

More on Influenza as an «electromagnetic illness» - and on the link from the sun to cells

by Einar Flydal¹

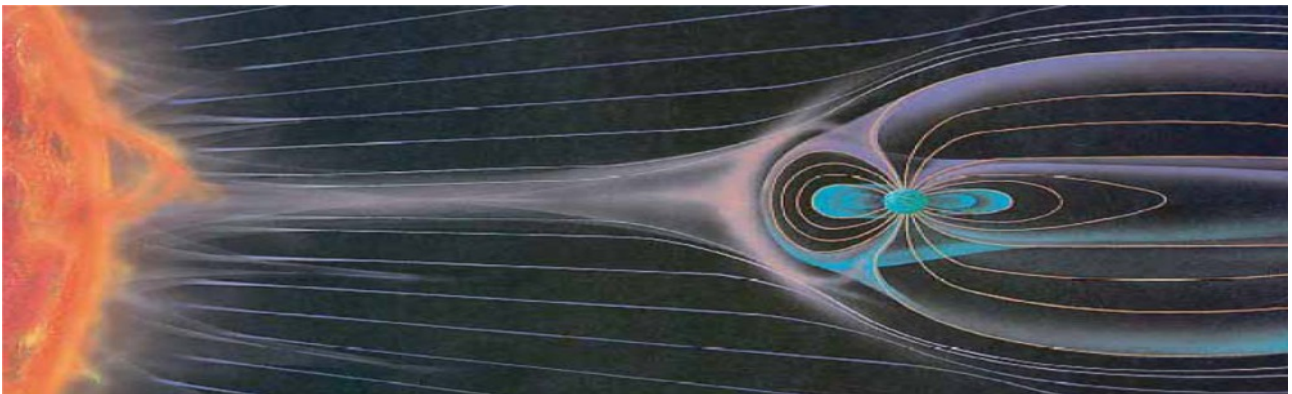


Figure 1: Black spots and large eruptions on the Sun cause solar wind to sweep towards the Earth and influence the magnetic fields of our planet

Dear reader, I am using the corona pandemic as an opportunity to learn more about the science of flu and other epidemics – and pass on some of that knowledge. In this blog post, I provide a summary of a research article addressing a causal chain going all the way from the surface of the sun to the inner life of both humans and influenza viruses. Such a leap, spanning many scientific areas, challenges our habitual thinking. It may not seem intuitively reasonable to propose such a relationship. Yet the explanations are well founded: They are solidly grounded in researchers' findings and represent established knowledge.

Quick recapitulation

This article is a follow up of two previous blog posts on flu and electricity from [February 18th](#) and [February 24th](#), 2020 (Norwegian only). Hence this recap:

The idea that influenza epidemics are related to *electricity, among other things*, has been recorded in the Western world since antiquity, and in China since time immemorial – though described in slightly different terms.

Such an explanation contradicts today's general perception. However, in my previous two blogposts I described why there is no justification for bluntly rejecting the findings that electricity plays an important role in influenza outbreaks - quite the contrary. There is in fact good evidence that influenza is not just a random *viral disease*, but also a kind of "*electrical disease*" linked to solar activity as well as major changes in the electrical environment of humans (see Firstenberg 2017 and sources given there).

I also showed that there is good evidence (Kostoff 2020) that wireless and electrical environments weaken our *immune systems*. This last fact alone could conceivably contribute to *propel* epidemics. But could there also be some kind of electromagnetic effect that *changes* or *activates* viruses, or our reactions to them?

In the following it is shown that this is likely the case.

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An article by a geneticist and a virologist starting with sunspots and ending in the genetics of the flu virus

In my text below, I present the findings of two researchers (Zaporozhan and Ponomarenko 2010) and what they consider *probable epigenetic causal mechanisms* - mechanisms by which genetics are influenced by the environment outside the genes themselves. The mechanisms are known. What is new is that Zaporozhan and Ponomarenko put these mechanisms into a new context. You don't have to know genetics to understand the main points. If some paragraphs seem incomprehensible, keep reading, you will get it!

The authors of the article are medical doctor and geneticist Valeriy Zaporozhan, and biophysicist, immunologist and virologist Andriy Ponomarenko from the Ukrainian State Medical University in Odessa. They will provide us with the larger picture:

The two scientists link our small lives on the Earth's crust with the *Earth's large electromagnetic system*. And not only to this, but also to the electromagnetic *solar winds* that "blow" through space (see Figure 1 above). At the same time, they show how sensitive life down to the cellular and viral level is to electromagnetic influence, and the incredibly complex and carefully adapted interactions we are part of - from here to the sun - without even noticing!

The authors have a broad academic background and base their paper on a long list of studies from various fields of research that few of us have ever heard of. The journal the article is published in, [*International Journal of Environmental Research and Public Health*](#), is an interdisciplinary, peer-reviewed journal of environmental science, technology and public health research. The article can be downloaded freely [HERE](#).

Below I summarize the article in very brief terms and with considerable simplifications. Among other things, I omit some interesting points on how our biological rhythms are influenced by highly different electrical pulses from the natural environment, and some points that probably will interest geneticists in particular. Those wanting nuances and technical details, or wishing to review all of the 114 references must refer to the original article, somewhat verbosely titled: "*Mechanisms of Geomagnetic Field influence on gene expression Using Influenza as a Model system: Basics of Physical Epidemiology*".

And so my summary - with some detours and comments - begins:

The causal links

Many of the biological processes of humans and other creatures follow rather rapid, as well as rather slow, rhythms of electrical pulses and magnetic fields in our environment. The sunspots, which increase and reach their maximum every 11.3 years, provide us with one such rhythm. This permanent rhythm in sunspots can be seen reflected all the way down to *gene expression*. Gene expression is the term for the processes where information in genes is transmitted to the cell's structures and functions. Normally, the end product is a protein, but information may also be transferred to RNA molecules, which then make the proteins.

Let's take it step by step:

The sun continuously emits electromagnetic particles (or waves if you wish) into space. This particle current, *the solar wind*, fluctuates in strength with the sunspots - and thus reaches its maximum at about the same time as the sunspots. Some of the particles flow into the Earth's magnetic field, affecting it, and being affected by it, as seen in Figure 1 above. As solar activity increases, so do, as a consequence, the number of solar spots and the strength of the solar wind.

The Earth's magnetic field intensifies in tandem with the solar winds and therefore also has its maximum every 11.3 years, but slightly delayed in relation to the solar spots. Changes in the Earth's magnetic field change the electromagnetic environment on Earth.

It has long been known among the few who study such things, that some statistical features of human health also fluctuate in tandem with the Earth's magnetism. This applies to *influenza epidemics*, which tend to appear when the solar winds, and thus the Earth's magnetic field, are at their strongest, with a variance of approximately two years (Figure 2). The strength of the Earth's magnetic activity can also be seen reflected in the number of psychiatric hospital admissions, and in certain blood values.

Earth's magnetic field affects biology and thus sickness, and the correlation with influenza outbreaks has been so clear that people in antiquity saw it. Yet, there have

been no modern medical explanations for this. A lack of causal explanations is not uncommon in medicine, but modern Western science has set narrow verification requirements causing this particular baby to be thrown out with the bathwater. Electromagnetic phenomena and their relevance to human health have been considered unreasonable; dismissed as rubbish and speculation simply not worth the bother of looking into. This has been a rush to judgement, a manifestation of academic complacency. In reality, the evidence is extensive. Dismissing these phenomena by referring to the fact that they are not widely known among medical researchers or biologists, is obviously not valid reasoning. There are few researchers in this field, thus the teachings of medical institutions do not include this type of knowledge, at least not as anything but an example of ancient superstition.

What might be the mechanisms behind this influence from weak, low-frequency electromagnetic fields? In fact, many scientists have tried to answer these questions in the last decades and Zaporozhan's and Ponomarenko's article, among others, devotes its attention to such already existing research results.

The following example of such a mechanism is taken from meteorological atmospheric research (Sönning 2012):

It has for long been known that the difficulties that the production difficulties with photographic gelatine in art printshops, leading to variations in the etching of the copper print plates used. Research into the matter led to a surprising discovery in the 1970s to 1980s. It was found that the cause of the unpredictable behaviour of the photographic gelatine (made of collagen) used in four-colour printing at the time was due to certain electromagnetic frequencies, produced by atmospheric discharge processes during weather events. These weather-specific pulsating, low-frequency frequency patterns are capable of influencing the diffusion properties of such photo gelatine, even in electrically shielded production facilities and inside acid development baths, from a distance of up to 500 km from the weather event. They are named after their discoverer Hans Baumer: CD-Spherics a. t. B. Their main frequencies are, depending on the weather, 4, 6, 8, 10, 12, 28 and 46 kHz.

Collagen happens to be the most common protein in our body and a component of many membranes. Thus, cell metabolism can also be impacted in a weather- and frequency-specific way. Weather-sensitive people often sense an impending weather change days before its visible arrival. In fact, this electromagnetic weather change also allows them to measure it, which would also enable a new basis for weather forecasting (Sönning 2013, Baumer & Sönning 2002).

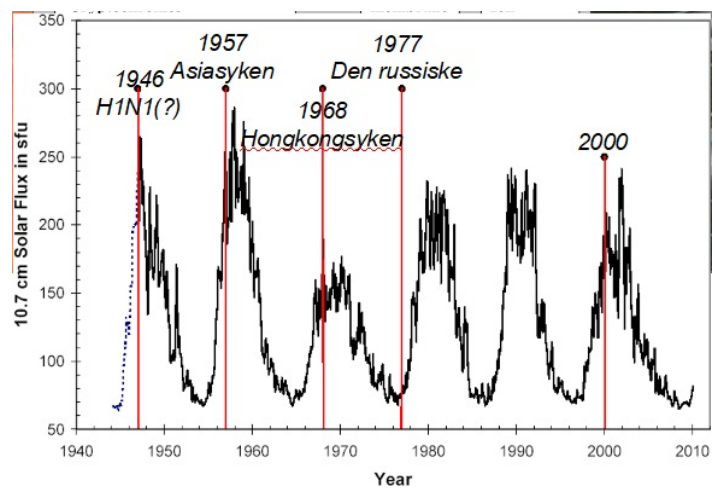


Figure 2: The strength of solar winds - with some influenza epidemics (Zaporozhan & Ponomarenko 2010). Years and names (in Norwegian) added by E.F.

Low-frequency pulses are also generated during mobile phone communication as a result of information coding, named *amplitude modulation*. Here, the amplitude of the information-transmitting high frequency (carrier wave) is modulated, thereby creating, more or less accidental low-frequency ELF signals. These pulses, which are hardly discussed, are largely located in the frequency spectrum of natural frequencies to which biology has adapted in the course of evolution (Wölfle undated, Hecht 2018).

In short, the two researchers relay some of the scientific evidence on how even (mainly) extremely weak, low-frequency electromagnetic fields (ELFs) can affect biology. Along the way, they discuss in detail three mechanisms that dominate the research literature: *the plasma membrane hypothesis*, *the free-radical mechanism*, and *the ion resonance model*.

The researchers believe that most observed influences on genetics and other biological regulatory mechanisms from magnetic fields, from the Earth's magnetic field included, can be explained by *radical pairs* and *electron spin*. So what is that? They are phenomena belonging to the strange world of quantum physics and quantum biology, where one particle can turn into two, and be at multiple places at the same time - while the two are coordinated with each other and influenced by observing them. Understanding such stuff is too ambitious for this blog post – not least for me. Luckily we do not need to understand too much of it for the purposes of this article. (If you want to get into the basics, I recommend McFadden and Al-Khalili's book from 2014. It is popular science literature, but as the topic is developed throughout the book, not an easy read for us foreign to such stuff.)

The details of these mechanisms are important to the professionals, but not to us. Nor are the innermost details of genetics and epigenetics, i.e. how the inner workings of genes are affected, albeit this is the main theme of their article. Therefore, I will only touch lightly on this: The two researchers explain in detail how the influence of subtle magnetic fields can change chemical bonds and structures, thus affecting biological processes. Then they join the pieces of the larger picture, and this is where we will soon pick up.

But allow me first to make a slight digression:

The researchers note that all the explanations they lay out, provide a solid and well-established foundation within their respective fields confirming the presence of significant biological effects that cannot be explained by *heating effects*. The effects must be caused by *the information - mediated by the electromagnetic field*, not by the strength of the field. The field strength seems insignificantly weak, they note, but the "interpretation" of the information somehow causes effects. This may seem incomprehensible, but the two scientists are completely in line with contemporary research in both the Eastern and Western hemisphere since the pre-1970'ies. American scientists got published the Russian researcher Presman's extensive review of the research status at the time: "Electromagnetic Fields and Life" (New York, 1970). A central point of this review is that electromagnetic fields carry *information value*: biological systems are designed to ingeniously interpret the fields, in one way or another. In other words, the two researchers deliver a blow to the

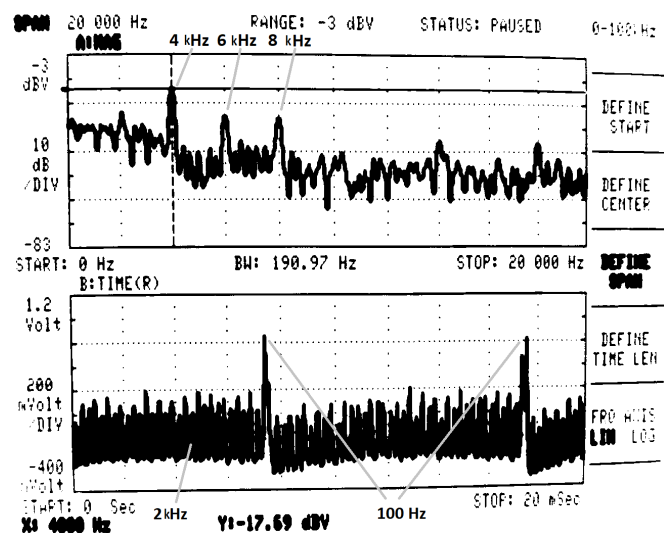


Figure 3: A Fourier analysis (top) and a time series log (bottom) show low frequency pulsation in 4G (LTE): 2 and 100 Hz, 4, 6 and 8 kHz marked. (Measurement: Marcel Honsebeck 2018)

foundation of our safety limits for non-ionizing radiation. Their opinion on the denial of non-thermal biological influence, still prevailing in certain academic circles, is obvious.

However, as they move on, we will follow:

Zaporozhan and Ponomarenko show (Figure 3) a variety of genetic and epigenetic pathways that all appear to be well-established. The new twist is that they put them all together, showing how they all form parts of a contingent network of causes and effects, starting in the Earth's magnetic field and culminating in the effects on the immune system and influenza viruses, and thus on the risk-relationship between host and virus. I will summarize the three main features, and explain them sufficiently to get the grip of the main picture, without going into all the details. I have marked recurring words in Figure 3 *in oblique, green, bold*.

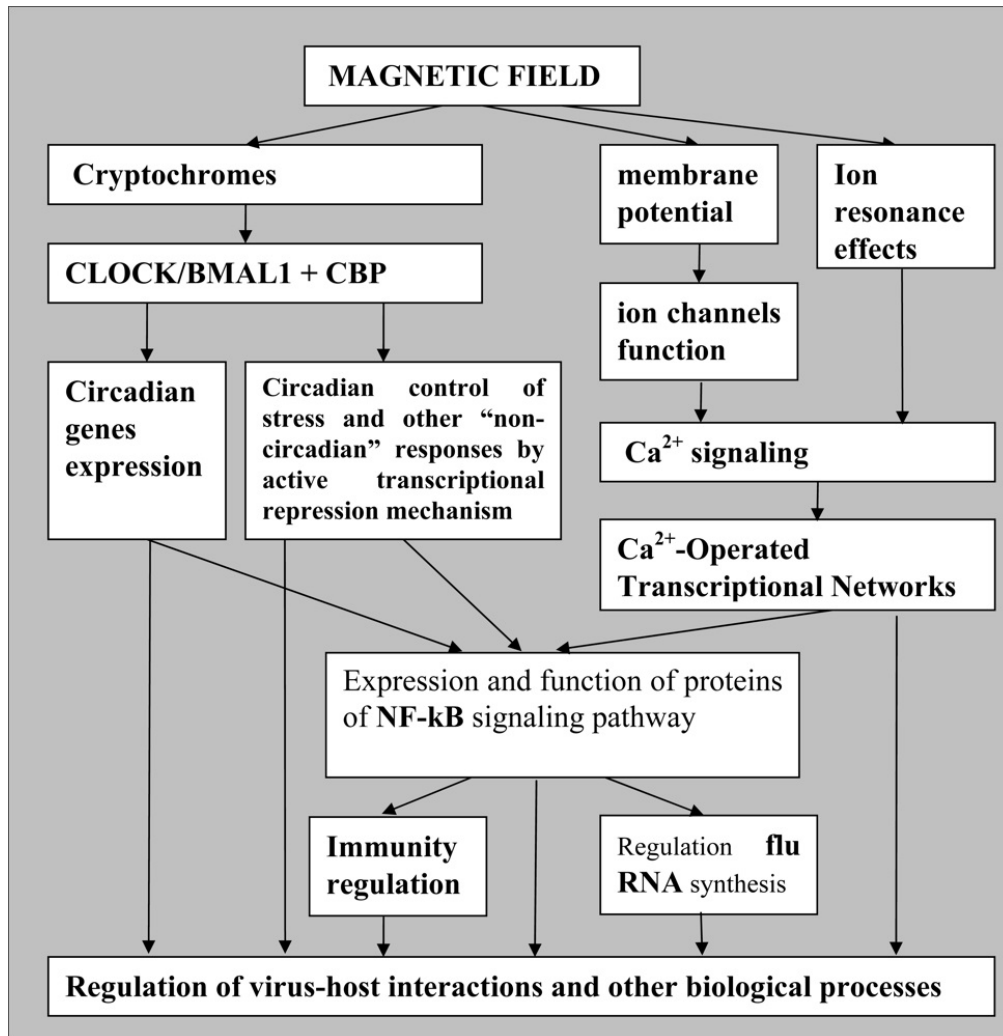


Figure 4: Biological causal sequences influenced by the magnetic field until the outbreak of an influenza pandemic (Zaporozhan & Ponomarenko 2010)

The causal sequence farthest to the right happens via *ion resonance*, which has to do with electrons changing places in molecules to form *radical pairs* and *electron spin*, phenomena that belong to the awesome world of quantum biology. (Many previous researchers have pointed this out as a central mechanism, for example Keilmann 1992 and [Warnke 2007](#)). Fortunately, the figure shows this causal chain coming back to the next one we will look at. Thus, we can move on without bothering too much with quantum biology - other than to make the point that the researchers believe significant biological influence is happening along this path.

The causal sequence second from the right, passes through the cell walls by changing the *membrane potential* - the voltage difference between the inside and the outside of the cell wall.

This affects the opening and shutting of *ion channels* which regulate which substances are allowed to enter and exit cells.

Calcium ions (Ca^{2+}) are among these substances. Increasing calcium levels in cells have far-reaching consequences both for neural pathway *signalling*, where Ca^{2+} is included, and for chemical processes within the cells. (It has been written extensively about this mechanism in recent years, as it can explain many "unexplained disorders", including energy loss (fatigue) - and reactions to a variety of environmental stressors, including electromagnetic fields.)

Figure 3 shows how the entry of Ca^{2+} also influences *transcriptional networks*, which are sets of molecules that interact and control how the genes affect the structure of proteins, and of the entire structure of the life form in question. As if that were not enough, the figure shows that the transcriptional networks also affect the *NF-kB signaling pathway* in the next step. And what is that? Well, I have read that NF-kB exists in almost all cells of animals. It is a set of proteins with a number of key functions. Among other things, it controls how DNA transmits its instructions, and it affects cell survival mechanisms. And, not least, NF-kB, is involved in creating antibodies to bacteria and viruses. Thus, NF-kB affects *the immune system* of the host where the virus has taken up residence.

The same mechanism also affects *the RNA synthesis* of the influenza virus. The reason is - I have understood from people who know more about this than me - that the virus itself is not capable of propagating its genetic material. Viruses are therefore in fact not "alive". Instead, viruses feed off the RNA synthesis in a host's cells, and have been doing so since the beginning of life. Thus, an influence on the synthesis mechanism of the cell's RNA will also alter the gene expression of the RNA virus that feeds off it. Both influenza and corona viruses are RNA viruses and thus may change properties so that the virus's impact on the host organism changes.

The causal sequence appearing on the left side of Figure 3 shows that magnetic fields also affect *cryptochromes* - a protein sensitive to light and electric fields also at other frequencies. It is a relatively recently discovered and complex protein, given its name because it was initially not understood what its function could be. It was simply cryptic. Now cryptochromes are known to have a number of central functions in our sensory organs. They direct plants towards light, and help migratory birds to "see" how far south or north they are from the equator based on the angle of the Earth's magnetic field.

The cryptochromes affect *CLOCK/BMAL1* and *CBP*, which are the names of proteins that are part of the biological clock that keeps track of our bodily functions. These are part of the body's cycle which takes approximately one day (in Latin; circa + dies) - and therefore is called *the circadian system*. The workings of our genes are influenced by the circadian rhythm. Thus, our reactions to various types of stressors are affected, whether they come from the outside in the form of environmental toxins, or as virus attacks from within. This is another causal chain (to the left in the figure), whereby both the immune system and the virus's most central machinery is affected.

At the bottom of the figure we see the result of it all: "*Regulation of virus-host interaction and other biological processes*".

In other words, viruses can be modified - in a more or less random direction - as a result of exposure to even very weak electromagnetic fields. The immune system can be changed, and weakened, by such very weak electromagnetic fields. Thus, the relationship between host and virus can also be altered - from the normal state where the immune system keeps the virus at bay - to an entirely new situation, where the immune system cannot keep up.

Logic tells us that the new situations we would notice the most, are those where the virus becomes more aggressive, while the immune systems gets weakened. The likelihood of such changes are greatest when the magnetic field is strongest, as indeed is reflected in the epidemics.

To these explanations from the two researchers, we can add that they do not seem to contradict the findings I discussed in earlier texts. Quite the contrary. Most importantly, they have assembled old and newer established knowledge and shown how it is connected and that it fits well together. It reinforces prior discussed research and is probably about as close as we can get to the strange and unclear concept of "current knowledge status".

There is good reason therefore, to take the two scientists Zaporozhan and Ponomarenko seriously.

Turning the larger picture into practical action

This larger understanding of influenza and other virus outbreaks can be practically useful in several ways:

One point made by the researchers is how predicting and preparing for outbreaks can be made easier, given the understanding that they are most likely to occur in periods when the Earth's magnetic field is strongest. It is easy to understand the wisdom of keeping the immune system in order. The insight into how biological processes are affected by such and other electromagnetic fields, can probably also be useful in a wide range of other areas, not the least in radiation protection, to limit exposure from *man-made* electromagnetic fields that can cause adverse or unforeseen health effects.

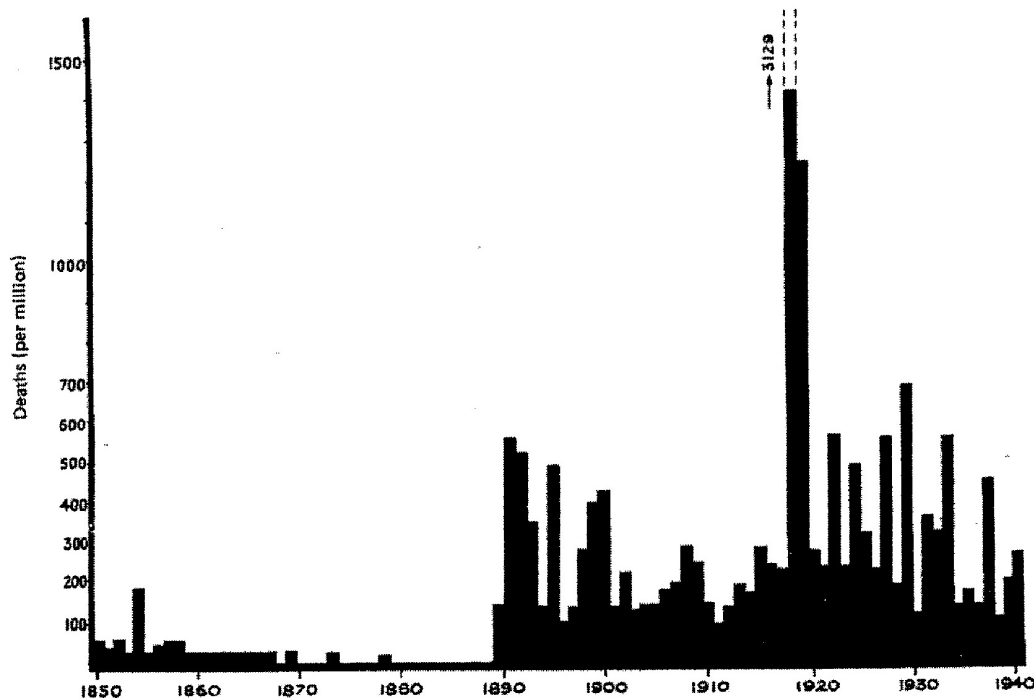


Figure 5: Influenza mortality rates in England and Wales 1850 - 1940, deaths per million (first published by Stuart-Harris 1985, reproduced by Firstenberg 2017) (The column of Spanish influenza in 1918 approximately halved)

In this light, the explanation of Zaporozhan and Ponomarenko can help us understand why influenza appears to have evolved from a rare disease, to a normal, annual, seasonal disease - and to draw practical consequences from it:

A graph, here borrowed from Firstenberg's book (Figure 4) shows how flu-related deaths in England and Wales from 1850 to 1940 changed from being negligible in non-epidemic years, to becoming an annual phenomenon with far higher death rates. This coincides with the expansion of electricity.

So, could it be that the relationship between hosts and influenza viruses are influenced not only by the magnetic field of the Earth, but also by electromagnetic fields created by humans? It seems that

way. Or even worse, as Firstenberg claims, that there was no virus, just the direct impact of the changed electromagnetic fields. If so, how should we respond? Probably not with plans for a development towards "a fully electrified society", as is the prevailing ethos here in Norway.

Firstenberg believes the Spanish flu has been set off by the long-wave transmitters of the United States Navy that were activated in 1918, creating the first worldwide radio network. He presents a lot of interesting material about this terrible pandemic. People my age grew up with stories of relatives or acquaintances who died from it. It is estimated The Spanish flu killed somewhere between 17 and 50 million people, perhaps as many as 100 million, according to Wikipedia – not the least healthy young adults.

Initially, the idea that radio waves could trigger something like that, seemed completely absurd to me. However, after having looked into it for a while, I had to concede: It may actually be possible.

Opening one's mind to this possibility, and delving into the research explaining how, does of course not imply an acceptance of all theories floating around in these Corona times. Including the claims that the aggressive virus was produced and released *deliberately* to divert attention from the 5G rollout. Such claims I consider meaningless, speculative and malicious towards those who are left frightened by it - unless *really solid* evidence proves me wrong. All I have seen so far is a tawdry blend of true and false, inserted into distorted interpretations and old myths that I do not believe at all.

At the same time, the research I have reviewed shows that the fear of increasingly powerful WiFi routers, and new wireless networks causing damage to our health and our environment, is not at all unjustified. Nor is the fear of the coming networks using millimeter frequency ranges electrical fields, such as 26 GHz and 60 GHz - to power 5G.

We should not tamper with the Earth's electromagnetic field

The explanations presented by the two researchers are quite grandiose. They connect us to space, making us infinitely small. They also show that biology is incredibly sensitive to subtle electromagnetic variations. To what variations, which frequencies, frequency patterns, modulation (or pulse) patterns, and other characteristics we and other creatures respond the most, we really don't know much about, even though we think we know a lot. However, we do know it is important, and we do know that tampering with "Earth's electrical envelope", as Firstenberg poetically calls it (Firstenberg 2018, chap. 9), is an experiment done blind. We know exceedingly little about what the consequences might be, and yet we do no testing for biological effects beforehand.

Within this field of research - *the impact of our globe's electrical circuitry* – there are a few small research groups gathering knowledge. They struggle to make their knowledge widely heard, not because the knowledge is immaterial, but because it is not part of the largely established understanding. Neither does their research have major commercial interests attached to it, which could provide for the marketing of their knowledge.

Leaving the knowledge of our globe's electrical envelope aside for a bit, this spring (2020), the Norwegian members of the parliament have in their hands a whitepaper (Meld. St. 10 (2019-2020) regarding a new and larger government involvement in communications satellites. The hearings in the Commerce Committee scheduled for March 26, were cancelled due to the corona eruption - a pandemic which appears to have been created - or affected - by disturbances of precisely that sphere where the satellites are to be placed: the magnetosphere.

The strategic thinking behind the endeavour to use the magnetosphere for commercial gain has been based on the premises of physicists. They think risk and impact in terms of *energy quantities*, not in terms of *biologically relevant information content*. Thus, they simply and imprudently calculate the energy output from the satellites, and conclude them to be miniscule compared to the energy from solar winds carried into our planet's magnetic field from the sun.

Their conclusion therefore must (of course), be that the energy emanating from the satellites cannot have any consequence: So they're good to go.

Their thoughts do not follow the same orbits as those of our two researchers from Odessa.

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