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Luckhurst, Roger (2019) X-Ray specs. continent 8 (1-2), pp. 186-192. ISSN 2159-9920.

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# X-Ray Specs

Roger Luckhurst

In December 1895, Professor William Conrad Röntgen of the Physical Institute at the University of Würzburg, published a short, preliminary communication called 'On a New Kind of Rays'. For over a decade, laboratory physicists had been exploring the detection of new kinds of 'dark matter' or particle wave forms when electricity was passed through vacuum tubes. These devices were often called 'Crookes Tubes' after the English chemist who invented and first manufactured them, William Crookes. What Röntgen had discovered was that even when the tube was entirely wrapped in cardboard a spooky fluorescence could still be picked up by certain photosensitive surfaces at some distance outside the vacuum tube.

Röntgen spent eight weeks feverishly working to confirm this phenomenon, discovering that these rays, unlike visible light, seemed to be unaffected by refraction and could pass through wood and thick textbooks. However, more dense materials would block the rays, including many metals. Like a stage magic trick, Röntgen could photograph the metal contents of a sealed wooden box. The world fame of this discovery was ensured, however, by Röntgen's discovery that if he held his hand up in the path of the beam, in front of a photosensitive plate, he could record that the rays passed through the soft flesh but cast a shadow of the bones of his hand. This became known as a 'shadowgraph' or 'radiograph', an experiment easily replicated with basic equipment. By early 1896 this kit was already being advertised in the back of photography journals and guidebooks.<sup>[1]</sup> The image of Mrs Röntgen's hand, with the wedding ring floating oddly as a dark mass around the bone, became a familiar image for replication. 'I have seen my death!' Anna Bertha Röntgen is said to have exclaimed. Soon, the spectral shape of the hand of an embalmed mummy, unseen for thousands of years, was revealed without the need for the destructive act of unwrapping the body.

Röntgen called this newly detected form the x ray, because he considered their properties as yet unknown but likely to be determined quite quickly. Yet the name stuck, partly as a response to their uncanny ability to render visible the invisible, but also because no one could pronounce or spell 'Röntgen' outside Germany (the American spelling is often Roentgen). He received the first Nobel Prize for physics in 1901 for his astounding discovery.

It is striking how this abstruse laboratory experiment flashed round the world within a month

of the publication of Röntgen's paper. Röntgen's findings were first repeated in England by Alan Campbell Swinton, who photographed his own hand on 13 January 1896. *Nature* reported the discovery by 23 January 1896, followed by the medical journal *The Lancet* and the *British Journal of Photography*. In America, Dr Gilman Frost of the Dartmouth Medical School was the first to use x rays diagnostically, producing an image of the broken wrist of a 14 year-old boy, findings published in *Science* in February 1896. *McClure's Magazine*, always a keen reporter of the sensational discoveries and proleptic possibilities of America's celebrated engineer/inventors, announced in April 1896 'The New Marvel in Photography', reflecting on 'this contagious arousal of interest over a discovery so strange that its importance cannot yet be measured'.<sup>[2]</sup> Even sober Teutonic physicists professed amazement at the discovery. Berlin physicist Otto Lummer declared in February 1896, 'I could not help thinking I was reading a fairy tale', yet the replicable proof 'that one could print the bones of the living hand upon the photographic plate as if by magic' secured the finding.<sup>[3]</sup>

The electrical discoveries of the 1890s often generated fantastical proleptic projections of discoveries just around the corner. In 1893, *McClure's Magazine* started carrying an opening gazetteer section called 'THE EDGE OF THE FUTURE'. Interviews with Thomas Edison or Alexander Graham Bell, soon pushed from phonograms, ticker-tape machines, telephones, and incandescent lamps into the world of 'Airships of the Near Future', 'The Sudden Rise of the Horseless Carriage', 'Making the Deaf Hear by the Use of Electricity' or even 'Thought Transference by Electricity' (two sets of wired-up helmets meant that electrical thoughts in one could be transmitted to the other wirelessly). In an era when Heinrich Hertz demonstrated the existence of invisible waves, Crookes threw shadows with 'dark light', and Guglielmo Marconi demonstrated communication by wireless telegraphy, the x rays were simply another way of capturing the magical world of the invisible ether and putting it to use. 'The ether seems to promise fairly and clearly a great and new epoch in knowledge, a great and marked step forward, a new light on all the great problems which are mysteries at present.'<sup>[4]</sup> In a famous episode in 1903, the French physicist Prosper-René Blondlot claimed to have discovered

and photographed 'N-rays' emitted by human bodies as 'a kind of atmosphere of an altogether special nature' that could also be seen by certain psychic sensitives.<sup>[5]</sup> A passionately nationalistic French community of physicists upheld this error of the experimental apparatus against the German success of the x rays for several years.

Within weeks of the announcement of x rays, this familiar logic of proleptic fantasies emerged. In *The Electrical World*, the American physicist A. E. Dolbear noted:

*"It must seem like a ghostly experiment to photograph the skeleton of a living person as though it was dissected out and articulated with wires. But the same process has its threatening aspect. If one can photograph through wood and black walls, and in the dark too, then privacy is impossible; for it will be light to everywhere but to one's eyes, and for these there will be substitutes."*<sup>[6]</sup>

The idea that x rays threatened the privacy of the person was again established almost immediately. In *Punch* on 25 January 1896, a satirical poem on the rays included the stanza:

*"We only crave to contemplate  
Each other's usual full-dress photo;  
Your worse than "altogether" state  
Of portraiture we bar in toto."*

The poem started with this jocular tone – and a rival French magazine at the time carried a cartoon by the famous illustrator Robida that suggested the respectable bourgeoisie might have to revert to using armour to protect their modesty. But there is an interesting turn at the end of the *Punch* poem that raises another context for the x ray:

*"No, keep them for your epitaph  
These tombstone-souvenir unpleasant;  
Or go away and photograph  
Mahatmas, spooks, and Mrs. B-s-nt!"*<sup>[7]</sup>

The last line evokes the occult Theosophical Society, founded by the notorious fraud Helena Blavatsky in the 1880s. She claimed to receive ancient hermetic wisdom dictated by the Mahatmas, wise spiritual elders housed in their fortress in Tibet. After her death in 1891, the Theosophical Society was led by Annie Besant, who

had been surprisingly converted after a controversial career as a militant atheist, feminist and socialist.

The idea that the x rays might capture 'spooks' was commonly raised in the early months of Röntgen's discovery. In the January 1896 edition of *Borderland*, the eclectic occult journal published by W. T. Stead alongside his more famous *Review of Reviews*, the discovery of x rays were simply accepted as confirming what had been long known by photographers who claimed to capture ghostly spirits on film. John Traill Taylor, author of *The Veil Lifted: Modern Developments of Spirit Photography* had long claimed, Stead explained, that alongside visible light rays were 'other rays which were popularly termed invisible because their effects were not perceived by ordinary vision, but which were, nevertheless, capable of causing photographic action. If any thing or entity – call it a spirit if you like – emitted rays of this nature only, most assuredly it could be photographed.'<sup>[8]</sup> Then the French doctor Hippolyte Baraduc published his book *The Human Soul: Its Movements, Its Lights, and the Iconography of the Fluidic Invisible*, which explored how the previously undetectable vital forces that radiated from the human body could now be captured by the recording devices emerging from radiant physics. His claims that he could capture 'thought photographs' was widely (if somewhat sceptically) reported. In July 1896, the *Literary Digest* carried an essay called 'The Roentgen Rays and the Spiritual Body', which interpreted the discovery of x rays like this: '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.' The x rays would continually generate what I have often called this *occult supplement* around the technical apparatus. It was a means for those seeking to use the very experimental framework of materialist physics to undo the ideology of materialism itself and declare the proof of the empirical trace of spirit.

In fact, the occult supplement was already built into the central device of this experimental assemblage. William Crookes, who had first commercially produced vacuum tubes, was a controversial figure in chemistry and physics. In 1870, following the traumatic death of his brother, Crookes turned to

Spiritualism, which at this time was just reaching another peak around a new sensational séance phenomenon – the full-scale materialisation of surviving spirits from beyond the grave. Crookes publicly announced, as a respected Fellow of the Royal Society, that he would investigate these claims in his London laboratory. In 1871, to the consternation of his fellow men of science, Crookes announced that he had discovered, detected and measured a brand-new energy that could be manipulated by certain highly sensitive mediums – something he called 'psychic force.' The controversy that followed proved detrimental to Crookes' commercial interests (he was a self-made scientific entrepreneur, not a gentleman amateur), and he soon stopped speaking publicly about his beliefs. However, he was a member of the secretive Ghost Club soon after it emerged in 1882, and later he became the President of both the British Association for the Advancement of Science and the Society for Psychical Research. The amazing phenomena captured in his Crookes tubes blurred these lines of inquiry. Once again, the x in x rays marked the chiasmus where science and magic, matter and spirit, might converge.<sup>[9]</sup>

Another proleptic promise of the x rays was not the simple loss of privacy, but the idea that new technologies of vision might emerge that could exploit the rays for specifically intrusive ends. In 1896, it was reported that Assemblyman Reed of Somerset County New Jersey was introducing a bill to the New York legislature 'prohibiting the use of x-rays in opera glasses in theatres.' This seemed to respond to a prurient idea that x rays could be calibrated to see through clothes but stop at the skin rather than penetrating the body to the skeleton. It is an anxious concern that resurfaced in the twenty-first century with the development of 'scatter back' x ray machines at airport security intended to reveal objects concealed under clothes.

In fact, even the ability for lenses to block harmful infra-red or ultra-violet rays was not invented until 1913. It was William Crookes, once again, who was at the forefront of this research, which he undertook to produce goggles that could protect the eyes of furnace workers who often developed cataracts. Crookes produced three hundred different tints and mixes of ground glass for different purposes. The first commercial 'sun-glasses' that were meant to block harmful ultra-

violet rays and also protect pilots and soldiers against the dangers of sun glare, were built around these 'Crookes Lenses'. Crookes was still seeing marvellous things beyond the visible spectrum. After his wife died in 1916, the elderly chemist was photographed by the famous spirit photographer William Hope in Crewe. Plain to see in the image is the spirit of Lady Crookes hovering above her husband (others noted the similarity of the spirit to a previously published photograph of Lady Crookes).

The first patent for an x ray machine was taken out by Siemens and Halske in March 1896. Röntgen himself refused to patent his discovery, so his announcement was followed by a race to patent improvements to the Crookes tube itself as well as applied medical and other applications. One estimate suggests nearly 20 000 patents have been associated with the x ray.<sup>[10]</sup> It's in this context of speculative enthusiasm that we can locate that famous apocryphal technology, X-Ray Spectacles.

The cultural associations of 'X-Ray Specs' are one with the lurid promises of those famous advertisements that populated the back of pulp magazines from the 1920s to the 1960s. The implication that a technological enhancement of vision could be turned toward sexual voyeurism had been part of the first responses to Röntgen's discovery, as the *Punch* poem quoted earlier suggests. In the pulp magazines, the adverts for X-Ray Specs promised 'See the bones in your hand! See through clothes!' They slotted into the world of fantastical hyper-masculine enhancement. In 1922, Charles Atlas, who started out as an under-nourished Italian immigrant who grew up in Brooklyn, began his mail order body building business, offering to turn nerdy weaklings into butch hard bodies. The famous ads with a weakling having sand kicked in his face, only to return as a triumphant Hercules with sculpted muscles and a surplus of sexual magnetism, entered into the everyday discourse of popular culture. By 1942 there were four hundred thousand people on the Atlas course, and he had a mail order business that employed 27 secretaries to answer the mail.

These ads appeared in detective pulps like *Black Mask*, whose hard-boiled, tough-guy he-men offered 'a prophylactic toughness that was organized around the rigorous suppression of affect.'<sup>[11]</sup> In the science fiction pulps, there was a

kind of continuity between the fiction and the ads, fantasies of protagonists (and readers) re-tooled with metallised bodies enhanced with superpowers. X-Ray specs were in a continuum with the dubious promise of physical and mental enhancements that would end up with L. Ron Hubbard promoting 'Dianetics' through the pages of *Astounding Science Fiction* in 1950. In 1955 Fredric Wertham's exposé *Seduction of the Innocents* and his subsequent testimony to congressional hearings produced a moral panic about the effect of post-war comics on young boys and girls. Wertham devoted a whole chapter to the adverts, suggesting that aside from distorted body images and the 'childhood armament program' of toy weapons, ads were also encouraging voyeuristic and scopophilic perversions. 'I have examined and treated a number of youths after they have been arrested for prowling around trying to look in windows to see women undressing', he lamented.<sup>[12]</sup> Binocular, telescopes, and X-Ray specs – they were all coded with perverse promise.

As anyone who spent a dollar (plus postage and packing) on mail order X-Ray Specs came bitterly to learn, Röntgen's x rays were not involved in this technology. As the journalist Jack Hitt later reflected, 'I remember X-Ray Spex, with that promise of seeing girls naked beneath their clothes, as my first shattering disillusionment with the world of adults and all their horrible lies.'<sup>[13]</sup>

George W. MacDonald patented the first trick 'X-Ray' Spectacles in 1906, which used a feather trapped between two lenses to diffuse the image received by the eye, giving the illusion of a spectral, blurry doubled image that might, with a bit of fantasy investment, be seen to enhance normal vision. As the commercial sunglass industry began to take off in the 1920s, becoming a major fashion accessory from the 1950s, the toy industry faithfully doubled this adult world. Sunglasses became emblematic of outsider jazz cool and Hollywood style, where the stars started wearing Ray Bans and prompted a multi-million-dollar industry to emerge.<sup>[14]</sup> Perhaps the most successful patent for an 'optical means for simulating an X-ray image' was filed by Harold N. Braunhut for Honey Toy Industries Inc. in 1969, just as the rebels and outsiders of the Black Panthers aggressively adopted sunglasses as part of their military uniform. The patent lists MacDonald and at least four other related filings for X-Ray Specs in the

1950s, but this was the toy that generated a significant personal fortune for Braunhut. Lo and behold, the diagrams filed with the patent continue to show a spectral hand being held up in front of the lenses, just as Röntgen had demonstrated 75 years before.

Like the logic of the dream-work, much of the secret history of this apocryphal technology resurfaces in condensed and displaced form in John Carpenter's cult B-movie, *They Live* (1987). In the film, the dispossessed and homeless hero, Nada, played by the wrestling star Rowdy Roddy Piper, stumbles upon a group of insurgents living in the tent city of Justiceville in downtown Los Angeles who are manufacturing sunglasses with special 'Hoffman lenses' that allow their wearers to see the secret reality that underpins American capitalism. Like fantasy X-ray specs, the wearer can finally see the truth beneath the veil, or in this case the skull beneath the skin. The lenses reveal the skeletal aliens who hide amongst the American population, nearly all exclusively the obnoxious wealthy yuppies and Republican ideologues of Reagan's America. It is a conspiracy theory that owes almost as much to the post-war science fiction pulps and their adverts as a faux-naïf concept of ideological demystification (it only takes an adjustment of vision to see *without distortion*). Once Roddy has put on the sunglasses and seen the true real, like the Charles Atlas of the old ads he is there to kick the ass of the bullies.

These truth-unveiling sunglasses are Ray Ban Wayfarers (or cheap knock-offs of that blocky style), first put on the market by Bausch and Lomb in 1952 at the start of the post-war boom in designer sunglasses, a brand that secured their tie to Hollywood chic all the way up to *The Blues Brothers* (1980) and *Risky Business* (1983). For all the overt critique of the Reaganite consumerism of the 80s and the broad satirical swipes at yuppies in *They Live*, the form of its critique, the alien conspiracy theory, and the mode of its critique, ideological unmasking of the truth beneath a deceitful surface, is very pulp, very 50s.

Wayfarers were invented to block out the harmful ultra-violet light: Ray Bans ban rays. In *They Live*, they open a whole other spectrum of vision. The heavy black glasses of the blind (we are introduced to Justiceville through a blind preacher) make you see into a deeper reality. They are like the

sunglasses jazz musicians wore inside, onstage, at night, to close themselves off from the audience and to conceal the tell-tale dilated pupils of heroin or amphetamine use. *They Live's* sunglasses are also explicitly connected to drugs. They are manufactured out of an illegal chemical factory in derelict downtown. Nada is made woozy by their use and they seem to leave him with his defences down. There is some speculation that these are Albert Hoffmann lenses, named after the chemist who synthesized LSD in 1938, the drug that Aldous Huxley said opened the doors of perception to heaven and hell. Certainly, Nada is a fugitive from society almost as soon as he puts those sunglasses on, and even his ally Frank beats him to a pulp over wearing a pair of shades.

Are the sunglasses meant to signal the detachment of the cool cat, someone hip to the wiles of The Man? Or are they a way of *seeing in black* – that is, giving the wearer an attunement to the perspective of the racial outsider, the invisible man, in post-war American culture, the Black Panther insurgency look? The first images of the shanty town in *They Live* are overtly racialized, and it seems that Nada's black friend, Frank, has the better grip on the rigged game of the economy than the white hero. As Slavoj Žižek notes, there is an added poignancy that their huge fight is over Frank's refusal to put on the sunglasses, to see as his true oppression that he already knows but nevertheless strongly disavows. The fight is not at all pointless: 'Liberation hurts. You have to be forced to put your glasses on,' Žižek says.<sup>[15]</sup>

Maybe, then, the X-Ray Specs in *They Live* are neither Albert Hoffmann glasses nor Abbie Hoffman glasses – named for the yuppie 60s rebel, as Jonathan Lethem has suggested<sup>[16]</sup> — but E. T. A. Hoffmann glasses. Hoffmann's tale 'The Sandman' is full of voyeuristic gazes, menaces to the eyes from the Sandman, and the return of the torturer of children Coppélius if only you can see through his disguise. Freud turned to 'The Sandman' to theorise the insistent punishment of the gaze and the dread of the uncanny.

Dream logic ensures that meanings are constantly shifting, twisting and upending themselves. If you fix on sunglasses as an iconography of outsider cool in the 1980s, then this ignores the fact that the 80s were the period of the grotesque commodification of that very 'cool'. The sunglasses

industry in the US reached an annual turnover of \$1 billion for the first time in 1985, in part as a result of the new luxury designer brands first introduced by Porsche Designs in 1978. Soon yuppies were chasing after Vuarnets or Cazals for hundreds or thousands of dollars, and Cartier staged a display of crushing twenty-five thousand illegal designer knock-offs at their Upper East Side HQ to register their offence at this assault on their brand name and shareholder value. Hollywood, which had been at the very origin of selling sunglasses to the masses since the 1930s, did its bit: Tom Cruise, Don Johnson, Madonna, Michael Jackson, Jack Nicholson, all wore particular kinds of designer shades. Even The Terminator, when he landed in LA from the future, had to get some Persol Wraparounds, then selling for \$198. Do the sunglasses in *They Live* make you the resistant cool outsider or the commodified uncool insider?

There is another political twist in the history of X-Ray Specs that takes place in the 1980s. It came out in a court case that the holder of the X-Ray Specs patent, Harold Braunhut, the mail-order king, had used a portion of his fortune to help a Ku Klux Klan Grand Dragon buy a cache of illegal firearms to stoke the racial war to come. Harold 'von' Braunhut was Jewish (the 'von' was added to try to sound more Teutonic), but he had close associations with the Aryan Nation leadership and had even been given the dubious honour of lighting their burning cross at their annual jamboree. 'Hitler wasn't a bad guy', he was claimed to have said.<sup>[12]</sup> Another shiver comes with Jonathan Lethem's thought that perhaps the Hoffmann lenses in the film echo the name of Michael Hoffmann II, the notorious Holocaust denier, who published *The Great Holocaust Trial* in 1985 and believed a secret elite, a cryptocracy, was undermining American democracy.

In 2017, John Carpenter responded aggressively to the news that neo-Nazi groups had claimed *They Live* was an allegory about an international Jewish conspiracy. This appropriation has to do extraordinary violence to the complex texture of Carpenter's film, to wear really narrow blinkers to see only Roddy Piper as the white martyr exposing the last truth. Such readings make you want to quote the punk band, X-Ray Spex: 'Oh bondage, up yours!'

In the era of the internet, the cheap trick offered by

the X-Ray Specs adverts might appear a delightfully naïve fantasy of demystification from a previous age. Google searches bring up an infinite variety of old pulp magazine ads or the patented spiral lenses printed onto ironic and post-ironic T-shirts. But how far have we really got from the dreams of catching spirits on film or teenage fantasies of seeing through clothes? In *The Matrix*, the dreary Mr Anderson becomes Neo, the uber-hacker, The One, when he puts on his Ray Bans, to see anew like his ultra-cool mentor Morpheus. As he stands in the corridor at the end of the film, Neo no longer sees our illusory construct of the world but the zeros and ones of the code behind that illusion. Judging by the amount of men who still hang around in long leather coats and sunglasses, the compensatory fantasy offered by the apocryphal technology of X-Ray Specs is still alive and well.

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[1] See, for example, Arthur Thornton, *The X Rays* (Bradford: Lund, 1896). Percy Lund publishers were specialists in practical photography and the book ends with several pages of ads for Crookes tubes to repeat the experiments at home.

[2] H J W Dam, 'The New Marvel in Photography', *McClure's Magazine* VI (April 1896), 405.

[3] Otto Lummer, quoted in Otto Glasser, *Wilhelm Conrad Röntgen, and the Early History of the Roentgen Rays* (London: Bale, Sons, and Danielsson, 1933), 29.

[4] 'The Edge of the Future', *McClure's Magazine* VII (March 1897), 392.

[5] Mary Jo Nye, 'N-Rays: An Episode in the History and Psychology of Science', *Historical Studies in the Physical Sciences* 11: 1 (1980), 134.

[6] Quoted in Otto Glasser, *Wilhelm Conrad Röntgen*, 41.

[7] *Ibid.*

[8] 'More Experience in Spirit Photography', *Borderland* 3: 1 (Jan 1896), 38.

[9] See Roger Luckhurst, *The Invention of Telepathy* (Oxford: Oxford University Press, 2002).

[10] See Marcio Luis Ferreira Nascimento, 'Brief History of X-Ray Tube Patents', *World Patent Information* 37 (2014), 48-53.

[11] Christopher Breu, *Hard-Boiled Masculinities* (Minneapolis: U Minnesota P, 2005), 1.

[12] Fredric Werthem, *Seduction of the Innocents* (London: Museum Press, 1955), 216.

[13] Jack Hitt, 'The Battle over the Sea-Monkey Fortune', *New York Times* (15 April 2016).

[14] See Vanessa Brown, *Cool Shades: The History and Meaning of Sunglasses* (London: Bloomsbury, 2015).

[15] Slavoj Zizek, 'Freedom Hurts' in Craig Oldham (ed.), *They Live: A Visual and Cultural Awakening* (London: Rough Trade Books, 2019), 63.

[16] See Jonathan Lethem, *They Live* (San Francisco: Soft Skull Press, 2010)

[17] For the history of this case, see Jack Hitt, *op. cit.*