

## Pregnable of Eye: X-Rays, Vision and Magic

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An expanded version of a text written to accompany Phillip Warnell's film, *The Girl With X-Ray Eyes* (2008). A version of this text was also given as a talk given for the annual conference of the British Society for Literature and Science, Keele University, March 29, 2008.

I dwell in Possibility –  
A fairer House than Prose –  
More numerous of Windows –  
Superior – for Doors –

Of Chambers as the Cedars –  
Impregnable of Eye –  
And for an Everlasting Roof  
The Gambrels of the Sky –  
(Dickinson 1970, 327)

Michel Serres has argued that, where philosophy has been governed by the prepositions 'on', 'under' and 'in', we would profit from a thought that might let itself be governed by other prepositions, like 'with', 'across', 'among' and 'between' and 'through' (Serres 1994, 83; my translation). What is the defining modern experience? We will not find it, I think, where we usually look for it, in desire, power, rationalisation, commodification, constitution of the subject or dissolution of the subject. The predominating modern experience, I want to say, is that of being permeated. Accordingly, this essay is predisposed to and by the last preposition in Serres's list, as a thinking through the 'through'.

### Bony Light

The profession of Mr Venus, the articulator of skeletons in Dickens's *Our Mutual Friend*, gives unease to his beloved: "I do not wish to regard myself, nor yet to be regarded, in that bony light" (Dickens 2000, 88). It is easy for us to imagine that, when they burst into view in December 1895, and swept across the world during the following year, X-rays must have had just the same kind of unnerving effect, stripping away the flesh to reveal 'the skull beneath the skin' (Eliot 1969, 52). Only injury, torture or extreme malnutrition makes the skeleton apparent in life in the same way. The X-ray saw through time as well as fleshly space, giving us a glimpse of our future postmortem condition, and making it grimly manifest that we already are the skeletons to which we will one day be reduced. A poem that appeared in

*Punch* in the immediate aftermath of the sensational discovery of X-rays makes the connection clear:

O, Röntgen, then, the news is true,  
 And not a trick of idle rumour,  
 That bids us each beware of you,  
 And of your grim and graveyard humour. (Anon 1896a)

And yet, this reaction did not last long, and accounts and evocations of the X-ray quickly acquired a different temper, as X-rays became associated with life, health, beauty and growth, in this anticipating and complementing the highly positive attitude towards radioactivity in general during the first half of the twentieth century, which many saw as a kind of alchemical vitalisation of matter (Campos 2007). Human beings were not the only beneficiaries of X-rays: ‘If the Roentgen method of seeing through things pans out anywhere near as well as its friends expect’, suggested *Life*, ‘we are entitled to hope that it will almost put an end to vivisection. There will be no need to put a knife into a live animal when a ray will make its inner workings visible’ (Anon 1896b). The diagnostic possibilities of X-rays were apparent straight away, but its therapeutic uses were also enthusiastically embraced, despite its disappointing lack of effect on bacteria. Indeed, the very dangers of X-rays suggested therapeutic and cosmetic possibilities. Within months of their appearance, it had become well-known that prolonged exposure of the skull to X-rays (and exposures at this period could be, terrifyingly, of an hour or more) led to hair loss. This provoked the cheerful suggestion in *The Lancet* that X-rays might have value as a depilatory:

If the time that elapses before positive baldness was effected could be reduced what an incalculable benefit would Roentgen’s discovery confer on shavers. Thus to remove the beard would only require the placing of a Crookes’s tube for a few minutes over the chin before retiring to rest, when next morning the ordinary application of soap and water would complete the operation! Under these circumstances, the “new barber” may not impossibly be one of the many outcomes of the “new photography.” (Anon 1896d, 1296)

Despite mounting evidence of the dangers of X-rays, Albert Geysler was able through the first two decades of the twentieth century to continue treating women with radiation for excessive hair and other ailments. In 1924 he set up the Tricho Sales Corporation, which gave hair-removal treatment to tens of thousands of women before claims for damages from women with appalling tumours caused the company’s collapse in 1930 (Collins 2007, 68-9).

The simplicity and relatively easy availability of the equipment necessary to produce X-rays meant that many were able to encounter, explore and invent their own excitements with the new discovery. A correspondent contributed to *The Lancet* some anecdotes arising from a travelling X-ray display that he conducted, which included a report of two elderly ladies who

entered the small room and, solemnly seating themselves, requested me to close and fasten the door. Upon my complying they said they wished “to see each other’s bones,” but I was “not to expose them below the waist-line,” each wishing to view the apparently dismantled osseous structure of her friend first! (Hunter 1896)

Another (a young girl ‘of the domestic servant class’) saw the opportunity for some fine-grained quality-control in her matrimonial arrangements, asking the lecturer in confidence if he ‘would “look through her young man unbeknown to him while he looked at the pictures to see if he was quite healthy in his internals.” ’ (Hunter 1896). One might have expected the funereal associations of the X-ray to have given them a decidedly anaphrodisiac cast, but the thrilling prospect of being able to peer beneath the clothing of females – ‘I hear they’ll gaze/Thro’ cloak and gown – and even stays,/These naughty, naughty Roentgen Rays’ in the ribald wink tipped by one contemporary poem (quoted, Bleich 1960, 6) – seems to have maintained its mortuary eroticism even when the flesh itself yielded to the X-rays, as in the ‘Lines On An X-ray Portrait of a Lady’ which appeared in *Life* in March 1896

She is so tall, so slender; and her bones –  
Those frail phosphates, those carbonates of lime –  
Are well produced by cathode rays sublime,  
By oscillations, ampères and by ohms.  
Her dorsal vertebrae are not concealed  
By epidermis, but are well revealed.

Around her ribs, those beauteous twenty-four,  
Her flesh a halo makes, misty in line,  
Her noseless, eyeless face looks into mine.  
And I but whisper, “Sweetheart, Je t’adore.”  
Her white and gleaming teeth at me do laugh.  
Ah! lovely, cruel, sweet cathodograph! (Russel 1896)

The story has been told many times of how X-rays and other forms of radiation, having been presented as universal forces for Enlightenment and

human improvement, turned out to be harbour terrible dangers. As Bettyan Holtzmann Kevles observes:

Whereas the first generation of X-ray explorers lived in a world in which science meant progress, today we are aware of the potentially lethal repercussions of exposure to radioactivity and are apprehensive about the delayed action of all kinds of invisible enemies from chemical pollution to dormant viruses to electromagnetic power lines. The combination of invisibility and delayed reaction is still hard to grasp. (Kevles 1997, 53)

The peril lay in the pleasure and the pleasure in the peril. There can be few people over the age of fifty in the industrialised countries who do not still remember the pleasure of viewing their own infant metatarsals wiggling under the foot-fluoroscope in the shoe-shop, the pleasure spiced by the danger which, as Jacalyn Duffin and Charles Hayter have shown in their assiduous reconstruction of the long history of this apparatus (Duffin and Hayter 2000), had been known about well before it came into operation in the 1920s. We may suspect that the repetition of this story is fuelled, not by outrage and apprehension at scientific irresponsibility, but rather by a sense that the pleasure of the X-ray would have somehow to be paid for. To see oneself *sub specie mortis* - ‘To take our flesh off, and to pose in/Our bones’ as *Punch* put it (Anon 1896a) – there was delight in this bony light.

### **Quick and Penetrating**

The X-ray may have been embraced so pleurably because seeing through things was no novelty in mental life. The dream of X-ray vision is ancient, abiding and widely broadcast. X-ray vision is an imaginary redemption of one of the most fundamental deficiencies of sight, namely that it gives us access only to the outsides of things – only to their aspects and superficial appearances. Early theories of sight not only recognised this feature of seeing, they actually amplified it, for example in the extraordinary theory of the ‘simulacra’. For the early atomists, Democritus, Leucippus and Epicurus, and others beside, vision was made possible not because of light being reflected from the surfaces of things, but because those things were perpetually shedding infinitesimally thin peelings of their outer surfaces. These ‘eidola’, ‘effigies’ or ‘fleeces’ of appearance, entering directly into the eye, were what the eye actually ‘saw’. This is in marked contrast to the ear, which has the power of discerning the inward nature or qualities of things – which is why we ‘sound things out’, and why to ‘sound’ a body of water is to get to the bottom of it.

There would seem to be a defect, a defeat, a deflection at the very heart of vision, which accords oddly with the human tendency to laud it as the master sense, identifying it with the power to know and grasp things immediately, as what they essentially are rather than merely what they contingently appear to do. This counterfactual idea of the eminence and autonomy of the eye can be seen in the various fantasies of projective or exorbitant vision – that is, vision that surpasses the puny orbit of the eye of flesh, to encompass infinities of distance, and to overcome the limits of location and of scale. Plato’s ‘extramission theory’ of vision, that the eye emitted rays which actively seized or illuminated the objects of sight, so that ‘the eye sees the physical world by shedding its own light upon it’ (Smith 1996, 22) proved hugely influential, being transmitted by Euclid, Theophrastus, Ptolemy, Galen and Islamic scholars of ophthalmology (Lindberg 1981, 1-11). Aristotle doubted the theory and, as his influence increased across Europe and the Arabic world, the tide began to turn, but even Leonardo entertained the extramission theory for a time, and it has remained a staple of occultist and heterodox traditions, as well as being regularly reverted to by the more florid kind of psychotic.

So, when Bettyan Holtzmann Kevles suggests that X-ray photography may be ‘the only major scientific discovery that was entirely unanticipated, but which was nonetheless accepted immediately, universally, and without question’ (Kevles 1997, 2), she may be right about the universal acceptance of X-rays, but is surely wrong about them being unanticipated. Wilhelm Röntgen first observed the rays when experimenting with a Crookes tube, a device invented by William Crookes in 1878. When the tube was exhausted of air and high tension electric current passed between a cathode and an anode inside it, a glowing stream of ‘cathode rays’ (later identified as electrons by J.J. Thomson) was produced. Röntgen noticed that, with the discharge tube enclosed in black cardboard, a paper plate coated with barium platinocyanide two metres away began to glow. Four weeks of intensive work led to the appearance of his paper ‘On a New Kind of Rays’ at the end of the year, news of which penetrated to all parts of the world within days (Röntgen 1895, 1896). But the new kind of rays might have easily have been discovered earlier, since Crookes tubes had been spilling out X-rays in laboratories for almost two decades. Crookes himself must have regretted not realising sooner that the photographic plates that kept getting fogged up in the vicinity of the cathode rays were not in fact defective. As George Sarton remarks, though Röntgen’s discovery, and careful work of analysis, helps to establish 1896 as the beginning of modern physics, the discovery of X-rays ‘was in the air when it was made [for once this phrase merits a literal application], and if Röntgen had not been available or had been less persistent or successful, the selfsame discovery

would have been made sooner or later – and probably very soon – by Lenard or somebody else’ (Sarton 1937, 358).

But there is another, more general sense in which X-rays may be said to have been verified in 1895 rather than primitively revealed. Quite apart from all the metaphorical references to looking into the secrets hidden in another’s mind or breast, mesmerists and spiritualists had been claiming the power to see through opaque objects for much of the nineteenth century. Accounts of the prehistory of ‘animal magnetism’ regularly mention individuals endowed with this faculty, such as the young lady of Lisbon described in the *Mercur de France* of 1725 ‘whose lynx-eyes appear to have been capable of penetrating the earth to an extraordinary depth. She also possessed the faculty of seeing into the interior of human bodies , and of perceiving the circulation of the blood, the process of digestion, &c.; and she discovered diseases which escaped the penetration of the most able and experienced physicians’ (Colquhoun 1851, 2.17). Anton Mesmer’s discovery of ‘animal magnetism’ in France produced a wave of testimony to the extraordinary sensory augmentations that could be achieved by means of the magnetic or electric fluid. Among them was the physician Jacques-Henri-Desiré Pététin, who in 1808 described at length the remarkable displacements and reordering of the senses experienced by a cataleptic patient in his care. She first of all developed the capacity to hear through her stomach and fingertips, while being unable to hear through her usual organs, which required her physician in all seriousness to address all his enquiries to her abdomen or to her fingertips (Pététin 1808, 1-17). Having discovered that his patient could also taste with her stomach, Pététin then made another astonishing discovery: she was able to read the values of playing-cards placed face-down on her stomach (Pététin 1808, 45). She had less success identifying a ring that had been wrapped in taffeta, probably, Pététin surmised, ‘because the same substances which intercept the movement of the electric fluid, were also an obstacle to this new manner of seeing’ (Pététin 1808, 47, my translation). There were more revelations in store for the disbelief-suspending Pététin, for his patient then developed diagnostic powers exceeding his own, to see both into his body and into the future course of his ailment:

You are sluggish this morning, Monsieur Doctor ... - You are right, Madame; if you knew the reason, you would not reproach me like this. – Oh! I can see; you have had a migraine for four hours; it will not go until six, and you are right to do nothing for this malady, which no human power can prevent from running its course. – Since when have you been a doctor? – Since I have had the eyes of *Argus*. – Would you be able to tell me on which side I have my pain? – In the right eye, the

temple and teeth; I can tell you that it will pass across to the left eye, that you will suffer greatly for three or four hours, and that at six o'clock your head will be perfectly clear. (Pététin 1808, 55-6, my translation)

His patient then went on to identify with her eagle-eyed abdomen a medallion that he held over it in his closed hand and then to read the address on a letter enclosed in a box and concealed in the his hand (Pététin 1808, 56). The interesting feature of this account is that vision is not only freed from the constraint of not being able to penetrate opaque objects, it is also freed from its localisation in the organs of sight, thus becoming doubly mobile.

Mid-century mesmerists like J. Stanley Grimes developed the same kind of analogies between magnetism and clairvoyance as later writers would between X-ray radiation and the seeing of the unseen.

Light cannot penetrate boards and stone walls, but magnetic force can do so; for a magnet affects iron filings through such obstacles, almost as if there was nothing in the way; and so also does gravitation. It is plain that if we could perceive through the medium of this magnetic force instead of light, we could see through boards and walls as easily as the magnet operates through them; for the magnet operates in the dark just as well as in the light. (Grimes 1850, 169)

Grimes saw the clairvoyance of the mesmerised subject as 'uninsulated perception' (Grimes 1850, 165), explaining that 'in Clairvoyance, the brain seems to be excited by Etherium in a different state [i.e. different from ordinary sense perceptions] – by emanations which are ordinarily excluded by insulation – and which are introduced in opposition to the insulating guards' (Grimes 1850, 172). A subject in such a condition, 'with his eyes closed and carefully bandaged, can see, or rather can perceive, through walls impervious to light and sound, and at immense distances – can perceive, indeed, in a way as incomprehensible to us as the perceiving with eyes was to a blind man' (Grimes 1850, 169). .

In his autobiography, *The Magic Staff*, the medium Andrew Jackson Davis reported his experiences under mesmeric trance of being able to 'discern, and that, too, without a conscious effort, the whole mystery and beauty of the human economy' (Davis 1857, 217), the view of the interior anatomy being enlivened by flames and emanations of life force:

From the brain I saw the diversified currents of life or magnetic fire, as they flowed through the system. The bones appeared very dark or brown; the muscles emitted in general a red light; the nerves gave out a soft, golden flame; the venous blood a dark, purple light; the arterial blood a bright, livid sheet of fire, which constantly reminded me of the electric phenomena of the clouds. Verily, gentle friend, I saw every ligament, and tendon, and cartilaginous and membranous structure, each illuminated with different sheets and magnetic centres of living light, which indicated and set forth beautifully the presence of the spiritual principle. (Davis 1857, 217)

Davis reports successfully reading, with his eyes bound, the title of a book hidden behind a row of five other books (Davis 1857, 218) and looking through the walls of the building in which he is sitting:

Next, I could distinctly perceive the walls of the house. At first, they seemed very dark and opaque; but soon became brighter, and then *transparent*; and, presently, I could see the walls of the adjoining dwelling. These also immediately became light, and vanished – melting like clouds before my advancing vision. I could now see the objects, the furniture, and persons, in the adjoining house, as easily as those in the room where I was situated. (Davis 1857, 217-18)

This builds to a climactic vision in which ‘by a process of *inter-penetration*’ (Davis 1857, 218) clairvoyance is joined to what might be called ‘pervoyance’ on a global scale:

my perceptions still flowed on! The broad surface of the earth, for many hundred miles, before the sweep of my vision – describing nearly a semicircle – became transparent as the purest water; ... The external anatomy and the internal physiology of the animal kingdom were alike open to my inspection. An instinctive perception of comparative or relative anatomy filled my mind in an instant. The why and the wherefore of the vertebrated and the avertebrated, of the crustaceous and molluscan divisions of the animal world, flowed very pleasantly into my understanding; and I saw the brains, the viscera, and the complete anatomy, of animals that were (at that moment) sleeping or prowling about in the forests of the Eastern hemisphere, hundreds and even thousands of miles from the room in which I was making these observations. ((Davis 1857, 219-20)



These claims were still being made two decades later, in the work of Johann C.F. Zöllner, who undertook systematic investigations of supernatural and spiritual phenomena with the assistance of the medium-conjuror John Slade, publishing his results as *Transcendental Physics*, the title of which nicely epitomises the new alliance which was forged between magical thinking and advanced scientific ideas in the late nineteenth century. In preparation for an experiment on the psychic manipulation of chemical polarities, Zöllner asked Slade to tell him when two prisms crossed over blocked out all the light, but was intrigued when Slade assured him that he could still see the blue sky perfectly through the prisms. When Zöllner increased the size of the prisms to cut out all ambient light, he was obediently astounded to find that Slade was still able, despite the intervening prisms, to read out to him a passage from a biography of Faraday held up in front of him (Zöllner 1880, 51-2).

Occultists, spiritualists and supernaturalists seized upon the Röntgen rays as the ocular proof of the powers they had been claiming for decades. H.J.W. Dam observed wryly in April 1896 that ‘The relation of the new rays to thought rays is being eagerly discussed in what may be called the non-exact circles and journals’ (Dam 1896, 409). Jules Bois suggested in the French occult journal *Revue Spirite* that ‘the discovery of the famous X-rays that traverse opaque materials may well put us on the road to a rational explication of clairvoyance. As well as X-rays, there may well be ‘X-ray vision’, that is, vision that traverses matter and also time, penetrating past and future’ (Bois 1896, 355). Another, more excitable contribution to the same journal, which took a close interest in the new radiant technology in the later 1890s, enlisted Röntgen in a roll of honour of nineteenth-century prophets of mesmeric power: ‘Hail to Mesmer, Deleuze, Puysegur, Reichenbach, Allan-Kardec Aksakof, de Rochas, Lafontaine, Roentgen and the shining and invincible legion of magnetisers!’ (Messimy 1896, 405, my translation). In fact, despite his sideswipe at the occultists, H.J.W. Dam’s article in *McClure’s Magazine*, which brought off the scoop of a visit to the laboratory of the retiring Röntgen, did its best to present his subject as a kind of magnetic magus, an adept of the force he has discovered: ‘his long, dark hair stood straight up from his forehead, as if he were permanently electrified by his own enthusiasm... His eyes are kind, quick, and penetrating’ (Dam 1896, 410). Dam was allowed to sit in the dark in Röntgen’s isolation box and see the effect of the X-rays for himself. His description evokes the thrills of the séance:

The moment the current passed, the paper began to glow. A yellowish-green light spread all over its surface in clouds, waves, and flashes. The yellow-green luminescence, all the stranger and stronger in the darkness, trembled, wavered, and

floated over the paper, in rhythm with the snapping of the discharge. Through the metal plate, the paper, myself, and the tin box, the invisible rays were flying, with an effect strange, interesting, and uncanny. The metal plate seemed to offer no appreciable resistance to the flying force, and the light was as rich and full as if nothing lay between the paper and the tube. (Dam 1896, 412)

Tom H. Gibbons and Linda Dalrymple Henderson have shown how X-rays continued to suggest the visibility of the invisible among twentieth-century avant-garde artists of a more mystical temper (Gibbons 1981; Henderson 1988). More recently, Mark S. Morrisson has seen X-rays as having a central role in the assimilation of contemporary science to the occult that is part of the larger return of alchemical conception of mutable matter in the modern period (Morrisson 2007, 26, 47, 67, 116).

It would clearly not be long before reports were received of people claiming to have precisely the X-ray eyes mooted by Jules Bois. The most detailed of these concerned Afley Leonel Brett, the eleven-year-old son of Massachusetts physician Dr Frank Wallace Brett. Dr Brett was in the habit of hypnotising his son (we are not told why), but knew nothing of his son's accomplishment until, one afternoon, in November 1897, 'upon coming out of a hypnotic state into which he had cast him, he made use of this curious expression, "Oh, papa, I can see your bones!" ' (Anon 1899, 6). Not only was the boy able 'to see through the usual clothing, underclothing, and flesh of a man, and to observe the bones and internal organs as clearly and as accurately as the ordinary eye reads a newspaper' (Anon 1899, 6), he could see more detail than X-rays provided:

Outside clothing, linen, underwear, the human skin and flesh itself, are as nothing in his sight. The bones of the subject stand out in bold relief, and the organs of the person upon whom he may be looking are spread before him as though on a chart. These miraculous eyes also behold the human anatomy in its true colours, red, white, brown, even to the blue of the venous blood. This is impossible with the X rays. Under its use everything appears of the same shade. (Anon 1899)

Other cases went the rounds of the popular press on both sides of the Atlantic. The *Penny Illustrated Paper* recalled in 1911 that 'Dr. Ferroul, of Narbonne, and Dr. Grasset, of Montpellier, some years back examined a young girl of Narbonne, and she was found to possess eyes similar to those of Lionel Brett. Experiments proved that she could see through opaque bodies as clearly and penetratingly as if her eyes generated Röntgen rays'

(Anon 1911a, 28). More recently, Leo Brett's accomplishments have been duplicated by the Russian teenager Natasha Demkina, who has been making miraculous diagnoses of patients' ailments based on her powers of X-ray vision since 1997, when she was 10. This is how she described her powers in the programme *The Girl With X-Ray Eyes*, broadcast by BBC's Channel 4 in February 2005:

The mechanism of my vision is pretty simple. I have two ways of seeing. The first is normal, like everyone else. The second kind of vision I call medical vision. When the medical vision is switched on I see ... like when you open an anatomic book you see the anatomical structure. If I need to examine a particular organ more closely, let's say the heart, lung, kidney or liver, I focus more closely on this organ. I can see all the processes at work – for example, the circulation of the blood, or respiration. I love to observe it. There is inside us a spectrum of such bright colours. In real life I've never seen such a combination of colours. You could only perhaps compare it to a sunset. (Garnsey 2005)

It is hard to tell if this is an eidetic hallucination or a hallucination of eidetic power. In either case, an accessory fantasy pigments the fantasy of X-ray vision, namely, that of the immediate legibility of the human body. Natasha Demkina's story makes much of the fact that, when she first began to see the insides of bodies as a young girl, she lacked the anatomical names for what she nevertheless clearly saw – even though the history of anatomy shows that naming is actually an essential part of seeing. Indeed, this seems to be the function of the child-figure in such stories of miraculous vision: once the body's processes had been unconcealed, they would be entirely intelligible to the most untutored eye. Leonel Brett's most spectacular success was with a sixty-year old woman who had been diagnosed with cancer of the liver. Dr Brett sought the opinion of his son:

Dr Brett refused to declare his diagnosis until Leo had been called into his study to aid. "Leo," said Dr Brett, "I want you to compare this lady's liver with mine." In hardly a minute, the boy answered, to quote his own words, "Why, papa, her liver is much larger than yours. Besides, yours is smooth, while hers is all covered with bunches like hubbly ice. Yours is brown, while hers is brown all streaked with white, like fancy chocolate cake. The white stuff looks to me like candle grease." This proved that the woman was not suffering from cancer, but from amyloid degeneration of the liver. (Anon 1899)

The handy-dandy dynamic here is a familiar one: the advance in a technical form of imaging which gives the medical profession enhanced authority produces a compensatory fantasy in which the doctor's power of interpretation is appropriated and outdone by the patient. This involves an odd interference of perspectives. For it was the X-ray that made the human body seemingly intelligible, by simplifying the internal body's tangle of tripes into a flat diagram, in which levels were clearly separated, and the complex relations of organs and tissues faded into homogeneous haze. But the X ray has then suggested the fantasy of a penetrative vision that was superior to it, for example in showing the details of texture and colour in which the X ray was lacking, even though true colour would be impossible without some source of light to allow the differential reflections that result in the distinguishing of colours. But, far from clarifying the scene, colour would be likely to restore the very illegibility that the X-ray overcame. A seeing that is an immediate knowing is bundled in with the fantasy of the seeing that can overcome every obstacle, even though that immediate legibility provides strong indications that X-ray vision cannot be involved here at all, given the very considerable expertise required to interpret X-ray photographs.

We may safely assume that, in such fantasies, the experience of vision, which is supposed to be yielding primary and immediate evidence to the senses, evidence which is then subsequently subject to interpretative processes, is in fact an artefact, back-formed from a process of imaginary interpretation that has in fact preceded and produced it. Where the young Demkina seems to be making plausible and sometimes impressively intuitive guesses from external evidence, the fantasy of X-ray vision is a way of concealing this process both from others and very likely from herself. As we will come to see, such opacity is a recurring feature of fantasies of superlative perspecuity.

### **Intimate and Interior Light**

The pleasure of X-rays would seem to rest with the vicarious power they gave to the viewer, confirming the fantasy of the unstoppable force of the hungrily excursive eye. X-rays, or at least the cathode-ray tube apparatus which produced them, would eventually be linked to the development of vision at a distance, in the form of television. A meeting of the Röntgen society in 1911 reported on a presidential address by A.A. Campbell-Swinton, in which he 'outlined an arrangement by which with the aid of cathode rays it might be possible to realise distant electrical vision, or in other words, do for the sense of sight what the telephone had done for the sense of hearing' (Anon 1911b, 24).

One side of the dream of X-ray vision was limitless hyperoptical power: nothing could lie hidden from the penetrating gaze of the transperceptive viewer. But the other side was the sense of being unobstructedly open to view. A sermon produced in the year following the discovery of X-rays made explicit the sense that here was a visible manifestation of the way in which the individual soul lies open to the eyes of God:

Christ knew what was in man. He used the X rays to discern the thoughts and intents of the heart. He sees through us, for we are transparent. It may be we entertained the delusion that our thoughts were known only to ourselves. But the X rays of his vision disclose them. Whatever doth make manifest is light. And so we live in the very light of Christ's vision. Nothing is hid; nothing is beyond the range of His sight. (Ide 1896, 517)

No doubt X rays, along with the other forms of radiation of which people began to hear in the 1890s – while investigating X-rays, Henri Becquerel discovered the radioactivity of uranium salts in 1896 (Becquerel 1896) – also assisted in forming the paranoia of psychotics like Daniel Paul Schreber, who was already institutionalised during the period when X-rays came to notice, but who seems to have assimilated the new rays to his delusions that his body was being dissolved and remade from the inside by rays from God. The rays, which Schreber thought of as the nerves of God (Schreber 2000, 95), were intensely damaging, bringing about a pulling out of the nerves, and a sensation that his skull was being ‘repeatedly sawn asunder in various directions’ (Schreber 2000, 147). And yet they were restorative and protective too: though he felt that ‘the bony material of my skull ... [is] partly pulverized by the destructive action of the rays ... it is restored again by pure rays particularly during sleep’ (Schreber 2000, 147). Indeed, Schreber asserts that ‘I doubt very much whether I am at all mortal as long as the communication with rays lasts’ (Schreber 2000, 145). Schreber attributed to the rays a picture-making power, as in this explanation of what he means when he uses the expression ‘the mind’s eye’: I receive light and sound sensations which are projected direct on to my inner nervous system by the rays; for their reception the external organs of seeing and hearing are not necessary. I see such events even with eyes closed’ (Schreber 2000, 121n). But when Schreber explicitly mentions X-rays, it is in a rather unexpected way, to suggest that they might be used to make visible the workings of the other rays to which he had been subjected:

During the first years of my illness it would in my opinion have been an easy matter by a thorough examination of my body with the help of medical instruments and above all with Roentgen-Rays (not then discovered) to demonstrate the most

obvious changes in my body, particularly the injuries to my internal organs which in other human beings would have been fatal. If it were possible to make a photographic record of the events in my head, of the lambent movements of the *rays coming from the horizon*, sometimes very slowly, sometimes—when from a tremendous distance—incredibly swiftly, then the observer would definitely lose all doubt about my intercourse with God. (Schreber 2000, 303)

One might expect X-rays to have encouraged a revival of the epidemic of delusions of having a glass body that were regularly reported in the seventeenth century (Speak 1990). Is there not anxiety in the prospect of being open to the piercing gaze of others, like a glass vessel or a jellyfish? Is there annihilation in this look? The terms suggest the work of Jean-Paul Sartre, for whom looking and being looked-at often dramatise the stark asymmetry between the lived body and the body as object. In fact Sartre uses the experience of undergoing an X-ray to dramatise the difference between two kinds of perception, at the beginning of the section on ‘The Body’ in his *Being and Nothingness* (1943):

Of course during a radioscopy I was able to see the picture of my vertebrae on a screen, but I was outside in the midst of the world, I was apprehending a wholly constituted object as a *this* among other *thises*, and it was only by a reasoning process that I referred it back to being *mine*; it was much more my property than my being. (Sartre 1984, 303-4)

We may suspect though, that this was not quite the experience of the first viewers of X-ray photographs and fluoroscopes. For radioscopy seems to have made visible a body that is both subject and object, both in the world and immediately my own. There seems to have been a kind of rapture in the particular form of capture that the X-ray offered for the interior body – Schreber speaks often of the ‘voluptuous’ effects of his delusions. X-rays were amazing not because they showed the human body in a new light, but precisely because they seemed to verify a form of implicit perception of invisible interiority that people wanted to believe they already had. In X-ray irradiation, I am not invisible but transparent, not annihilated but made open, and, what is more, open to myself. Perhaps this accounts for the deep desire among earlier spectators of X-rays to view themselves in depth. They seemed to materialise the coenaesthetic apprehension of the interior body, to give reflexivity an outward and visible form. Among the many gags on the subject of X-rays published during 1896 was the following:

SHE: I wish some photographs taken.

PHOTOGRAPHER: Yes, madame, with or without?

“With or without what?”

“The bones.” (Anon 1896c)

Through the agency of X-rays, I seem to be able to turn myself inside out, seeing myself from both sides, both in my being and out in the world. The X-ray is an reified coenaesthesia, an object on which the internal seeing without an object can come to rest. It is the visible form in the world of the ‘nihilation’ the no-thing that, according to Sartre, I am.

Perhaps an important part of the pleasure of X-rays, or rather X-ray photographs (‘cathodographs’ as they were inaccurately known for a while), was what they did to the flesh rather than the bones. Renaissance anatomy peeled away the outer rind of skin to reveal the unlovely, odorous chaos of tubes and tissues inside. But, with X-rays, the flesh was delivered up, not as meat, but as light. The body revealed by X-rays was not merely irradiated, it was made radiant. Alongside those who saw the worldly applications of X-ray photography, in medicine, metallurgy and archaeology, there were many who saw in its results the proof of the spiritual or astral body. The *Herald and Presbyterian* newspaper proclaimed that:

This discovery corroborates, so far as any material experiment can, Paul’s doctrine of the spiritual body now existing in man. It proves, as far as any experiment can prove, that a truer body, a body of which the phenomenal body is but the clothing, may now reside within us, and which awaits the moment of its unclothing, which we call death, to set it free. (quoted Glasser 1933, 206)

Hippolyte Baraduc, a doctor at the Salpêtrière hospital, who had been experimenting with the photographing of invisible soul-emanations for some years before the news broke about X-rays, saw in them not the shadows formed by the partial occultation of the rays, but rather a positive imaging of the soul - for ‘light is...shadow is not’ (Baraduc 1913, 74). X-rays went public just as Baraduc’s book *L’Âme humaine* (1896) was in press, but he was able, writing of himself in the third person as was his practice, to add the following explanation of them:

The interesting fact of procuring photographs of the hand showing its skeleton and its form, struck the scientific world with astonishment, it is the faculty which this invisible light had of lighting up the cavity of the body by illumining or by exciting, so to speak, *the intimate and interior light of the fluidic body*,

which Dr Baraduc had iconographed two years before. The vital soul appears so luminous that, alone, the most opaque bodies which possess less luminous life, such as the bones, decide upon the spectral shadow of the totality of the organs: neither veins nor nerves appear, all is immersed in the intensity of the photo-chemical light of the animistic body. (Baraduc 1913, 77)

Baraduc saw X-rays as the way in which science had at last become 'acquainted with the luminous body' and therefore as 'a link between the purely physical known experiments and those of a more elevated order' (Baraduc 1913, 77-8). The semi-translucent mist of X-ray flesh resembled the bodily forms displayed by spirit photographs. X-ray flesh was therefore a kind of teleplasm. It was not the inert, dark body of the en-soi, but the soft body of the lived flesh, the flesh I inhabit and know as my own. The X-ray seemed to show the flesh ensouled, suffused with spirit.

This was the aspect of X-ray vision that was taken up most enthusiastically by occultists and supernaturalists. X-ray vision revealed what occultists had been saying all along, that matter was fundamentally insubstantial, especially when regarded by the transpiercing inner eye. Swâmi Abhedânanda's *How To Be A Yogi* (1902) attributed the power of X-ray vision to the enlightened:

They digest their food consciously, as it were. They claim that by a third eye they can, so to speak, see what is going on in their internal organs. Why should this seem incredible to us when the discovery of the Roentgen rays has proved everything to be transparent? (Abhedânanda 1902, 47)

This dream manifested itself in H.G. Wells's *The Invisible Man*, which was published in 1897, the year following the worldwide radiation of the idea of X-rays. Wells's hero employs the idea of being able to vary the refractive index of the materials of the human body, reversing the process in which glass when it is smashed and powdered loses its transparency:

Just think of all the things that are transparent and seem not to be so. Paper, for instance, is made up of transparent fibres, and it is white and opaque only for the same reason that a powder of glass is white and opaque. Oil white paper, fill up the interstices between the particles with oil so that there is no longer refraction or reflection except at the surfaces, and it becomes as transparent as glass. And not only paper, but



cotton fibre, linen fibre, wool fibre, woody fibre, and *bone*, Kemp, *flesh*, Kemp, *hair*, Kemp, *nails* and *nerves*, Kemp, in fact the whole fabric of a man except the red of his blood and the black pigment of hair, are all made up of transparent, colourless tissue. So little suffices to make us visible one to the other. For the most part the fibres of a living creature are no more opaque than water.’ (Wells 1995, 83)

The process is achieved by a form of radiation, which is both distinguished from X-rays and in the process associated with them:

‘the essential phase was to place the transparent object whose refractive index was to be lowered between two radiating centres of a sort of ethereal vibration, of which I will tell you more fully later. No, not these Röntgen vibrations – I don't know that these others of mine have been described. Yet they are obvious enough.’ (Wells 1995, 86)

X-rays suggested more than the possibility of seeing into the secluded interior of the body. For many occultists, X-rays were an analogy – visible in their effects if not in their actuality – for the process whereby the body itself was believed to propagate force and form beyond itself. A parallel was commonly drawn in the 1890s between X-rays and force of ‘od’ that was the subject of enthusiastic investigation by Carl von Reichenbach in the 1850s and 1860s. Reichenbach saw the od as a force radiated by all living beings, especially, of course, higher beings like, well, men:

an uncommon degree of radiation is attributable to the force we call od, whose bounds, perhaps, like those of light, lie in the infinite. The consequence of this radiant energy is that we carry about with us continually an illimitable train of radiant light which, undetected by our own eyes, sweeps into space from our fingers, toes and limbs, and that, as living beings formed of matter, we are surrounded by a luminous atmosphere of our own, which we take with us wherever we go. (Reichenbach 1926 91)

For these experimenters, the body was not merely the penetrated object of radiation, but also itself a radiating source.

### **X Marks the Spot**

The most famous exponent of X-ray vision is not in fact a turn-of-the-century artist or occultist, but a twentieth-century comic book hero,

Superman. One of the interesting things about comic book heroes and science fiction series such as *Star Trek* is what might be called the sceptical credulousness of their fans, who like there to be a plausible physics behind the various fantastic effects featured in the series. One wartime episode, which featured in a newspaper comic strip, of February 18th 1942, rather than a comic book, shows Superman failing the army recruitment eye test, as a result of absent-mindedly reading the eyechart in an adjoining room with his X-ray vision.

SUPERMAN

The Failure



<http://www.thrillmer.com/comics/superman420218.jpg>

This identifies an interesting feature of X-ray vision, namely that, in order to be of any utility, the X-rays must be stopped, concentrated or brought to a focus. The power to penetrate cannot be absolute or universal, otherwise it would not be a power at all (in fact, even Superman's x-ray vision comes up short when it encounters lead). For power must always be concentrated, or, to say the same thing differently, it requires a differential field of operation – here, power, there powerlessness; here the subject of power, there its object. Superman must direct his gaze (in both senses, both aiming it and governing it), in order to switch on and focus his X-ray vision. That he can sometimes lose concentration and allow his X-ray gaze to wander into a middle distance suggests that he may suffer, in his own terms, from some optical deficit, an occasional failure to resolve objects at the required focal length. The power to surpass material limits must itself be subject to some limitation: Superman must maintain supremacy over his own superpowers; indeed this is precisely the role of Clark Kent, the incarnate form in which Superman voluntarily curbs his powers, but in that very process, assures that they can be powers at all, which is to say, powers that he can exercise, rather than being subjected to them. The fact that Superman's X-ray vision was bundled together with a heat-ray until the 1950s, after which time the conjoined powers were dissociated (another way of limiting the illimitable), intensified the danger, as illustrated, for example, in the episode in which Superman loses control over his destructive vision and runs amok, melting lampposts.

On the one hand, X-rays promise a utopia of pure spiritual essences, in which it would be possible to see through the obscuring veil of materiality,

and in the process leave it behind, moving to a higher plane, or to a more refined condition. On the other, they involve an irreducible necessity for some form of material mediation, a screening, detaining, or fixing, which seems to compromise, or indefinitely to defer the immaterialist dream of a world in which all that is solid may be melted into air.

The question of how Superman sees through things at all with his X-ray vision even when it is functioning properly is also somewhat ticklish. For the problem with X-rays is that, for the most part, what they like best is to go through things, and to go on going through things unless or until they meet something, like lead, that absorbs or scatters them. In order to exercise his X-ray vision, Superman would need some arrangement whereby the rays could be bounced back to him, as though he were able to exude some kind of screen which could be sent out in advance of the X-rays in order to reflect them (Ralston 2007). The problem is that this seems not to be possible with X-rays, which are very difficult indeed to reflect. Röntgen himself decided early on that X-rays could not be described as a kind of light, since, unlike light, they could not be reflected, refracted or polarised. The problem of how to see X-rays, or to employ them indirectly as a form of visual perception is similar to the problem, as identified by Daniel Dennett, with the schoolboy fantasy of a universal acid, capable of burning through any substance: *so what do you keep it in?* (Dennett 1995, 63). The problem will arise with any projective theory of vision, that is, as some kind of action or emanation of the eyes, rather than as a passive reception of luminous stimulus, and the problem of Superman's eyes actually recapitulates ancient wrangles over the theory of optical extramission. How do the projected rays get reintrojected, or make report back to the eye? It was precisely because of their extreme disinclination to come visibly to rest that X-rays took so long to be discovered.

In this they also resemble the various forces of emanation that were being dreamed of by many occult investigators from Mesmer onwards. Reichenbach explains the fact that the odic force has remained unsuspected and undetected for so long by 'the absence of any general odoscope or odometer which anyone might use, and so prove its existence with ease, and in a way that would appeal to the senses of the entire world' (Reichenbach 1926, 92). The reason, in turn, for the continuing unavailability of odoscopes and odometers

springs from the very nature of od itself, that is to say, from its power of penetrating all matter and space without incurring congestion at any point, and without ever permitting of its densification up to the point of general perceptibility. Heat, electricity, and light have isolators of their own up to a certain

point, but I have never been able to discover an isolator for od.  
(Reichenbach 1926, 92-3)

Indeed, Reichenbach explains the derivation of the name ‘od’ from this very characteristic, through an extended etymological daisy-chain involving words like Sanskrit *va*, ‘to move about’, Old Norse *vada*, (‘ “I go quickly, hurry away, stream forth.” ’) and Germanic *wodan* and *odin*, meaning ‘all-transcending’ and therefore ‘signifying the power penetrating all nature which is ultimately personified as a German deity’ (Reichenbach 1926, 93), to conclude that ‘ “Od” is consequently the word to express a dynamid or force which, with a power that cannot be obstructed, quickly penetrates and courses through everything in the universe’ (Reichenbach 1926, 93). Schreber seems to have had the same apprehension of the fundamental contradiction between radiation and finite, embodied existence: ‘Rays did not seem to appreciate at all that a human being who actually exists *must be somewhere*’ (Schreber 2000, 151).

Fortunately, however, X-rays do not in fact possess a universal power of permeation, for different substances absorb them to different degrees; in crude terms, and with some interesting exceptions, the greater the mass of the intervening material, the more X-ray energy they soak up. It was this differential constraining of the X-rays, along with the property they had of causing certain chemicals to fluoresce, which allowed them to be tracked and captured. Strictly speaking, therefore, all that one saw of X-rays was the trace of the gaps left in the otherwise indifferent cascade of radiations – of metal, bone and, as techniques improved, of tissues of different absorptiveness. The objects revealed by X-rays were precisely those that interfered with X-ray vision, resisting or retarding their penetrative passage, and were therefore defects, diffractions, detentions, rather than the direct exhibition of powers. Not only did X-rays commonly reveal flaws and fractures, they were themselves flawed light, a kind of fracturing into visibility. It is for this reason that X-ray photographs were a time known as ‘shadowgraphs’, or, borrowing an earlier term for a silhouette, ‘skiagrams’, from the Greek *skia*, shadow, this term becoming particularly common in dental radiography (Poland 1898, Symington and Rankin 1908). Though intimating a too, too solid flesh fading or melting into the condition of spirit, X-rays typically made visible the most mundane objects – the denser and grosser the objects, the more easy they were to visualise. Nowadays, generalised X-ray vision is much more likely to be used to detect concealed items in the material world than to enlarge human perception to encompass other worlds or higher states of being. An example is the scanning technology being developed by Terahertz Microelectronics (Frincu 2007), which uses terahertz radiation, lying between microwave and infrared, to enable containers and clothing to be scanned for suspicious devices.

Interestingly, although the forensic advantages were immediately clear, what X-ray for the most part disclosed were objects that were already known to be there. This may remind one of the common complaint that the spirits who communicated secret knowledge never seemed to be able to impart genuinely useful because previously unknown information – the structure of the tobacco mosaic virus, for example, or the winner of the Cheltenham Gold Cup. And this gets us close to one of the strangest aspects of X-ray vision. X-rays resembled spirit photography – the link being suggested by the fact that both of them were referred to as ‘Photography of the Invisible’ – most of all in one surprising respect, namely that they both looked *exactly as one would expect them to*. In the case of spirit photography, the reason is not far to seek: like images of flying saucers and aliens, spirit and fairy photographs could hold no surprises because their role was one of confirmation, not of discovery.

The most striking of the mundane objects revealed by X-rays made its appearance in the first and still the most famous X-ray photograph, the wedding-ring worn on the left hand of Bertha Röntgen. Bertha’s hand-portrait was much imitated, and the wearing of a ring always seemed to be a required element in the picture. The ring resembles those other hard objects disclosed by the X-ray – bullets, needles, and swallowed coins. But, it differs from them too, in that it was worn on the outside of the body. Though it seems to hover around the finger on which it is worn, the ring is not about to rattle to the floor, for it is held in place by the now-invisible flesh. Rings are often used in myth and fairytale to confer invisibility, but they also give the invisible body continuity and integrity, like the bandages in which Wells’s Invisible Man is swathed. The symbolic function of the ring seems to be to keep magically intact the body that invisibility might otherwise dissolve entirely. It therefore seems to perform the same function of retarding dissolution as the ‘bracelet of bright haire about the bone’ that Donne imagines his own corpse wearing in ‘The Relique’, as a testament to his continuing love, and evidence that ‘there a loving couple lies,/Who thought that this device might be some way/To make their souls, at the last busie day,/Meet at this grave, and make a little stay’ (Donne 1965, 89).

X-rays certainly represented an important form of visual prosthesis, and are part of the process whereby vision was autonomised, taken out of and beyond the individual human body, through various forms of device and apparatus, including telescopes, microscopes, and the various forms of analytic vision that followed on the development of photography, including motion analysis and spectroscopic analysis. All of these forms of vision extended the capacities of the eye. But these forms of prosthetic seeing are more than just enhancements; they are also reflexive forms of seeing, that is, ways of envisaging vision itself.

When the promoters and accompanists of the X-ray craze spoke, as they so often did, of ‘Photographing the Invisible’, two kinds of invisibility colluded in the phrase. There was first of all the ordinary invisibility of eclipse, of that which is concealed or obstructed from view – pencils behind the sofa, swallowed coins, documents in sealed envelopes. But there was another kind of invisibility, namely the indiscernibility of that which is outside or beyond the order of the visible. There was in fact considerable curiosity about the question of whether X-rays might themselves be visible. Röntgen himself suggested that X-rays could under some circumstances induce fluorescence on the retina, allowing them in some sort to be ‘seen’, which suggested to others that ‘[I]f it were possible that they should have any direct effect of nerve-stimulation, the door might be opened to the hope that by their aid sight might in some cases be artificially given to the blind’ (Anon 1897). X-rays prompted reflections on both kinds of invisibility. The desire to see with or through X-ray vision went along with the desire to be able to see X-ray radiation itself, a desire which seemed to be fulfilled in the many forms of emanation, radiation and aura that had been seen and photographed in the last two decades of the nineteenth century. X-rays brought in a conveniently reflexive knot the power of radiant seeing and the seeing of radiant power.

It is for this reason that X-rays were regarded for about a decade primarily in terms of a new form of photography, and that their fortunes were closely twinned for that first decade with the fortunes of photography itself. Inherently photographic, X-ray vision was linked with photography’s power to arrest and anatomise vision, to get on the inside of seeing itself, making the invisible, the act of seeing itself, visible. In an X-ray, I see a seeing that is not mine. This is true of photography and cinema, though in these cases, I am seeing a kind of seeing that could, under different circumstances, be mine. But in the case of X-ray vision, I see a kind of seeing that can never be mine, since it is not optical seeing. Here, I seem to be able to see the ways in which I cannot see; I can see my own blindness. But, for this very reason, I also seem to see that I can sometimes see what I never in fact can; X-ray photographs provide the visible proof that vision can encompass a vision not its own. This of course is true only because the non-optical effects have been translated into the order of sight, most notably by being captured in some form of visible or material form – a photograph, or fluorescing screen. But this means that this vision can already be in a sense familiar to me. I recognise the X-ray as the very form of my fantasy – whether it be in the idea of the glass body, so widespread among the deluded and the dsymorphically depressed in the sixteenth and seventeenth century, or in ideas of the ‘piercing look’, or just the activity of a gaze that ‘looks into’ things. I see in X-rays the visible form of my dream of vision, a kind of seeing that is at once inaccessible to me and deeply harboured in me.

There were two sides of the fantasy of X-ray vision. One is the dream of a gaze that dissolves what it sees, that sees through or behind appearances, rather than bouncing off them. This is the dream of a material world subdued to the powers of thought, by being immaterialised by it. But this seems to weaken thought, which seems like a nothing, unable as it is to achieve material form. The other side of the fantasy of X-ray vision, drawn from the capacity of X-rays to leave traces, is the dream of the power of thought to materialise itself. Though these two dreams are opposites – the one effecting an immaterialisation of the world, the other effecting a materialisation of mind or thought – they are intertwined in the fantasies of X-ray vision. If X-rays provided the proof of the power of thought to permeate the material, X-ray photographs provided the proof or ground of this power of thought to impress or sculpt itself in visible form. They were force-forms.

Hippolyte Baraduc was the most persistent and articulate of the experimenters in the thought-photography that tried to make visible thought's powers of self-exteriorisation. He believed that the 'luminous vibration of the soul' – which, like X-rays and other invisible radiations, becomes apparent only in darkness, 'for in daylight it is immersed in the intensity of the exterior solar light' (Baraduc 1913, 12). Baraduc insists that his 'iconography' is not photography, since it involves neither light, nor the mediation of lenses: 'Solar light is refracted in inflected foci, whilst the animistic glimmering of man, or the force of universal life, penetrates straight into the bodies, or emerges without deviation and traces itself in its very form' (Baraduc 1913, 32). Baraduc sometimes speaks of 'capturing' these emanations of odic force (the term he borrows from Baron Reichenbach), but more often he stresses its power 'of directly graphing itself' (Baraduc 1913, 33).

A complex relationship to scientific equipment runs through Baraduc's accounts. On the one hand, Baraduc requires the exterior forms of scientific equipment – most particularly the sensitive photographic plates which receive the impress of psychic emanations – but also other accessory items, such as needles, and vacuum tubes. But he is at pains to point out that, unlike ordinary scientific procedures, the effects he measures occur without material mediation. A good example is furnished by his account of 'electro-human light' as demonstrated, in an experiment of March 2, 1896, by a 'Russian savant' named Iodko. Baraduc held in his right hand a Crookes tube (the vacuum tube which produced cathode rays and also, as became clear to Röntgen, X-rays, when an electric current was passed through it) and in his left a condenser. When Iodko approached the tube, it lit up, though without the normal requirement of a current being passed through it, though not with 'the green shades of the ordinary cathodic rays; they are

pearly and appear more brilliant as the person seems stronger, more full of life' (Baraduc 1913, 82). The apparatus of the X-ray, doubled by the elaborate psychic apparatus which Baraduc invents, is a necessary substrate or mediating material form to enable Baraduc's demonstration of the ways in which psychic force operates without mediation. X-rays were particularly suitable for dramatisations of this mediated immediacy, since they required so little equipment or substances, compared with other experiments of the new physics of radiation.

Baraduc thus gives expression to the idea, not just that each living entity, and indeed each organ in the body, has 'a radio-activity, a zone of vibration which is particular to each of them' (Baraduc 1913, 20), but also that this radiation has a tendency to gather, fix, or concentrate itself into visible forms, or 'psychicones'. The result is the production of what Baraduc calls the 'somod', the equivalent of the theosophists' 'astral body'. He defined it as 'that fluidic spectre, which is the intermediate agent of cosmic life and life personified in one existence; it is the living luminous double of the material body, which it possesses and maintains' (Baraduc 1913, 44). There were others to whom the discovery of the Röntgen rays gave encouragement. Baraduc's French contemporary Louis Darget made photographs of thought-forms or what he called 'V-rays' by simply attaching photographic plates to the forehead or solar plexus of his subjects (the solar plexus was often seen ; later on, he dispensed even with this procedure and created photographs of objects simply by focussing his thoughts on to a sensitive plate. (Krauss 1995, 49-51; Clément 2005, 116-22; Lember 2007, 135-41).

Baraduc's ideas encouraged the conception of 'thought-forms' by the theosophists like Annie Besant and C.W. Leadbeater. Like Baraduc, they take encouragement from Röntgen's discovery, proclaiming that 'Röntgen's rays have rearranged some of the older ideas of matter, while radium has revolutionised them, and is leading science beyond the borderland of ether into the astral world. The boundaries between animate and inanimate matter are broken down' (Besant and Leadbeater 1905, 11). Arguing that '[i]t has long been known to those who have given attention to the question that impressions were produced by the reflection of the ultra-violet rays from objects not visible by the rays of the ordinary spectrum' (Besant and Leadbeater 1905, 12), they developed their own, much more colourful theory of psychic emanations:

Every thought gives rise to a set of correlated vibrations in the matter of this body [the 'mental' or astral body] accompanied with a marvellous play of colour, like that in the spray of a waterfall as the sunlight strikes it, raised to the *n*th degree of colour and vivid delicacy. The body under this impulse throws



off a vibrating portion of itself, shaped by the nature of the vibrations – as figures are made by sand on a disk vibrating to a musical note – and this gathers from the surrounding atmosphere matter like itself in fineness from the elemental essence of the mental world. We have then a thought-form pure and simple, and it is a living entity of intense activity animated by the one idea that generated it. If made of the finer kinds of matter, it will be of great power and energy, and may be used as a most potent agent when directed by a strong and steady will. (Besant and Leadbeater 1905, 18)

In his detailed discussion of the relations between X-ray photography and photographs of other kinds of invisible radiation, Clément Chéroux observes an important difference between the two: ‘in radiography the body acts as a kind of negative, through which the invisible light passes, whereas in the experiments of the effluvisists, it is itself the source of the radiations’ (Chéroux 2005, 188). Magical thinking always centres around fantasies of power, as an embodiment of its own powers of fantasy, and for Baraduc, power is concentrated in the figure of the adept, who is ‘a centre of radiation’, with the power ‘of projecting and making sensitive in the visible world, the forms which its powerful conception has engendered and has called forth from the elements of the invisible world’ (Baraduc 1913, 53). X-rays gave the body visible interiority; the magical rays photographed by Baraduc, Darget and others effected what Albert de Rochas called ‘the exteriorisation of sensibility’ (1895). In fact, however, the intermingling and reversibility of the positive and the negative, the radiating and the fixed, the interior and the exterior, the force and the form, is the essential feature of magical thinking regarding the making visible of the invisible.

Spiritualists and supernatural speculators at once assimilate themselves to X-rays and attempted to distinguish themselves from them. X-rays provide a visible and objective embodiment of a widespread and unsunderable addition to the belief in an invisible power of transcendent vision. Although X-ray photographs provide the ocular proof of this imaginary optical power, they also represent a challenge to the magical imagination, which strives to move radiation over from the side of the object to the side of the subject. The radioactive occultists of the late nineteenth century wanted the force to be with them, rather than acting upon them. They wanted to be the origin of magical radioaction, rather than its mere arena or occasion. But to deny the possibility of a visible form or precipitate for the projective or effluvial power seemed to leave it worryingly abstract or incomplete; so it was necessary to imagine anew visible forms in which the invisible force could manifest itself. In order to subjectify the imagined power, it would have to have an image or object. This is perhaps the paradox that drives all forms of

magical thinking, in so far as they may ultimately have as their reference the power of thinking itself. Magical thinking only has power insofar as it resists reduction to the condition of an object; but it can only exercise its power if there is an object over which it has dominion, namely, itself – for magical thinking is always in part its own secret object.

Supernaturalists try to believe they possess a pure, and immediate force – the idea of emanation being perhaps the form of immediacy itself, a power of, and over bodies, that itself requires and comes to rest in no body. The fantasy of X-ray vision is a fantasy of a world without limits or resistances, a ‘soft’ world which yields to the power of thought, will, desire. Later in the twentieth century, the prospect of absolute transparency began to acquire a darker cast, Roger Corman’s film *‘X’: The Man With the X-Ray Eyes* (1963) tells the story of James Xavier, a scientist who develops X-ray vision in himself. After pushing his associate from a window, he becomes a fugitive, taking refuge as ‘Mentallo’ a carnival act. When his employer discovers his gift he sets him in business as a healer. Escaping to Las Vegas, Xavier makes a fortune playing blackjack using his X ray vision. But his life is torment – he sees buildings ‘without their sheaths of brick and stone’, and people stripped to their bones in ‘an acid of light’. In the end he is enjoined by a preacher to pluck out his eyes, which he does (Winstead 2006).

Transparency has lost much of its Enlightenment prestige in our time. Beatriz Colomina sees the ideal of X-ray vision as a governing principle of postwar architecture, as it is expressed in buildings such as Philip Johnson’s Glass House in New Canaan, Connecticut, which she describes as ‘an image...a photograph of what everybody had in mind, a dream in physical form. The dream of transparency finally inhabited’ (Colomina 2007, 177). This modernist dream of openness and accessibility takes an aggressive and martial form in the context of the Cold War:

The x-ray house not only exposed itself along with anyone inside it, and the world outside along with whoever comes near it, but also broadcast images out into the world. The glass pavilion simultaneously absorbed images from the outside and threw images into the outside. It was a delicate but efficient media machine attached to a bunker. (Colomina 2007, 191)

In the dystopias imagined by Roger Corman and Beatriz Colomina, every last pocket of opacity as been seared away, leaving a vitreous desert of universal transparency. Jean Baudrillard’s book *The Transparency of Evil* represents a culmination of his long preoccupation with the dissolution of hidden depths or interiorities. In a world in which everything must be made visible, and in which, consequently, ‘value radiates in all directions’, the

transparency of evil is indistinguishable from the evil of transparency (Baudrillard 1993, 5).

But magical thinking always secretes its own form of opacity, which compromises even as it complements the fantasy of illimitable permeation, if only in its paradoxical dependence upon the idea of a concentration of the power of dissolution. For all the talk of ‘manifestation’, ‘materialisation’, ‘evidence’ and ‘bringing to light’, there has always remained, probably had to remain, some unsuspected opacity, some stain or shadow of obscurity, precisely some *occultation*, within the occult regimes of magical thinking. The force of emanation borrows and secretly precipitates the form of what X-rays made so vulgarly and sensationally visible, in all its indispensable mediations or substrates – the frames, screens, and apparatuses that are always in fact needed to metastasise the fantasy of the immediate. Ultimately, these screens cannot be seen through, because they are the ground of seeing, where seeing comes home to itself. This is a fantasy of a power that can see through everything except the power of its own fantasy. This – the power of the fantasy of the power of fantasy, and so on, proliferating inwards on itself beyond the reach of any clairvoyance – is the dark star that hunkers hugely in the midst of every form of magical thinking, hungrily warping towards it all the light.

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