

# Point and Counterpoint in Environmental Health Research

## Introduction

In this essay I wish to examine the relationship between the public and the environmental health sector.

In order to facilitate this I am going to concentrate on three areas that are, to varying degrees, emphasised in alternative, non-scientific approaches but are scarcely addressed in mainstream environmental science: light and health, magnetic fields and geopathic stress.

## Background

Most new scientific ideas will go through three major stages:

Stage	Name	Features
1	Unorthodoxy	Considered a 'fringe theory' or irrational; ridiculed.
2	Acceptance	Either gradual or sudden, resulting in a 'paradigm shift'.
3	Orthodoxy	Well-supported and ingrained into the establishment.

In parenthesis, it will be noted that this process could apply to the uptake of any ideas, not just scientific.

The question is whether the process is being impeded or encouraged. The first area we are going to examine, light and health, exemplifies this well. I would put it in the Stage 2 category of growing acceptance.

## Light and Health

A connection between light and health has been well-established and there is little argument about that. However, research is quite limited though it has been

growing steadily in the last few decades. 'Light therapy for dealing with health problems was popular until the 1930s, after which time the introduction of penicillin led to pharmaceuticals taking the leading role'. (Van Bommel and van den Beld, 2003)

The man named the most frequently regarding the effects of light on health is John Nash Ott, who highlighted the benefits of UV reaching the eyes from sunlight. Ott, however, despite interest from other parties, could get no funding for his research. Not many people stood to benefit financially from sunlight. (It should be noted that the source quoted above is actually Philips Lighting.) It is perhaps Russia, a country with severe budgetary constraints, that promoted heliotherapy the most, particularly Ultraviolet Blood Irradiation. 'We take 2% of blood from an ill patient, irradiate it, put it back, and the whole of the patient's blood is instantly changed,' claims Professor Kira Samoilova from the St Petersburg Academy of Sciences. (Griggs, 2001)

But now it is no longer just Russia conducting extensive research. There is particular interest in connections between the suppression of melatonin by 24h lighting and higher incidences of breast and colorectal cancers. (Pauley, 2004) This is in conjunction with surprising revelations about a third photoreceptor - the first two being the rods and cones - in the mammalian retina: ganglion cells which are 'specialised to encode ambient light intensity' and 'synchronize circadian rhythms with the solar day' (Berson, 2003).

Results show a need for cortisol stimulation during the day by blue-tinted light, and melatonin stimulation at night by red and by darkness. 'Like the early years of the tobacco and lung cancer debates, warnings and public awareness programs regarding the use of day and night-time lighting may be warranted. Specifically, artificial day and night lighting systems should be designed and re-designed to enhance rather than disrupt this very sensitive and visually separate retinal-circadian system which is separate from the visual system.' (Pauley, Ibid, p.11)

The results of this and other research on the benefits of the right light at particular times have enormous implications on how we conduct our lives in a 24h society. (Appendix 1)

As far as the health benefits of light are concerned, it has only been a fringe theory for the past century because of lack of financial support for research, and is now moving comfortably into our Stage 3 of orthodoxy.

### **Magnetic Fields**

There are few areas relating to health and the environment as contentious as low frequency electromagnetic fields (EMFs). It is common practice though in some countries when wiring buildings to reduce the EMFs. In Germany an

electrician will routinely use ducting and/or *netzfreishalter*s (demand switches) to do so. I am focusing here though specifically on magnetic fields as we cannot usually be shielded from them, thus creating an interesting dilemma.

As regards EMFs in general, the World Health Organisation states: 'Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health.' (WHO, 2006, p.2)

But Professor Henshaw from Bristol University is quoted as saying, '...A body of studies in human populations have reported that magnetic fields at even low levels can disrupt the production in the pineal gland of the important hormone and natural anti-cancer agent melatonin. This may explain why studies have shown that exposure to magnetic fields may lead to increased risk of childhood leukaemia, adult brain cancer, miscarriage and depression.' (Bristol, 2005)

These remarks are in retaliation to the National Radiological Protection Board's recommendation of a 100 microtesla upper limit of exposure. Sweden and Switzerland have established limits of 0.2 and 1.0 microtesla respectively. (Ibid) The WHO rely on recommendations from the International Commission on Non-Ionizing Radiation Protection, giving limits of 100 (public exposure) and 500 (occupational exposure) microtesla. (WHO, Ibid, p.5).

The WHO should be acting as intermediaries between the scientific profession and the general public. A rather patronising tone, however, is clear on their assessment of 'public perception of EMF risks' e.g:

*'Every activity you can think of has an associated risk. Travelling may result in a car accident, or a plane or train crash. Staying at home may not protect you from an earthquake. Living in general is associated with many risks. There is no such thing as a zero risk.'*

(WHO, 1998)

We are consequently moving into a situation where distrust in official statements becomes so strong that anything that comes from *unofficial* sources is accepted at face value. It has therefore been very much up to consumer groups like Powerwatch to keep an eye on proceedings. It is to their credit that they - and others - retain a scientific objectivity in the face of considerable odds: from vested interests on one side and woolly thinking on the other. Their book 'Killing Fields in the Home?' (Philips, 1999) shows an openness to new ideas tempered with an impressive scepticism. For example, regarding the research done by Southampton Health Authority on the 'Tecno AO' device for dealing with electromagnetic stress, despite finding no scientific explanation for *how* it works, they give an unbiased verdict that it *does*. (Ibid, pp.116 - 8)

The sheer proliferation of magnetic fields *is* disturbing. My own brief research as shown in Appendix 2, suggests that we are subjecting ourselves to influences we know little about on a daily basis if even an ordinary phone emanates a field of 400 nT (0.4 microtesla), well below WHO levels but much higher than Powerwatch's recommended maximum of 200 nT (Ibid, p.8)

That this research generally remains stuck in transition between Stages 1 and 2 is, therefore, not that surprising. Our whole infrastructure is threatened if we cannot use phones, drive in cars and sit in tube trains for hours every day and remain healthy. It appears to me that it is not so much sinister corporations blocking research into this phenomenon, it is all of us. We would rather not know.

In the meantime, those who 'feel' something is amiss are going to continue buying weird and wonderful devices to counteract 'the bad energy'. In the absence of unbiased and extensive scientific research, they don't have much of an option.

### **Geopathic Stress**

As much as research into magnetic fields and health may be gaining slight ground in the world of academia, geopathic stress is gaining none and is likely to remain at Stage 1 for a long time yet.

In brief, geopathic stress is supposedly a malign influence caused by disturbances below ground, such as stagnant water, underground streams, caves, mine-shafts etc. It generally manifests in people living above it through weakened immune systems, insomnia, depression and cancer. Other indications on the site include a proliferation of certain animals and plants (Appendix 3).

There are many bizarre health claims in the fringe sector, so what is it that makes GS any more deserving of attention? Well, the first thing is that it is so obvious. Once experienced it is easily recognised; not however, so easily dealt with. Secondly, the Chinese have known about it for thousands of years. The character *sha*, shown here, means 'life-taking breath' and is an influence Feng Shui practitioners seek to remedy.



(Anugyan, 2003)

The four strokes below the character symbolise a fire coming from below the ground, representing a destructive force. (Ibid)

Even if GS has been recognised by a culture thousands of years ago, this does not, of course, prove its reality. There have been some interesting modern observations though, such as the fact that gypsies - not known generally as health food fanatics - have much lower incidence of cancer than other people. It has been suggested that this is because they don't stay in any areas high in GS for too long (Cowan, 1996) though I would be inclined to consider a genetic cause first.

Also, an infra-red study of Regensburg in Germany revealed houses to have been built in the past *alongside* rather than *above* subterranean water. (Day, 1995) How the builders accomplished this is not known, but that it is not older buildings suffering so much from GS as it is modern ones, is generally accepted amongst GS practitioners.

It should be obvious from my brief introduction here that there is almost no scientific verification for GS, but proof as to its existence or not is well within scientific parameters. For example, an association of places considered 'sick' with GS could be compared with incidents of depression statistically. The next stage, if GS were proved to exist, would be to isolate what factors could be causing it. Suggestions in the past have included noxious gases and radiation.

It seems likely that what is keeping it at Stage 1 is not any vested interest - only the building industry may be partially threatened by it - but a *cultural* bias. The fact that it has been recognised in China for so long, also in older European cultures (see Appendix 3), would support this supposition. All it needs therefore is time and a willingness from scientists to give it the serious attention it deserves.

#### **Stage 4**

It is clear that there has to be more than three stages, for if the final stage really remains final then a stagnation, a dogma, has developed: 'As individuals, scientists can be as pigheaded about their ideas as anyone else, but science itself perishes as soon as "authority" takes charge.' (Calder, 1985)

It may seem that we are dealing with a cycle, rather than a line, where the process can effectively begin again, but I would consider it more a spiral. For instance, it has long been scientific orthodoxy that high temperatures are sufficient to kill bacteria, hence the accepted wisdom of heating meat to 72 °C. The discovery of organisms living by hydrothermal vents on the ocean floor at 77 °C and above (*Pyrolobus fumarii* exists at 110 °C) refuted this. (Segré, 2002)

This is the inevitable next stage, where orthodoxy is re-examined, but it is not as if we return to Stage 1 now, before pasteurisation existed, we simply become more accurate with our definitions and parameters. Stage 4 is not Stage 1 as we are now at a completely different level.

The problem though is when scientific orthodoxy does not wish to question itself. Powerwatch has been named above as a watchdog outside of the establishment. We may need watchdogs in other areas as well.

Much of the research on photoreceptor ganglion cells, mentioned at the beginning of this essay, was accomplished by implanting rats with 'human MCF-7 breast cancer xenografts' (Pauley, Ibid, p.8). Whether animal experimentation is the best route to further knowledge or not, I will not debate here, but point out that this may be an area where science needs the input of outsiders. In this way at least, Stage 4 shows some similarity to Stage 1. In the absence of clear communication channels between the two parties - public concern and the scientific establishment - we are subjected to conflicting belief systems, extreme emotions and even violence.

Jared Diamond refers to a 'Greco-Judeo-Christian' background in science. (Diamond, 1997) The inference is therefore that a deep-rooted bias exists in scientific methodology whether we are aware of it or not. If this is true, then a deeper questioning of empirical research is required. The ethical dilemma facing scientists regarding the use of results from Nazi experiments on Jews, for instance, holds a particularly disturbing mirror up to scientific objectivity. (Cohen, 2002)

*"Data" is merely an impersonal recordation of words and numbers. It seems unattached to the tortured or their pain.'*

(Ibid)

## **Conclusion**

Projections list depression as the second highest global health concern of 2020 (Appendix 4) and it is associated with all three health issues examined above, each of which demand much more attention - as does the last section - than I have space to give here; and although I have questioned the apparent objectivity of science itself, not one of these health issues is actually out of the bounds of scientific analysis. Instead I have shown how research can be bogged down by financial, social and cultural prejudice. Scientists may defend themselves as being upholders of the truth, but by being closed to new ideas they are displaying not healthy scepticism but a jaded cynicism.

If we are to combat problems such as depression we need to sustain a healthy relationship between public perception, represented often by popular ‘fringe’ theories, and the scientific establishment. Without a scientific approach, we rely on half-baked ideas; without public input, no matter how subjective, science can remain stagnant, even become immoral.

We clearly need more ‘third parties’ or ‘watchdogs’ that are trusted by both the public and the scientific establishment.

For this to work the mediators need to re-examine and be aware of the roots and nature of science itself.

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## **Appendix 1 - Light and Health**

<u>Time of Day</u>	<u>Recommendations</u>
Daylight hours	Get 15 min exposure to sunlight for Vitamin D in the morning. Work under natural daylight or full spectrum white light to stimulate cortisol, the 'stress' hormone. Fluorescents should have electronic ballasts (30 kHz), not magnetic (50 Hz). Recommended level for moderately difficult visual tasks is 2000 lux.
Evenings	Use non-blue, dim light, favouring yellow-orange part of the spectrum. Incandescent bulbs are fine for this - as is a log fire!
Night	Sleep in total darkness. Shift workers should do this during the day, using an eye-mask. Use red lighting for bathroom visits.

### **Summary of Conclusions from Light Research**

(sources: Pauley, 2004; Berson, 2003; van Bommel and van Beld, 2003)

## **Appendix 2 - Magnetic Fields**

<b>SOURCE</b>	<b>Approx. extent of field</b>	<b>Magnetic field (nT)</b>
Telephone with cord	1-2 cm	400
Telephone, cordless or mobile	50 cm	200
Car	From feet up to waist	300-600
Underground train	Whole body	100-300 (1800 when accelerating)
Overground train (not electric)	Whole body	Negligible
A high street pavement (Cowley Road, Oxford)	Near the ground, where cable runs	900

### **Magnetic Fields from Various Sources**

(Source: The author, using an Extremely Low Field Monitor Oct 2003)

**Appendix 3 - Geopathic Stress**

<b>Fauna</b>	<b>Flora</b>
Stray cats Moles Wasps Ants Beetles	Oaks Herbs Mushrooms Willow Ivy Ash Mistletoe Elder

**Indications of the Possible Presence of Geopathic Stress**

Note also that an old Russian technique to detect GS was seeing if meat decayed particularly rapidly as rates of decay are increased in such areas. A German technique was to place an ants nest on land - if the ants stayed, that was taken as indication of the presence of GS.

(Anugyan, 2003)

## **Appendix 4 - Conclusion**

Rank	1990	2020 Projection
1	Respiratory infections	Heart disease
2	Diarrheal disease	Depression
3	Newborn disorders	Vehicular accidents
4	Depression	Stroke
5	Heart disease	Emphysema/bronchitis
6	Stroke	Respiratory infections
7	Tuberculosis	Tuberculosis
8	Measles	War
9	Vehicular accidents	Diarrheal disease
10	Congenital defects	HIV

### **Leading Causes of Disability-Adjusted Life-Years (DALYs)**

(Bloom, 2005)

Consider a commuter who spends two hours a day on the London Underground. Air quality is an obvious problem, but we can now add magnetic fields and poor light as major contributory factors relating to depression from regular travel on the tube.