

Design Noir: The Secret Life of Electronic Objects

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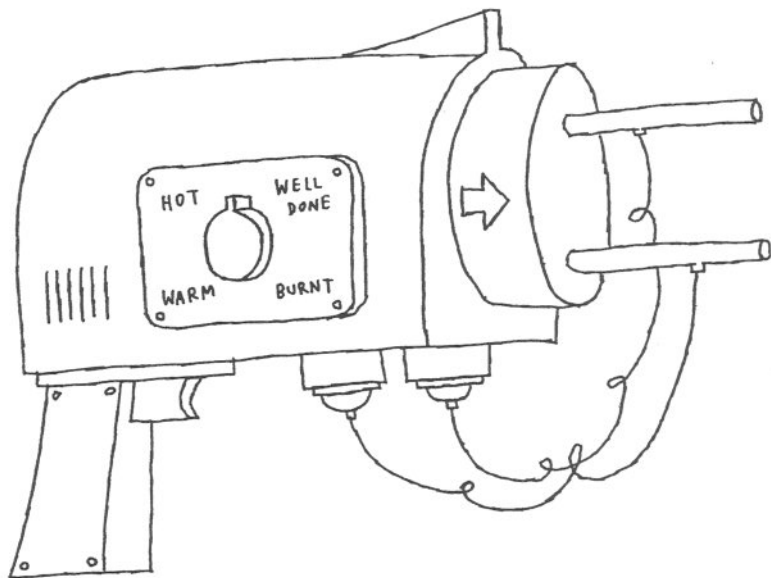
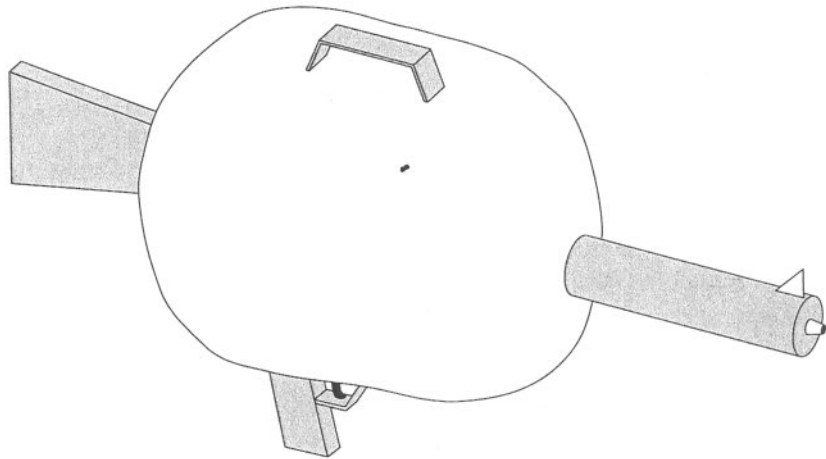
Nowhere to hide

As designers, we are interested in the interaction between devices, hertzian space and the imagination. We prefer to think of the electromagnetic spectrum as an inhabitable landscape, with its own electroclimate and electrogeography. But like other 'natural' environments, the electromagnetic spectrum is constantly under threat from commercial over-development. Unsurprisingly, industry views hertzian space solely as something to be bought and sold and commercially developed for use in broadcasting and telecommunications. The spectrum is highly regulated by the state and nearly all uses of it require a license – unauthorised use is viewed as trespassing. The high value of electromagnetic real estate has encouraged the government to explore radical plans to raise billions from the part privatisation of the spectrum. If these plans go through, it will revolutionise the allocation of spectrum to media, telecommunications and public sectors. Not-for-profit and community-based organisations will find it more and more difficult to compete for access with aggressively commercial companies.

The electromagnetic spectrum underwent intense militarisation during the twentieth century. Enormous parts of it are reserved for military communications, and extensive research has led to EM weapons such as the controversial non-lethal 'ray gun', which makes victims feel as if their skin is burning even though it is not. However, it is the efforts being made to render the EM spectrum totally transparent that are most disturbing. There are several ongoing debates about the extent to which governments should be allowed to eavesdrop on ordinary citizens' electronic communications. The European Union, for example, is seriously considering the idea that all electronically mediated communications should be stored for seven years to aid policing, but probably the most alarming use or, more accurately, mis-use of the spectrum by governments is Echelon, a global spy system established by the US National Security Agency (NSA) in 1948. Other partners in the project are the Government Communications Head Quarters (GCHQ) of England, the Communications Security Establishment (CSE) of Canada, the Australian Defence Security Directorate (DSD) and the General Communications Security Bureau (GCSB) of New Zealand. Echelon consists of listening posts positioned all over the globe which can monitor and analyse practically any fax, e-mail or phone call sent anywhere in the world. As information is gathered it is processed by the vast NSA computer system, any words that match a special Echelon dictionary are flagged. When a key word is found, the message is transcribed and kept for future reference.

The government monopolisation of the EM spectrum is taken to the extreme in Craig Baldwin's cult film *Spectres of the Spectrum* (1999). The film, an idiosyncratic take on media archaeology, plunders

Foam gun (top), drawn by Jon Hares,
Ray gun (bottom), drawn by Tom Gauld, p.15



the electromagnetic imaginary for its material. It mixes spiritualism, mesmerism, telepathy and time travel with a potted history of the use of electromagnetism for communications, weapons and medicine, and features characters such as Tesla, Alexander Graham Bell and Wilhelm Reich. Set in 2007, the film uses a montage of sound, live action and clips from a 1950s educational TV programme called Science in Action to tell the story of Booboo, a telepathic woman who travels back through radio space to find a coded message inserted in the airwaves by her grandmother. The message holds the key to overthrowing the New Electromagnetic Order (NEO) and their complete corporate colonisation of the imagination through a misuse of HAARP, the High Frequency Active Auroral Research Program set up by the US Air Force and the US Navy in 1993 in order to 'understand, simulate and control ionospheric processes that might alter the performance of communication and surveillance systems'.

The reality is not so dramatic. Now that so many of us are connected to the spectrum through mobile phones, it is becoming a convenient medium for the state to communicate with its citizens and sometimes monitor them. At one point, the UK government planned to send text messages to the mobile phones and pagers of unemployed people to test their basic maths and English skills. If they did not score highly enough, they would be asked to do a course or face a reduction in their benefits. It is not all one-way though: in the UK, many first-time voters expressed a desire to vote using their phones, and many people who did not vote in the last general election said they would have done if they could have used their mobile phones. It was widely reported that more people voted to eliminate contestants in the reality TV programme Big Brother than voted for the ruling Labour Party in the last election.

A more imaginative application, borrowed from the Amsterdam police force, is to send 'text bombs' to stolen mobiles so that they are unusable. After an owner reports their GSM phone stolen, the police start sending text messages every minute:

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| 17:56pm           Menu |
| THIS HANDSET IS      |
| STOLEN, BUYING OR    |
| SELLING IT IS A CRIME |
| -THE POLICE          |
|                       |
| Back                 |
|-----|
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The messages are sent by a computer system specially designed for the police. The system can still work even if the handset's Subscriber Identity Module (SIM) card is removed, as it uses the phone's International Mobile Equipment Identity Number to track down the mobile phone number currently being used on the phone.

An early hint of the UK Labour Party's fascination with mobile technology and the EM spectrum was shown when politicians used their pagers to receive information during parliamentary exchanges at the dispatch box. A team of researchers working in the party's 'rebuttal' unit at their Millbank headquarters in London would search a database of opposition politicians' quotes and statements for information related to specific questions. So when a researcher discovered that a Tory backbencher who had asked

the Prime Minister a question about the insurance industry was a paid consultant to the Institute of Insurance Brokers, this fact was passed on to a Labour MP via his pager. Tory MPs seemed more upset by the way the politician read directly from his screen than by the use of the pager. This is an example of the spectrum being used as a sort of central nervous system, controlling the different limbs of the party.

Another use of spectrum as a nervous system, though on a rather larger scale, was recently discovered by scientists at Roke Manor Research Laboratories. They have developed a way of using the network of cellular phone masts to detect stealth bombers, which were designed not to show up on radar screens. The mobile phone network only exists when it is actually being used: it is like a sensitive skin stretched over the country, woven from the signals linking callers to base stations and each other. By measuring any loss of signal strength occurring through absorption by a foreign body, such a computerised nervous system can detect where it has been touched. Specially developed devices and software can sense the distortions and deflections in the telecommunications network created by bombers flying over the UK, right through the network. The advantage of this system over radar is that the entire network would have to be destroyed in order for it to be disabled, which would mean flattening the whole country.

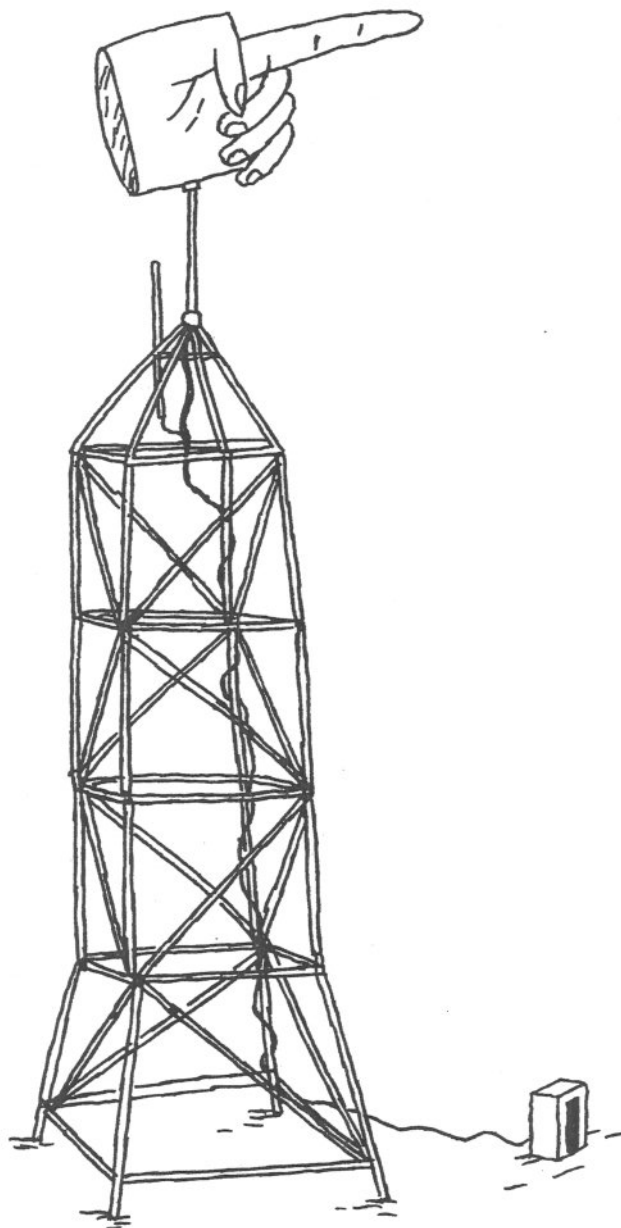
Spectral geographies

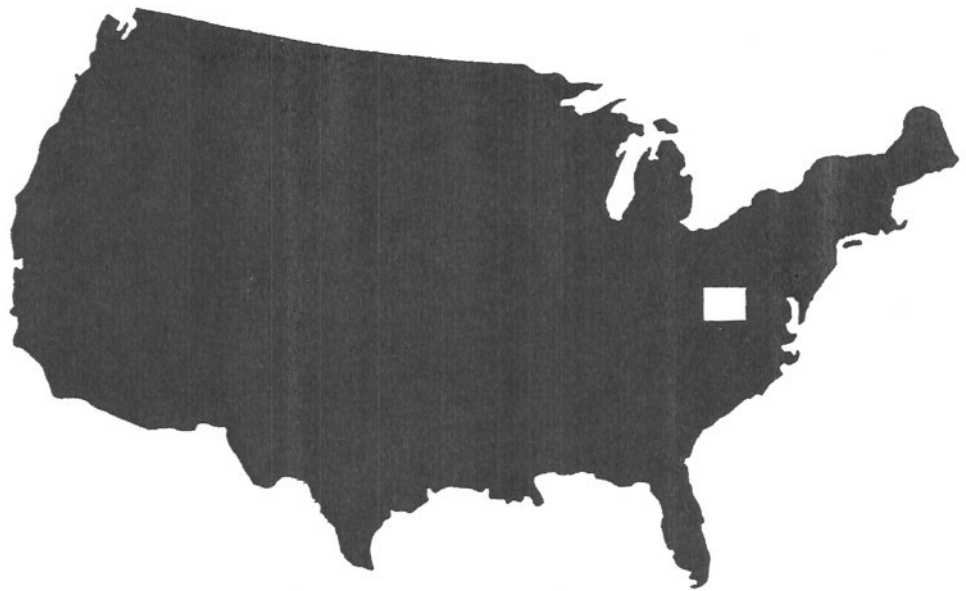
Although we cannot sense electromagnetic radiation, it is actual and very real, and interacts with the physical world to produce a new in-between landscape of shadows and hotspots we call an electrogeography. This hybrid landscape connects with rural and urban landscapes in a variety of different ways. Computer models produced by telecommunication research laboratories show how radio waves interact with the urban environment, and demonstrate clearly how hertzian space sits within the physical realm.

Different regions are now recognised as having different electrogeographies with specific features. For example, experiments to test the effectiveness of electronic tagging for criminals were conducted in three different locations: Manchester was chosen as an inner city area with numerous high-rise buildings, Norfolk because of its widely dispersed population and flat terrain, and Reading because it is a low-rise town with a highly developed technological infrastructure. The assumption was that high-rise buildings would block signals and create shadows, flat terrain would allow signals to travel freely over great distances and a dense technological infrastructure might generate electronic interference.

Tools developed for visualising the spectrum can also help us to understand hertzian space as a real landscape. Situated in an electrically quiet location 60 km north of London, the Baldock Radio Station operates 24 hours a day, 365 days a year, monitoring the spectrum. Although its main purpose is to track down sources of interference, it also helps the Radiocommunications Authority to identify rogue broadcasters. The station can monitor activity on any part of the radio spectrum, outputting the results as 'waterfall' charts. In these images consisting of offset layered snapshots taken over a period of time, the spectrum is portrayed as a landscape. Radio stations appear as regular, permanent features in the landscape, while rogue stations zigzag through the spectrum, trying to avoid detection.

Stealth bomber detector, drawn by Tom Gauld, p.18





The hertzian landscape even has its own natural preserves. In the US, West Virginia state legislature uses the Radio Astronomy Zoning Act to create a National Radio Quite Zone. This 13,000 square mile area is designed to be an electromagnetic sanctuary, relatively free from electromagnetic pollution. Situated close to the state border between Virginia and West Virginia, the zone is shielded from the nearest city by a mountain range, there are no high-powered radio or TV stations nearby and only a few electric power transmission lines pass through the landscape. Commercial airlines do not fly overhead, so there are no radar signals, and heavy trucks and buses are only allowed to pass on the other side of the mountains. The NRQZ was established by the Federal Communications Commission in 1958 to minimise the risk of interference to the National Radio Astronomy Observatory located at Green Bank. The area is also home to listening post run by the US Navy at Sugar Grove, which was once intended to be the site for the world's biggest bug. Even today, the area is still shrouded in secrecy.

Electrosmog

Electronic objects are disembodied machines with extended invisible skins. They couple and decouple with our bodies without us knowing. Working on microscopic scales, often pathogenic, many electromagnetic fields interfere with the cellular structure of the body. Paranoia accompanies dealings with such hertzian machines. How do they touch us? Do they merely reflect off our skin, or the surface of our internal organs? In other words, do they merely 'see' us, or can they 'read' us too, extracting personal information about our identity, status, and health?

Vatican Radio broadcasts the Pope's speeches and events to the furthest corners of the world in 40 languages via a forest of 58 antennae located at Santa Maria di Galeria near Rome. Following concern at

the disproportionately high incidence of leukaemia in children living near the transmitter site, in March 2001 the Italian Environment Minister charged three senior officials of the radio station with exceeding Italian laws on electromagnetic emissions. The Vatican denied causing a health hazard, and only agreed to reduce the number of transmissions as a goodwill gesture after the government threatened to cut off the electricity supply to its radio station. As the Vatican enjoys the legal status of an independent city-state, its lawyers also claimed immunity from Italian laws in this case, and argued that the station's emission levels did comply with the less stringent international standards. This fusion of religious content, electromagnetic space, health concerns and government regulations is a particularly colourful example of struggles occurring all over the developed world between large corporations, governments and increasingly concerned citizens.

The rapid expansion of uses for the electromagnetic spectrum has resulted in a new form of pollution, or electrosmog. Many different organisations exist to raise awareness of these issues, from the official, like the FEB (The Swedish Association for the Electro-sensitive) to the grassroots, like the EMF Guru website. There are also specialist centres such as the Breakspear Hospital in England, which specialises in treating environmental illnesses, including hypersensitivity to electromagnetic fields. But much of the information available on the effects of electromagnetic pollution is quite technical and difficult to understand. *Powerlines* (1997), a poetic documentary film by Helen Hall, uses dance and music to examine the mystery of electromagnetic fields, the promise of new energy, and the dangers of electromagnetic pollution. It is an artistic interpretation of a scientific area and introduces the topic to an audience who otherwise might be alienated by the technical subject matter. Located on the edge of a global electronic culture, it explores the shifts beginning to occur in the ways we relate to our environment, especially when we have to move beyond our senses:

'As the environment becomes flooded with electromagnetic radiation, all our senses are swamped with energy and information. While the entire world becomes electrified we are being overloaded by a vast world of electronic images, lights, and sounds, as huge amounts of information travel around the world at the speed of light and interact with the millions of electrical processes in every living cell of our bodies.'

Helen Hall, from the script of *Powerlines*.

The uncertainty about the effects of electro-pollution has resulted in a plethora of companies producing and selling protective devices, many of which seem highly unscientific. One company called LessEMF manufactures and sells protective underwear via the internet under the category of personal protection devices:

'Gain control of your inner environment – very sheer, comfortable undergarments you can wear over your regular underwear to shield yourself from powerline and computer electric fields, and microwave, radar, and TV radiation. This silver-plated, stretchable, washable nylon mesh is electrically conductive. It reflects radiation. Plus you won't get those static shocks as you used to in dry weather and your clothes won't cling to you! Fabric provides up to 35 dB of shielding at 100 MHz. Made in USA. Surround what you want to protect!'

<http://www.lessemf.com>

LessEMF also sells scientific meters for measuring different kinds of radiation, but the underwear is particularly interesting because these items illustrate a new and different idea of comfort. They might not be physically comfortable, but they obviously offer psychological protection for the wearer. It is as if the manufacturer and buyers of these products realise that we need to start developing objects that redefine our relationship to this new environment. However, many of the objects available now are not so convincing, and come across as slightly paranoid.

Radiant objects

Pathological products based on paranoia or eccentricity often reveal more about the aesthetic possibilities of this new space than more conventional objects. Many devices designed to make private situations and information public depend on the 'leakiness' of electronic objects, tuning into the dreams of radiant products. The 'computer intercept system' sold by the Surveillance Technology Group is an excellent example.

'Without entering the premises, electromagnetic radiating from unshielded computer screens and ancillary equipment can be intercepted from a remote location. The Computer Intercept System's highly sensitive receiver logs all radiating signals into its 100 channel memory. These emissions are then stabilised, processed and reassembled into clear reproduction of the intercepted data onto its built-in monitor.'

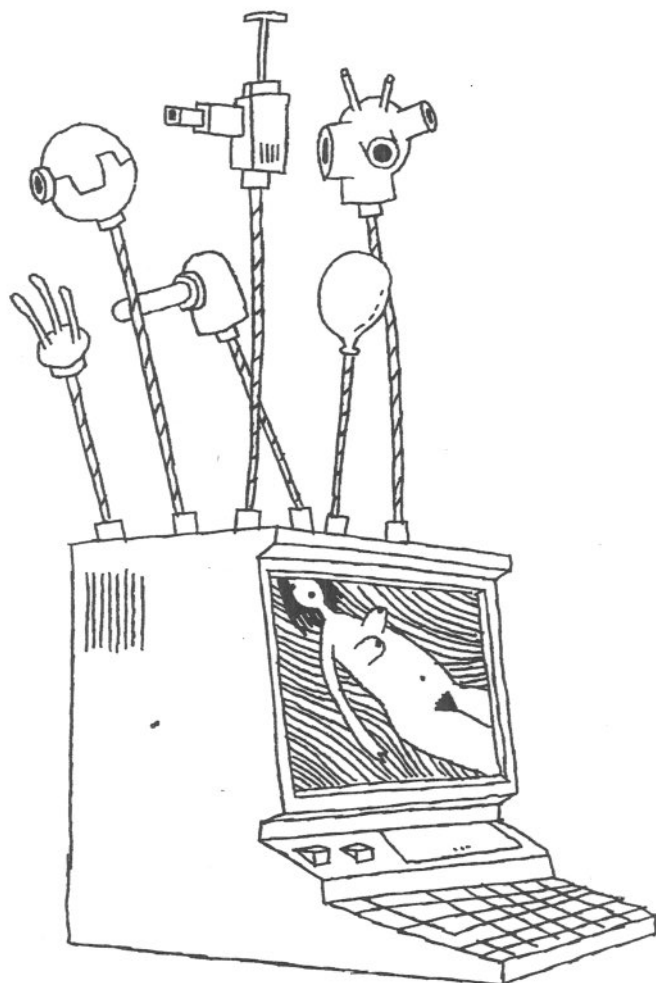
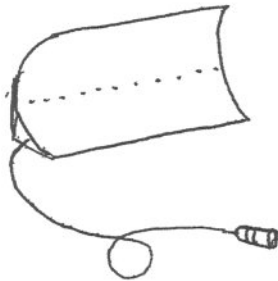
Surveillance Technology Group brochure

The realisation that computers leak has led to a radically different way of thinking about electronic products compared to non-electronic objects. In 1985, Dutch scientist Wim van Eck published a paper which caused a panic within the US government and was immediately classified. Wim van Eck proved that computer VDUs emitted electromagnetic radiation similar to radio waves and that they could be intercepted. This surveillance technique has become known as Tempest monitoring. Tempest stands for Transient Electromagnetic Pulse Standard. It is the standard by which the US government measures electromagnetic computer emissions and details what is safe (allowed to leak) from monitoring. It is also sometimes called van Eck monitoring or van Eck phreaking.

This electromagnetic leakiness gives rise to some very interesting issues to do with privacy, territory and the edges or boundaries of one's own identity, space and objects. Many of the most interesting debates in this area are taking place in the field of law. In 1992 police in California scanned a house using a thermal imaging device. The scanner showed that the building was generating excessive heat, and on the basis of this information, the tenant's electricity records and the testimony of an informant, the police obtained a search warrant. Inside the house, they found more than 100 marijuana plants growing under high-intensity lights.

In court, the defendant's lawyers claimed that by using a thermal imaging device the police had 'entered' his home, and should therefore have applied for a search warrant beforehand, just as they would have to if they were to physically enter the house. The prosecution countered that the defendant's home had 'leaked' into the street, and no privacy laws were violated. The issue was summed up by one

Tempest computer monitoring and interception system, drawn by
Rei Terao (top) and Tom Gauld (bottom), p.22



academic when he asked: 'Does this (scanner) take someone from outside (a home) and put them in or take information from inside and take it out?'

The US government compared the scanning to watching a house from the outside, which does not require a warrant. The US Solicitor General's Office wrote: 'Thermal imagers do not literally or figuratively penetrate the home and reveal private activities within... Unlike a hypothetical sophisticated X-ray device or microphone that could perceive activity through solid walls observations that would amount to searches, a thermal imaging device passively detects only heat gradients on exterior surfaces.' Another example of attempts to legally define ambiguous private and public boundaries within hertzian space occurred when a man was imprisoned on the basis of material picked up by a neighbour on his cordless phone. The court ruled that no one had invaded his privacy, as by using a cordless phone he had 'no reasonable expectation of privacy'.

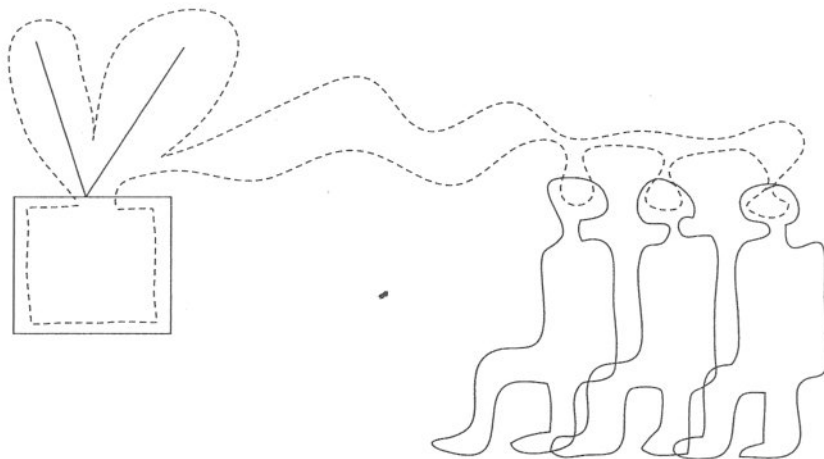
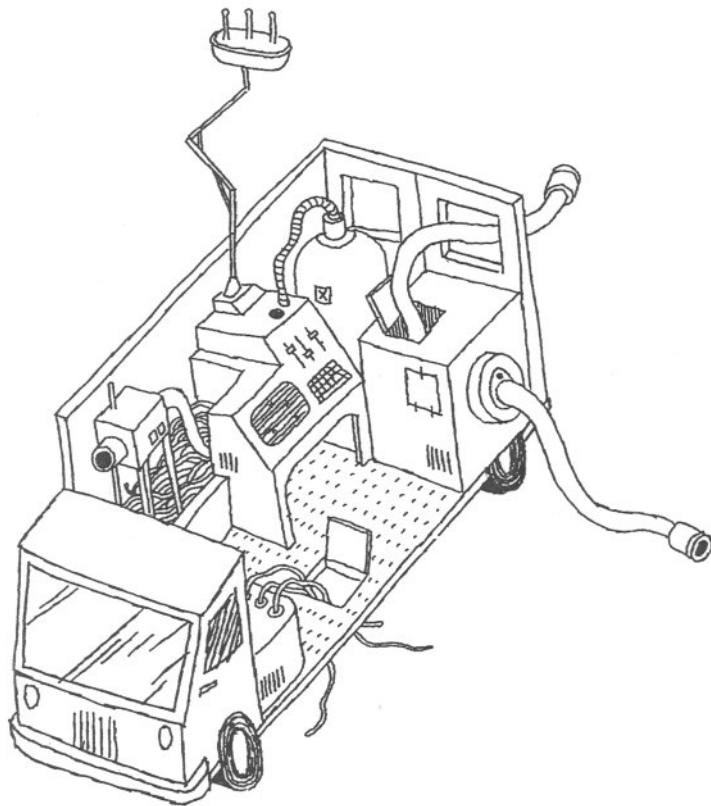
In Britain, television licensing authorities exploit the semi-mythic status of TV detector vans, as license inspectors cannot physically enter your house to check if you own a TV set or not without your permission. No one seems to know how these vehicles, which supposedly roam the city cross-referencing TV signals, addresses and TV license data, work, or if they even exist. As we begin to redefine inside and outside legally in relation to leaky products and devices, the question of how these devices actually work could become very important. Do they 'enter' our homes? Or do the electronic objects in our homes 'leak' into the street? These examples show that even such basic concepts as inside and outside are redundant when we start to talk about inhabiting hertzian space.

It is not just the difference between inside and outside, private and public, that is causing difficulties. Defining the exact moment when a piece of digital information becomes yours is also proving elusive. A Canadian police anti-pornography unit claimed that possession of computer pornography occurs when an image is saved on a computer's hard drive or a diskette. Most people have no idea what is being saved to their hard drive: the computer can make a copy of an illegal picture and save it to disc when a person is just peeking at an illegal image out of curiosity but has no intention of downloading it. It has still not been determined whether or not a person is guilty of possession of illegal pornography if it has been inadvertently saved to their hard disc without their knowledge.

The growing awareness that computers radiate is also beginning to influence the way we think about them in relation to our bodies. After one of our lectures, a woman approached us with a story. When her father died, she decided to clear out all his belongings. She found a new home for everything except his computer. He had spent so much time sitting in front of it working, that she felt he had somehow exchanged energy with it, she felt as though some of his energy or radiation had become mixed up with the computer's radiation. She could not bring herself to get rid of his computer, and ended up with a slightly spooky situation she did not know how to resolve. The house was completely empty except for one room where the computer sat on the floor in a corner.

As awareness of the existence of electromagnetic fields grows, our notions of the 'haunted' might begin to evolve in new directions, as well. In *The Ring* (1998), a film by Hideo Nakata, a mysterious video cassette transmits a psychic virus to anyone who watches it. Within ten minutes of the film ending, the telephone rings, and unless the tape is passed on to someone else, the person dies within seven days. In a way, you could say that the haunted house has been superseded by the haunted product. Ghosts move

TV detector van, drawn by Tom Gauld (top) and Anthony Dunne (bottom), p.24



tv license detection telepaths training (they work in threes to avoid disputes)

through the magnetic fields and electronic workings of video cassettes, video players, TVs and the telephone system rather than hallways and cellars. There is something poetic about the idea of a ghost existing in a magnetic medium, breaking into everyday life through products that shape and transform the very same media.

Lawyers, criminals and the superstitious are already aware of these issues, designers and architects need to explore them too. Not just by finding new ways of exploiting the electromagnetic spectrum as a medium, but by defining and giving tangible expression to new thresholds between inside and outside, public and private, mine and yours, within a cultural context.

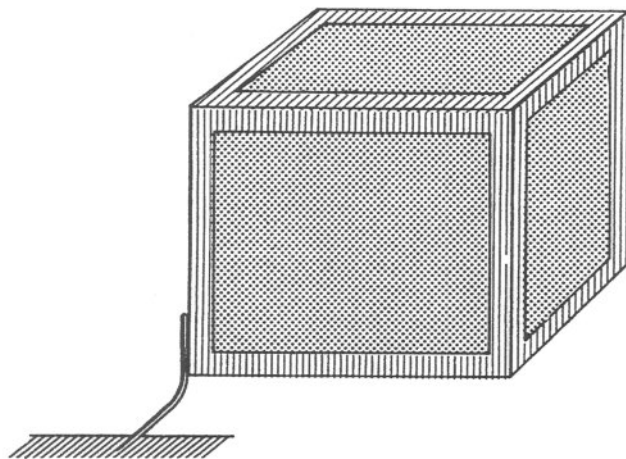
Immaterial sensuality

As a result of these changing notions and shifting boundaries, a whole host of technologies, devices and materials have been developed to offer protection or shelter from the spectrum. These objects and materials could be defined as 'radiogenic', that is they interact directly with electromagnetic waves, either reflecting energy, converting it or diverting it. Radiogenic objects and materials function as unwitting interfaces between the abstract space of electromagnetism and the material culture of everyday life, revealing unexpected points of contact between them. This fusion of the immaterial and sensual can generate some intriguing situations, objects and aesthetic possibilities.

The challenge today is not to create electronic space, but electronic-free space. The extent of hertzian space is reflected in the difficulty of finding electromagnetically unpolluted parts of the globe as sites for intelligence gathering 'antenna farms' and the use of Faraday cages to create 'empty' zero-field spaces for isolating sensitive equipment. A modern war is won by the side that best exploits the electromagnetic spectrum, denying the enemy its effective use and protecting friendly electromagnetic systems against electronic attack. In order to prevent electronic eavesdropping, many office buildings are now designed to function as Faraday cages, utilising electromagnetic shielding materials throughout the structure. Ceramic conductive coatings or fine blackened copper wire meshes are laminated in glass to create 'datasafe' windows. The same technology is used to protect sensitive equipment inside buildings from bursts of external radiation.

As electronic products escape their cases and leak into the space surrounding them, it might become necessary for us to seek shelter in specially constructed non-radio spaces, or negative radios. With the Faraday Chair (1998), for example, we used a conductive ceramic coating to shield the occupant. This utilitarian shelter of minimum dimensions and comfort might even be a retreat, a new place to dream, away from the constant bombardment by the radiation of telecommunications. We just do not know what the real effects of the new space that has been constructed are, but to completely shield our homes is a luxury only the rich could afford.

Antenna test-sites and other specially designed technical environments like anechoic chambers are used to measure an object's 'leakiness' in order to predict its effect on other objects. The complexity and specificity of these spaces show just how difficult it is to create fully-shielded environments. Most protective environments concentrate on blocking only particular wavelengths. In *City of Façades* (2001), architect Oliver Michell has developed a range of prototype Faraday Curtains that make use of



this shielding technology. His project proposes a new settlement populated by radio enthusiasts broadcasting opinions and (dis)information from a very dense site in Berlin. The city's fabric consists of a layering of protective surfaces, or façades, which protect broadcasters from the electromagnetic waves generated. In the true spirit of radio hams, the city is to be assembled by its inhabitants themselves, using a selection of designed parts and a set of construction guidelines.

Most of the materials Michell has chosen to focus on are familiar elements of domestic surface decoration such as wallpaper and net curtains, modified to filter out electromagnetic fields. His Faraday Curtains consist of readily available domestic net curtains soaked in clear resin before being vacuum metalicised with copper. Although a design proposal, this project is intended to be technically feasible. For instance, the lace used for the curtains was checked to ensure the holes were of a suitable dimension to shield against short wave radio waves. The final result expresses a hertzian domesticity, acknowledging the need for privacy and homeliness while providing psychological and physical protection from electromagnetic fields.

A different approach to shelters was explored by another architect, Pedro Sepulveda-Sandoval, as part of his ongoing research into digital shelters for the scanscape. His kit for making temporary zones of privacy consists of specially made tape with the words 'digital shelter' printed on it and a waveshield mobile phone jammer. When the electromagnetic shelter is set up, the only visible indication of its existence is a taped rectangle marking the functional limits of the phone jammer. This project very clearly demonstrates the environmental qualities of electromagnetic fields: when somebody steps inside the taped boundary, their mobile phone stops working. It is as though they have stepped into an invisible shelter that prevents telephone signals from penetrating its walls.

Waveshield devices are currently used in cinemas and restaurants to minimise 'social pollution'; they work by generating a radio signal that prevents the telephone from communicating with a base station, thereby losing its connection with the network. The UK distributor for these devices requires government approval before one can be sold. Using a jammer constitutes a form of trespass.

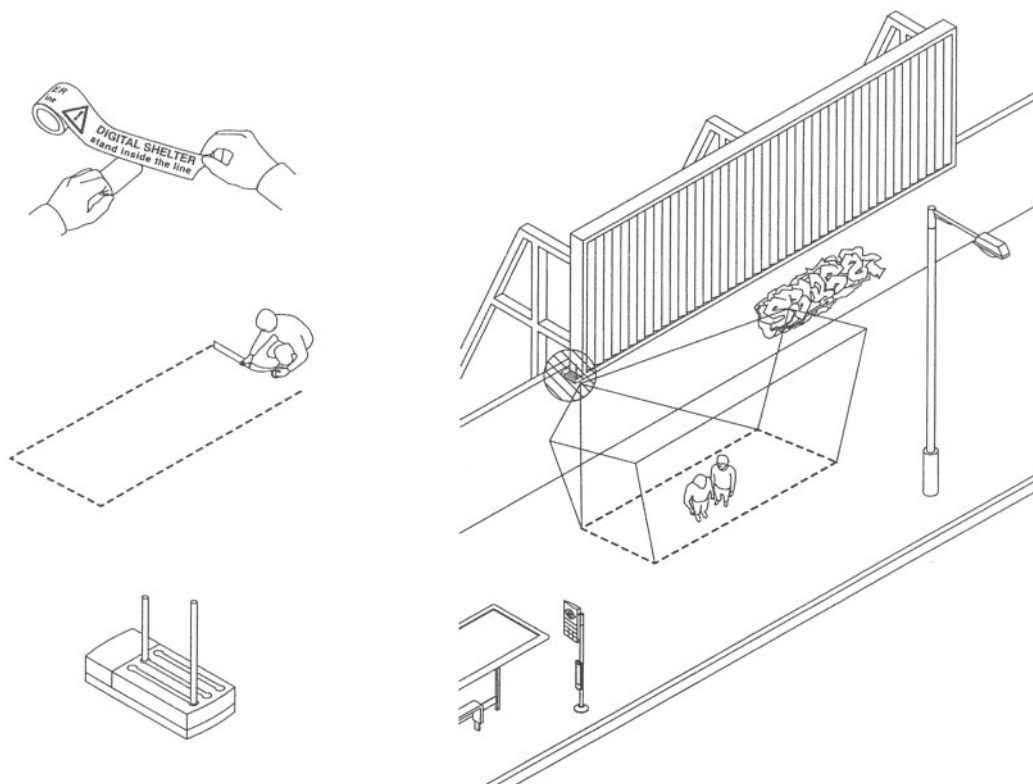
Like all supposedly immaterial media, hertzian space has its material props. In the case of mobile phone networks, it is the unsightly masts dotted throughout the countryside and perched on buildings in all major cities and towns. There are believed to be more than 20,000 such masts in Britain and an estimated 100,000 more will be needed over the next decade. Several American companies including ARCNET of New Jersey, the Larson Company of Arizona, Valmont Industries of Nebraska, and AT&T are jointly creating camouflaged antennas disguised as trees, like the 40 m white pine. These masts are covered with epoxy-resin bark, and antennas are concealed inside branches. Royal palm and saguaro cactus designs are also available, to suit different environments.

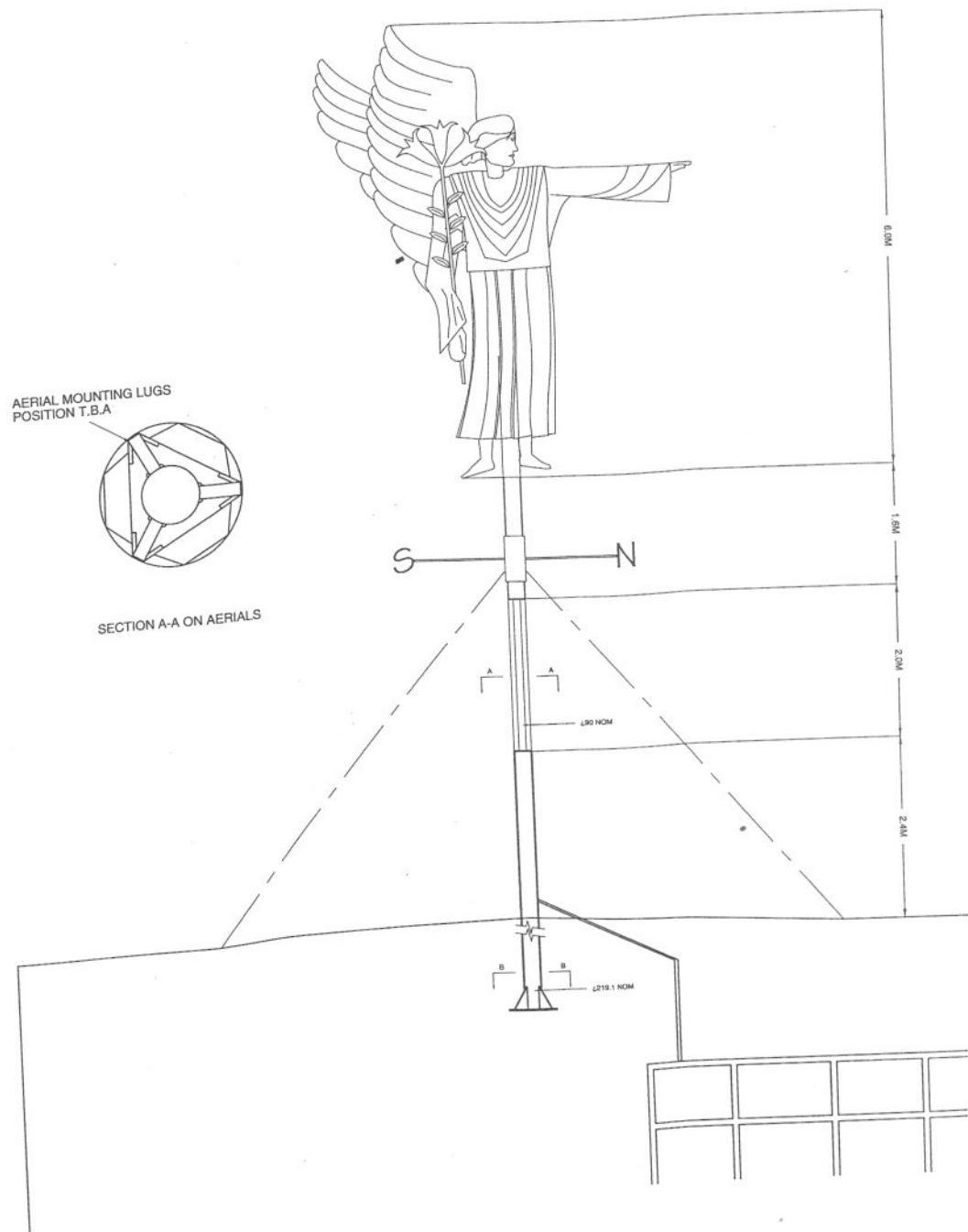
Hundreds of church spires already carry some form of telecommunications equipment, and in return the churches receive a rent of between £3,000 - £30,000 per year. One of the most intriguing stealth antennas is located in Guildford cathedral in Surrey. The telecommunications company One-to-One offered to re-gild the cathedral's 5 m angel weather vane with gold leaf at a cost of £20,000 if it was allowed to place a radio mast inside it. The pole on which the vane rotates has been replaced by a new steel structure concealing three transmitters.

Solutions like these are produced outside of a conventional design context. Whereas a professional designer might try to express the meaning of the antenna, or create a 'modernist' sculptural statement to house the technology, the angel antenna simply juxtaposes the needs of two usually separate worlds. The visual culture of religious paraphernalia and the efficiency-driven exploitation of the EM spectrum join to create an accidentally poetic landmark. Electronic technology gives existing objects, in this case a weather vane, new and almost magical qualities. The Guildford angel expresses beautifully the poetic potential of ubiquitous computing, that is, the belief that computers will cease to exist as discrete objects and will be absorbed, like the electric motor before, into pre-existing artefacts and environments. Rather than forcing material culture to express this fusion, the angel antenna is an example of how juxtaposition could lead to a more enjoyable, if cerebral, meeting of material and electronic cultures.

Digital Shelter by Pedro Sepulveda-Sandoval, p.27

Peel the backing off the Digital Shelter adhesive tape and stick to the floor in the chosen space. Attach mobile phone jammer to the wall. Stand inside the line to use the shelter.





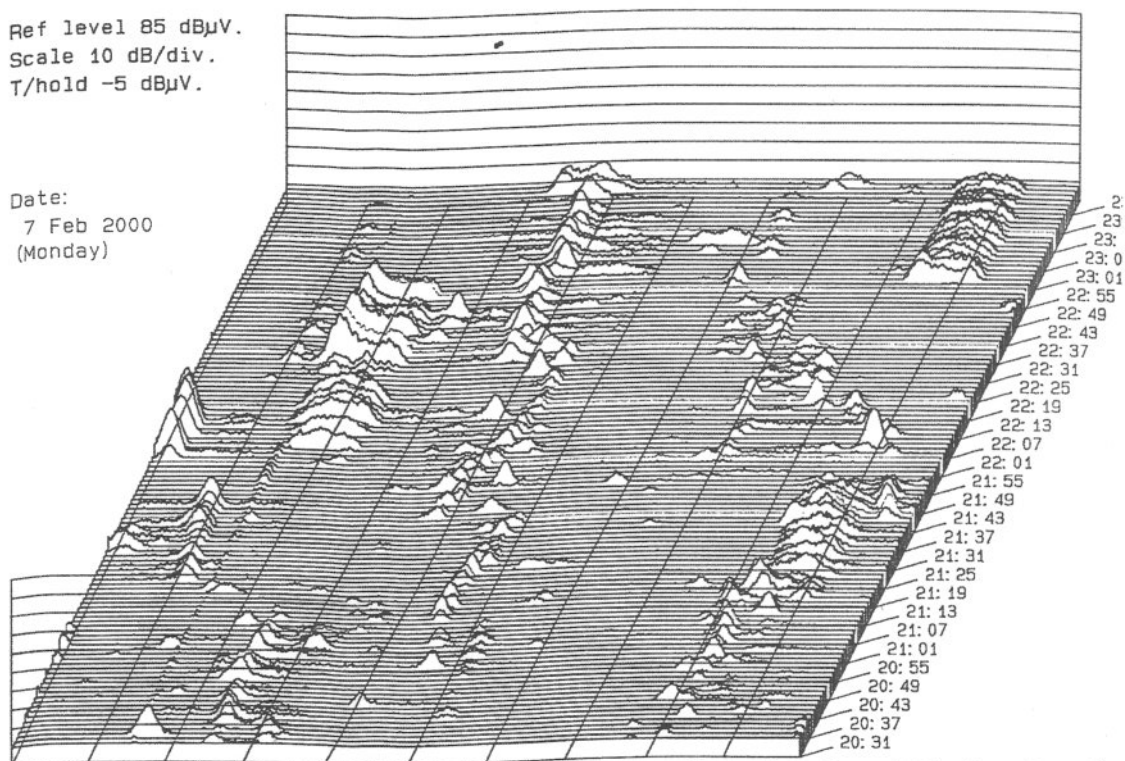
Camouflaged antenna, Guildford Cathedral, p.28



Camouflaged antenna, USA, p.28

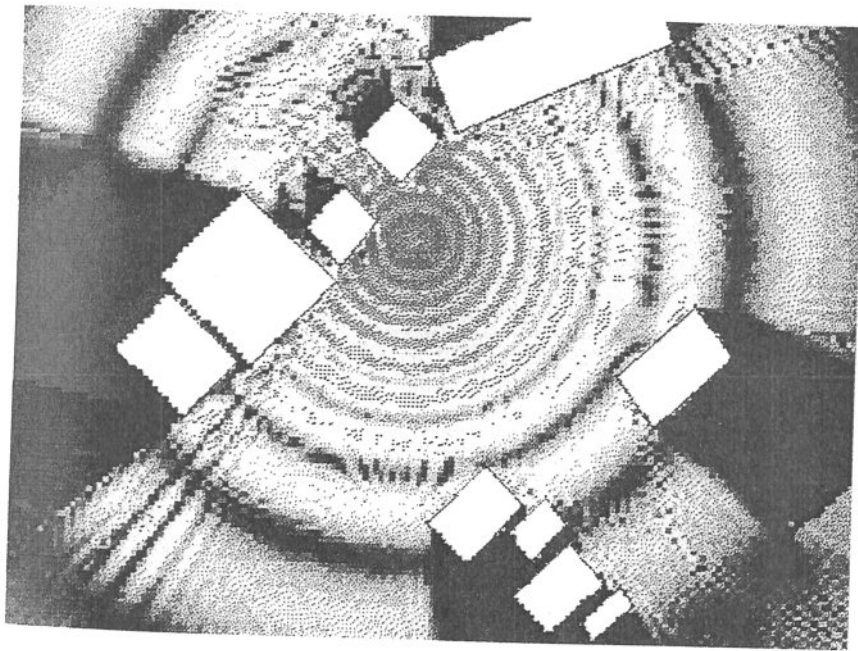
Ref level 85 dB μ V.
 Scale 10 dB/div.
 T/hold -5 dB μ V.

Date:
 7 Feb 2000
 (Monday)



Start 120 plots, 1 per 1.5 min. 3 kHz per div. Stop Time (UTC) (New thresh)
 2.95500 MHz 50 sweeps per plot. vid.avgd 2.98500 MHz
 Res BW 300 Hz VBW 300 Hz SWP 1.0 sec
UNSTABLE A3E CF 2970 KHZ

'Waterfall chart' produced by Baldock Radio Station, p.18

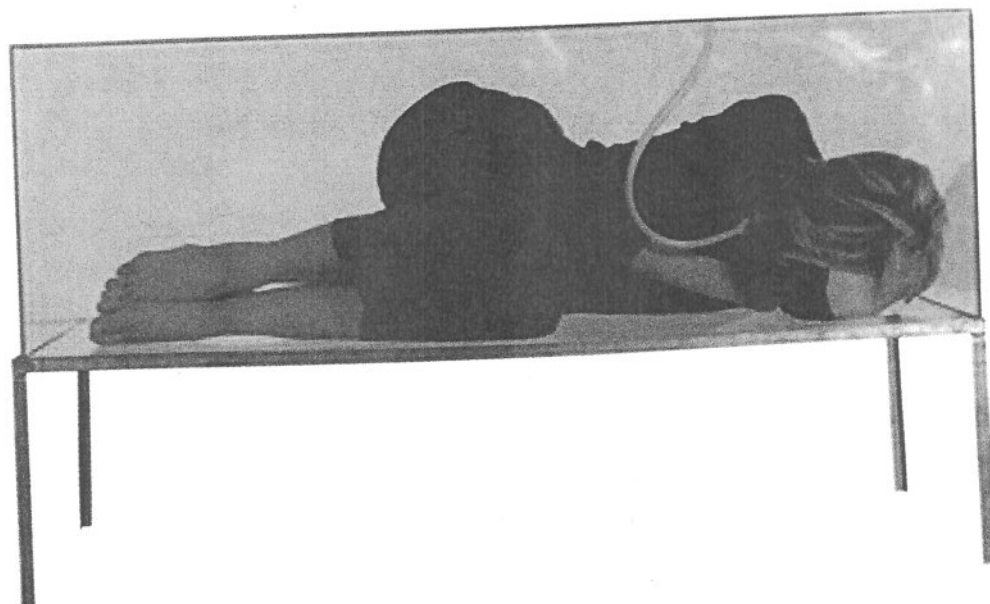


Computer model of radio waves interacting with buildings, p.18

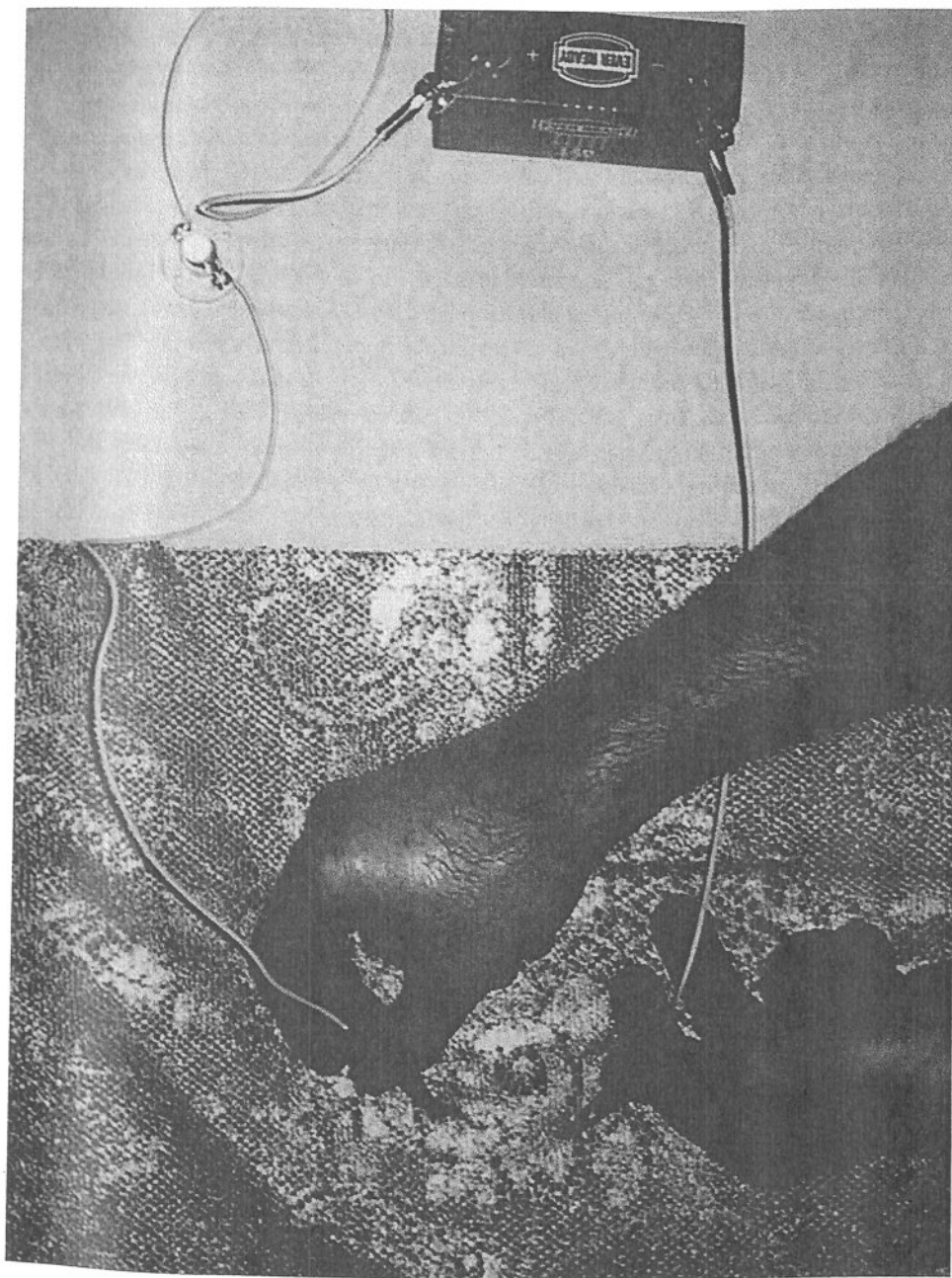
**NO PERFUME
NO PERFUMED PRODUCTS
NO AFTERSHAVE
NO SMOKING
NO FLOWERS**

Entrance sign, Breakspear Hospital, Hemel Hempstead, p.21





Faraday Chair by Dunne & Raby, p.26



Faraday Curtains by Oliver Michell, p.26

Some people have developed a refined appreciation of the aesthetic potential of the new electromagnetic landscape, and know how to enjoy it before the rest of us do. These electro-connoisseurs hint at what might be as these strange pleasures seep into everyday life. Radio Hams have long taken pleasure in the spectrum, but a more recent development is radio orienteering. The transmitter hunters, or 'foxhunters' as they are also known, derive enjoyment from the spectrum by treating it as a real environment and playground. Five low-power transmitters (foxes) are set up to automatically transmit on the same frequency for exactly one minute each, one after the other. The contestants attempt to locate as many as possible within a two-hour time limit, carrying a card to mark with unique punches found at each fox. Scoring is determined primarily by the number of transmitters found and secondly by the amount of time elapsed. Contestants are individually timed and set out at five-minute intervals, coinciding with the start of transmissions from fox number one. The people who place the transmitters are true connoisseurs of the rioscape and have a special skill: they have internalised the qualities of the new environment to such an extent that they can tell how the radio waves will reflect or be absorbed by different materials and features in the landscape. Radio orienteering is not just a sport, but also a community bound together by specialist knowledge and a sensitive appreciation of a new environment.

Another group of people with a heightened and more romantic appreciation of the rioscape are 'whistler hunters', natural radio enthusiasts who tune into radio transmissions created by atmospheric events. They search out VLF (very low frequency) radio waves or 'sferics', short for 'atmospherics': natural radio-frequency emissions in the ionosphere, caused by electromagnetic energy radiated from lightning. These signals – resonant clicks and pops called 'tweaks' and 'bonks' by scientists – occur in the audible range and may be picked up by antennas and amplified for listening. Occasionally sferics get caught on, and travel long distances along, the magnetic flux lines around the earth, producing 'whistlers', downward gliding signals which may last up to three seconds. These sounds are best received at night, far away from power lines and electromagnetic pollution. Whistler hunters travel far to unpolluted sites, sometimes camping out for days, listening for the elusive sounds of natural radio. Although the sounds are fleetingly beautiful, out of context they lose much of their charm; their beauty is entwined with the effort endured and the symbolic significance of receiving them, which for some is quasi-mystical, for others a defiant gesture against people's careless attitude towards nature.

Pylon enthusiasts, connoisseurs of the material culture of electromagnetic space, extend the pleasures of trainspotting into the electronic world, recording data and savouring the rare and the unusual. One website gathers information about pylons from all over the world and even has a section updated monthly called the 'pylon polemic'.

'This site is dedicated to the humble electricity pylon, whose beauty remains tragically unrecognised. Railed against by mis-guided environmentalists, these delightful constructions enhance and beautify their surroundings, providing a comforting reminder of Man's harnessing of the forces of nature. They also provide children and adults alike with the opportunity to engage in the fascinating and rewarding hobby of electricity pylon number collecting.'

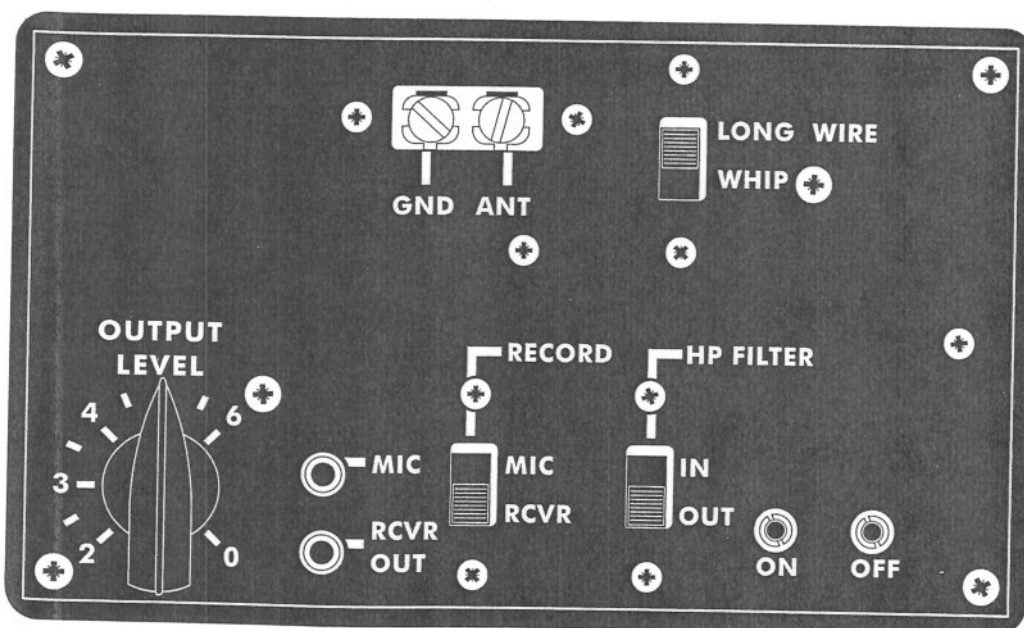
<http://users.tinyonline.co.uk/high/high/pylonof.htm>

Pylon polemic 17, for example, argues strongly for the notion of 'pylon tourism' and the benefits it would bring local communities. Apparently a site on the outskirts of Rochdale is a mecca for pylon enthusiasts. Just off the A680 to the north-west of the town is a pylon – National Grid Company Plc's ZP 226 – nicknamed 'The Pink Pylon', painted that colour for an appearance in a British film called 'Among Giants'. The author of the polemic regards this pylon as a potential revenue generator for the town.

Electro-sensitives

A growing number of people are discovering they are 'allergic' to electromagnetic fields and suffer from electrical sensitivity. The Breakspear Hospital near London specialises in the treatment of environmental illnesses including electrical sensitivity. Its director Dr Jean Munro writes:

'Just as abnormal food and chemical sensitivities can be tested for, so can electrical ones. The procedure is simply to sit in the same room as an electrical oscillator at about TV viewing distance. The tester then tunes the oscillator through all the frequencies likely to be giving problems. This is usually from less than the heart rate frequency of 1 Hertz (cycle per second) to more than 1 GHz (one-billion cycles per second). The patient reports on any symptoms felt. These will usually be the same as those triggered during the foods and chemical testing. The frequencies at which the symptoms are triggered and neutralised are recorded. There are usually one or more frequencies at which all the symptoms clear up. In addition, patients often get great relief in realising that symptoms that they have suffered from for years can be turned on, and off, at will from an electrical oscillator, not connected to them in any way.'



VLF radio, front

Many sufferers have developed their own DIY treatments to alleviate their symptoms, which can include nausea and the onset of headaches when using a telephone. One of the most common methods is described by Marcus Trower writing about the syndrome in Red magazine: 'When she can't sleep, Pauline plugs herself into the mains to drain her body of electricity. She shows me the flex she uses. At one end is a bare wire loop she puts round her fingers or big toe; at the other end is a plug with a single earth pin. She wears a helmet made from tinfoil when she has an attack. To cook she turns on the microwave, then runs to another room until it's finished cooking.' Another woman in Ireland lives in a small two-bedroom wooden chalet called a Scandinavian home. She has no electricity there, uses oil heating and lamps, gas to cook, and has two old fashioned irons that she heats on the fire. She tried a battery operated TV, but this still affected her. If she has to use the phone, she goes to the main house where her husband lives and takes out the main fuse first.

Environments and treatments designed for these electro-sensitive people embody knowledge and ideas about well-being and comfort that may eventually find their way into the mainstream. In the near future, more of us may feel the effects of the inevitable increase in usage of the EM spectrum. Hyper-sensitive people are the pathfinders for this changing environment, 'human canaries' alerting us to dangers and concerns that are bound to become more common as more technology becomes wireless.

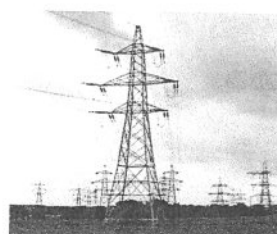
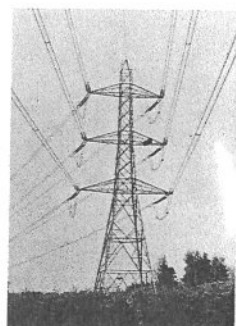
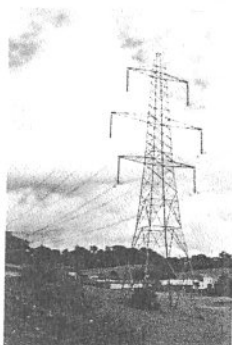
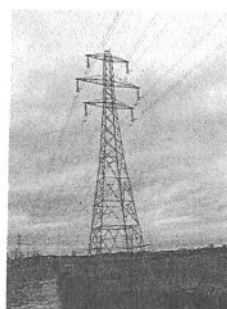
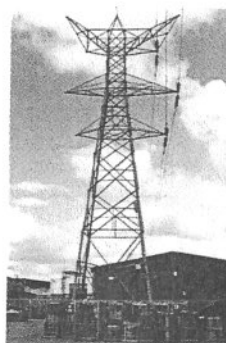
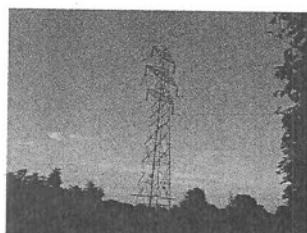
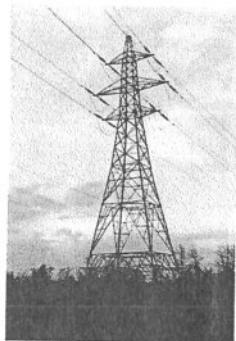
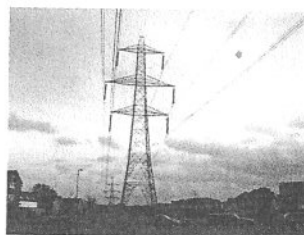
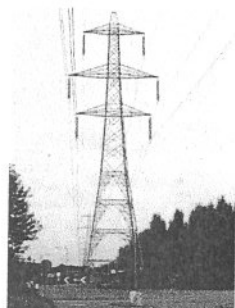
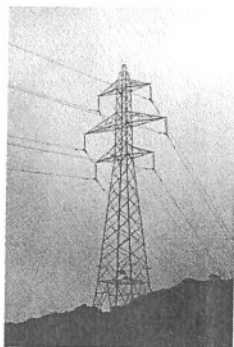
We are not recommending that designers try to predict misuses of products, but rather that they refer to this rich narrative space as a context of use instead of the models of normality usually referred to when new functional possibilities are being developed. Designers could draw on the specialist knowledge, concerns and pleasures of beta-testers, early adopters, electro-connoisseurs and hyper-sensitives to evolve a deeper understanding of how to make ourselves at home in this new environment.

LABORATORY SERVICES

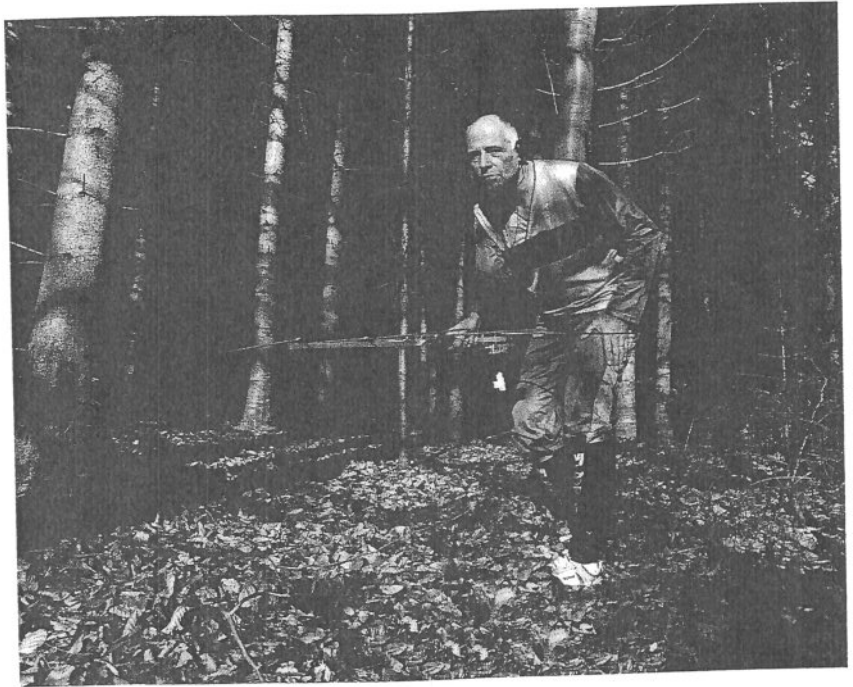
VLF REC. NO: VLF-1

LS SN: 450426-1VLF

VLF radio, back



Pylons featured on the Pylon of the Month website, p.38



Transmitter hunters, p.38



DIY treatment for electro-sensitives, p.40