# The Science of Microwaves Causing the Symptoms of the Diplomats in Cuba and China

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## Abstract

So it seems that we have a mystery regarding what happened to the diplomats in Cuba and China. This paper is to demonstrate that established science already has an answer. The symptoms that the diplomats experienced are caused by radio or microwaves. Not only does an overexposure to microwaves explain their symptoms, the physics of radio wave propagation and resonance of conductive and dielectric objects, including humans, also explains the delivery of this energy that would cause these effects, through walls and other objects, targeting specific individuals and not affecting others around them. This paper shows that radio and microwaves are the obvious, logical cause of the diplomats symptoms and that this is according to already established science.

## Introduction

There is actually a very large amount of research on the effects of radio and microwaves and the symptoms that they cause.

So for someone that's aware of this huge amount of research, it's been fascinating watching how the investigators were initially, and for a lot longer than what they should have been, seemingly unaware of this.

The established scientific research describes a range of symptoms that an overexposure to radio and microwaves cause and these are essentially the same symptoms that the diplomats experienced.

Before and even after the New York Times article revealing the truth, there are some journalists, absolutely ignorant of the established research, that according to them science doesn't have a clue of what caused the symptoms.

For a qualified scientist that has actually researched this, that is absolutely fascinating.

The truth is that there is a huge amount of established scientific research that already has the answer for what is most likely and very probably the cause of what happened to the diplomats in Cuba and China.

So the objective of this paper is to describe this already established science, why these symptoms would be produced, the obvious use of radio and microwaves as a weapon and how this energy would be delivered and directed at the diplomats.

## The Established Scientific Research Of Radio And Microwaves Producing The Same Symptoms As The Diplomats

First, this is what the diplomats experienced:

– ringing in the ears
– weakened cognitive function, including loss of short-term memory.
– blurred vision
– fatigue, sleep problems
– dizziness, lack of balance
– headaches
– nausea
– abdominal pain
– nosebleeds
– hearing loss
– ear pain
– pressure in the ears
– buffeting, that's an effect produced like that caused by a partially open car window

https://edition.cnn.com/2018/09/02/health/cuba-china-state-department-microwaves-sonic-attacks/index.html

https://www.theguardian.com/world/2018/feb/24/fresh-row-over-mysterious-sickness-affecting-us-diplomats-in-cuba?fbclid=IwAR0OJ41Hgldh-9RIRtGOchkPIRJU7Emk0xcLQC0JXsq7gensLmDQnxXZkOo

https://www.peoplesworld.org/article/opponents-of-us-cuba-ties-score-from-health-attacks-on-diplomats/

https://www.nytimes.com/2018/09/01/science/sonic-attack-cuba-microwave.html

https://www.nytimes.com/2019/07/23/science/cuba-diplomats-health.html

(Swanson et al, 2018)

So a range of symptoms without a known natural biological cause, that would connect these symptoms and cause them to occur in the diplomats.

The symptom that has been the most correlated with the all the diplomats, is the ringing in the ears and this is why they were originally referred to as “Sonic Attacks”.

So sound was suggested as the cause, infra and ultra sound.

The problem with sound causing these effects, is that it cannot be directed at individuals, except for ultrasound devices, that could be converted into audible sound on reaching the target. However, ultrasound won't travel though obstacles, walls, windows...etc, so the diplomats in their homes would be protected.

Infrasound gets through obstacles with less difficulty, however it's long wavelength means it cannot be directed at specific individuals.

So sound is very unlikely to be the cause of what the diplomats experienced.

Microwaves, though, can get through walls and be directed at areas, where individual diplomats would be in, and they cause sounds to be heard, when the microwaves are at certain frequencies and pulsed in certain ways, because of the microwave hearing effect.

These sounds are also described as the same sounds that the diplomats heard: “...described as being a buzz, clicking, hiss, or knocking, depending on several transmitter parameters...”, from Frey's 1962 paper describing the microwave hearing effect (Frey, 1962).

Frey also found that “...The effect was induced several hundred feet from the antenna...”.

So we've got a cause for the sounds, radio or microwaves that can get through walls, windows, other obstacles, transmitted from an adjacent apartment or outside and be heard by specific individuals.

Now let's find out what the established science says regarding the other symptoms.

Frey's research from his 1962 paper also describes other effects along with the sounds that were generated:

“...With somewhat different transmitter parameters, we can induce the perception of severe buffeting of the head...Changing transmitter parameters again, one can induce a "pins-and-needles" sensation...” (Frey, 1962)

He also found that his subjects and himself were getting headaches when he was in the microwave field. (Frey, 1998).

So an obvious correlation with the symptoms of the diplomats in Cuba and China.

"Radio or Microwave Sickness”, first described by the German doctor Erwin Schliephake in 1932, also describes essentially the exact same set of symptoms as the diplomats.

This was published in the German Medical Weekly, with data describing the following symptoms that correlate with those of the diplomats and being produced from radio transmitters:

- severe tiredness and fatigue during the day
- fitful sleep in the night
-headaches to the point of intolerability

The symptoms of Radio or Microwave Sickness were further verified by the scientific work of the Russian author Zinaida Gordon, from the Moscow Institute for Industrial Hygiene and Occupational Diseases (Gordon, 1970).

Examining more than a 1,000 workers at radio installations, electrical utilities, radar stations...etc, she found that the following symptoms where being produced as a result of their occupations of working with radio or microwaves.

- daytime tiredness
- autonomic nervous system disorders
- loss of productivity
- sleeplessness
- depressions
- headaches
- hyperactivity and inner agitation
- cardiovascular regulation changes of various types

There's also a large amount of other research, such as that of Simonenko (1998) showing that radio frequencies cause:

- Headache
- dizziness
- irritability
- fatigue
- weakness
- insomnia

- chest pain
- difficulty breathing
- indigestion

This image is from NASA research, a Wallops Flight Facility, Safety and Health Training Course on RF & Microwave Radiation Hazard Awareness, presented by Safety and Mission Assurance, referring to the microwave hearing effect (Wallops Flight Facility, Safety and Health Training Course, 2011).

Note the reference to the buzzing, clicking, hissing sounds, so the same as what the diplomats experienced.

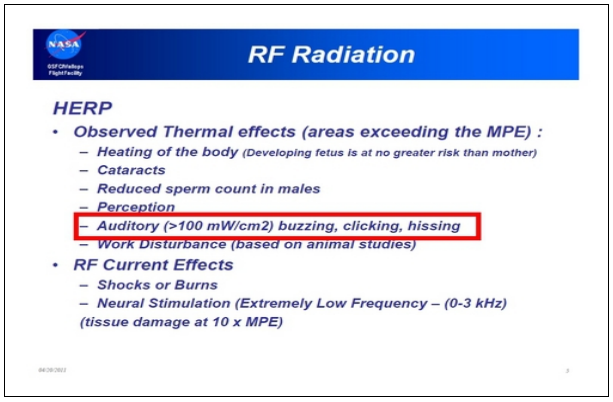


*Figure 1*

This image is also from the same presentation, showing some symptoms of a possible over exposure to RF radiation and note that a lot of these are also the same symptoms that the diplomats experienced.

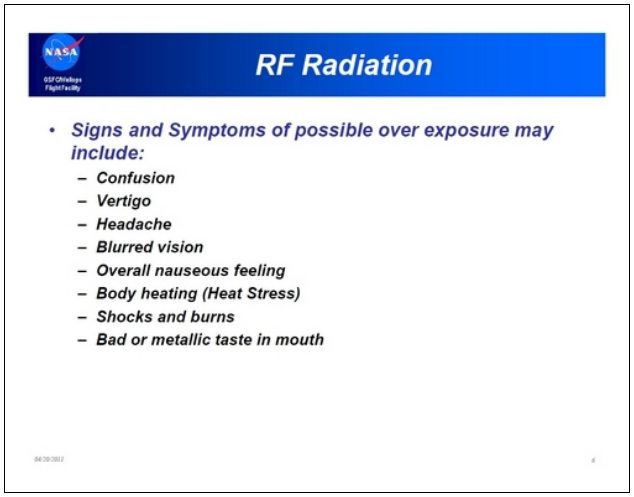


*Figure 2*

So NASA's own research shows that radio and microwaves cause the same symptoms as the diplomats.

This was originally found on the official NASA website: sites.wff.nasa.gov.

It's no longer there, which I find very interesting, although it should be possible to verify that it existed. I've also got backups of the presentation document.

So this is proof that radio and microwaves do cause these symptoms and that there is an awareness of this and that awareness is already throughout the world and in the US. Subject matter experts should have been consulted that would have been aware of this and there should also be a very interesting answer as to why they weren't.

Also, in an open letter to Edmund Stoiber, the president of the federal state of Bavaria, Germany, Dr. Cornelia Waldmann Selsam, representing a very large group of doctors, stated that they had noticed that a lot of patients who live in the vicinity of mobile phone base stations, had been experiencing the following symptoms:

Sleep disturbance, tiredness, headache, restlessness, lethargy, irritability, inability to concentrate, forgetfulness, trouble finding words, depressive tendency, noises in the ears, impaired hearing, dizziness, nosebleeds, visual disturbances, frequent infections, sinusitis, joint and muscle pains, feeling deaf, palpitations, increased blood pressure, hormone disturbances, gaining weight, hair loss, nocturnal sweating, nausea (Selsam, 2004).

So again we have the symptoms of Radio or Microwave Sickness and these are the same symptoms that the diplomats experienced.

A lot of research also shows that the various symptoms are produced at non-thermal, so low energy levels, although for our purposes it just needs to be shown that there's a huge amount of research that these symptoms are caused by radio and microwaves, regardless of the energy level, since those using it on the diplomats are probably not going to be concerned with FCC safety limits and won't be worried about transmitting at higher energy levels.

This isn't a debate then regarding the non-thermal effects of radio and microwaves, so those caused by cell phones and other devices.

It's a scientific fact that an over exposure causes essentially the same symptoms that the diplomats experienced, although there's also a lot of legitimate scientific evidence that says that non-thermal levels also have biological effects.

So regardless of whether the effects are produced at thermal or non-thermal levels, since both of which could have been used on the diplomats, a lot of the same symptoms that they experienced are scientifically known to be caused by radio and microwaves.

So this is what science says radio and microwaves cause and this is also what the diplomats in Cuba and China experienced:

– auditory buzzing, clicking, hissing, ringing in the ears
– confusion, so weakened cognitive function, including loss of short-term memory
– vertigo, so dizziness, lack of balance
– headache
– blurred vision
– overall nauseous feeling
– abdominal pain
– nosebleeds
– hearing problems
– severe buffeting of the head, so the effect of driving with a partially open car window

(Frey, 1962), (Frey, 1998), (Gordon, 1970), (Schliephake, 1932), (Selsam, 2004), Simonenko(1998), (Wallops Flight Facility, Safety and Health Training Course, 2011)

These are also just some references to the symptoms caused by radio and microwaves, there's a huge amount of other research also verifying this.

So it's obvious that radio and microwaves are the most likely cause of the diplomats symptoms.

Let's now describe how this energy could be used to target the individual diplomats.

## Delivery Of This Energy

The requirements to deliver this energy are essentially very basic, a directional antenna, such as a yagi, that can be easily stored in a luggage suitcase and a signal generator, transmitter and amplifier, with the ability to send pulsed transmissions. This is just standard laboratory equipment.

Together with human resonance, these could target individual diplomats, producing the symptoms in just them and not others.

**Directional Antenna Radiation**

Yagi's are directional antennas that can receive and transmit radio or microwave energy in a directed beam.

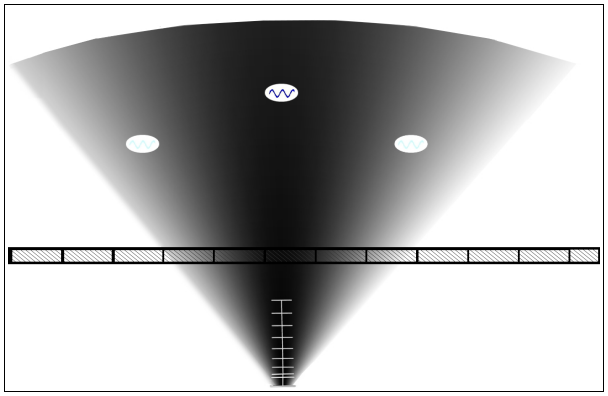

*Figure 3*

Figure 3 represents 3 diplomats in the beam of a yagi antenna with a wall between them, the transmitting antenna being used from a neighboring apartment or house or outside their home or workplace building...etc.

The diplomat in the center of the beam receives most of the electromagnetic energy, with those further out receiving very little of it. So a yagi antenna could be used to target a diplomat and not others around them.

The microwave hearing effect, produced by such a beam, would explain what some diplomats have stated experiencing, such as “He moved just a few feet, and there was silence. He climbed back into bed. Inexplicably, the agonizing sound hit him again. It was as if he’d walked through some invisible wall cutting straight through his room.”

https://www.apnews.com/697536f065e6470eaa5ccfc35061e7ce

**Human Electromagnetic Resonance Effects For More Specific Targeting**

Humans are tuned to unique resonant frequency ranges and if human resonance is used, more specific targeting of individual diplomats could occur, with other diplomats closer around them not being affected.

Electromagnetic resonance then could be very significant with regard to biological effects. “We feel that the phenomenon of head resonance may be important in the study of behavioral effects, blood-brain barrier permeability, cataractogenesis, and microwave bioeffects.” (Gandhi et al., 1978)

The ARRL (The American Radio Relay League, the national association for Amateur Radio) warns HAM radio users about transmitting in these resonant frequency ranges of humans.

"...the adult head, for example, is resonant around 400 MHz, while a baby's smaller head resonates near 700 MHz." (ARRL Handbook, 1992).

So just like an antenna, that resonates to a specific frequency, the human brain does the same thing and that's because all conductors, and also dielectric materials, have resonant frequencies based on their dimensions and electrical conductivity.

The human brain is an electrical organ and uses charged particles, ions for conducting electricity and it also has dielectric qualities, so it has resonant frequency ranges that would affect it the most.

These are the frequencies that would generate the strongest electrical currents and, thus, in an electrical organ, create biological effects. Others would be affected by different resonant frequencies.

This is what produces the ability to cause symptoms in a specific targeted diplomat, with others close around them.

Experiments have been described, where a weak oscillator was used to produce signals between 300 and 600 MHz (Jaski, 1960).

Subjects were asked to indicate if they notice anything unusual and were not allowed to see the dial.

Quoting from Jaski: “...At a particular frequency between 380 to 500 MC for different subjects, they repeatedly indicated a point with ALMOST

UNBELIEVABLE ACCURACY (as many as 14 out of 15 times).”

MC refers to MHz in the quote above.

Also quoting from Jaski: “...Subsequent experiments with the same subjects showed that at the "individual" frequency, STRANGE THINGS WERE FELT. Asked to describe the experience, all subjects agreed there was a definite "pulsing" in the brain, ringing in the ears...”.

So this was in 1960, before Frey's research, and again we have radio and microwaves producing effects like those of the diplomats in Cuba and China and we have a reference to a specific resonant frequency being used, that's unique to each individual, producing these biological effects.

So resonance is a quality that all electrical conductors and also dielectrics have. If a wavelength is significantly longer or shorter than the resonant frequency wavelength, then it will generate significantly less electrical current in that conductor or electromagnetic fields in a dielectric.

Note how in the following figure, the long wavelength exerts a force on the electrons in the conductor. Long before the peak of the wavelength reaches it the electrons have already been compressed, where they can essentially no longer move, thus preventing an electrical current from being generated.

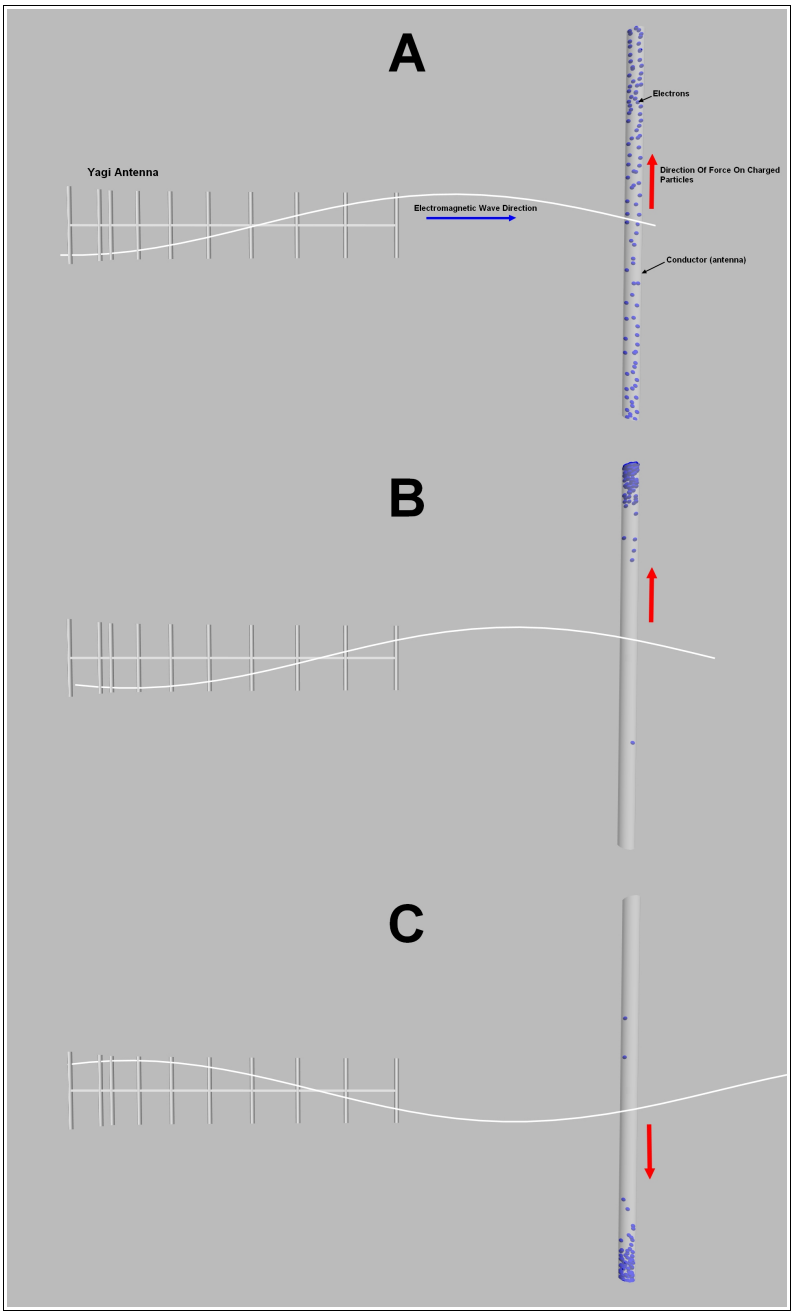


*Figure 4*

The same with the trough of the wave.

So all that energy that could be used, isn't moving the electrons and being converted into electricity and that's because this isn't a resonant frequency for that conductor's size. So the energy is just being wasted.

The following figure shows what occurs if a wavelength is shorter than the conductors resonant wavelength.

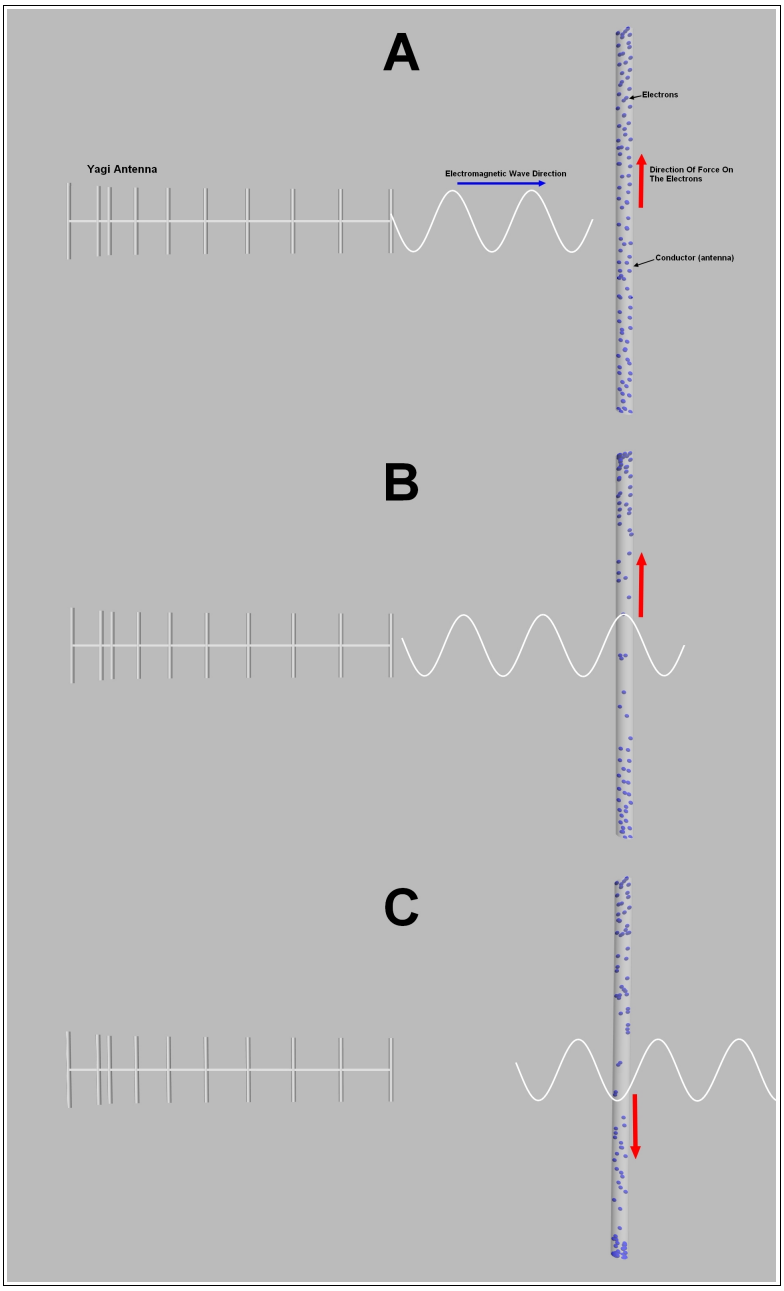


*Figure 5*

Here with the peak of the wavelength reaching the conductor, some of the electrons get compressed, although there's still large gaps available between them.

The electromagnetic wave then proceeding further, starts reducing the upward force on the electrons and further on starts producing a downward force, while there are still these gaps available above.

So energy from the electromagnetic wave is now being used to turn the electrons around, rather than ideally, and what would occur with a resonant frequency, is that the electrons would have been forced into those gaps, to the extent where the repulsive force on each other would be used to turn them

around, rather than using energy from the electromagnetic wave to do it.

So again, energy is being wasted, except here it's because the wavelength is shorter than what the conductor requires to most efficiently generate electricity.

This figure shows a resonant wavelength for the conductor.

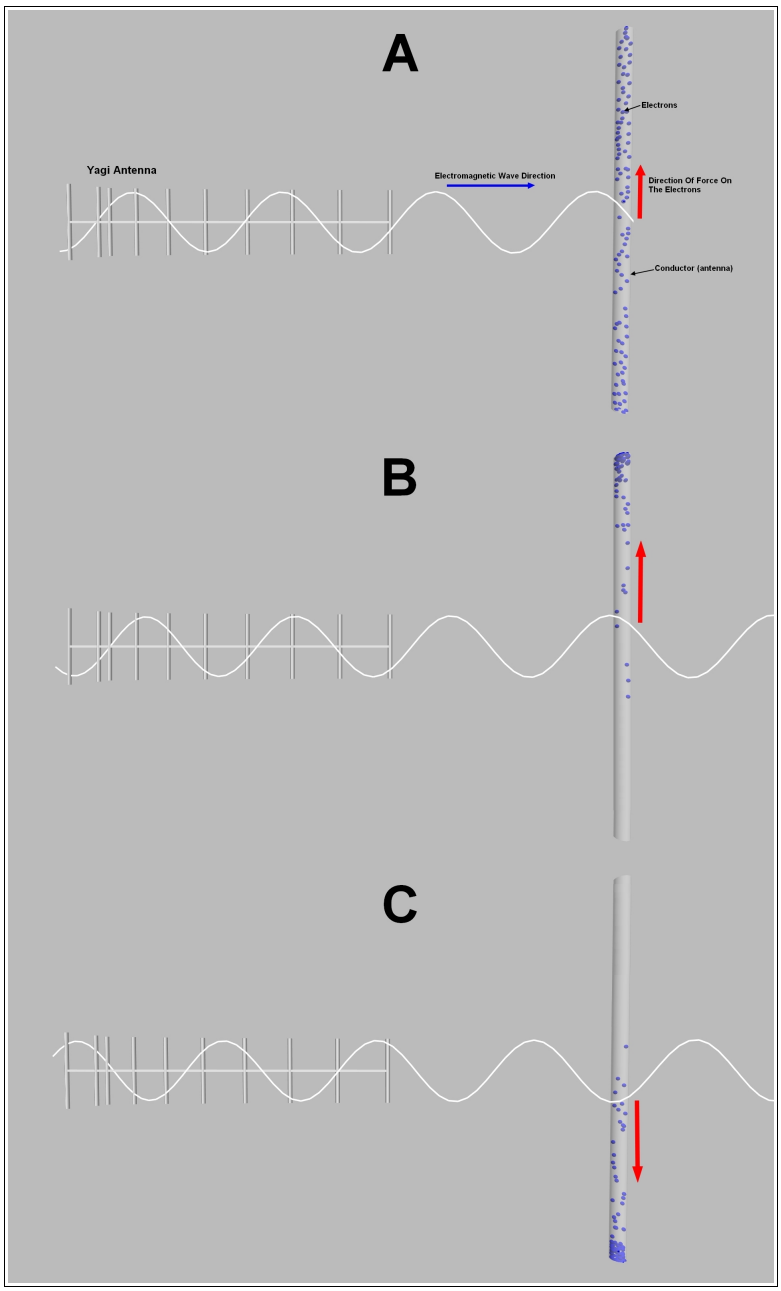


*Figure 6*

Here, when the peak of the wave reaches the conductor, the electrons are getting compressed to the extent that when the upward force starts reducing and then turns around, to produce a downward force with the trough of the wave, the electrons are ready to start moving with it.

That is, the repulsive force of the compressed electrons facilitates the change in direction. So the size of the conductor itself is being used to efficiently convert the energy from the electromagnetic wave into electricity.

So with the shorter and longer wavelengths, energy from the electromagnetic wave was going against where the electrons physically want to go. With the resonant wavelength though, the incoming peaks and troughs reinforce the electrical energy and forces that's already in the conductor, rather than going against it.

This generates far stronger electrical currents than the other wavelengths.

The same qualities that produce resonance in this conductor also produce resonance in the human brain, and so it also has specific resonant frequency ranges that will produce the most electrical current in it and thus, biologically affect it the most.

Although instead of electrons, the human brain has charged particles, ions, that are affected by the electromagnetic waves.

Figure 7, shows two diplomats, with different resonant frequencies, next two other in the same region of the transmitting antennas beam. The diplomat on the left is at the same resonant frequency as the transmitted signal and so large amounts of biologically effective electromagnetic fields are generated. The other diplomat is at a different resonant frequency, so the same effect is not generated in them.

This is how symptoms could be produced in one diplomat, with another right next to them not experiencing those symptoms. The energy levels received from the same transmission are sufficiently stronger to produce noticeable symptoms in the one and not the other.

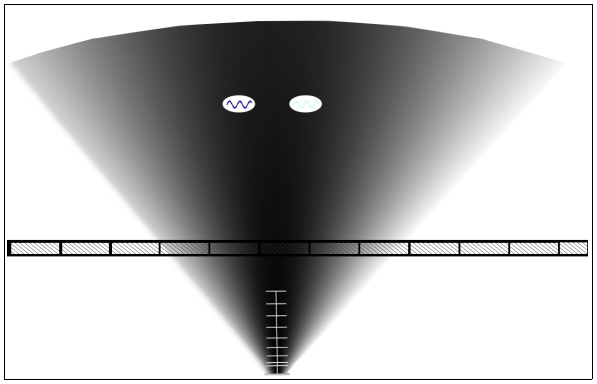

*Figure 7*

**Detecting Resonant Frequencies**

The diplomats resonant frequencies could be determined using a very basic system, with standard laboratory equipment.

A yagi antenna, or another directional antenna, could be used to transmit a range of frequencies.

Since the ARRL references frequency ranges of around 400 MHz for an adult head, to a baby's smaller head resonating near 700 MHz, for adults a range could be chosen from around 400 MHz to 500 MHz.

A second receiver would then be used to detect the reradiated energy that the resonant frequencies generate.

The reradiated energy is produced because electromagnetic waves create oscillating electrical currents in conductors, or electromagnetic fields that reinforce or amplify themselves in dielectrics, and oscillating electrical currents or electromagnetic fields also create further electromagnetic waves.

So the transmitted signal from the yagi, if it's at a diplomats resonant frequency, will create oscillating electrical currents or electromagnetic fields in them.

Some of that energy will be reradiated, as an electromagnetic wave of the same frequency.

The other diplomats won't reradiate this energy, or at least not to the same extent, because the electromagnetic fields generated in them are weaker.

So to detect the diplomat's resonant frequency, the return signals just need to be compared for when the diplomat is away and then when they're home.

The strongest return signals will be those at the diplomat's resonant frequency ranges.

This then is a very basic radar system, that could use just standard laboratory equipment.

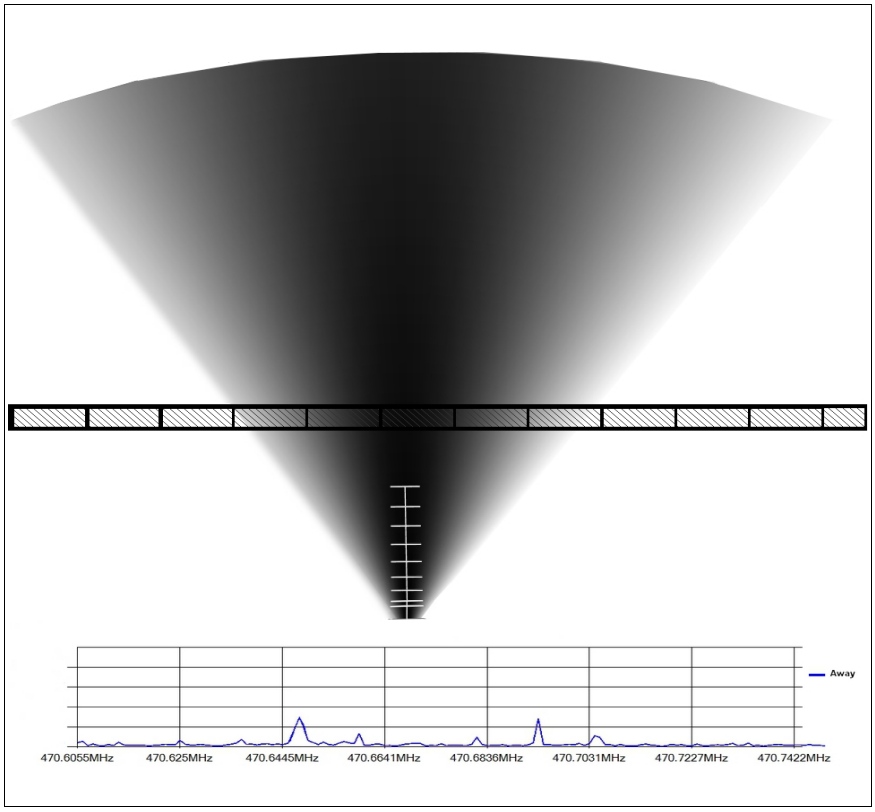


*Figure 8*

Figure 8, shows the return signal response on a spectrum analyzer for a specific frequency range when the diplomat is away. Here that frequency range is between around 470.6 MHz to 470.74 MHz.

Of course this is just a small segment of a far larger range that would be analyzed (i.e, 400 MHz to 500 MHz). Pulses would be transmitted throughout this range using this basic radar system.

The graph shows the return signal response for the transmitted signals. A spectrum analyzer with another yagi, or some other directional antenna, could be used to produce this graph of the return signal strengths. Now figure 9 shows the strength of the return signals when the diplomat is home.

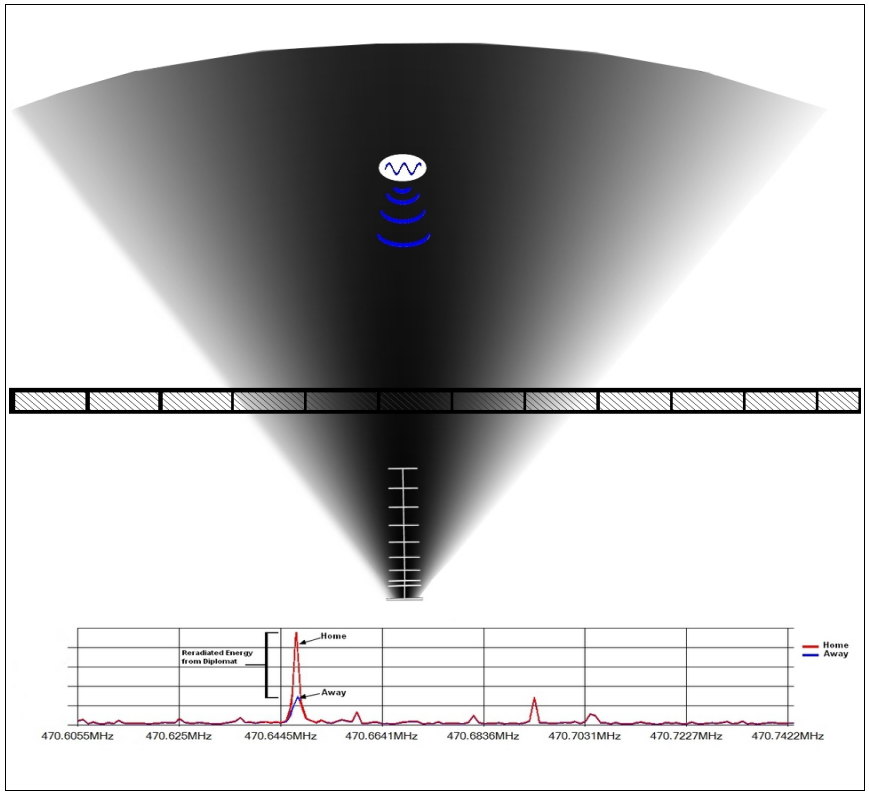


*Figure 9*

Note at around 470.65 MHz, how the return signal (in red) is a lot stronger now that the diplomat is home. This is because they are reradiating this extra energy and they're reradiating it because that frequency is generating reasonably strong oscillating electromagnetic fields in them, that could also have biological effects.

Those then are generating a reradiated electromagnetic wave. This then is essentially a basic radar system, transmitting a signal and detecting the reradiated energy.

The strongest reradiated electromagnetic waves will be produced at the diplomats resonant frequencies and these then are the frequencies that will have the strongest biological effect on them. Others will have different resonant frequencies and so won't be affected or won't be affected to the same extent.

So a basic radar system built from standard laboratory equipment could be used to detect their resonant frequencies. Those frequencies could then be transmitted into the diplomats environment, having the greatest biological effect on them and not others around them.

## The Physics of Electromagnetically Induced Neurological Effects

This section describes how the forces from electromagnetic fields from radio and microwaves would convert into neurological or biological effects.

Electromagnetic waves produce electrical currents in conductors and dielectrics also have the ability to reinforce or amplify electromagnetic fields that would then also produce currents in conductors within those dielectrics.

Humans are electrical conductors that use electricity for biological functions and we have dielectric qualities, so receiving electrical energy from electromagnetic waves would and does cause biological symptoms and established science has already verified this.

So this section describes in more detail how this energy is received that would then cause neurological and biological effects.

Charged ions are used by neurons to send and receive signals, they are conductors of electrical currents. Electromagnetic waves induce forces on these ions, because they're charged particles, and they also affect voltage gated channels.

Three mechanisms are described then that would convert radio or microwave energy into neurological or biological effects, modifying the signals sent by neurons or also damaging neurons:

- Increased Brownian motion of the ions
- Ionic drag
- Direct effect on Voltage Gated Channels

**Increased Brownian motion**

The microwave hearing effect has been described as being caused by a thermoelastic expansion process. That is, a sudden increase in temperature from a pulse modulated electromagnetic wave produces an expansion of biological material and this results in a sound wave being generated (Foster, 2000).

This section describes how such an increase in temperature is also an increase in the brownian motion of the ions, with brownian motion being the random movement of particles, and that this increase in movement could also have neurological effects.

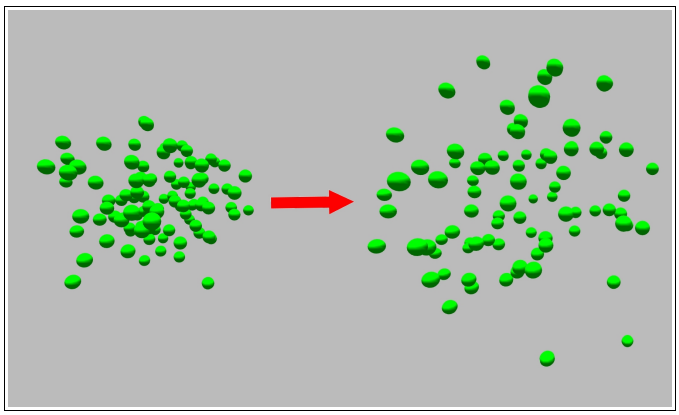

*Figure 10*

This figure shows the effect of brownian motion on a group of particles.

The movement results in an expansion of the region that the particles are in. Clearly if the movement is increased then so will the expansion.

Brownian motion equates to heat. Note that there are also no other forces on these particles, it's just the brownian motion itself.

So this section now describes how fluctuating heat caused by electromagnetic waves that produces sound waves, i.e., the microwave hearing effect, could also effect neural signaling. A simulation was created to test whether this could occur.

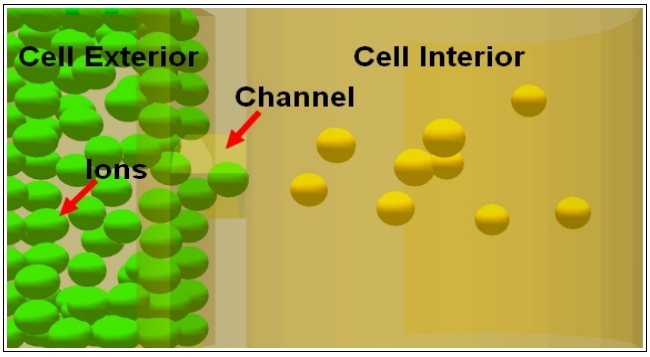


*Figure 11*

This figure shows the simulation structure of an extracellular area, a channel and the interior of a neuron. The external area is filled with simulated ions.

The ions also have a small charge on them to produce a voltage difference between the external and interior regions, simulating the voltage gradient of a neuron.

The ions in yellow represent those that have moved into the neurons interior. The resulting change in voltage is what activates neural signaling, so it would be very significant if we could show that changes in brownian motion, due to heat, would affect the amount of movement of ions from the exterior to the interior.

This graph from the simulation shows that increasing brownian motion clearly does affect the movement of ions into the cell.

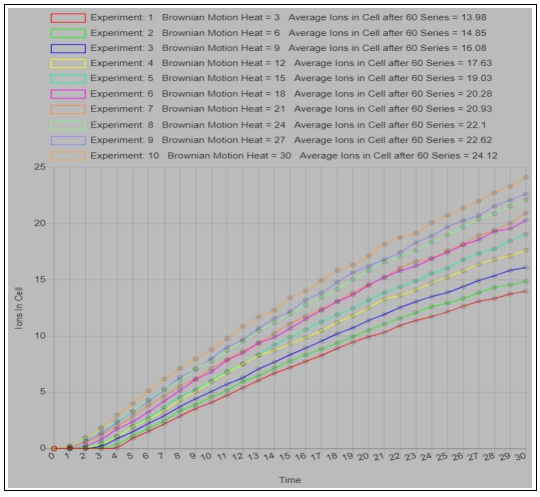


*Figure 12*

This would convert into changes in neural signaling, i.e., neurons would be activated when they otherwise wouldn't be. This then would result in all kinds of neurological effects, dizziness, confusion...etc.

Obviously thermal effects from longer duration, with significant increases in temperature could cause considerable damage or be lethal, however this could be used the same way that the microwave hearing effect is generated. That is pulses of electromagnetic energy would be used, significantly increasing the temperature and brownian movement of ions for a moment in time and then that heat quickly dissipating.

These pulses could then affect neural signaling without significantly increasing temperature.

Frey's research showed that it's the peak power that causes the hearing effect from electromagnetic pulses, with the average power being well within safety limits (Frey, 1962).

Such pulses could also then be used to increase brownian motion and affect neural signaling that would produce the various neurological effects, without causing significant, permanent damage.

**Ionic drag**

With electrons, electromagnetic waves move them in a specific direction based on the orientation of the electric and magnetic fields.

The larger size of the ions, though, used for neural signaling and the density of the fluids that they're in means that they're more difficult to move.

So generally, just increases in temperature result from smaller oscillating movements and collisions with neighboring molecules.

If an electromagnetic transmission though is sufficiently strong and of a low enough frequency it can cause other effects besides the random movement of ions from increases in temperature.

The resonant frequency of the human mind for an adult should be around 450 MHz, with a wavelength close to 70 cm. This means that the oscillations occur at a long enough duration that could produce forces on the ions sufficient to move them in a specific direction.

If someones resonant frequency is used it also means that the forces on the ions will be stronger and of course those using these devices as weapons aren't going to be worried about transmitting within the FCC's safety standards, so ionic movement or drag could be a factor.

Should ionic drag occur it could also result in neurons with longer axons receiving more of the electromagnetic energy. This is because they would be closer in length to an electromagnetic wave with a longer wavelength, that would cause such ionic drag.

This figure shows the effect of the same electromagnetic wave on two neurons, one long and the other short. At the same stage in the waves cycle, as it passes the neurons, the ions in the neuron with the short axon have been compressed almost to the extent where they can no longer move.

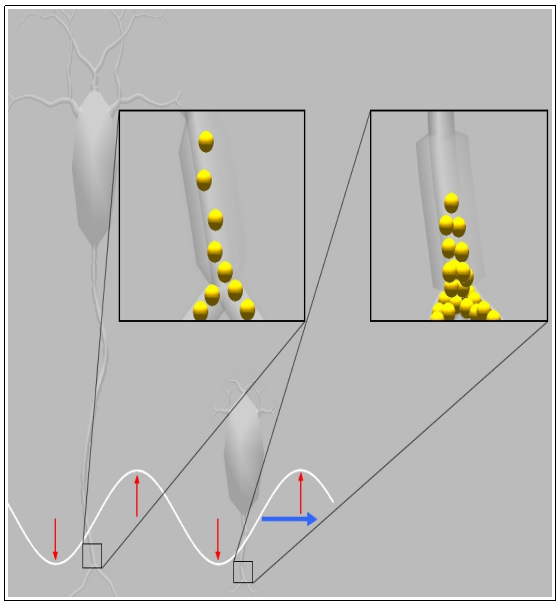

*Figure 13*

This is also long before the trough of the wave is reached.

The red arrows indicate the direction of the electric field and the force on the ions. The blue arrow shows the direction of movement of the wave.

With the longer neuron's axon there are still large gaps between the ions. So they will receive more of the energy, converting it into movement.

This movement will also convert into heat because of the friction generated with other molecules and could explain the damage that has been reported to the white matter tracts of the diplomats, since they have longer axons.

https://www.theguardian.com/world/2017/dec/06/us-embassy-attack-cuba-brain-abnormalities-victims

The ions in the shorter axons wouldn't generate the same temperatures, because they get compressed a lot sooner, limiting their movement.

**Direct effect on Voltage Gated Channels**

There's a large amount of research that shows that electromagnetic fields have a direct effect on Voltage Gated Calcium Channels (VGCCs).

In 26 studies, the biological effects of electromagnetic fields were blocked or significantly lowered by calcium channel (VGCC) blockers. That is, in preventing the VGCC activation the biological effects of the electromagnetic fields were also prevented, showing that VGCCs are activated by electromagnetic fields (Pall, 2015).

VGCC activation has roles in producing a wide variety of EMF effects.

The effects of excessive VGCC activation would include “....elevated intracellular calcium [Ca2+]i, excessive calcium and nitric oxide signaling and also excessive peroxynitrite, free radicals and oxidative stress” (Pall, 2015).

Excessive activation of VGCCs can affect learning and memory (Krug et al., 2014) and also cause attention deficits (Thimm et al., 2011).

It's also been shown that pulsed microwave fields, at a non-thermal level, produce an essentially instantaneous increase in calcium/calmodulin-dependent nitric oxide (NO) and that this is very likely due to the instantaneous activation of the VGCCs from electromagnetic fields (Pilla, 2012).

“It is likely, that these EMFs act directly on the voltage sensor of the VGCCs ...with the voltage sensor being exquisitely sensitive to these EMFs” (Pall, 2015).

So the effect of direct VGCC activation would produce various neurological and biological effects, showing again that the transmission of electromagnetic waves is most probably the cause of what the diplomats in Cuba and China experienced.

## Use of Electromagnetic Waves as a Weapon

The use of electromagnetic waves as a weapon is obvious.

Quoting again from Frey's research:

“...With somewhat different transmitter parameters, we can induce the perception of severe buffeting of the head...Changing transmitter parameters again, one can induce a "pins-and-needles" sensation...” (Frey, 1962).

Also quoting from Jaski “...all subjects agreed there was a definite "pulsing" in the brain, ringing in the ears...” (Jaski, 1960).

Something that can produce “severe buffeting of the head, pulsing in the brain” sounds like a very effective weapon.

Note that a weapon does not need to be lethal. Just reducing the ability of a soldier to perform could create a very effective weapon.

Also just generating sounds (Jaski, 1960) (Frey, 1962) and headaches (Frey, 1998 ), could be very effective at achieving this.

Frey's research that “...The effect was induced several hundred feet from the antenna...” and the fact that they were using energy levels within the safety standards also shows that electromagnetic waves would be a very effective weapon (Frey, 1962).

The Wallops Flight Facility, Safety and Health Training Course on RF & Microwave Radiation Hazard Awareness, presented by Safety and Mission Assurance for NASA also further verifies this, describing effects the same as those experienced by the diplomats in Cuba and China: confusion, vertigo, headache, blurred vision, overall nauseous feeling (Wallops Flight Facility, Safety and Health Training Course, 2011).

The National Security Agency (NSA) also confirmed to a lawyer for Mike Beck, a National Security Agency counterintelligence officer, that they have intelligence information that a foreign country had built a “...high-powered microwave system weapon that may have the ability to weaken, intimidate, or kill an enemy over time and without leaving evidence. The 2012 intelligence information indicated that this weapon is designed to bathe a target’s living quarters in microwaves, causing numerous physical effects, including a damaged nervous system.”

https://int.nyt.com/data/documenthelper/202-nsastatement/665ff9158ffa09ed1e91/optimized/full.pdf#page=1

Not only can electromagnetic radio and microwaves produce these effects and these are effects that have already been verified by established science, they can also be directed in beams.

So clearly a technology that would be a very efficient weapon and that's provable according to already established science.

#### Why the Confusion and Resistance to the Idea of Electromagnetic Waves As a Weapon?

The use of electromagnetic waves being the very probable cause of what the diplomats in Cuba and China experienced is logically obvious. It seems though that we need to answer why this was considered so mysterious and even after the New York Times article describing microwaves as most obvious cause there's still resistance from certain journalists and a few consultants that they quote, specifically a Washington Post article and a few others.

The very unusual occurrence of radio and microwaves was also not mentioned at all as the cause during a Senate Foreign Relations Subcommittee hearing on the Cuba embassy attacks on US diplomats, that was in January 2018.

https://www.c-span.org/video/?439474-1/state-department-officials-testify-attacks-us-diplomats-cuba

How could the scientifically most probable cause not be mentioned as being responsible or at the very least, a likely probability?

I find this fascinating because I, as a qualified scientist and that's been researching this area, knew then what the most probable cause was and the investigators, with all those that they could consult, did not.

Note how Senator Marco Rubio asks in the hearing:

“Let me ask this...and this would never happen...if someone in the US government says that we want to cause these symptoms in people, that technology doesn't exist, we don't know of that technology. Is that accurate? We are not aware of a technology that does this. We've never seen a technology anywhere in the world that does this to people.”

In response Mr. Todd Brown says: “That's my understanding senator, when going to the subject matter experts, both in government and outside government, we have not seen this”.

Sen. Rubio continues: “Dr. Rosenfarb have you ever seen cases of this, outside of an actual blow to the head or something similar?”

Dr. Charles Rosenfarb responds: “I have not”.

Now think about this and what the established research says, described here, regarding a technology, electromagnetic waves, that cause the symptoms experienced.

Think about Frey's research, a US citizen, and the government's own NASA research. Clearly established science already knows with almost certainty what technology causes those symptoms.

Why do those responsible for investigating this not seem to be aware of the established science?

It was public scientists like Professor James Lin, an expert researcher on microwaves and their biological effects, who wrote a scientific article on this around December 2017 and then Dr. Beatrice A. Golomb, a professor of medicine at the University of California, published a paper describing how pulsed radio frequency or microwave radiation are the most obvious cause.

http://ieeexplore.ieee.org/stamp/stamp.jsp?reload=true&tp=&arnumber=8267384

https://www.mitpressjournals.org/doi/full/10.1162/neco_a_01133

This was mentioned in the New York Times article 1'st of September of 2018.

https://www.nytimes.com/2018/09/01/science/sonic-attack-cuba-microwave.html

So public scientists and journalism were the first to reveal the truth. The question is, why?

Also, Kenneth Foster in response to James Lin's paper says:

“That theory is a real stretch, It would require something like a major airport radar transmitter with the subject’s head close to the antenna in its direct beam … I guess it is possible, but not likely.”

https://www.huffpost.com/entry/microwave-weapons-embassy-attack-cuba-china_n_5b8bdaf4e4b0cf7b00370cc8

Consider this statement and then Frey's research saying: “...The effect was induced several hundred feet from the antenna...” (Frey, 1962).

The energy requirements would also be less if someones resonant frequency is used, mentioned by Jaski: “...at the 'individual' frequency, STRANGE THINGS WERE FELT. Asked to describe the experience, all subjects agreed there was a definite 'pulsing' in the brain, ringing in the ears...” (Jaski, 1960).

Without using resonance it would be like blasting a radio with a radio station's frequency that it's not tuned to.

Frey's research did not use resonance and those sounds were produced using electromagnetic waves within the safety levels, so sounds that are a lot louder could logically be produced if someone isn't concerned with safety levels, since the effect is said to be produced by a thermoelastic expansion process, more energy would equal a louder sound or if resonance is used.

Neurologist Alberto Espay has also been quoted as saying, “Microwave weapons is the closest equivalent in science to fake news.”

https://www.washingtonpost.com/national/health-science/scientists-and-doctors-zap-theory-that-microwave-weapon-injured-cuba-diplomats/2018/09/06/aa51dcd0-b142-11e8-9a6a-565d92a3585d_story.html

Consider that statement also and the established facts regarding the effects of microwaves described here and also the National Security Agency (NSA) confirming that they have intelligence information that a foreign country had built a high-powered microwave system weapon.

Clearly not fake news and in fact science says that it would create a very effective weapon. So a very unusual statement considering what science actually says.

There's got to be a logical answer why the established science is in conflict with some journalists and who they consult and why it took so long for the most probable answer to be provided.

The most obvious possibilities are:

1) Ignorance - No one knows everything.
2) Classified Technology - Very likely factor considering the ability to covertly use these such weapons.
3) Organized Crime – Also very likely since it can be used covertly and the technology is in it's essence very basic, it's been around at least since the 1960's.
4) Invested interests – Telecommunications industry and others wouldn't want what our devices use to be considered unhealthy

Now I'm not saying which of these specifically refers to those mentioned here, I'm sure that 1 or 2 would be preferred. There are logical reasons though, based on the huge amount of scientific research that says that electromagnetic waves cause the symptoms that the diplomats experienced.

Why it would take so long for the most obvious answer to be accepted and why there would still be resistance.

Consider this fact, there's this huge amount of established research that clearly shows that electromagnetic waves are the MOST probable answer and yet at the Senate Foreign Relations Subcommittee hearing on the Cuba embassy attacks on the US diplomats it wasn't even mentioned as a possibility.

Why was it not even mentioned? Even if it wasn't the cause or the most probable cause, why was it not at least mentioned, considering the huge amount of evidence that says that it is the cause.

Yet, we have things mentioned that logically do not explain the facts and the most obvious answer the “huge elephant in the room” wasn't even mentioned.

This surely is proof of something in itself.

There's a very interesting answer to this question.

## Conclusion

So the mystery of what happened to the diplomats in Cuba and China is not such a mystery. The established science describes a technology that would cause the symptoms, the sounds heard and also the other biological effects. Not only do electromagnetic waves explain the symptoms, it also explains how these symptoms could be caused through walls and other objects and with resonance individuals could be targeted with others around them. Electromagnetic waves then are the obvious cause for what the diplomats experienced, explaining essentially every relevant factor and that there's a huge amount of already established science that verifies this. This work then has achieved the objective of further reinforcing this answer and providing further answers.

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