe significant coincidences that illuminate processes hidden to the conscious mind, events which are related despite having no causal relationship. Simultaneous discoveries are synchronicities, as are accidental breakthroughs, such as when Oersted wandered past a magnetic needle whilst holding an electrified wire and discovered the electromagnetic field. X-rays were another accidental revelation, seen as a green glow on a distant screen. Penicillin was discovered in a contaminated bacterial culture, and frog legs jerking on a metal wire showed that nerve transmission was an electrical phenomenon. Immunization, dynamite, cellophane, fingerprinting, Kevlar, Teflon, vulcanised rubber, superglue, the Post-it note, and arguably the Americas were all discovered by chance.

Downloads and discoveries bypass the thinking mind to arrive in the light. They may well up from the depths of the unconscious mind, or be carried in the breath of the spirits, or perhaps these are two descriptions of the same process. Jung was never sure whether the entities he met in his 'night sea journeys' through inner-space had any independent reality. For Emanuel Swedenborg (1688-1772), the source was Jesus Christ, who appeared in visions and dreams and gave him enough material to fill several library shelves. Since childhood, Swedenborg meditated on his breath whenever concentrating, and according to his writings, angels would visit him and control his breathing.<sup>22</sup> He was the foremost mineralogist in Europe and a polymath who mastered eight languages and wrote on everything from anatomy to astronomy. He described a system of repeated form on different scales in nature, calling to mind the fractals which mathematicians, biologists, and geographers would invoke hundreds of years later. He also pre-empted by centuries fundamental physical principles, including the wave theory of light, and Bell's interconnectedness:

This universal, including its smallest particles, is a work coherent as a unit, to the extent that no one part can be touched and affected without some sense of it overflowing to all the rest<sup>23</sup>

Elsewhere he described the nature of sub-atomic particles:

The smaller and closer the parts are to the simple substratum, the smaller they are in mass, their dissimilarities soften, their imperfections decrease and their forms become more perfect. They are also lighter and quicker in their motion.<sup>24</sup>

He also suggested that elementary particles might not exist independently, conceptualising them as processes or vehicles assumed by energy to get things done. This remains speculative in current quantum physics. The Buddha came to similar conclusions, again with breath techniques. He described how the body is made up of innumerable millions of *kalāpas* in perpetual motion and flux, constantly forming and dissolving, each 1/467656th the size of a particle of dust raised by a chariot's wheel in summer.<sup>25</sup> Hence both the particle and the wave of the quantum world were perceived by a guy sitting under a tree 2,500 years ago.<sup>i</sup>

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<sup>i</sup> The Buddha, if he existed at all, recorded nothing; everything ascribed to him was noted down later. In this book, when I write that the Buddha did or said something, it may have been someone else thousands of years ago practicing similar techniques, rather than the big man himself.

Meditation and sleep quieten certain areas of the brain, and many psychedelic drugs suppress activity in the same areas, as explored in *Neuro-apocalypse 2*. As sense melts and chains of logic fall to bits, insights from the deep mind rise to the surface. This has attracted many mystics to drugs, including W. B. Yeats and Aleister Crowley, who mixed mescaline into magick at the end of the nineteenth century.

Perhaps the first Enlightenment scientist to dabble was Sir Humphrey Davy at the end of the eighteenth century. His nitrous oxide trips lead to a massive philosophical tract on the nature of mind, and he went on to pioneer the science of electrochemistry and discover several elements. William James' insights with the same chemical lead<sup>26</sup> him to inaugurate the field of the psychology of religion in 1902, with *The Varieties of Religious Experience*. Havelock Ellis took mescaline in 1896 and published *Studies in the Psychology of Sex* the following year, introducing the concepts of autoeroticism and narcissism. He also disputed the assumption that masturbation was pathological in an era when parents applied irritant ointments, clamps, and spiked and electrified anti-erection devices to protect their children from their urges.<sup>27</sup> Many psychologists were using drugs around the turn of the twentieth century, including Freud, whose twenty-year cocaine habit might explain his discovery of the ego, his deep insights into the nature of neurosis, and his habit of reducing everything that crossed his mind to sex.

Acid-emia came into its own in the sixties, with the new psychedelics, especially LSD, another curiously non-rational discovery. Hoffman first synthesised LSD-25 in Switzerland in 1938, as one of a series of ergot-based compounds for relief of labour pains, but he shelved it without noting any special properties. Five years later, due to 'a peculiar presentiment - the feeling that this substance could possess properties other than those established in the first investigations',<sup>28</sup> Hoffman went against lab protocol and remade isotope 25. LS-serendipi-D soaked through his skin, and 'unusual sensations' interrupted his work. Three days later, he prepared a tiny, cautious dose to test on himself, but by today's standards it was massive, because LSD was far more potent than anything known. That afternoon, the angel of acid, with plastic wings and a smirking face, pushed his bike down the road towards the psychedelic revolution.<sup>29</sup>

The five-year delay was fortunate, as World War II could have been far worse if the fascists surrounding Switzerland had got their hands on it before the hippies. Among other qualities, it is a great aid to visualisation. It revealed in 'a moment of clarity' the potentials of cyberspace and the fundamental protocols of virtual reality to its

inventor Mark Pesce.<sup>30</sup> An LSD enhanced Dr. Mullis visualised the basic molecular concepts of the polymerase chain reaction central to the DNA test,<sup>31</sup> and Francis Crick was no stranger to acid.<sup>32</sup> The father of molecular genetics was a founding member of a society formed 'to examine without prejudice the scientific, medical, legal, moral, social, and philosophical aspects of heightened mental awareness, with special reference to the effects of pleasure-giving drugs'.<sup>33</sup> It was named SOMA, after the drug from the Vedas.<sup>i</sup>

With mind-benders, something hidden is revealed. Psychedelics opened Fritjof Capra's eyes to *The Tao of Physics*, starting a new library shelf on physics and Eastern mysticism. Carl Sagan, a veteran ganja smoker, proved that a soup of organic compounds irradiated with ultraviolet light could form amino acids, and suggested this as a mechanism for the origin of life.<sup>34</sup> Acid 'no sooner eliminates the supremacy of categories than it tears away the ground of its indifference and disintegrates the gloomy dumbshow of stupidity', wrote Michel Foucault.<sup>35</sup> His scholarship was on the historical forces hidden under the surface of society, though whether he perceived them on drugs is unclear. The Oxford professor Susan Blackmore is candid about what lead her to the memes behind the scenes and the genes:

I can honestly say that without cannabis, most of my scientific research would never have been done and most of my books on psychology and evolution would not have been written.<sup>36</sup>

Sam Patterson, named 1996 Inventor of the Year by the US Patent Office, gets mashed at the beach and sits doodling cogs until:

In a brief flash a complete solution goes off. That's when I start sketching like mad. If I'm lucky I can draw it out in the sketch. I don't fully comprehend it until I'm finished.<sup>37</sup>

Psychedelic insights may be of a more personal nature, which made them useful psychotherapeutic tools until they were outlawed. Subjects on LSD score higher in tests for originality of word associations,<sup>38</sup> in the Purdue Creativity Test, in tests of visualization, and on tests of field-dependency (something discussed in *Neuro-apocalypse 1*).<sup>39</sup> Many artists meet their muse mashed. Keith Haring's art was cooked in acid, and Lewis Carroll was chopping up all sorts on the looking glass. Robert Louis Stevenson wrote *Dr Jekyll and Mr. Hyde* during six days and nights of a cocaine binge, which explains the story somewhat; apparently he was told his tales by 'the little people who manage man's

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<sup>i</sup> See *Neuro-apocalypse 3*

internal theatre'.<sup>40</sup> Ken Kesey's *One Flew Over the Cuckoo's Nest* was written on acid and mescaline. Ironically, he was switched on when the CIA fed him LSD without his permission during an experiment. He liked it so much that he dedicated himself to administering acid all over California. The first two hundred lines of *Kubla Khan* were revealed to Coleridge during an opium dream. Even England's greatest poet was at it. Pipe fragments from Shakespeare's home tested positive for cannabis residues, as well as for camphor and the hallucinogenic nutmeg.<sup>41</sup> Clearly he was using more than just metaphor in Sonnet 76:

Why with the time do I not glance aside  
 To new-found methods and to compounds strange?  
 Why write I still all one, ever the same,  
 And keep invention in a noted weed.<sup>i</sup>

Assisted revelation is an everyday event amongst certain groups, including my own beloved Daime. Our thousands of hymns were received, not composed, with the help of ayahuasca, and I know two inventors who have patented devices conceived of during sessions, and many artists whose visions inform their art. Ayahuasca is the vine that winds between the worlds. It is the rope (*waskha*) of the spirits (*aya*), and it does just what it says on the label.

Spiritual revelation was part and parcel of early science. Kepler's search for geometry in astronomy began with a divine revelation.<sup>42</sup> Paracelsus felt that his inspiration came from the spirits and the stars. He certainly wrote like a man possessed, constantly and single-mindedly until 'with boots and spurs and fully dressed, he throws himself into bed and rests merely for three hours or so, then writes on again'.<sup>43</sup> This belligerent mishmash of contradictions, who believed he was 'chosen by God to blot out all the phantasies of elaborate and false works',<sup>44</sup> spent his life wandering Europe in a cloud of controversy, baiting academic medics whilst curing the patients they could not. Town records attest that he cured, for example, over half of the lepers in

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<sup>i</sup> 'Compounds' meant drugs in his time.

quarantine outside Nuremberg.<sup>45</sup> He was one of the first, and definitely the most energetic critic of the classical humoral theory of medicine, and the earliest proponent of the ontological concept of disease - the idea that a disease is a thing in its own right rather than an imbalance. According to him, finding specific medicines for specific diseases was the proper goal of the alchemist, not making gold,<sup>46</sup> and his great work developed into modern pharmacology. He treated by tuning in to the specific essence or 'signature' of the disease, and selecting from nature the plant or mineral with the same signature. Applying alchemical principles to medicine, he viewed the body as a vehicle for transformation, and was the first to describe digestion as a process of separation. Unlike his contemporaries, he also appreciated the subtleties and risks of chemicals, noting that 'all things are poison and nothing is without poison, only the dose permits something not to be poisonous.'

Among his many eccentricities, Paracelsus was a screaming apocalyptic, preaching drunken doom in the tavern whenever the spirit took him. Strange as it sounds, an interest in the apocalypse is not uncommon amongst scientific pioneers. Swedenborg believed God had chosen him to announce and describe the coming of the New Church, which followed the Last Judgment of 1757.<sup>47</sup> Newton is considered a paragon of rational science, the man who whipped the Royal Society into shape, restricting its activities to observation and mathematical modelling rather than messing around trying to generate frogs from mud. However, the primary obsession of this very obsessive man was the apocalypse. *Isaacus Neutonius* saw his mission in the anagram of his name (*Ieova sanctus unus*, or 'Jehovah's holy one').<sup>48</sup> He believed he was chosen by God to interpret *The Book of Daniel*, and wrote 4,500 pages calculating when the world was going to end.<sup>49</sup> His interest in astronomy and chronology was secondary, stemming from his desire to date events described in *The Bible* and decipher omens in the heavens.

Newton's other non-kosher passion was the illegal art of alchemy, to which a tenth of his library was devoted.<sup>50</sup> Before him, physics was a

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<sup>i</sup> He was later forced to flee Nuremberg after incurring the wrath of a wealthy family by arguing that the West Indian wood they traded did nothing for syphilis. There are several parallels with Benveniste's story. Both mixed medicine with concepts from another field (electromagnetism and alchemy), and both threatened mercantile interests by denouncing orthodox medicines. In both cases the expert called in to adjudicate had a financial investment in the orthodox system (the Nuremberg expert was a shareholder in the import business, and *Nature* advertises pharmaceuticals). Both Paracelsus and Benveniste were censored, and both published their work elsewhere (on the Internet and in *Three Chapters on the French Disease* respectively).

fragmentary set of theories governing different situations, but he derived the first universal theory in intellectual history from *The Emerald Tablet of Hermes Trismagistus*. He applied 'as above, so below' to apples and planets, to particles in both microcosm and macrocosm under the influence of gravity. It was meditation on alchemy, not experiment or rational deduction, which lead him to conclude that:

The changing of bodies into light, and light into bodies, is very conformable to the course of Nature, which seems delighted with transmutations.<sup>51</sup>

His intuition was recently validated in a particle accelerator, but at the time transmutation was the exclusive domain of Catholic priests transforming wine into the blood of Christ, and alchemy was illegal. His 'solid, massy, impenetrable particles'<sup>52</sup> became the standard model of the universe for centuries, but the invisible parts of his cosmos were forgotten, so we ended up with nothing more than molecules and meat.

The apocalyptic mind sees the bigger picture, and discoveries such as Newton's universal theory reflect this. Paracelsus appreciated the harmony of the whole when others focused on parts. With his study of miner's sickness, he became the first Western medic to describe a disease caused by pollution, recognising the reciprocity between man and environment.<sup>53</sup> He also appreciated the integral relationship between men and women, and was one of first to suggest that both have an equal part in conception. He was also one of first to write about or care about women's diseases, 'for man suffers as man, woman suffers as woman, both suffer as two creations beloved of God.'<sup>54</sup> His understanding of toxicity and the complex relationship between man and chemicals also stems from his broad perspective. Apocalyptics often bring together distinct fields. Paracelsus brought together alchemy, natural philosophy and medicine, Newton unified mechanics, maths and astronomy, and Swedenborg united practically every branch of the Tree of Knowledge into a hierarchy of forms.

These men laid the foundations for centuries of scientific inquiry, but their apocalyptic and mystical theories are forgotten, denied, or explained away, so Newton's occult interests are seen as madness resulting from ingesting mercury during alchemical experiments. As the rational mind focuses, it excludes uncomfortable data. It is not interested in the wacky theories of its greatest theorists, and it does not like to contemplate its destruction, but there are two sides to the apocalyptic mind, often existing together in the same skull. The wholesome side is the horizon pushing broad-mindedness that occasionally changes the world. It was this that the economist John Maynard Keynes was expecting to explore when he purchased a trunk

of Newton's notes, but he was horrified to discover a huge, obsessive investigation into the cataclysm at the end of the world, work which dwarfed his mathematical and astronomical projects. This is the other side of the apocalyptic mind. Neither Newton nor Swedenborg worried that the end was imminent, but for Paracelsus, the end was damn well nigh, as he wrote in his *Prophesy for the next Twenty-four Years*.<sup>55</sup> He died five years later in 1541, before his prophesies had time to mature. Most people think that his predictions of floods and the coming of the Antichrist and New Jerusalem were the rantings of a madman, but in *Jürgen's World* we will look at the events of the sixteenth and seventeenth century, and see if there was some poetic sense in what he wrote.

Unwholesome apocalyptic thinking persists in the highest echelons of science and the humanities. Toynbee worried about the 'self-destruction of the human race' at 'this supremely dangerous moment in human history'.<sup>56</sup> Physicists are often given to making dark pronouncements about the immanent future. 'It appears glaringly that civilized mankind finds itself at present in grave danger', noted Einstein, and:

I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones.<sup>57</sup>

Both sides of the apocalyptic mind are revealed in two of his quotes. The first was about international relations:

A new type of thinking is essential if mankind is to survive and move towards higher levels.

The second is the same idea, applied to scientific progress:

Problems cannot be solved at the same level of awareness that created them.

Like Einstein, Richard Feynman was key to the development of the atom bomb, and he too worried that it might exterminate humanity. Oppenheimer, who directed the development of the first bomb, turned against the nuclear program and died convinced that it meant the beginning of the end. The doomy tradition continues in physics with Stephen Hawking, who occupies the chair Newton once held at Cambridge. Having rethought our universe into a boundless entity with hidden dimensions, and gone some way to answer questions about the beginning of time, he posed the following question about the end:

In a world that is in chaos politically, socially and environmentally, how can the human race sustain another 100 years?

And his answer one month later?

I don't know<sup>58</sup>

Who knows? The answers to the big questions lie beyond the range of our rational minds, and they come to us when we stop thinking about them. Discoveries sit in the shadows, waiting for their covers to be dissed. 'Revelation' is the *re*-moval of a *velum* or veil, and the *apocalypse* is the un (*apo*-) of *kalyptein* (to cover).

There is a lot more to the apocalypse and apocalypitics than either manic street preachers or sensible rationalists suggest, and we will examine the apocalypse from various angles throughout the book. It is my obsession as well, and I could probably write 4,500 pages if I really let the Reverendus Nemucus go, but the end is nigh and the book is just beginning, so let us turn to some of the other unsavoury concerns of our greatest thinkers. We have already mentioned drug-addled pioneers who pierced the veil, and in *The Pores of Deception* we will look at some other effects of psychedelics, but before we get too mashed, let us explore the source of the revelations.

The word 'occult' derives from the same root as occluded, and it refers to something hidden from the normal senses, not goatskin trousers and men waving their wands around. The occult has been marginalised from at least the time of *Exodus*, where 'thou shalt not suffer a witch to live'.<sup>59</sup> Though the reasoning has changed, it seems to me as I sit editing on a mossy tombstone in a beautiful London graveyard, that the prejudice stems from fear of the unknown. In Paracelsus' day, mages and proto-scientists were allies struggling against the constraints of religion. Whilst theologians pursued received knowledge through musty libraries, and explained from the pulpit what long dead people had thought about reality, mystics and empirics were grabbing reality by the nuts to see what happens when you fiddle with it. United by curiosity, or 'lust of the eyes'<sup>60</sup> as St. Augustine put it, both camps manipulated mysterious symbols known only to initiates, mixed together rare materials to produce mysterious potions, made predictions, and occasionally caused explosions. To a great extent, it was mystics who laid the foundations of modern science, men such as Tycho, Bruno, Boyle, Pascal, Copernicus, Newton, and Kepler, but things changed as the shadow of the Enlightenment fell over Europe. Ghouls and spirits were banished, and eventually even God was ousted. Philosophy continued to fall until it hit the ground with rational materialism, where anything unproven or inexplicable is considered superstitious. Science became the daddy, religion shrivelled into a dodderly old granddad, and mysticism was relegated to the loony bin

like a mad aunt. Like all loonies, she sometimes comes out with something extremely perceptive.<sup>1</sup>

One might be tempted to think that Newton and Swedenborg were the last scientist-mystics, but many post-Enlightenment scientists have drawn on Eastern mysticism. Schrödinger found in Vedanta the answers to questions raised by quantum physics, *The Upanishads* pointed Bohr towards his radical conception of reality, and *The Bhagavad Gita* inspired Einstein. Many modern researchers practiced techniques more suited to the medieval coven than the modern lab. The devotees of animal magnetism include Michael Faraday, who reintroduced the field to science with electromagnetism and discovered the laws of electrolysis. Boole was an occultist, and Augustus De Morgan, who further developed Boolean algebra, was a Spiritualist.

Spiritualism was popular amongst many scientists, including Alfred Wallace, the malarial Darwinist, and John Elliotson, the mesmeric surgeon. Another was Nobel laureate Lord Rayleigh, who discovered argon and has a long list of units, waves, and phenomena named in his honour. Sir William Crookes was another, who discovered both thallium and the cathode ray used in TV screens, performed the first investigations into plasma chemistry, and also some of the important early work in nuclear radioactivity. He held séances under controlled conditions, and was almost kicked out of the Royal Society for his scientific reports on phenomena he witnessed, including levitation and the spontaneous appearance of writing and luminous bodies. The Spiritualist Karl von Reichenbach distilled the spirit of paraffin from crude oil, and even the chemical term 'spirit' comes from the idea of the vital force of matter. Perhaps the superstar Spiritualist scientist was Marie Curie, whose search for invisible forces lead her to the séance, which she treated as a scientific experiment, employing controls and

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<sup>1</sup> The flip side is that the spirit of science is often unwelcome in modern magic circles. Mysticism has become less empirical, more theoretical, and unbearably fluffy, with New Agers who balk at the idea of checking results, mediocre mediums, astral projectors who never go beyond their own projections, and oracles whose every card smacks of optimism.

In 'proper magick', every experience must be verified, because this is the only way to prevent a mage from disappearing up his own arse. It is simple. You can ask a friend to hang a scarf on her bedroom door before visiting her in a lucid dream, and confirm the colour of the scarf in the morning. You can meet your friends on Sirius at 23:23 on the 23<sup>rd</sup> of each month, and pass symbols between you. Tests can only ever illuminate. If you find that you are deluded, and you often will, it is part of the practice; mistakes point out areas for improvement. However, when something is confirmed, sweet whore of conception, when a servitor breaks through the veil and comes back with a mouth full of angel feathers, it is an incredible joy, and it makes the years of practice worthwhile.

taking detailed notes.<sup>61</sup> She became the first female Nobel laureate with her demonstration of radioactivity.

So what is it all about? What exactly goes on on the other side?

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