

*There has been a lot in the press recently expressing concern about the rollout of 5G in the UK. This could have potential consequences for human beings and the natural environment. Yvan Roux has carried out an extensive study on the effects of 5G on wildlife. Some of his findings are presented here.*

# ...and not only the bees

by Yvan Roux



All truth passes through 3 stages -  
**1st** it is ridiculed  
**2nd** it is violently opposed  
**3rd** it is accepted as self-evident  
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**A FEW DECADES AGO**, we began to hear about the loss of bees. Beekeepers observed a serious decrease of bees in their hives during the summer. Recently warnings came from entomologists worldwide who noticed a dramatic decrease in not just bees but other insect species<sup>5</sup>. 'Insect Apocalypse' The Guardian, Nov. 13, 2019<sup>1</sup>.

Suspected causes include agro-business decreasing biodiversity and insecticides such as neonicotinoids. Air pollution and climate change may play a part, but no one mentions the exponential increase of electro-magnetic radiation worldwide.

This electro-magnetic 'sub-noise' permeates the air and is always increasing due to the demands of new mobile phone and computer users insisting on fast access to data wherever they are. Telecom obliges with ever higher and more harmful intensities.

Let's look at the historical background that gave rise to this technology. In the 19th Century scientists focussed on the infra earthly sub-world of electricity and magnetism: James Maxwell's equation (1860) predicted an infinite number of frequencies, all travelling at the speed of light, and Heinrich Hertz (1886) built an apparatus that produced radio waves. He also explored the properties of microwaves. After these 'discoveries' scientists perfected wired transmission of messages (telegraphy - Morse code) and voice transmission through wires (telephone).

Practical application emerged, using frequencies to broadcast music and voices in the air. Then, by mastering

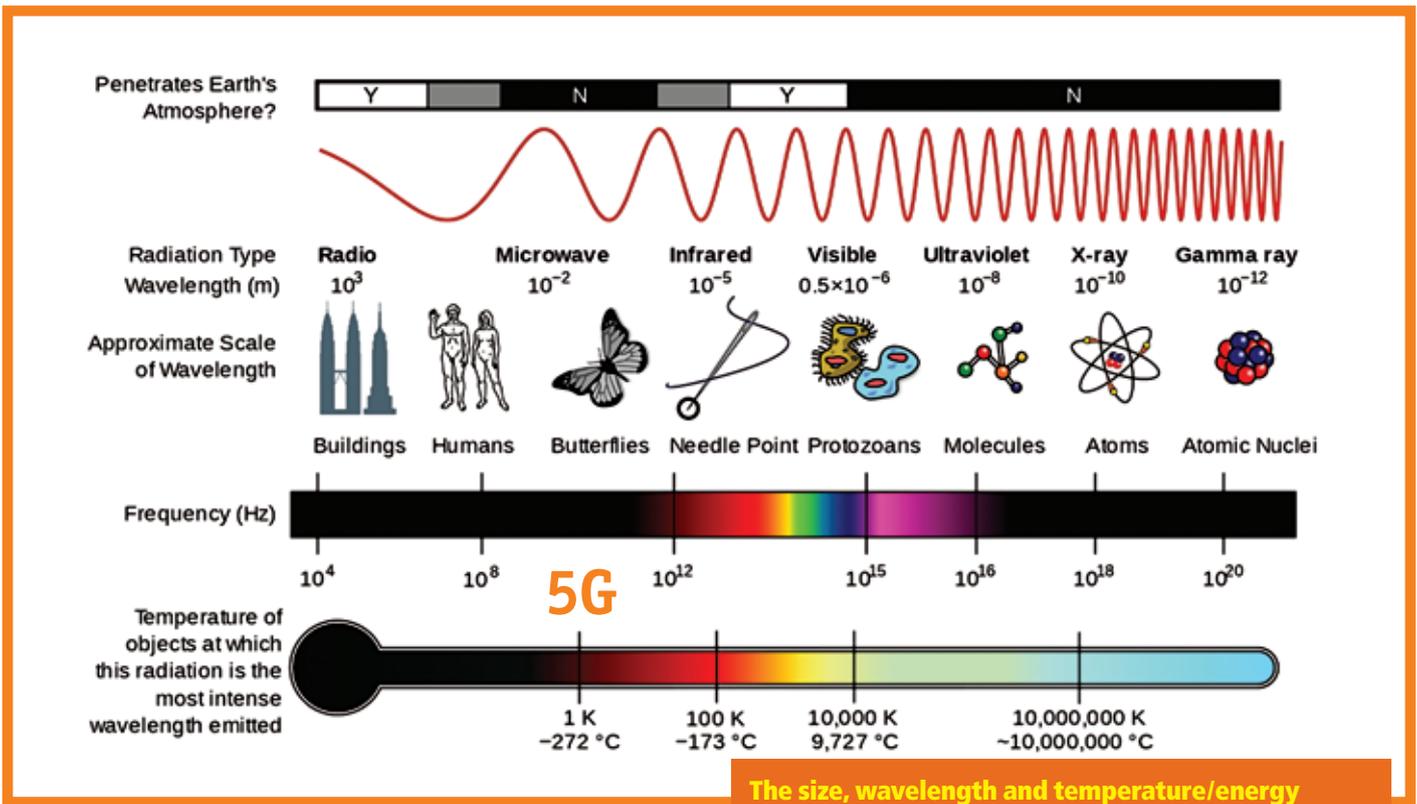
other parts of the radio wave spectrum, TV broadcasts became possible.

The invention of radar before World War II meant we could locate enemy planes and submarines. Later military scientists discovered that using the microwave side of the spectrum to transmit information was more reliable. This gave rise to satellite TV and our modern cellular computer/phone.

With this brief historical background we notice this fact: these apparatuses (radio, TV, mobile phones) that receive and emit waves of sound and images are transducers in that they can transfer frequencies of the world perceived by the senses (e.g. sound) into the sub-world of electricity and magnetism and back again. A wired (landline) telephone is an early example. The voice is recorded, transformed into an electrical signal, sent down the wires and transformed back to sound at the other end.

In the UK there are 300 commercial FM stations broadcasting 24/7, also community radio stations, police and hospital networks. There are also 85 Freeview TV channels and countless satellite channels. The air around us is chock-a-block with these frequencies.

The common denominator with all these transducing devices is a receiving or transmitting aerial. A TV receives but a mobile phone both sends and receives constantly. At the beginning of the last century, we could broadcast information through radio frequencies using one transmitting aerial (long vertical metallic rod) covering several hundred kilometres. Then we needed a new type of aerial to receive



The size, wavelength and temperature/energy scales that correspond to various parts of the electromagnetic spectrum. [Wikicommons](#)

analogue TV signals, and then satellite dishes on our houses to capture microwave broadcasting from satellites.

So, an aerial is linked with a specific range of frequencies. Form and frequency are a couple. The advent of mobile phones led to a multiplication of aerials in the environment for better fidelity of transmission. In fact, with 5G there is a need, in towns at least, for an aerial (or transmitting box) of pulsed microwaves every 500 meters. Now the Earth is being surrounded with satellites in low orbit that radiate 5G to cover all the Earth.

This short overview of our technological achievement helps us understand the impact on the insect world<sup>2</sup>. The insects are part of a group of animals with articulated feet (Arthropods). The lobster lives in water, but the insects invaded the air a long time ago. They are a Class strongly connected with the plant kingdom, and there are more than a million species representing 80% of all the animal species.

They have an external furry skeleton of chitin. The hairs on the chitin are called setae, strongly connected with their ventral nervous system allowing them to sense the surrounding in many ways (touch, smell, taste). Each species has its own type of antenna. Antennae come in dazzling shapes and lengths and some are quite extravagant - millions of antenna types in different shapes and sizes.

If for our technology we need specific forms of antenna to relate with specific frequencies carrying information, why not the insect world? What kind of frequencies might they be tapping into? We already know that some intensity of microwave can be quite hot (microwave oven). Between the microwave aspect of the electromagnetic spectrum and the colour red there are 17 octaves of frequencies that we called infra-red. Is it a frivolity of nature to create hundreds of thousands of aerials?

The entomologist Philip S. Callahan had a hypothesis concerning this question. Born in 1923 in Georgia USA he was stationed in Ireland during WWII as a radio technician for the US army. It was during these years that he researched the mysterious properties of the ancient towers of Ireland that peppered the landscape. In his book Nature's Secret

Force of Growth<sup>3</sup> he suggested that these round tubular towers built on ancient sites of worship are huge antennae that collect and distribute subtle energies (including electromagnetic waves) coming from the cosmos and the Earth. This resonant system increases the paramagnetic aspect of soil fertility.

**NOTE:** Paramagnetic means the property of some substances (in this case a lively biological soil) to react positively to an applied magnetic field. In the 1950s Callahan took a PhD in entomology and spent several years studying the complex insect antennae and their tiny hairs or sensilla. He saw them as tubular waveguides focusing on their dielectric and thermo-electret properties. With such a sensitive bio-electric apparatus it is not surprising to observe how often insects clean this area of their body surface.

*'...it would be understandable that an increase of microwave density in the atmosphere would harm an insect's ability to communicate or even endanger its life'*



**NOTE:** A dielectric material is an electrical insulator that stops the flow of electricity in a material but slightly shifts the position of molecules in the material causing dielectric polarisation. Recently Nature published an article titled Radio-Frequency Electromagnetic Field Exposure of Western Honey Bees ([www.nature.com/articles/s4198-018-56948-0](http://www.nature.com/articles/s4198-018-56948-0)) showing the dielectric properties of their external skeleton. The authors worked on an individual bee. When are they going to experiment on the whole beehive as a living organism?

**NOTE:** An electret is a dielectric material that has a quasi-permanent electric charge equivalent to a permanent magnet.

Through his research, Callahan developed a theory of insect communication<sup>4</sup>. What if their antennae were not simply to touch and smell their surrounding but also to broadcast and receive information? With respect to the resonator-wave guide characteristics of insect sensilla (hairs) on their antennae, Callahan postulated that such aerial structures (specific to each species) are thermo electret-coated dielectric waveguide aerials with the ability to receive short wavelength infra-red and microwave frequencies. If so, it would be understandable that an increase of microwave density in the atmosphere would harm an insect's ability to communicate or even endanger its life.

Insect attractants, such as pheromones, are described in terms of their fluorescent properties. Fluorescence is the emission of light by a substance that receives light or other electro-magnetic radiations - a form of luminescence not always visible. Specific to each species, the pheromone acts as a hormone outside the body and impacts their behaviour as an alarm system or sexual attractant.

A pheromone, like any other aroma, is a gas that expands in the air. A molecular structure very close to heat (full of hydrogen), a pheromone resonates in the air as an

infra-red frequency. Thus, insect antennae can be said to perform a kind of infra-red olfaction, able to detect both the smell of the pheromones and their electromagnetic signature in the infra-red spectrum. Day and night the infra-red aspect of the spectrum rains down on earth from the multiple star systems. These infra-red frequencies energise pheromones into fluorescence that can be sensed by insect antennae.

As well as man-made radiation, the Earth is constantly exposed to the spectrum of electro-magnetic radiations raying down from the cosmos in the form of radio frequencies, colours, x-rays, gamma rays and the elusive cosmic rays. By mastering the non-ionising frequencies (shorter than red) for radio/TV broadcasting we have increased our exposure to them millions of times 24/7.

We now have 5G to blanket the whole Earth with a spider web of radiations, endangering all insect life (80% of animal species). This desecration is one of the biggest ecocides and one with far-reaching consequences. Insects are vital for pollinating, recycling nutrients and food for other species and this could trigger a collapse of nature's ecosystems.

There have been no large-scale scientific studies on the effects of 5G on nature. It has never been tested for safety. There are only observations. In California, bees have been seen to drop dead between two 5G towers (viz video 'Honeybees and 5G wireless technology.'). 5G smog disrupts their navigational system and leads to colony collapse (Sharma and Kumar 2010) and The Journal of Insect Conservation 2016). CEO of Buglife Matt Shardlow says "A proper research programme and clear policy measures are long overdue.

Scientist and beekeeper Ferdinand Ruzicha wrote in Bees, Birds and Mankind (2003):

*"In the summer bee colonies collapsed...and in the winter bees went foraging despite snow and temperatures below zero and died of cold next to the hive,, from the time that several transmitters were erected in the vicinity of my beehives."*

Claire Edwards, co-author of The International Appeal 'Stop 5G on Earth and in Space', states that "...in the last 20

