The Lakhovsky Multiple Wave Oscillator Secrets Revealed

Bruno Sacco
Tony Kerselaers

MULTI WAVE RESEARCH

Doctor Nicola Gentile, 1935

"***The important physical phenomena that to me has been given to be discovered and which is not yet conveniently to be studied deeply for lack of suitable instruments*, make me to think that its scientific importance will be recognized in future as extraordinary.*** "

****wavemeters, mirror galvanometer, tubes filled of rare gas or to different rarefaction, localizers, micro-voltmeters, ohmmeters, etc…***

First Edition, summer 2010

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Herselt, Belgium

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DISCLAIMER

This book is a research publication of Multi Wave Research. It contains accurate analysis of the original Lakhovsky Multiple Wave Oscillator produced by C.O.L.Y.S.A. in France during 1931 and 1940. Relevant original documents are translated and added to this book. The discussed material is never been published before and it provides the knowledge to build Lakhovsky Multiple Wave Oscillators and open doors for further experimentation in this field by competent researchers.
Read this book thoroughly before undertake any experiments. High frequency, high voltage electric apparatus can cause serious shock injury and should only be handled by knowledgeable, competent people. All experiments are conducted solely at your own risk. We disclaim any responsibility for the use or misuse of any information in this book. While this book touches on the subject of human health, all information should be considered as anecdotal and should not in any way be used to construct a medical device. We are not qualified to give medical advice and the use of experimental equipment and research techniques described in this book may provide a false sense of security wherein one may neglect medical care.

About the Authors

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Tony Kerselaers is an Electrical Radio Engineer. He graduated at HIDN Mechelen in 1980. He has been working for Philips Electronics for many years where he was involved in RF design antennas systems. He works currently for NXP Semiconductors where he is involved in radio systems and antenna architecture. Tony filed more then 25 patents in this field.

Authors' Acknowledgments

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Finally the authors wish to thank their families, who once again put their lives on hold during many travels and hours spend on research.

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1. Introduction

Several "Lakhovsky Multiple Wave Oscillators" can be found on the internet and also purchased from different suppliers. Isn't it strange that they look different from each other and also have different specifications? How can this be, since manufacturers say these are all Lakhovsky Multiple Wave Oscillators? At a minimum we can say that it is not clear they are designed to operate according to the instructions of Georges Lakhovsky. The "modern" post world-war II story of the MWO is not a happy one. We learned that in 1963 Mr. Bob Beck supposedly discovered an original MWO stored in the basement of a California hospital. From this discovery the Multiple Oscillator revival began. The Borderland's "MWO Handbook" provides an overview of that period: a generation of experimenters started to build many various home-made MWO's, to speculate on how the original device was made, how the antenna rings were sized, etc. We'd like to polemize a bit with Bob Beck: why he didn't disclose the original MWO details? Why we never saw any pictures? Why is it that the discovered machine had no C.O.L.Y.S.A. identification? A new generation of experimenters, including ourselves, has wasted time and energies in speculating, discussing, building rubbish MWO's that had little or nothing to do with the real original design. We are *not* doctors, we are radio engineers, so we can't help in evaluating the MWO from a clinical point of view. Yet, we can finally provide an in-dept technical study of the *original* MWO technology and help experimenters to build his/her own original-compliant MWO.

We can find many articles and publications and we can also obtain original books of Georges Lakhovsky. However these documents do not describe accurately enough on how the machine operates. Also the granted patents are not describing deep enough how the MWO is working. It seems that G.L. wanted to cover up his great invention.

We were surprised that we found unpublished documents containing information on how the machines where designed and produced during the years 1932 - 1942 by the Laboratories C.O.L.Y.S.A., the George Lakhovsky's former company in Paris. We even found an MWO inventory list of C.O.L.Y.S.A. of all produced machines and the people who received these machines.

This is why a handful of people, each expert in different fields and internationally located, took the challenge to turn "the stone" around to discover the unknown secrets. Ground breaking work has been done in France which has been continued by tracking down original documents and multi wave oscillators in Italy which have been studied very deeply.

It is our intention to distribute this knowledge to all interested people. Perhaps many individuals may soon realize benefits by knowing how the Lakhovsky Multiple Wave Oscillator was once designed.

This second book is a new step beyond, evolving from our first book, LaRévélation"; it reports on the work that has been done in the second phase of our research. This

book reports deep technical analysis of the George Lakhovsky Multiple Wave Oscillator; machine, components, use cases, examples how to construct replicas and recovered original documents.

This work has been made possible after we discovered original C.O.L.Y.S.A. units in Italy. Dr. Boris H. Vassileff, a Bulgarian born Italian doctor has been using these machines for many years. This is a big discovery since Dr. Vassileff established three medical offices where he gave Lakhovsky therapy until he passed away in the eighties. Dr. Vassileff's tutor was Dr. Vittorio De Cigna, who pioneered the use of the MWO in Italy. One of the original units discovered was most probably previously owned by De Cigna. We found some of the published medical results he has achieved with these machines.

Dr. Boris H. Vassileff

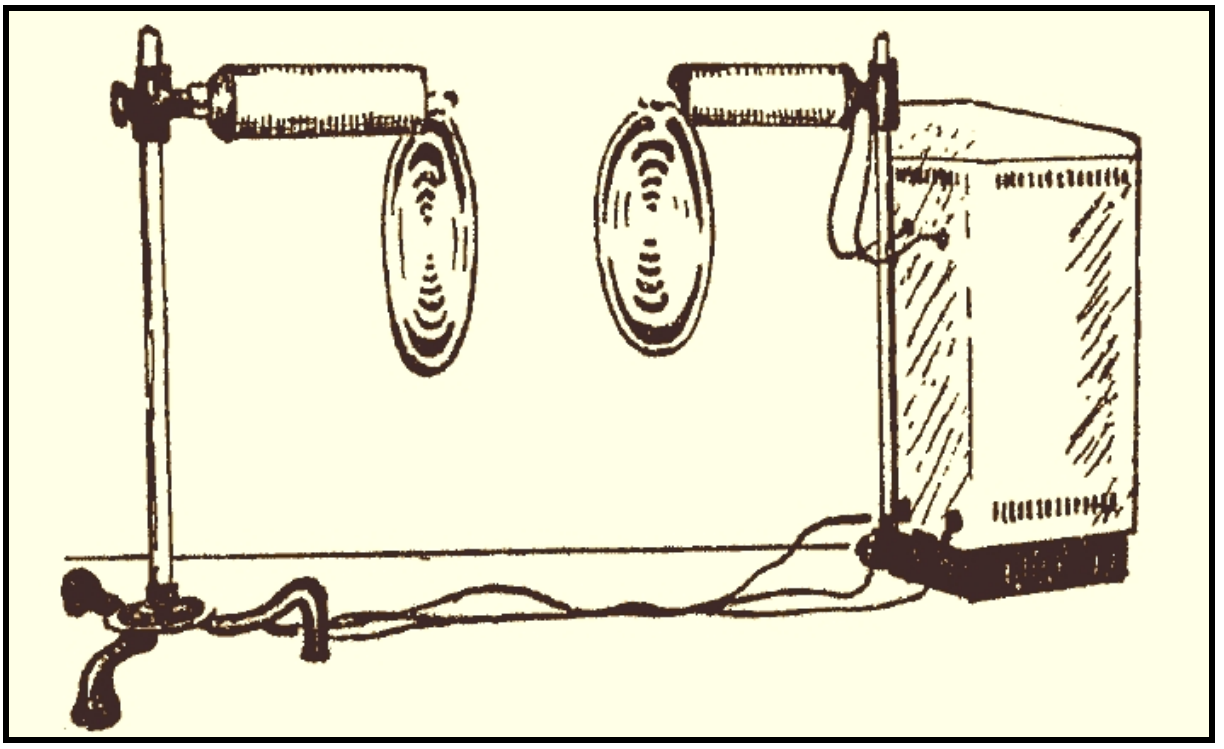
1938

1980

Dr. Vittorio De Cigna

2. An attempt to write the history and evolution of the Lakhovsky MWO

An original “front page drawing” of one of Dr. Boris H. Vassilleff Books

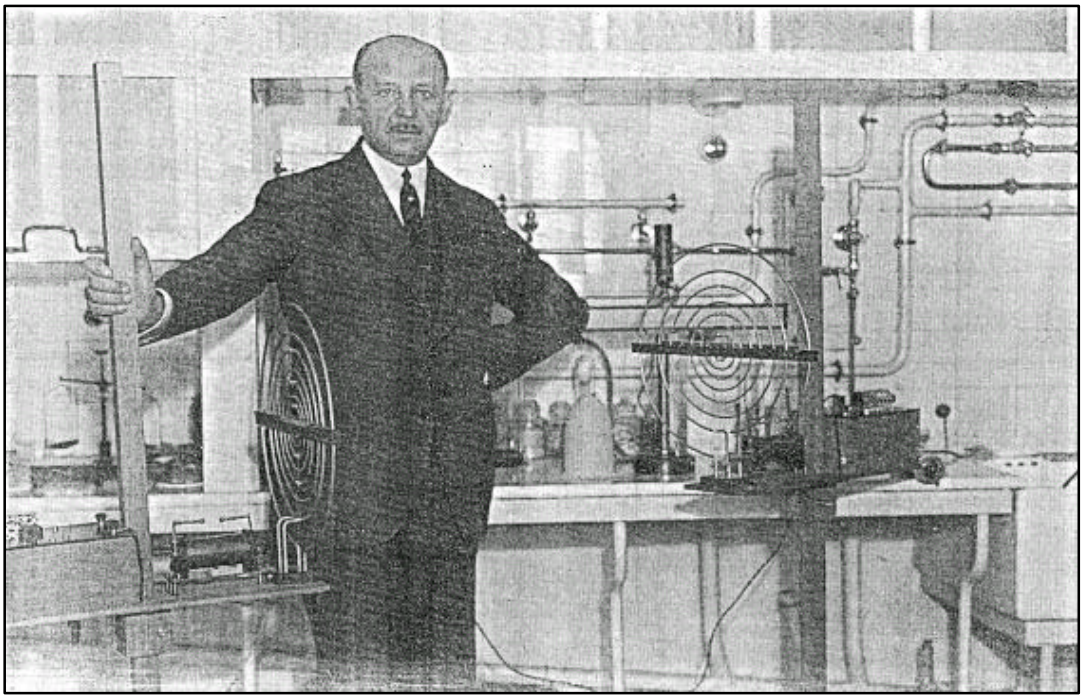


This classification is made with the knowledge at the time of writing and can change in future. Nevertheless, it gives a good idea of the evolution of the machine. Georges Lakhovsky was always keen to improve his machines according results obtained from successive trials.

Model #1

In the picture below you can see most probably, the very first prototype that G. Lakhovsky developed. We can distinguish two generators, one on each antenna. The opening of the outer oscillating circuit (antenna ring) is at the bottom side close to the generator to which it is connected.

G.L. with his first laboratory MWO



Model #2

In this model the coils and antennas had already their final design and since then they did not change very much anymore, except for some details. The generator is very compact and is attached directly to the bottom of the transmitting antenna.

Second MWO version

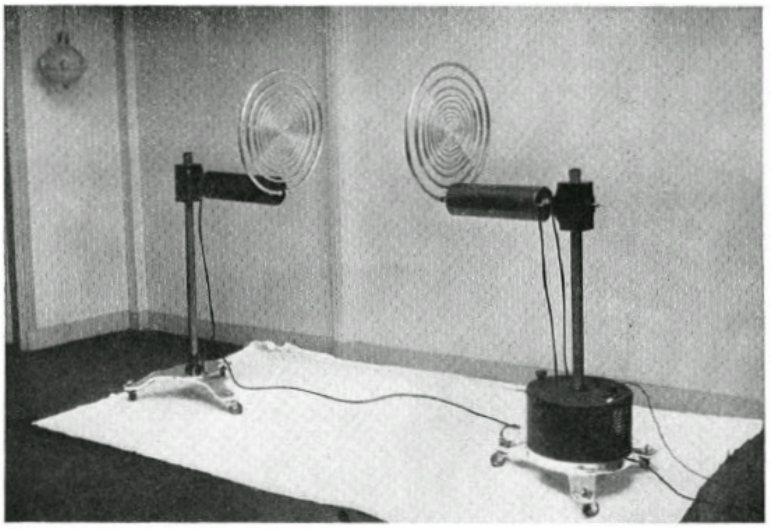
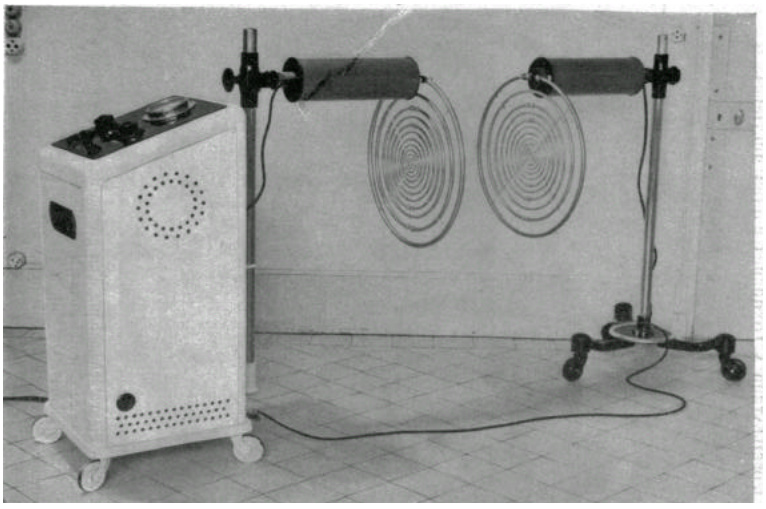


Fig. 13. — Oscillateur à ondes multiples. Appareil Lakhovsky complet avec ses deux résonateurs, créant un champ électromagnétique ambiant entre ses deux éléments.

Model #3

The generator takes its final form in the third version. Of course, there will be differences to the interior circuitry, mainly on the spark gap and other components, but the wiring diagram will remain the same. One can see changes over the different models in the method for the attachment of the antennas, but the design principle did not change, the diameter of the largest antenna ring is always the same. However the last model constructed has a larger outer antenna ring.

Third MWO version



The spark gap mounted on these devices is easily recognizable by the “V” shape.

Spark gap with “V” shape

Other models

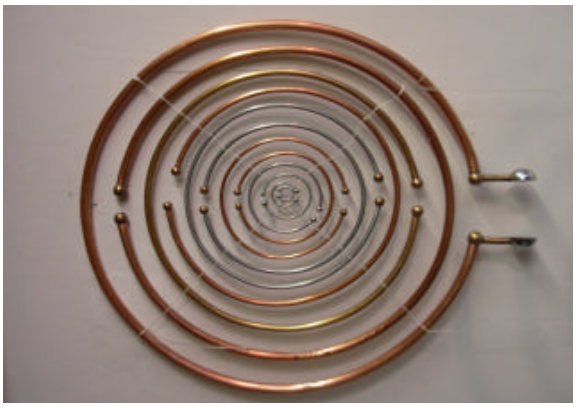
It is difficult to classify the next models that followed in the time, except the last one which is well known. Different models will be shown.

The MWO below belonged to Dr. Boris Vassileff and is in an unbelievable good condition. We like to draw your attention to the method of antenna connection. The attachment is made with a metal T. The outer antenna ring is interrupted inside the T attachment. The antenna is very light and is constructed in aluminium. The spark gap is of the “V” type.

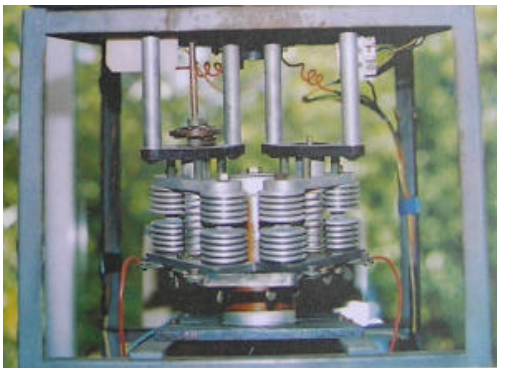
Boris Vassileff #3 model

The MWO below belonged to Dr. Boris Vassileff too and have been used during a long period of time. The spark gap is of the “V” type. The antenna on this device is constructed from several different metals. The exact materials are not exactly identified yet due to lack of specialist investigation. But most probably they are copper, brass, aluminium. Other similar antennas we heard about are made with additional metals too: silver, gold, stainless steel and iron.

Boris Vassileff #2 model



In the unit below, the antenna is constructed from multi-metals. The different antenna rings are hold together with Teflon rods. The construction of the device body is substantially the same as previous devices however here we find a pair of “Duflot” spark gaps. In such a design are the electrodes in line with each other in stead of in a “V-shape”. They are separately adjustable. Duflot has been designing “diathermy” equipment mainly and G. Lakhovsky used his spark gap design in this model.



Models difficult to situate

This is the first original device found in France; it has been studied in the first eBook “LaRévélation”.
The spark gap is a “V” type design and the antennas are made of multi-metals. It is certainly a model for the family retail segment.

In the picture below is the personal unit of Serge Lakhovsky shown. The enclosure of the MWO is made of wood. The antennas are constructed using three different metals that are alternated. There is no information about the spark gap.

The picture below shows a portable MWO with a single antenna. The antenna is constructed in aluminium.

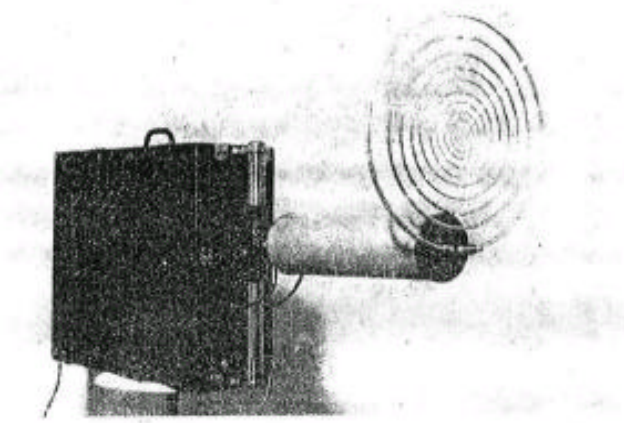
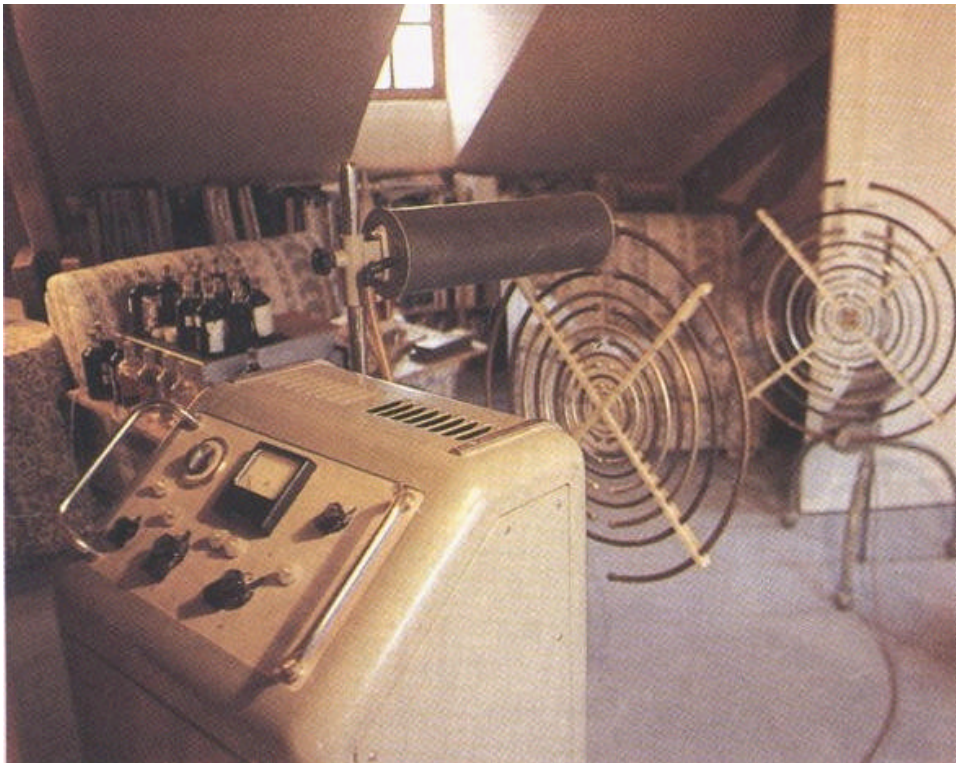


Fig. 2. — Oscillateur à ondes multiples Lakhovsky (Petit modèle).

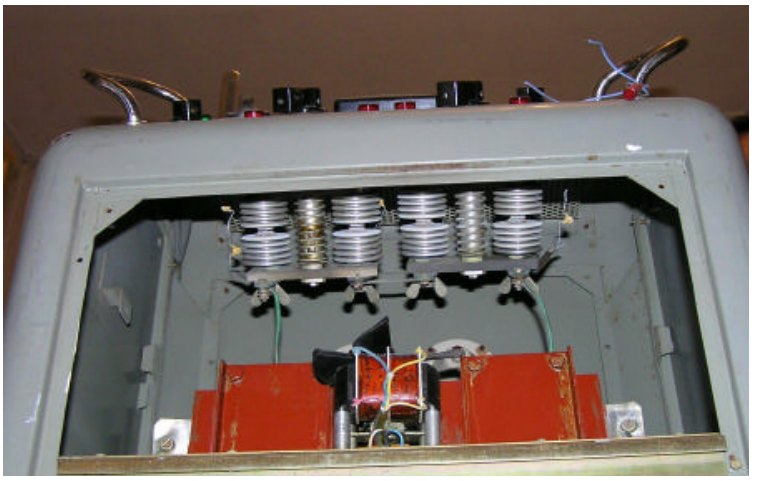
The last made unit was designed by the engineer Givelet (assistant of G.L.) in the 1950's. The diameter of the largest antenna ring is 62 cm (in all other C.O.L.Y.S.A. models the outer antenna ring is 50 cm).
Similarly, there are 14 oscillating circuits compared with 12 on all the other MWO's. The attachment of the antennas is very special and is no longer at the ends but in the centre of the outer antenna ring. The spark gap is a double "Duflot" type.

Last made MWO



Front panel, last made MWO

“Duflot” Spark gap, last made MWO



Receiving antenna, last made MWO

3. Analysis of the C.O.L.Y.S.A. original Multiple Wave Oscillator

Original picture of C.O.L.Y.S.A. identification plate

Original transportation package of a C.O.L.Y.S.A. MWO

3.1 Reverse engineering of the C.O.L.Y.S.A. Multiple Wave Oscillator

In this section we report the results of the analysis of the original C.O.L.Y.S.A. Multiple Wave Oscillators that we found. The focus is on the electrical characteristics and the theory of operation of the circuit.
As it will be evident, all devices share a common basic design that was only slightly modified by the designer over the years.

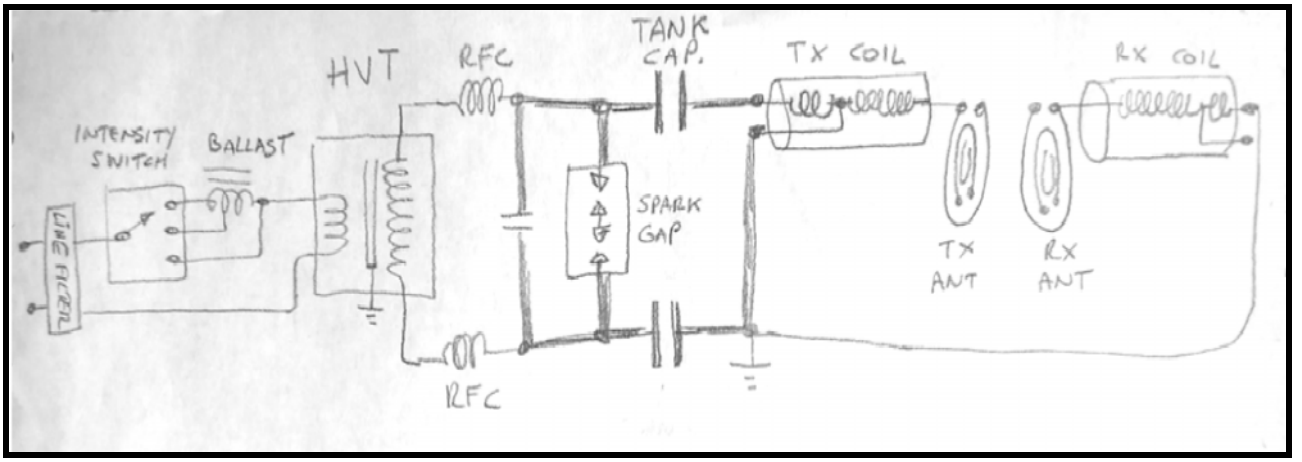
Three different C.O.L.Y.S.A. MWO's where found in Italy. They where belonging to Dr. Boris H. Vassileff. However the older one probably was previously owned by Dr. Vittorio De Cigna, the Italian MWO pioneer. The two doctors used these machines for many years. Two of the MWO's were used for a very long time while the third one was found nearly unused in the original package. Throughout this document we will refer to the MWO's by the following abbreviations:

BV1: This is the oldest MWO of the Boris Vassileff's MWO's
BV2: This is the second oldest machine of the B.V. MWO's
BV3: This is MWO is almost as new, like it was produced yesterday

3.1.1 How the circuit works

The principle electrical diagram of the C.O.L.Y.S.A. MWO is sketched in the following figure. The device is powered with mains voltage (terminals on the left).
The purpose of the line filter is to attenuate the interference injected from the MWO to the mains supply. A 3 position switch inserts progressively increasing inductances by means of a ballast inductor, in order to control the current of the high voltage transformer. The latter provides the high voltage to the spark gap circuit via two radio frequency chokes (RFC). Two twin tank capacitors feed the transmitter (TX) Tesla Coil. The output of the latter is connected to the TX antenna. Receiver (RX) antenna and RX Tesla Coil are basically similar in construction, but remain passive.

Principle electrical diagram of C.O.L.Y.S.A. MWO



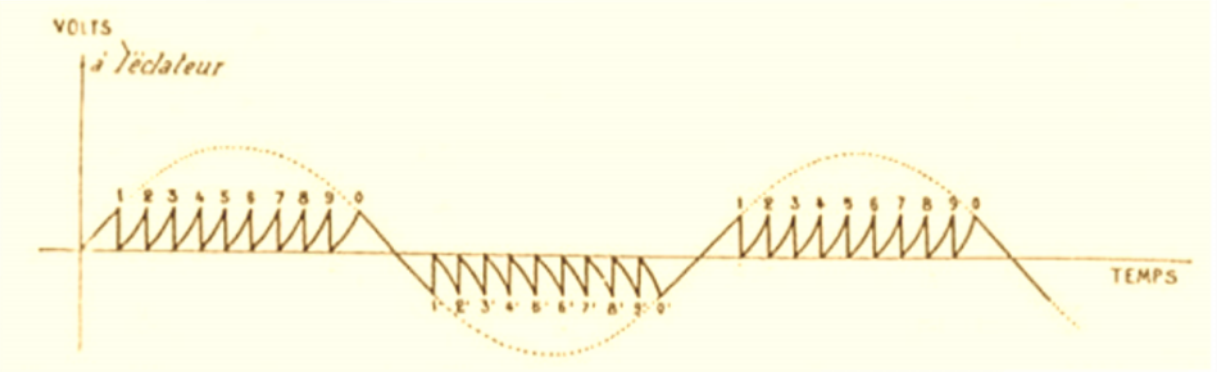
The MWO basic components:

High Voltage Transformer (HVT)
Ballast inductor
Spark Gap
Tank Capacitors
Boost capacitor
Primary Tesla coil
Secondary Tesla coil
Line filter
Radio Frequency Chokes
Two multi-band antennas: transmitter antenna, receiver antenna

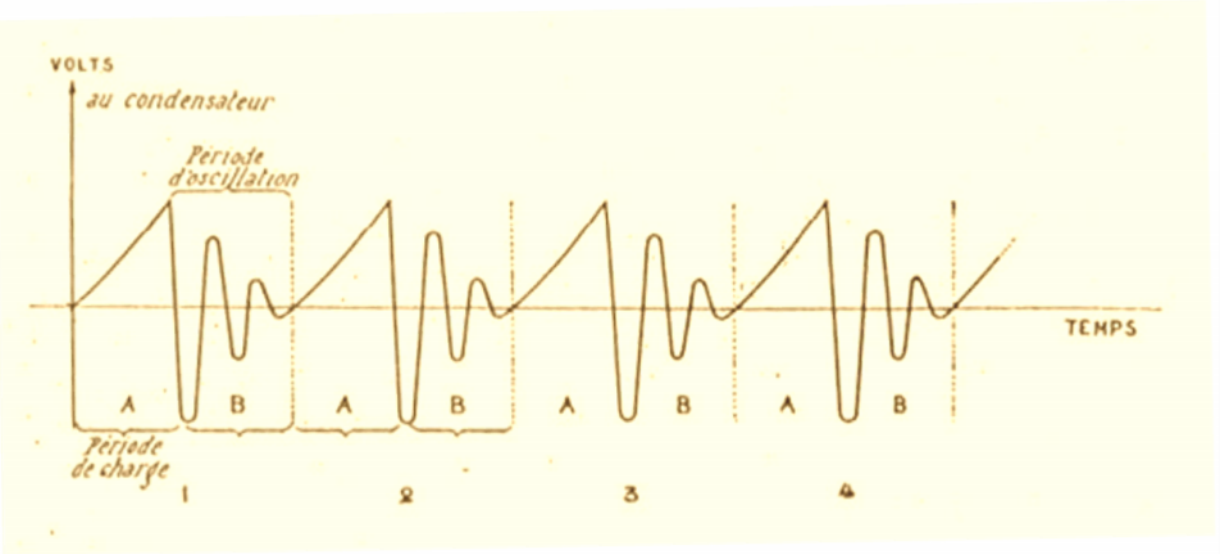
Let us examine the operation of the MWO. In the following figure, taken from an ancient document, two waveforms are shown:

- the voltage across the spark gap (“volts à l'éclateur”, solid line), and
- the voltage that the HV transformer secondary would provide

High Voltage at across the spark gap



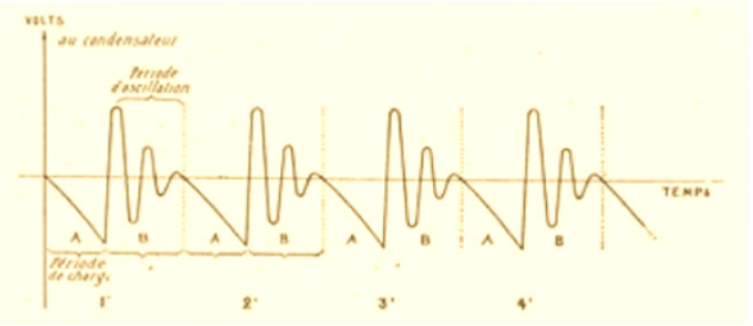
The spark gap initially appears as an open-circuit. The current from the HVT power supply charges the primary tank capacitors to a high voltage. The voltage across the capacitors increases steadily with time as more charge is being stored across its dielectric. Eventually the capacitor voltage becomes so high that the atmospheric air in the spark gap is unable to withstand the high electric field and breakdown occurs. The resistance of the air in the spark gap drops dramatically and the spark gap becomes a good conductor. In the waveform below, that is a closer view of the previous waveform (positive half-period); we are now at the time instant “1”.



The tank capacitors are now connected across the primary winding of the TESLA coil through the conducting spark gap. This forms a series resonant circuit and the capacitors discharge their energy into the primary winding in the form of a damped high frequency oscillation (in the above figure: period “B”). The natural resonant frequency of this circuit is determined by the values of the primary capacitors and primary winding and is between 750 KHz and 1 MHz.
The Tesla transformer uses a relatively loose coupling between primary and secondary and the majority of the voltage gain is due to high standing wave ratio that is created in the secondary winding. A normal transformer, like the High Voltage Transformer, uses an iron core in order to operate at low frequencies of the mains supply, but the Tesla transformer is air-cored to operate efficiently at much higher frequencies. The Tesla coil behaves as a high pass filter and passes a very high frequency range.
During the damped primary oscillation (period “B” in the above figure), energy passes back and forth between the primary capacitors and the primary winding. Energy is stored alternately as voltage across the capacitor and current through the primary winding. Some of the energy from the capacitor also produces considerable heat and light in the spark gap. The close proximity of the primary and secondary windings causes magnetic coupling between them. The high amplitude oscillating current flowing in the primary causes a similar oscillating current to be induced in the nearby secondary coil.
The self capacitance of the secondary winding and the capacitance formed by the transmitter multi-band antenna and ground results in another parallel resonant circuit being made with the secondary winding. The natural resonant frequency of the primary circuit is chosen to be the same as the natural resonant frequency of the secondary circuit. In this way there is a maximum energy transfer from the primary circuit to the secondary circuit. Energy is gradually transferred from the primary resonant circuit to the secondary resonant circuit. The amplitude of the primary oscillation decreases over several cycles and the amplitude of the secondary oscillation increases. When all of the energy has been transferred to the secondary winding and transmit antenna, none is left in the tank capacitors. We call this period the “first burst” and it takes 8 to 12 μseconds. At his moment the spark gap stops conducting.

Since the spark gap is now open-circuit the tank capacitor begins to charge again by the HV supply current and the whole process repeats again.

In the above figure, the next period “A” takes place and so on, until the positive half-wave voltage returns down at a voltage lower than the gap breakdown one. In the negative 50 Hz half-wave, the mechanism repeats, but with instantaneous voltages inverted, as depicted in the waveform shown at the left.



The MWO makes a high voltage of 200 KVolts at the transmitter antenna. This happens in a frequency band between 750 KHz and 1 MHz. Due to the nature of the signal generation a high (mainly) *electric* field is created between the transmitter antenna and the receiver antenna. However for higher frequencies also electro-magnetic fields are created. If the spark gap distance is set sufficient wide, the secondary voltage can reach such a high value that the surrounding air at the transmitter antenna breaks down and “effluvia” is created.

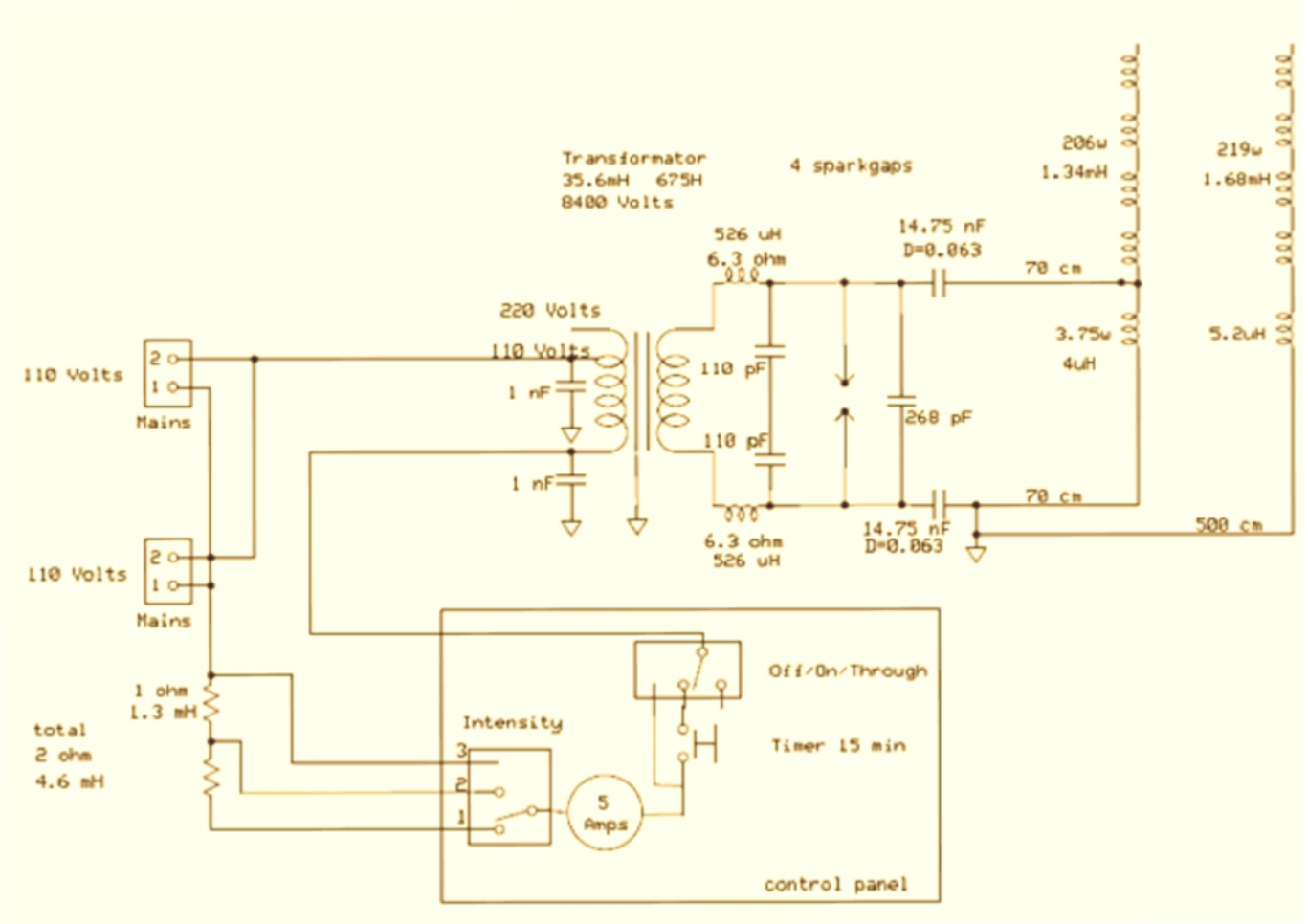
The mains supply voltage is converted by the High Voltage Transformer to a nominal voltage of 7KV, somehow depending on the model of MWO. The current from the HV power supply can be regulated by a ballast inductor which is in series with the primary of the high voltage transformer. With this method the ratio at which the tank capacitors are charged can be changed. On the machine there are 3 intensity settings (1/2/3) which allow for different ballast inductor values and thus different pulse rates.

The spark gap consists of 4 gaps connected in series. Putting gaps in series has the advantage that the audio noise that is generated is much reduced and provides at the same time a fast “off switching” the “first burst”. However the disadvantage of this is that more loss is introduced in the primary circuit.

When the spark gap starts conducting, the tank capacitors cannot deliver immediately the current required to sustain the spark, due to the primary inductance. For this short period of time the boost capacitor, having a capacitance value lower than the tank capacitors, provides faster current delivery to heat up the air.

3.1.2 Electrical diagrams

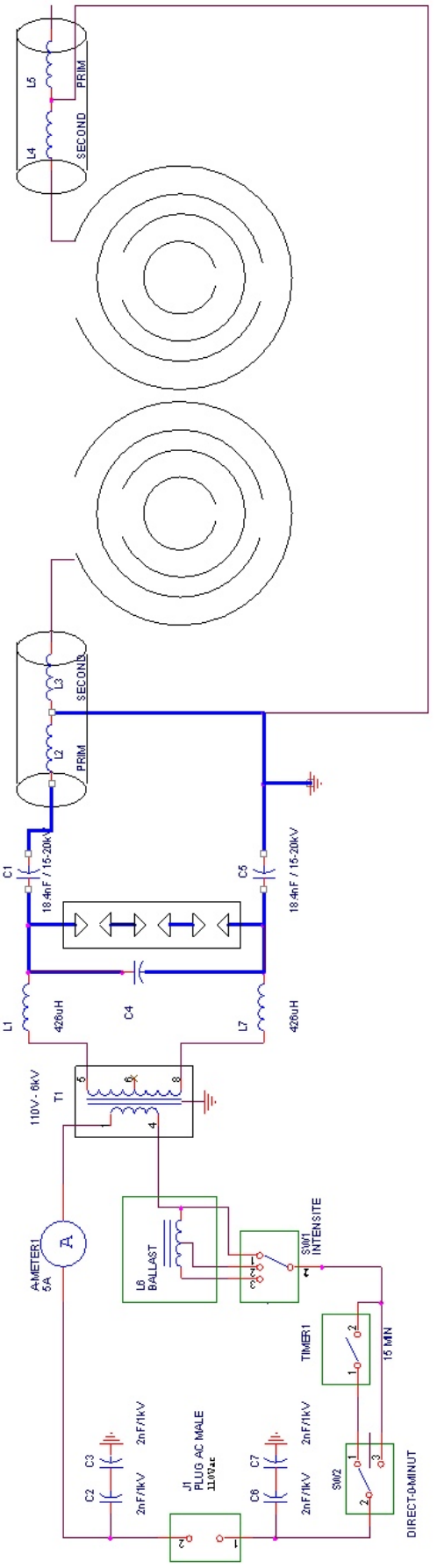
Schematic of BV1 MWO



Following components can be recognised in the schematic of BV1:

110 or 220 Volts Mains Inlet
Ballast
Intensity Switch
Ampere Meter
On/Off/Through Switch
15 minutes Timer
Line Filter (2 times 1 nF)
High Voltage Transformer
Radio Frequency Chokes, 526 µH
“V-shaped” spark gaps
Tank capacitors (14.75 nF)
Boost capacitors (twice 110 pF in series and 268 pF from tank parasite capacitance)
Transmit Tesla coil
Receive Tesla coil

Schematic of the BV2 MWO



3.1.3 Antennas

Each antenna consists of 12 open rings nested in each other, so each element has a dimension smaller than the previous one, and thus a higher resonance frequency. Every ring is an open loop antenna. Such an open loop antenna has the property to have a parallel resonance as first resonance at the open ends. This is optimal suited to be connected to a high impedance driver system like the Tesla coil. Let us call the smallest ring, the first ring and so forth. The first ring is parasitic coupled with the second ring. The second ring is further coupled to the third ring and so further. In this way all rings are finally parasitic coupled to the largest ring. This parasitic coupling to the largest ring decreases the natural resonance frequency of the outer ring. So it is not sufficient to take the natural frequency of the outer ring to determine the lowest operating frequency but one has to take the loading of the other rings into account. Another loading effect is present and that is the method of connecting the outer ring to the Tesla coil. This can have a very large influence on the lowest frequency. Moreover, in some models, a special T fixture is used. Here the internal stray capacitance is a major contributor to the resonance frequency of the outer ring. Since all the rings have a different diameter and as such different resonance frequencies, the combination of them makes a wideband antenna. Once the highest frequency limit of the antenna is reached, radiation is taken over by the Tesla coil itself. The Tesla coil is a helical antenna which reaches maximum efficiency once the wavelength reaches the dimensions of 3 times its diameter. For even higher frequencies like in the visible light zone or infrared, the energy is radiated by the antenna once the spark gap is aligned to make “effluvia”. The rings are not filled with noble gas but contain atmospheric air.
The antenna and its fixture are designed so that the orientation is adaptable. The possibilities are:

- Changing the height of the antenna
- Changing the closed part of the outer ring to down- or upside
- Change the antenna to vertical or horizontal position

We found antennas constructed in aluminium, like in the BV1 and BV3 machines and an antenna constructed with different metals like the BV2 antenna. All the antennas that Boris Vassileff used have roughly the same dimensions, 50 cm outer antenna ring. Only the last model made and US adopted antenna models having larger dimensions, with 62 cm outer ring.
The antenna rings are suspended with silk threads and are tuned for broadband frequency response.
Besides the electromagnetic resonances, the metal rings have also an acoustical behaviour: if tapped, they make a sound that depends on material and size of the individual ring. The aluminium rings, the big ones, produce a fairly clean “bell” sound.
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Multi-metal antenna BV2 MWO

Dimensions of Multi-metal antenna BV2 MWO

Material Antenna	Antenna Diam (centre to centre) [cm]	Tube Diam [mm]	Diam ball [mm]	Material Balls	Distance balls [mm]
Cu	50	13.5	20	Cu	76
Cu	41	12	18	Cu	22
Brass+Cu layer	34	10	15.5	Cu	47
Cu	28	8	14	Cu	20.5
Alu	23.5	6	12.5	Cu	24
Alu	20	6	12	Cu	19
Cu	15	5	9.8	Cu	8
Cu	10.5	5	9.8	Cu	8.5
Alu	9	4	8.5	Alu	7
Alu	6	3	7	Alu	6.5
Alu	3	3	7	Alu	6
Alu	1.7	3	7	Alu	2

Aluminium antenna BV3 MWO

Dimensions of Aluminium antenna BV3

Material Antenna	Antenna Diam (centre to centre) [cm]	Tube Diam [mm]	Diam ball [mm]	Material Balls	Distance balls [mm]
Alu	50	14	T-part	Alu	T-part
Alu	40	12	18	Alu	17
Alu	32.5	10	16	Alu	11
Alu	27	8	14	Alu	8
Alu	22.5	7	13	Alu	12
Alu	18	6	11	Alu	6
Alu	14.5	5	10	Alu	7
Alu	11	5	8	Alu	9
Alu	8	3.5	6.5	Alu	6
Alu	5.3	3	6	Alu	4
Alu	3.2	3	-		2
Alu	1.5	3	-		2

3.1.4 Tesla coils

The coils are slow wave helical resonators and cannot be seen as an electrical lumped component. This should be obvious since the current or voltage distribution along the coil is not uniform. The phase propagation velocity of such a helical resonator is dispersive, this means that lower frequencies are propagating slower along the coil then higher frequencies.

Tesla found an amazing gain in such a "coil" due to the standing waves if the electrical length of the "coil" approaches 90 degrees (λ /4), [US Patent 645,576; Applied for Sept. 2, 1897]. The voltage gain is only dependant on the voltage standing wave ratio (VSWR):

Vsecundary = S × Vprimary, where S is the voltage standing wave ratio.

The lumped component model is only valid if the current is constant over the complete coil; this is when the electrical length is short, below 15 degrees. Tesla said the "coil" should be having an electrical length of at least 75 degrees for providing sufficient gain.

K.L. Corum and J.F. Corum [Corum1] [Corum2] have published formulas to calculate the axial propagation factor from coil dimensions like diameter, length, number of turns, wire diameter and operating frequency. For these we can further calculate, for the first resonance frequency, the wavelength and electrical length of the coil.

$\lambda = 2 \times PI / \beta$ [m]
$\theta = 57 \times \beta \times H$ [º]
β [rad/m]

We found that the actual wavelength in the coil is between 2 and 3 meters for a frequency of 950 kHz. This is the effective wavelength that propagates through the coil. This is 100 times slower compared with free space propagation.

Secondly, the electrical length of the coils is around 30 degrees. This is far below the 75 degrees of which Tesla defined as a minimum.

We can conclude from this that the coils are not operating in the “Tesla mode” and Georges Lakhovsky designed these coils for a much lower gain. This was possibly done to reduce Corona effects at the transmitter antenna.

3.1.4.1 Transmitter coil BV1

Transmitter coil BV1

Parameters

Coil holder:

Length = 358 mm
Diameter = 100 mm
6 mm thickness

Primary coil:

Length = 26 mm
5 windings, 2 mm between windings
Tap = 3.75 windings
Clockwise direction
3 mm lacquered wire
Inductance = 4 μH (measured at 1 KHz, current on the coil is uniformly distributed)
6 mm between primary and secondary

Secondary coil:

Length = 280 mm
206 windings, no spacing
Clockwise direction
1.3 mm cotton isolated wire
Inductance = 1.342 mH (measured at 1 KHz)
DC resistance = 2.65 ohm (This is for 0 Hz)

The connection detail of BV1 TX coil:
The ground node is the *end point* of the primary (different than in BV2 MWO)

3.1.4.2 Receiver coil BV1

Receiver coil BV1

Parameters

Coil holder:

Length = 334 mm
Diameter = 100 mm
6 mm thickness

Primary coil:

Length = 60 mm
7 windings, 5.5 mm between windings
Clockwise direction
3 mm lacquered wire
Inductance = 5.2 µH
2 mm between primary and secondary

Secondary coil:

Length = 246 mm
219 windings, no spacing
Clockwise direction
1.0 mm isolated wire
Inductance = 1.684 mH
DC resistance = 1.6 ohm

3.1.4.3 Transmitter / Receiver coils BV2

The coils are interchangeable to each other In the BV2 MWO model; they have exactly the same design. In the picture below the coils are seen disassembled.

In the following table the coils parameters are summarized:

Parameter	Coil #1	Coil #2
Former diameter, mm	100	100
Former material	Bakelite	Bakelite
Primary turns	7	7
Primary wire diam.	2,5	2,5
Primary wire type	bare copper	bare copper
Primary tap #	1 ¼	1 ¼
Turn centers space, mm	4,5	4,5
Primary length, mm	37	37
Secondary turns	237	237
Secondary wire diam.(copper), mm	0,6	0,6
Secondary wire diam.(total), mm	1,2	1,2
Secondary wire type	copper+cotton	copper+cotton
Secondary length [mm]	304	304
Secondary inductance, calcul.[uH]		
Secondary inductance, meas.[uH]		
Overall holder length [mm]		

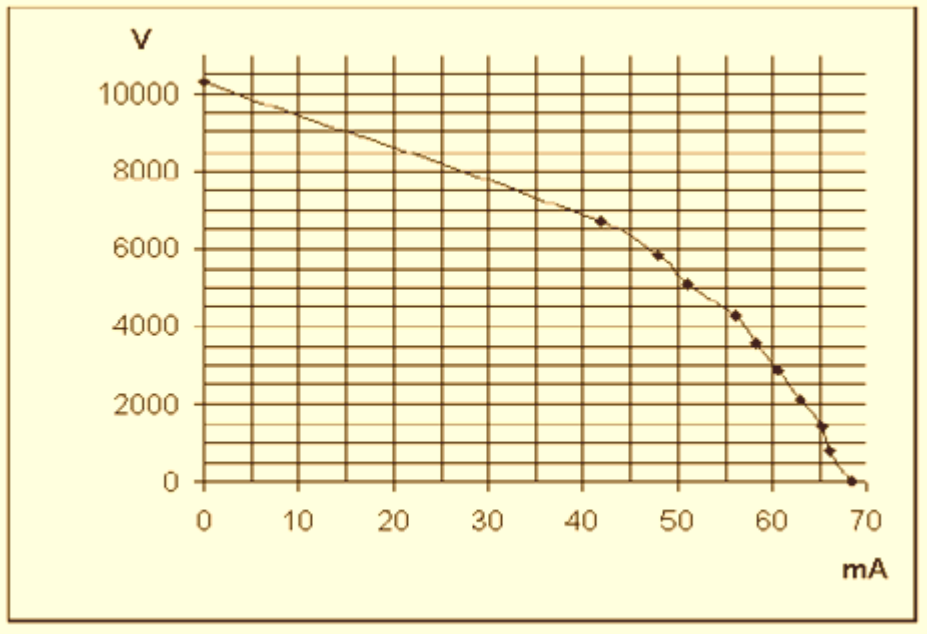
Secundary coil inductace: 1.61 mH
Primary coil inductance: 3.9 µH

The connection diagram of BV2 coils is *different* from BV1 MWO.
The *common point* between primary and secondary is the ground node.

3.1.5 High Voltage Transformer / Ballast

The High Voltage Transformer supplies the current to the tank capacitors. It is a current source. This type of transformer is designed to be operating in short circuit conditions. In the drawing below the characteristics of a modern High Voltage transformer suited for this application can be seen.

Voltage / Current graph of modern HVT



Once the spark gap is behaving as a short circuit, full current is delivered to the tank capacitors. The tank capacitors are storing energy while the voltage across them increases and current drawn from the HVT is decreasing. This can be well understood looking to the above graph. The final voltage that will be reached on the tank capacitors is depending on the spark gap distance. However other parameters like the composition of the atmospheric air, pressure and temperature have their impact on the voltage where the spark gap “fires”.
The high voltage terminals of the transformer are directly across the spark gap. This can be very destructive for the HVT since high frequency “spikes” that are generated by to spark gap on/off switching can enter the secondary HVT windings and might surpass the maximum current or voltage allowed. For this reason two inductors are placed between the spark gap and the high voltage transformer terminals.
For safety, usually the metal frame of the HVT is attached to the ground of the MWO which is further connected to safety ground.

To be able to control the output power of the MWO it is required that the short circuit current can be adapted. One solution to obtain this is to put extra inductance in series with one of the windings of the HVT. If this is done at the secondary side, relative high inductances are required that can handle high voltages. Making high

inductances require large physical sizes. However the same effect can be reached by using an inductor at the primary side. In this case a lower inductance and thus lower physical volume can do the same work. This is because the inductance can be virtually seen at the secondary but multiplied by the square of the transformation factor.
A ballast inductor is used to provide different output powers which have several inductors in series that can be switched out or in by the “intensity” switch at the control panel. So once selected for example to the highest value of ballast inductor (intensity 1), the tank capacitors are more slowly loaded with energy but for the same spark gap setting they still load to the same energy level compared with intensity 2 or 3. It only takes longer.
The output power of the MWO is directly proportional with the impulse rate of the damped waves. This is exactly what the ballast changes.

3.1.5.1 Transformer BV1

The High Voltage Transformer of BV1 has two windings in series at the primary side, one for 110 Volts and one for 220 Volts. At the high voltage side there is are two windings in series. The metal core is grounded.

Voltages

Measurements at the 220V connection (unloaded):

22 Volts primary gives 840 Volts secondary; voltage ratio 38.18

Measurements at 110V connection (unloaded):

10.1 Volts primary gives 780 Volts secondary; voltage ratio 77.22

=> The two input connections generate the same secondary output voltage

Primary inductance = 65.3 mH (220 V connection)

Secondary voltage = 8400 Volts
R secondary (DC) = 10.4 kOhm
Secondary inductance = 675 H

Currents

Short circuit current measured with primary voltage to 220V tap:

Primary = 230 Volts, I secondary = 65 mA
Primary = 175 Volts, I secondary = 45 mA

Short circuit current measured with primary voltage to 110V tap:

Primary = 110 Volts, I secondary = 65 mA

3.1.5.2 Transformer BV2

The HV transformer is shown in the above picture (Black, on the right). The ballast is the iron-cored, transformer-like component on the left. The HVT was measured feeding its primary (AB and AC terminals) with a 50 Hz, low voltage sinusoidal generator: with 3.57 V at the primary, the open circuit secondary voltage was 200 V, so that the voltage ratio is calculated as 200/3.57= 56. Since the BV2 MWO was native at 110 Vac, the secondary voltage nominal is: Vsec=110*56 = 6160 V

Other intermediate primary taps are present, but are unconnected. Therefore, their purpose, if any, was to increase the secondary voltage. This configuration was not tested.
The DC resistance of the HVT secondary is 1.5 kOhm. The ballast has two taps. The “Intensity” knob switches the ballast taps in the three configurations: I, II, III. The following table summarizes the measured data.

BV2 Ballast tests			
"Intensité"	I	II	III
Ballast Inductance [mH]	19,3	5,22	0
HV short circuit current [mA]	33	56	80

3.1.6 Spark gap design and history

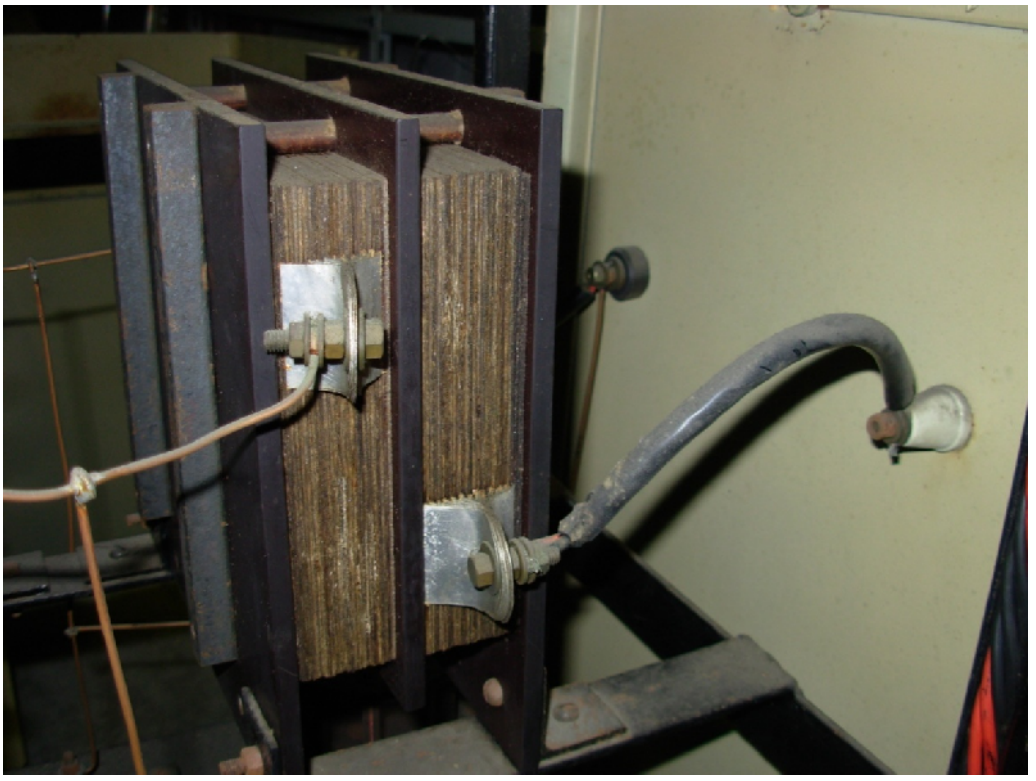
The spark gap is one of the important components in the MWO. Sufficient surface area is required for the electrodes since quite a lot of current has to be switched on and off. Other important requirements are low acoustical noise production and the ability to switch off after the “first burst” of the power is passed to the secondary of the Tesla coil. The electrodes should be resistant to wearing and in all MWO’s found Tungsten is used. We have found two different constructions; the “V” shape design used in most of the models and the “Duflot” design in which the electrodes are in line. The V-type is an interesting and very clever design that has many useful features: namely:

- The oblique gaps position works as an additional mechanical reduction that allows for increased precision of position adjustment.
- The parallel tungsten bar gaps provide a large gap surface, thus improving heat conduction, and low inductance.
- The large tungsten-brass bulk contact surface allow optimal heat conduction for dissipation

- The “stator” brass blocks screws can be easily loosened, the parallelism can be then adjusted, and screws can be fastened again, much easily.

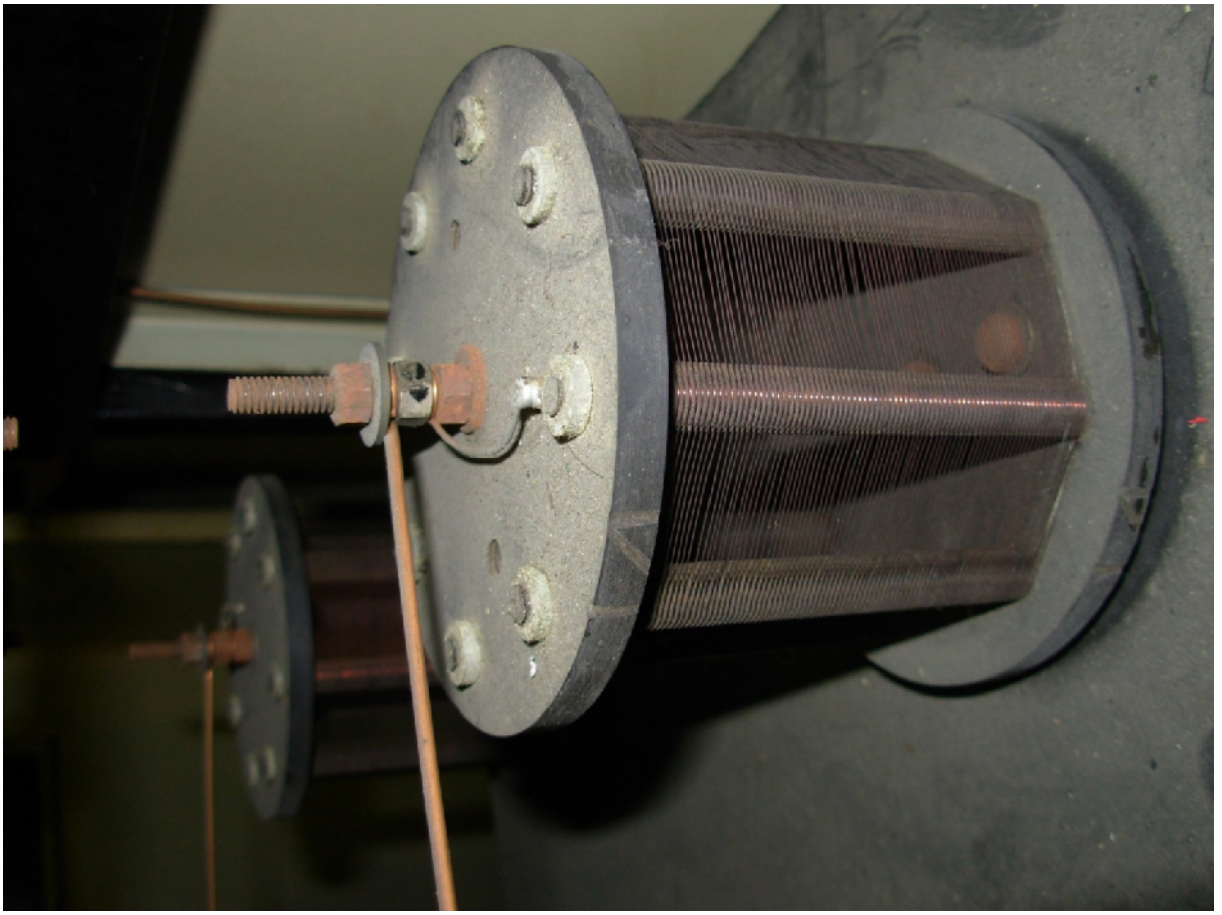
The Duflot spark gap was adopted too, in a following phase: probably the V-type spark gap cost was quite high, so probably C.O.L.Y.S.A. did consider the outsourcing of this component. Some more details of the story of the V-type spark gap can be found on the letter of a G.L. co-operator, later in this Book, in the section “Miscellaneous curiosities and open questions”

3.1.7 Tank Capacitors



The tank capacitors are heavy duty capacitors designed for switching purpose. Once the spark gap “fires”, the capacitor is short circuited and a large current is drawn through it. The capacitors should have low self inductance and loss to provide maximum output power at a fast rate.
The original C.O.L.Y.S.A. tank capacitors are multi-layer, mica insulated, flat capacitors. To keep the self inductance low, the individual metal plates are all routed outside of the capacitor pack and connected all together.
Two thick Bakelite plates are placed at the opposite end of the sandwich, in order to keep it strongly pressed by means of four screws, in order to avoid the presence of internal air bubbles that can cause internal corona and corrosion of the material.
The BV2 capacitor measured capacity is 18.4 nF. The equivalent series resistance (ESR), measured at 1 MHz, of the two tank capacitors is 0.7 / 1.4 Ohm respectively.

3.1.8 Protection filter



As discussed before in the section of the HVT; the high voltage transformer requires protection for the generated high frequency “spikes”. One solution is to provide inductors between the spark gap and the secondary terminals of the HVT. This high frequency inductor has a relative high self resonance frequency so that substantial impedance is seen by the high frequency spikes.
In the BV2 MWO the inductors are 426 µH each, single layer, air coils wound on a holder (see photo above). This type of winding allows minimizing the stray capacitance, while retaining a good turn-to-turn insulation. The DC resistance is 13 Ohm.

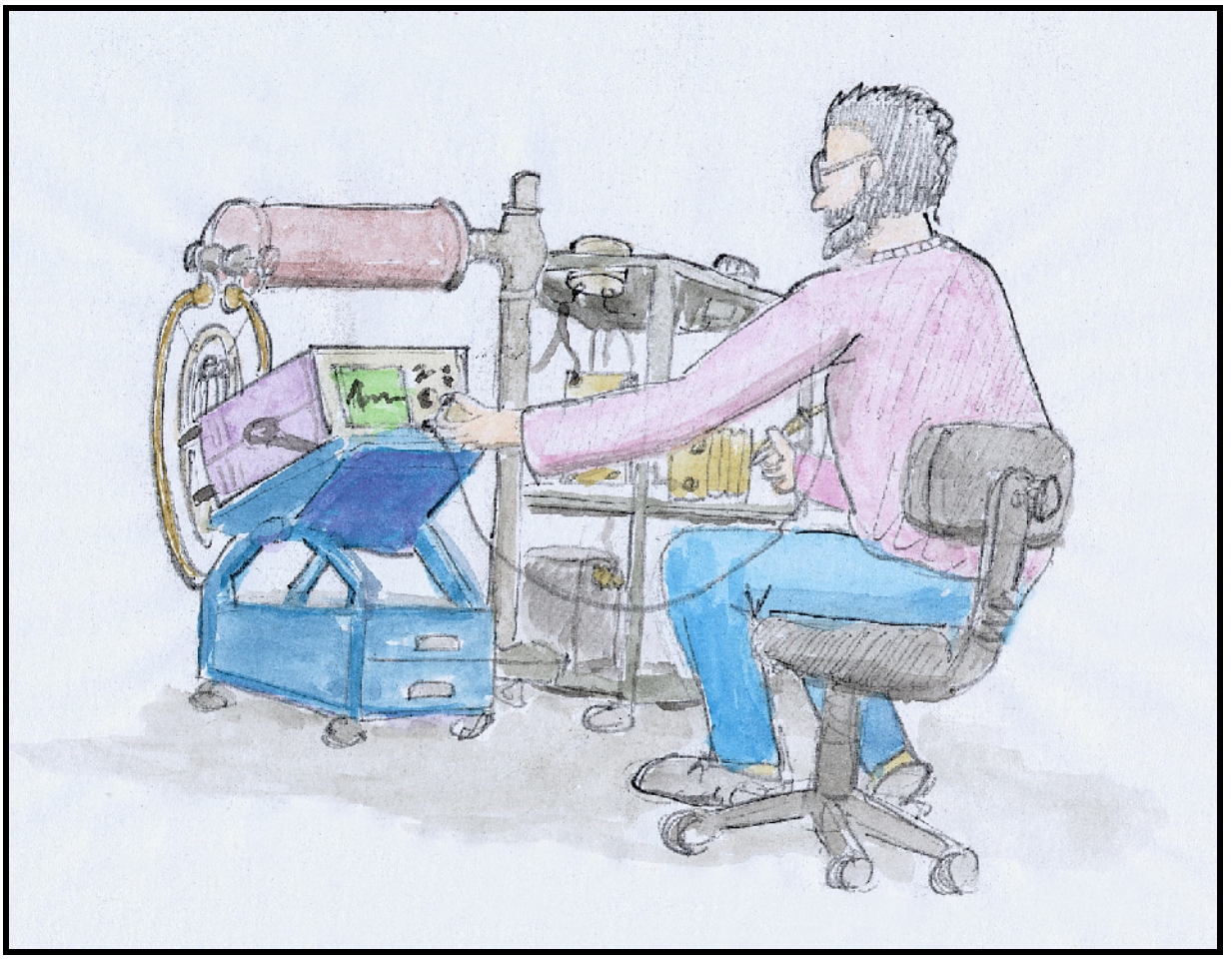
3.1.9 Boost capacitor

A natural place to add a *filter* capacitor would be across the HV transformer secondary. Instead, strange enough, in the MWO schematic such capacitor is placed across the spark gap. Why is this done this way?
Trying to answer this question, the first reasonable reason we could find was the following: since the Tesla Coil primary is -indeed- inductive, once the spark gap fires, the tank capacitors charge cannot abruptly discharge over the gap, due to said inductance in series to it. Therefore, the inrush current is limited and the spark could be somehow aborted. To sustain the first phase of the spark, the designer has probably inserted that “boost” capacitor in that place.
But was that the whole story?
Another possibility came up. From investigations in the past about the physical effects of spark gaps it is found that if there is too much inductance in the series circuit: spark gap – tank capacitors – primary Tesla coil; energy transmitted to air gasses is strongly suppressed. This circuit acts too slowly in delivery energy for fast heating the air gasses.
In three interesting ancient documents [Hemsalech1] [Gramond1] [Hemsalech2] it has been noted that while in an electric spark the spectroscopic emission of the constituents elements of the gap are present, the spectra of gasses in the gap are *not* present *if* the gap series inductance is too high.
Accordingly, the inductance of the primary of the Tesla coil In the MWO would suppress the important radiated energy of the “air” gasses.

To generate “air gases spectra”, then, we need a fast heating of the air in the spark gap. This is done by a fast and short delivery of energy burst by the boost capacitor(s) placed in parallel with the spark gap to minimize inductance and to create a fast reactive circuit.

4 Laboratory measurements on original MWO's

Researcher "back engineering" the C.O.L.Y.S.A. MWO



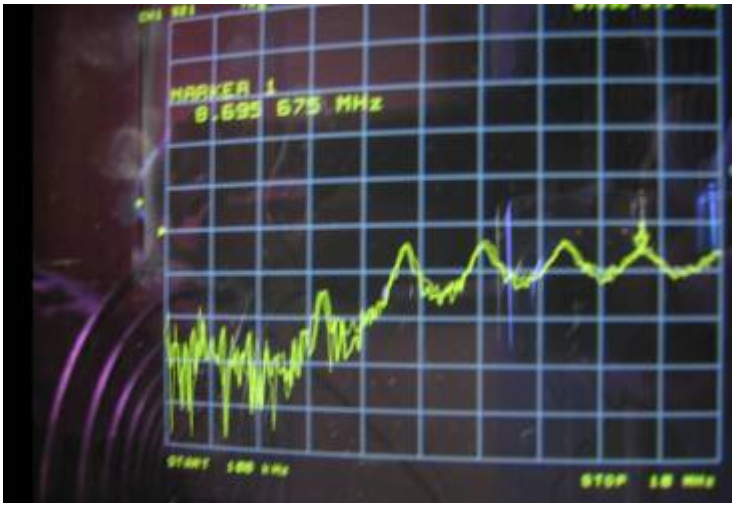
4.1 Measurements on BV1 MWO

4.1.1 Coil resonances

4.1.1.1 Resonances of transmitter coil BV1

This measurement is done with the primary connected to the generator part of an RF network analyzer (NA). The receiving input of the NA is connected to a small measuring loop antenna that receives magnetic induction field generated by the Tesla coil. The response is recorded to 10 MHz, see below picture.

Amplitude/frequency response of BV1 transmitter coil



We can see the response of a high pass filter.

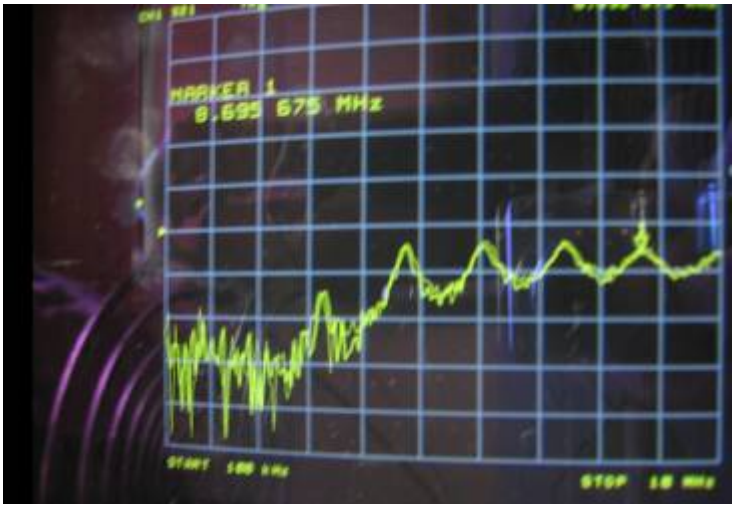
Frequencies:

Mode	MHz
Fundamental	1.595
First overtone	3.567
Second overtone	4.941
Third overtone	6.19
Fourth overtone	7.5
Fifth overtone	8.7

4.1.1.2 Resonances of receiver coil BV1

This measurement is done with 3 temporary windings around the original coil which are further connected to the generator output of the network analyzer. The NA receiving input is connected to a measuring loop antenna that receives the magnetic induction field generated by the Tesla coil. The cable that attaches the Tesla coil with the MWO is connected to the ground of the network analyzer. The amplitude/frequency response is recorded to 10 MHz.

Amplitude/frequency response of BV1 receiver coil



Frequencies:

MHz
3
4.4
5.6
6.8
8.1

4.1.2 Acoustic resonances of antenna rings

The antennas of the BV1 MWO are fabricated in aluminium. There has been made an effort to map the acoustical sound of these antennas with a piano. The different rings are not only tuned for a certain electromagnetic frequency range but also for acoustical sound.

BV1 antenna

The first five rings where identified as:

Ring#	Tune
1	Bb (4th octave)
2	D
3	G
4	A
5	C

4.1.3 System resonances

4.1.3.1 BV1 Transmitter System resonance

Analysis of the transmitter system resonance of BV1 has been done. These measurements are done in conducted mode with the Tesla coil and antenna connected.

Measurement set up #1: The spark gap is open and 3 temporary windings around the Tesla coil are connected to the generator of a network analyzer. The NA receiver input is connected to a measuring loop antenna that receives the magnetic induction field from the Tesla coil.

Measurement set up #2: The spark gap is closed and a temporary current transformer is placed around one of the connection wires to inject the signal. The NA receiver input is connected to a measuring loop antenna that receives the magnetic induction field from the Tesla coil. The transmitter antenna is removed.

- Measurement of the primary resonance:

Set up #2
Primary natural resonance frequency = 932 KHz BW = 50 KHz (Q=18.6)

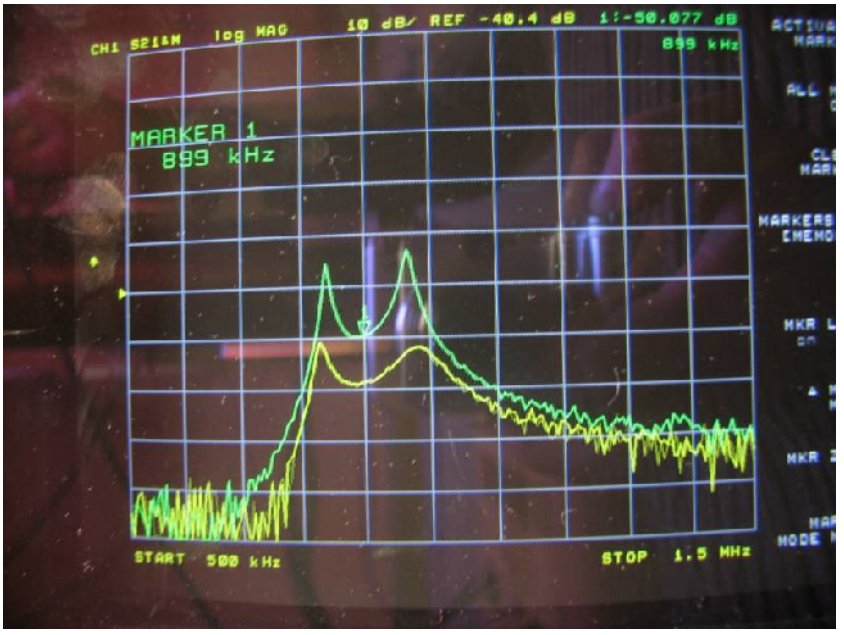
- Measurement of secondary resonance:

Set up #1
Secondary natural resonance frequency = 881 KHz BW = 20 KHz (Q=44)

- Measurement of band pass response when spark gap fires

Set up #2

System resonance BV1 transmitter



Yellow cure = BV1 MWO
Green curve = reference curve

Lower resonance frequency = 840 KHz BW = 20 KHz (Q=42)
Higher resonance frequency = 983 KHz BW = 50 KHz (Q=19.7)

The lower resonance frequency is the secondary natural resonance frequency (natural resonance at 881 KHz) that is pushed downwards (antenna side). The highest quality factor (Q) has been found at the lower frequency side. This is because the used tank capacitors have relative high loss and reduce the quality factor at the higher frequency side.

4.1.3.2 BV1 Receiver System resonance

This measurement is done with temporary 3 windings around the original Tesla coil which are further connected to the generator output of the network analyzer. The NA receiver input is connected to a measuring loop antenna that receives the magnetic induction field generated by the Tesla coil. The cable that attaches the Tesla coil with the MWO is connected to the ground of the network analyzer.

Different evaluations

5 meter cable connected to the network analyzer ground

Resonance frequency = 795 KHz BW = 10 KHz (Q=79)

1 meter cable connected to the network analyzer ground

Resonance frequency = 795 KHz BW = 10 KHz (Q=79)

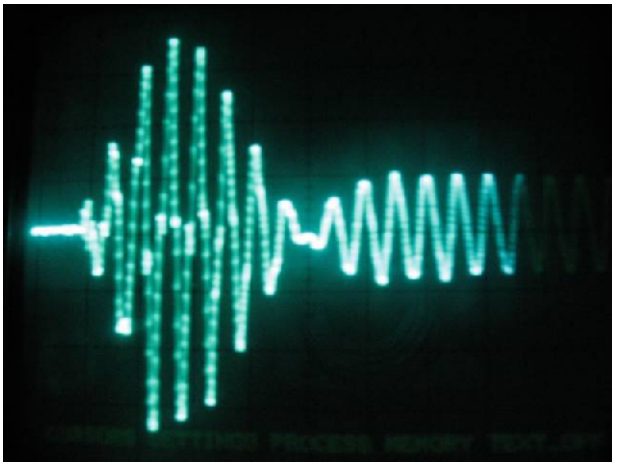
The cable for the ground connection has no influence on resonance frequency.

4.1.4 Waveforms

Analysis of BV1 in the time domain

The electric field is measured at a distance of 10 meters from the MWO. The receiving antenna is NOT in position.

BV1 Electric field in the Time domain



Measurements:

Envelope frequency = 125 KHz, 5 cycles of 950 KHz in “first burst”
First burst time = 8 µsec
Calculation of coupling factor:

Coupling factor = amount of RF cycles to first notch = F envelope / F resonance

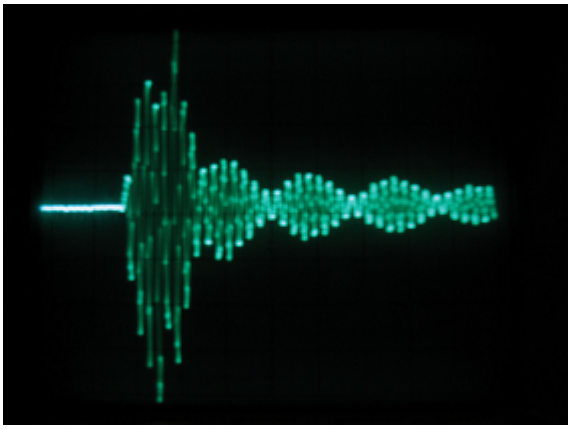
- Coupling factor = 0.13

Notice the 180 degree phase shift after the first burst.

There is one burst of 8 µsec during which the spark gap is open and energy is transferred to the secondary of the coil and the antenna. The longer part after the burst is the “consummation” of energy by the secondary and the antenna; spark gap is closed in this period.

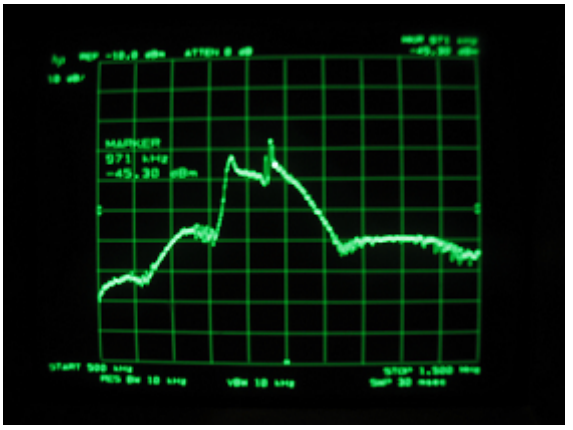
The electric field is measured at a distance of 10 meters from the MWO with a measuring antenna. The MWO receiving antenna is in normal “Lakhovsky” position.

BV1 Electric field in the Time domain



Left=860 KHz

BV1 Electrical field in the Frequency domain



Right=960 KHz

After the first burst and energy transfer to the secondary of the coil and antenna, energy is exchanged between the transmitter and the receiver coil / antenna.

4.2 Measurements on BV2 MWO

In this section we report the methods adopted to measure the RF behaviour of the BV2 MWO, and the results we have obtained.

The reader will notice that the methods adopted here are not exactly the same as in the previous section (BV1 measurement). The main reason for that is that this set of measurements has been performed by a different person, Bruno, with different laboratory instruments. We decided not to conform 100% each other and to try somehow different measurement approaches, still being all equally worth. Indeed, the measurements are basically equivalent and can be easily compared to see differences, if any, between the different C.O.L.Y.S.A. MWO models.

4.2.1 Antennas resonances

The resonances of these ancient MWO poly-metallic antennas have been measured by means of a spectrum analyser (Takeda TR4172) with internal tracking generator.

The tracking generator output was connected to a wideband bi-conical antenna (Schwarzbeck UBA9116, range: 30-1000 MHz). This antenna was placed (photo) 30

cm behind the MWO antenna. In order to excite the ring resonances with electrical field component, the biconical antenna was set in horizontal position.
The spectrum analyser input was connected to a receiving Close-Field probe ("sniffer"). Two different sniffers were used:

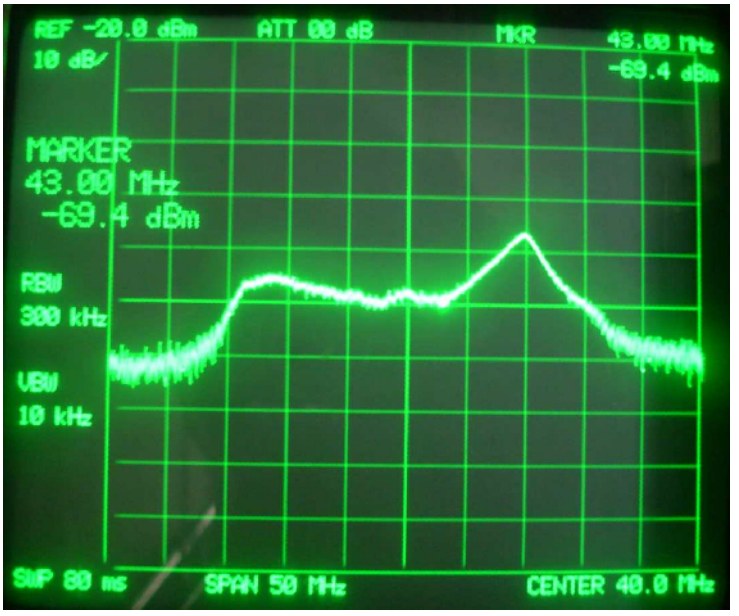
- A HP11941A (9 kHz-30 MHz), and
- A HP11940A (30 MHz-1 GHz).

The high-band sniffer was used from 1GHz down to 100 MHz, below this point the low-band sniffer was used instead, in order to have a higher sensitivity (though less level accuracy; here just frequency was to be measured, not amplitudes). The MWO coil was grounded from the relevant socket to the instrument GND.
All the rings were first scanned from beyond with the selected sniffer, looking for individual resonances (peaks).

The following resonances have been identified:

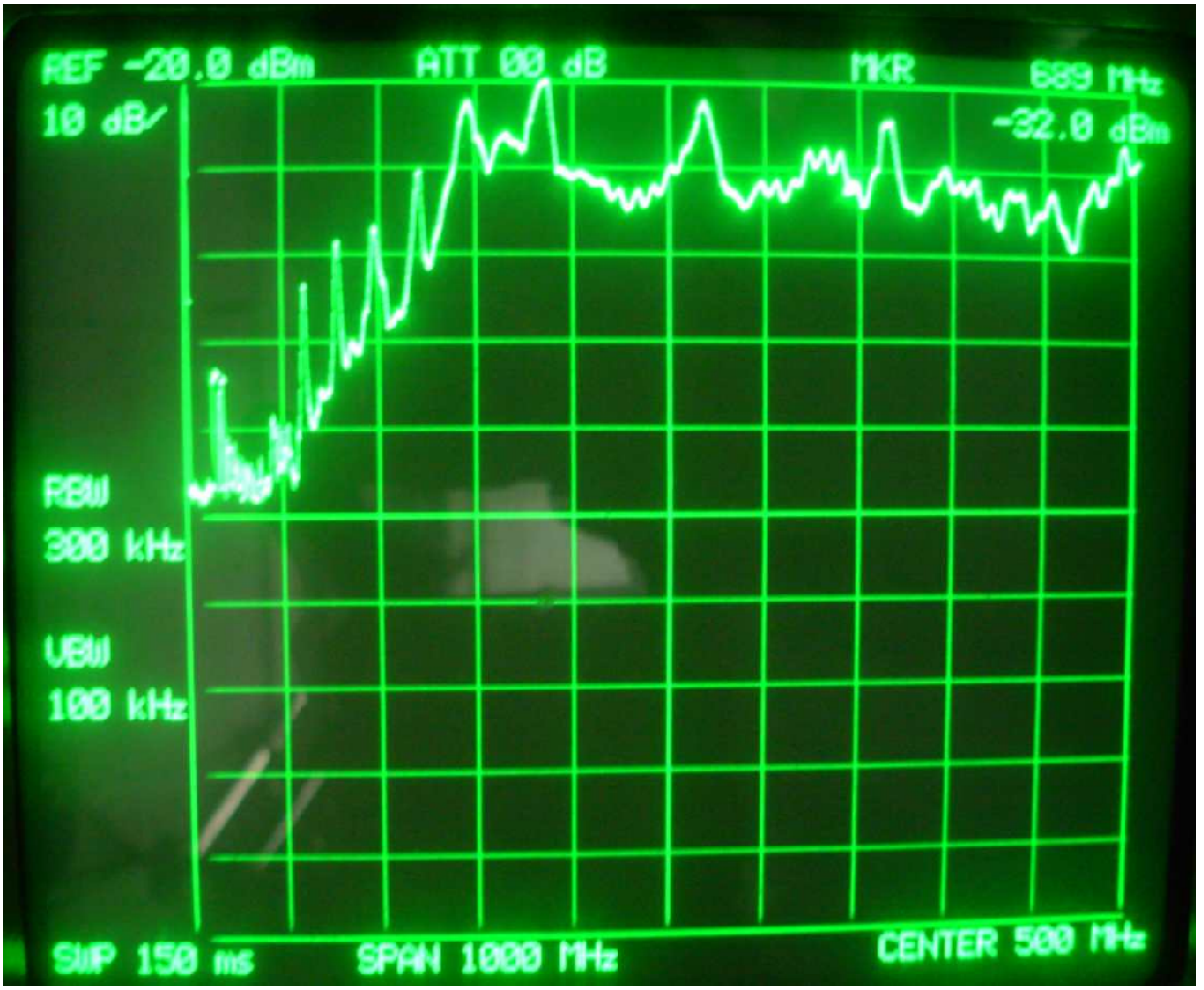
26-49 MHz (distributed pass band, with peak at 49 MHz)
122 MHz
156 MHz
196 MHz
240 MHz
295 MHz
349 MHz
373 MHz
... (Difficult to resolve)
530 MHz
... (Difficult to resolve)
730 MHz
1.26 GHz
...

The first resonances (26-49 MHz) are sort of melted resonances, forming a distributed pass band. However a clean 49 MHz peak is present (see figure).



Higher resonances are well defined, until about 400 MHz. At high frequency the individual ring resonances overlap with higher overtones of larger rings: as a result the peaks are difficult to resolve (see below).

Next, a panoramic view of the whole response across the whole 0-1 GHz band was desired, so the spectrum analyzer was set in *peak-hold* mode and the sniffer probe was slowly passed across the horizontal diameter of the MWO antenna, at 2 cm distance from it. The resulting trace is shown in the following image.



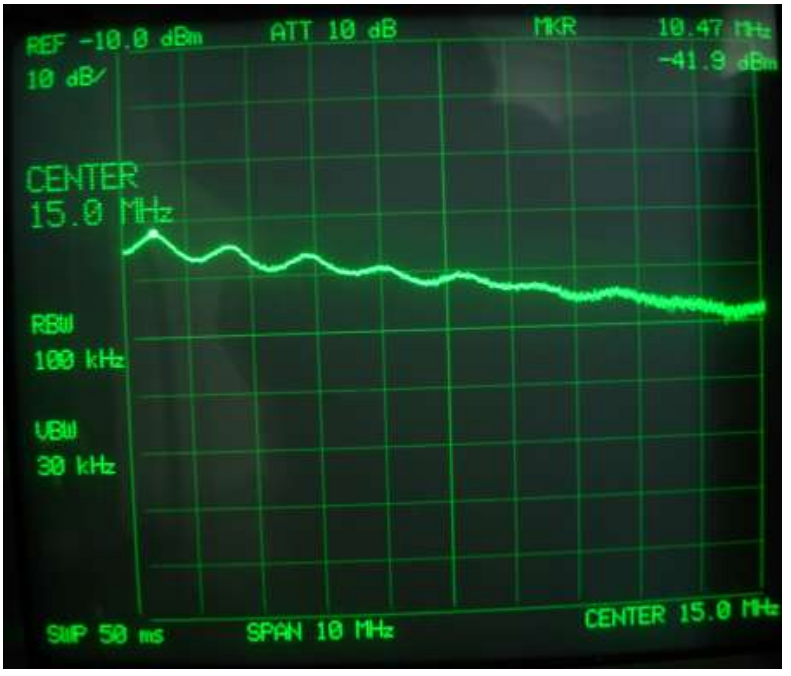
All the above listed resonances can be easily recognized in this image. The unresolved ones as can be seen form a wide distributed pass band. By the way the 0.75 MHz Tesla Coil resonance is visible too.
(The low edge of the spectrum has a lower level since both the high-band sniffer probe and biconical antenna has lower gain (antenna factors) for this frequency range).

4.2.2 Coils resonances

This section is devoted, as title says, to coil resonances. However, as the reader will notice, the *antenna resonances too* are visualized.
Yet another method was used here: the spectrum analyzer's tracking generator was connected *directly to the coil primary*, and the sniffers, HP11941A or HP11940A according to the frequency range, were passed across the antenna horizontal diameter, as done before.

At frequencies lower than about 40 MHz, the frequency response is dominated by the coil's behaviour.
In the 0-10 MHz range (see figures for Coil1 and Coil2) well defined resonances are visible. The fundamental is about 0.75 MHz, the overtones are: 3.1, 4.4, 5.7, 6.9, 8.2 and 9.3 MHz.

Mode	MHz
Fundamental	0.75
1st overtone	3.1
2nd overtone	4.4
3rd overtone	5.7
4th overtone	6.9
5th overtone	8.2
6th overtone	9.3



In the 10-20 MHz range the resonances become less pronounced, and tend to vanish.

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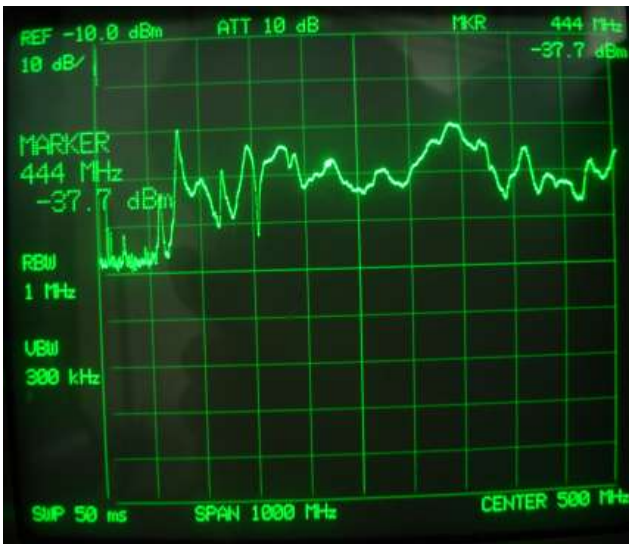
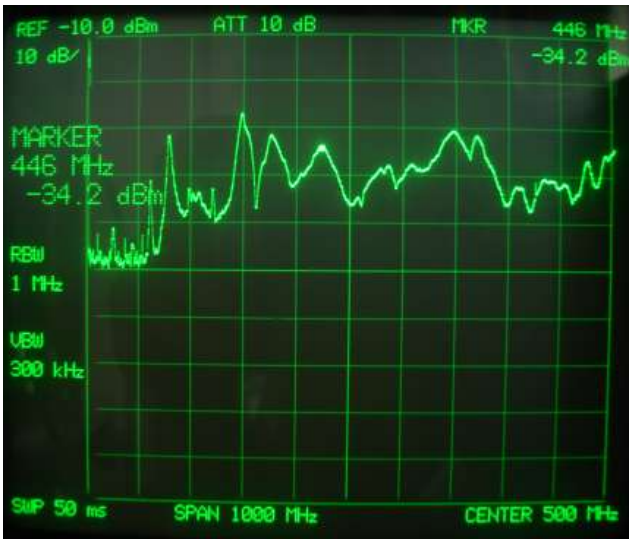
Coil1+ Antenna1 Coil2 + Antenna2





At frequencies above 40 MHz, the frequency response is dominated by the antenna behaviour.
In the two photos above the panoramic view of the whole response across the whole 0-1 GHz band is shown for Coil1/Antenna1 (left) and Coil2/Antenna2 (right). As with the method used in the previous section, the spectrum analyser was set in *peak-hold* mode and the sniffer was slowly passed across the horizontal diameter of the MWO antenna, at 2 cm distance from it. As it can be seen, the two frequency responses are not perfectly the same, most likely due to mechanical tolerances, resulting in slightly different behaviour.
One could expect a frequency response of a low-pass response because the secondary inductance is in series. However the secondary of the coil acts as a High Pass filter. This is due to the turn-to-turn capacitance which shunts the signal. The result is that the signals travel in the *longitudinal* direction partially through turn-to-turn capacitance, high-pass frequency response.
The photos show an interesting thing: while in the lower frequency range, under about 100 MHz, the attenuation went down to -50 dB (with respect the Reference Level), the overall frequency response rises again above 150 MHz (High Pass response, as mentioned before): from that point on, the resonances are the ones of the antenna rings and their overtones, since the RF signal passes with negligible attenuation through the secondary coil.

To summarize: with the first method (in previous section) we did illuminate the antenna from behind with an EM field produced by the biconical antenna. The method provides us with information on the *antenna resonances only*.
The *second method* (used in this section) gives us the *cumulative frequency response of Coil+Antenna system*. As described, the High-Pass type response of the coil allows the RF signal to pass through and reach the antenna in the range where it has been designed to operate (from about mid VHF to a few GHz).

4.2.3 Acoustic resonances of antenna rings

The antennas of the BV2 MWO are poly-metallic type. We made again an effort to map the acoustical sound of these antennas with a piano. However, not all the different metals have a “clean” sound. Aluminium has a clear sound but copper and other metals have less.

As shown in the following table, only a few rings were identified:

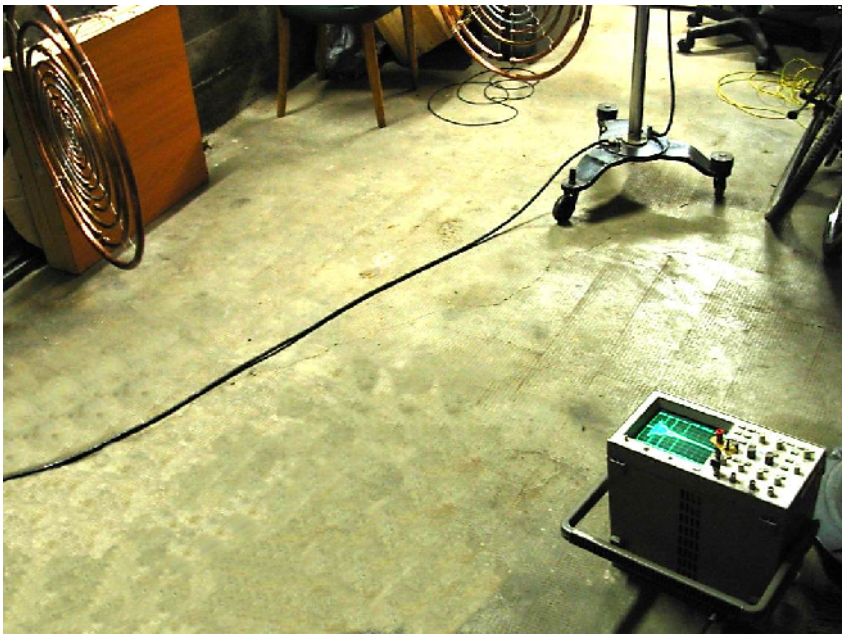
Ring#	Tune
1	??
2	A (4th octave)
3	??
4	??
5	E (5th octave)
6	B (5th octave)
7-12	?

4.2.4 Waveforms

The tests done in the previous sections have been made while the MWO shut off and a stimulus injected by an external instrument.
For the test reported hereafter, the MWO has been switched on, and many waveforms have been gathered by a digital storage oscilloscope HP54601A using a small measuring antenna.
Such an antenna can be:

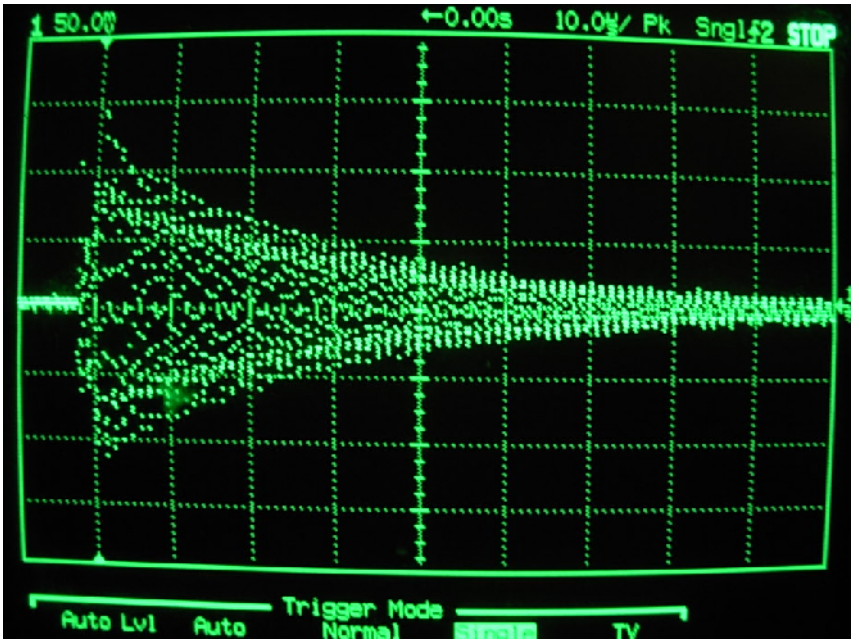
- Magnetic loop (a small, 3 cm diameter, 2 turn loop) or
- Electrical monopole (a 3 cm straight copper wire or cylinder).

Both types have proven to be suitable for testing waveforms, with not much difference in waveform shape. The antenna was inserted at the oscilloscope input; in order to provide a resistive termination, and some attenuation, a pass-through 3dB coaxial attenuator has been inserted at the oscilloscope input. Given the very strong electric field present in the operating MWO area, care must be taken when an electronic instrument connected with a wire is placed in vicinity.



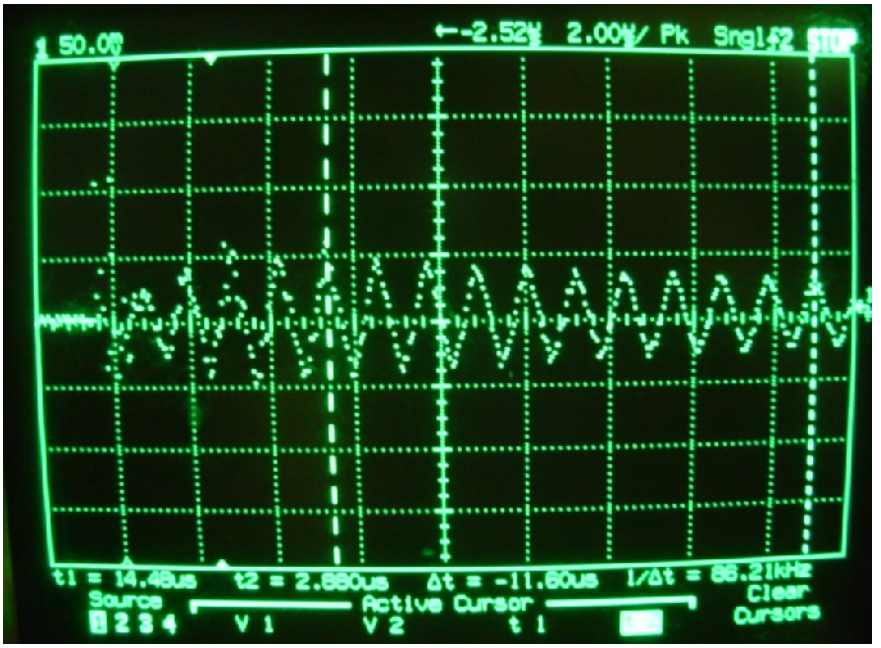
In the first test we placed the oscilloscope at 5 m distance from the MWO. In the following ones we “dare” to move it closer. However, the HP54601A susceptibility for electromagnetic compatibility (EMC) is good. Different electronic devices could be not the same.
I personally decided to put some ferrite clamps on the oscilloscope mains cable to suppress the common mode spikes.
The antenna used was always connected directly to the oscilloscope input, without any extension cables.

As it has been already mentioned in previous chapters, the dynamic electrical behaviour of the MWO depends also on the presence of the RX coil+antenna.
If TX only coil/antenna is present, the energy stored in the tank capacitors is transferred to the secondary of the coil and its terminal capacity (the antenna), back and forth, until dissipation occurs to dump the oscillation. This is easily visible in the following waveforms, taken with no RX coil+antenna connected (and removed far from the room). As it can be seen, in this case the major part of the waveform is similar to a damped oscillation: it is the damped resonance of the secondary inductance with the antenna. The energy here is no longer bounced back to the primary circuit. The exact behaviour depends, as the Tesla Coil



theory teaches us, mostly on the coupling factor between primary and secondary.

In the photo on the right side a waveform has been acquired in the same condition, but the time base was set to look for the carrier frequency. Two time markers are set at 10-cycles distance. The measured 1/dt is 86.2 KHz, so the carrier frequency is 10*86.2 = 862 KHz



Next, the RX coil+antenna have been connected too. As expected, in this case the energy is bounced between TX antenna and RX antenna. The waveform result is a "modulation" envelope on the carrier. Similar to what happens between primary and secondary; here the system is a double-resonator type, where the two resonators are TX secondary+antenna, and RX secondary+antenna.

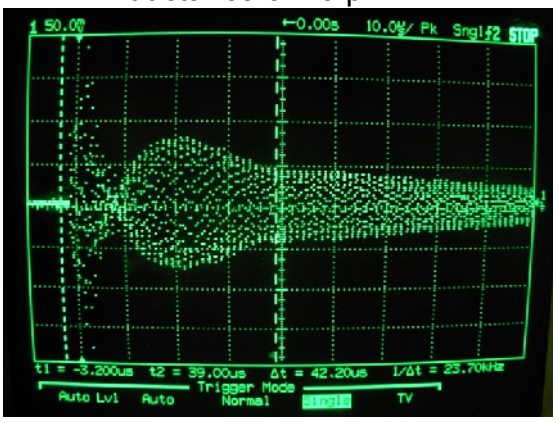
However, the coupling factor here depends on different aspects. Namely:

- The mutual capacitance between TX Antenna and RX Antenna, and
- The "ground wire"[1] impedance to the system ground and the inductance of the system ground

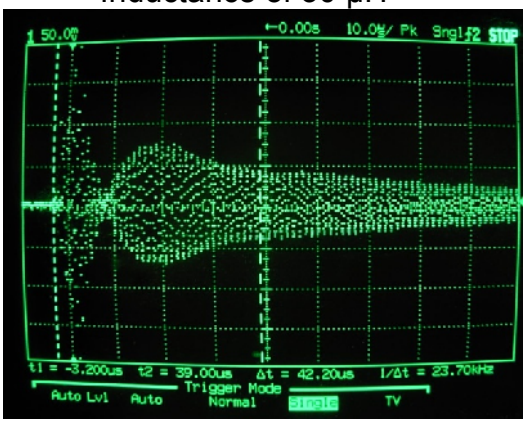
The impact of the impedance of the local system ground became clear to me the day when I was causing interference to neighbours. I made a dedicated system ground much closer to the MWO operating site. Something was changed in my MWO operation. Before the modification, the MWO in operation was able to excite the room fluorescent lights, even if they were switched off. After the modification this effect was no longer happening. So I investigated this effect of changed system ground. I did insert a variable inductance Lv (variometer type) in series between the MWO ground connection and the system ground. Adjusting the knob a remarkable difference could be seen on the time domain waveform of the electrical field. The pictures below of the electrical field waveform reports 4 cases of inductance: Lv = 40 μH, 30 μH, 8 μH, 2 μH.

[1] By ground wire I mean the wire connecting RX coil to TX coil (and MWO ground)

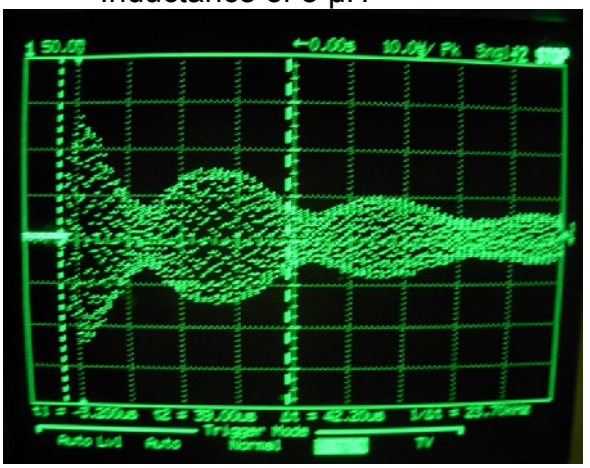
Inductance of 40 µH



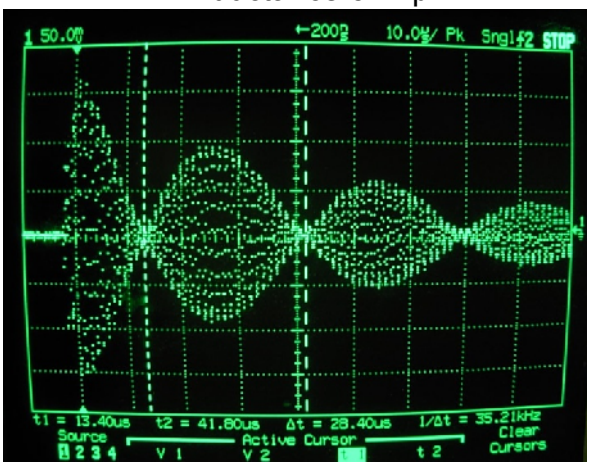
Inductance of 30 µH



Inductance of 8 µH



Inductance of 2 µH



The effect of the decoupling between TX Coil+antenna and RX Coil+antenna is remarkable. When the Lv is fairly large, 30-40 µH, the envelope modulation is greatly reduced. However the effect is smoothly varied while rotating the variometer knob. A “live” demonstration is shown on a short video.
To be noted that in my room fluorescent lights glow again with Lv in the 30-40 µH range, with a peak at 30 µH (probably common mode resonance)

The inductance values mentioned are relevant to the variometer only. The actual inductance would be L = Lv + Lgnd, where Lgnd is my system ground inductance. The latter is unknown, but should be fairly low. The system ground resistance has been measured <<0.3 Ohm, most probably equal to 0.1 Ohm.

Also, the positions where the oscilloscope and the measuring antenna are placed do influence a bit the gathered waveform. The waveforms shown above were gathered about 1.5 m distance from TX antenna, 2.5 m from RX one. But if the waveform is recorded in a point at equal distance from TX and RX antennas, a resulting waveform much less envelope-modulated is found, because it is the superposition of two similar waves, one coming from TX one from RX, the envelope of which are in 180° phase relationship.

Conclusion:

The ground inductance impact on the MWO behaviour has been addressed.
Could the ground inductance impact the MWO effectiveness too?
Could this aspect be the key point that G. Lakhovsky referred to as “soil quality” while reporting different healing effectiveness?
I am not a doctor, I am a radio engineer. I cannot help on this... Hope that this point will be explored and the question could be answered.

4.3 Measurements on BV3 MWO

We made electrical measurements on the "new" Vassileff MWO.
Unfortunately, we couldn't move the device to a laboratory, so we were lack of sophisticated measurement instruments. The measurements were made with portable tools only.

4.3.1 Coil resonances

The coils could not be opened (probably they were glued), so the internal wiring could only be guessed, based on known MWO schematic diagrams. The rear part of the coils has two connection sockets.
If the coil is properly inserted (i.e. Not reversed) in the support, the left socket corresponds to the left socket of the MWO (Ground connection) and the right socket of the coil corresponds to the right socket of the MWO (High Frequency out connection). See picture.

We measured the coil parameters with the inductance meter (and cross checked with the ohm meter).

Primary inductance: 2.24...2.28 mH (depending on coil)
Secondary inductance: 4.5 µH

Then, we measured the resonance frequency, with the MWO turned off (and not grounded[2]).

[2] This is a problem: the most realistic situation would be with ground connected, but unfortunately we did not remember to do it.

The stimulus was provided by means of a Millen Grid Dip meter, linked to the TX coil via a 2-turn loop around the Grid Dip coil, connected to a second 2-turn loop wound around the TX coil (see position on the picture above).
The generated electric field by the antennas was sampled by means of an x10 oscilloscope probe connected to the oscilloscope (HP54601A). The probe tip was simply kept near the antenna, in order to get some signal by capacitive coupling. The generated magnetic field was sampled by a small multi-turn loop, connected to the oscilloscope input.
Obviously no absolute field measurement was done. Instead, the Grid Dip frequency was manually swept to find the maximum electric field (or magnetic field; that was proportional to E-field). The frequency was read on the oscilloscope readout.
The phase relationship between TX, RX and the ground wire has been visualized using three oscilloscope probes, one positioned near the TX antenna, one near the Rx antenna and one near the ground wire, connected to three input channels of the oscilloscope.

The results are:

MWO complete, both TX and RX connected

Spark Gap closed:
Frequency TX = 741 KHz
Frequency RX = 714 KHz
Phase (TX, RX) = 180°
Phase (TX, Ground) =180°
Spark Gap open:
Frequency TX = 745 KHz
Frequency RX = ?
Phase (TX, RX) = 180°
Phase (TX, Ground) = 180°

MWO with only TX connected

Spark Gap open:
Frequency TX=748 KHz

During the tests, we noticed that the RX coil inductance (and resistance) had a non-steady value, suggesting that something could be internally wrong. Once handled to try to open it, without success, the problem had disappeared. The conclusion was that probably a "cold" soldering is present inside this coil. This problem should be fixed someday, by opening the coil and checking it. Since now the coil showed to work, the measurements were continued.

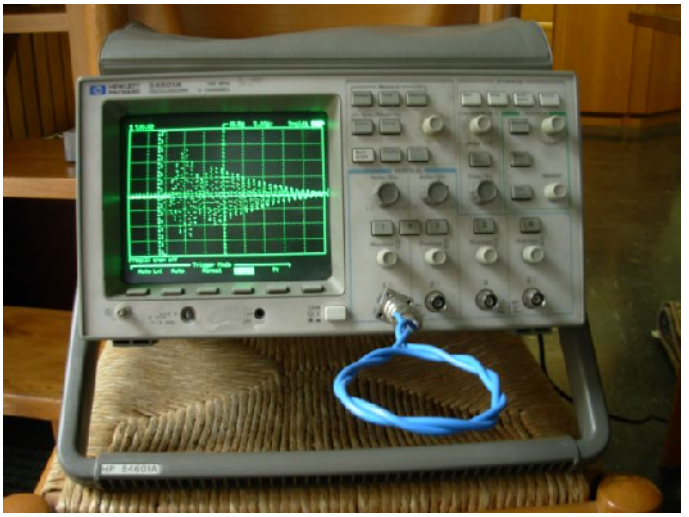
4.3.2 Waveforms

The MWO was eventually moved to the backyard (in order not to damage sensitive electronic devices in the room, due to strong generated E-field). The ground was first

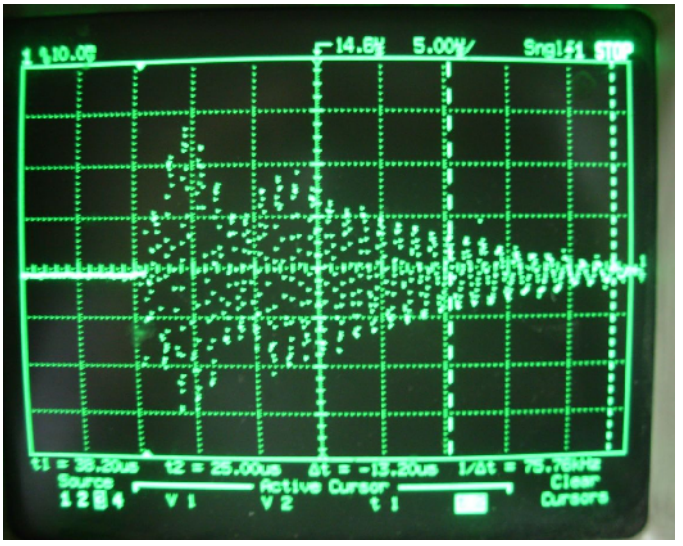
connected and then the MWO mains connection was connected to the 220V.
The MWO worked in the expected way.

Depending on the spark gap setting different lengths of discharge could be drawn from the TX antenna.

The E-field test reported in the Nicola Gentile paper [Gentile1] was repeated. He aligned [Gentile2] the spark gap for 10 cm discharge length. Then, a neon tube of 10cm long with two metallic poles, and fitted in a dielectric 40 cm long handle, was hold near the antennas.
It was successfully verified that in such conditions the test tube did light until a distance of 70cm from the TX antenna and 40 cm from the RX antenna[3].



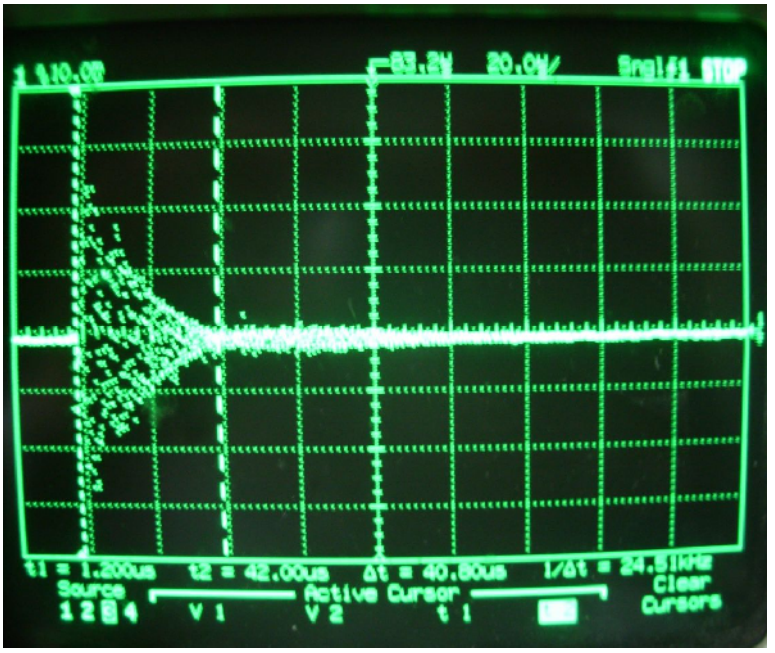
Next, the emitted signal waveform was checked.
To do this, the oscilloscope was placed indoors in the room next to the backyard to keep a safe distance in order to avoid damaging the oscilloscope.
For the same purpose, the oscilloscope mains supply was provided from a different wall socket.
The signal was picked-up by means of a two turn wire loop, see picture. A pass-through BNC attenuator of 9 dB, 50 Ohm was inserted, to terminate the loop into a 50 Ohm resistor. The oscilloscope has 1 MOhm input impedance. The storage feature of the oscilloscope was useful to capture single transient of the signal.
In the following pictures the waveform of the signal is shown.



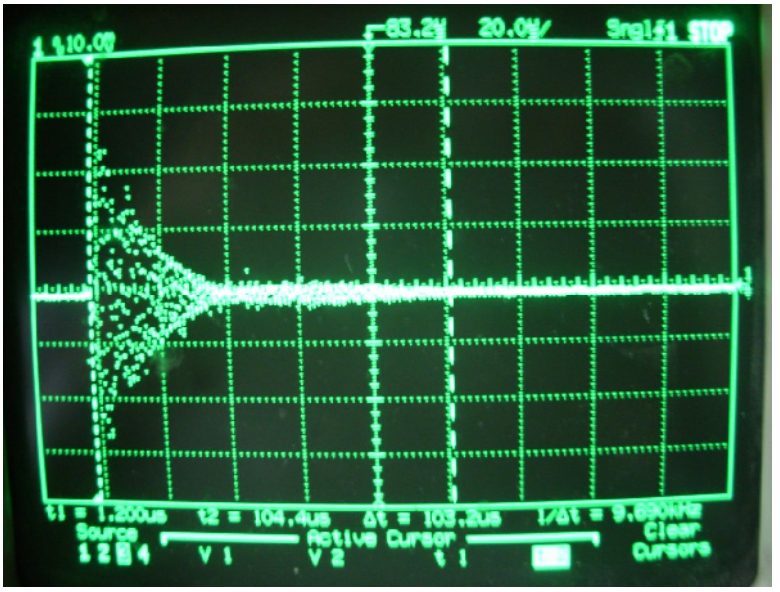
Here we can see the frequency of the "carrier": ten cycles last 1/75.7 KHz, so that 1cycle lasts 1/757 KHz. So the frequency is 757 KHz.
The first lobe duration is about 10 µs, not much different from the BV1 MWO.

[3] The same test was done on my (Bruno) replica of the LaRévelation MWO, with same results. However, I must say that my MWO RX coil gives a longer (2cm) spark against a copper tube, than the Vassilev "new" one (4mm).

Roughly the duration of the main part of the signal is 40 µs, as seen on the picture.



The duration, including most of the "tail" is about 100 µs.



4.3.3 Antenna first ring resonance measurement

This measurement was made in a different session. The purpose of the measurement was to reveal if the peculiar T-shaped antenna fixture has influence on the outer ring resonance. Apparently this technique was used for the latest C.O.L.Y.S.A. MWO.

Since we were not in a lab environment we had to use simpler, portable equipment. That did limit the resonance measurement to the lower frequency. At higher frequencies it is difficult to resolve the resonances with the available instruments. Thus we measured only the resonance of the outer ring.
We connected the antenna to the MWO and we measured the resonance of the outer ring with the grid Dip Meter. This time we had a HP 5315B frequency counter coupled (small loop) to the grid Dip Meter.

Antenna1: f1 = 27.1 MHz (other resonances: 82.6 and 122.3 MHz)
Antenna2: f1 = 25.8 MHz (other resonances: not measured)

There was no difference when the antennas were connected to the TX coil or to the RX coil.

For a discussion of the above values, and their possible meaning, please read further in section 9.2.

4.4 Comparison of Measurements

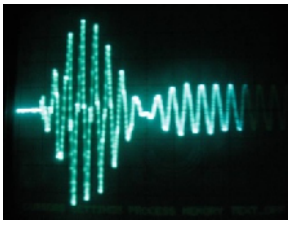
In this section we compare the measurement results between the 3 Vassileff MWO's. Unfortunately, we do not have the same measurements for the 3 machines but nevertheless interesting comparisons can be made.

4.4.1 MWO parameters

In this part a summary is made of the basic operation parameters of the MWO's.

MWO Basic construction parameters

	BV1	BV2	BV3
HV Transformer	8.4 KV / 65 mA	6.2 KV / 80 mA	
Tank Capacitors	2 x 14.75 nF	2 x 18.4 nF	
Spark Gap	V - Type	V - Type	V - Type
Coil Inductance	1.34 mH	1.61 mH	2.4 mH
Coil diameter	100 mm	100 mm	100 mm
Boost Capacitor	55 pF	50 pF	



Basic working frequency damped wave [KHz]

BV1	950
BV2	862
BV3	757

Time duration for the "first burst" [µseconds]

BV1	8
BV2	10
BV3	8

4.4.2 Antennas

The antennas of the 3 Vassileff MWO's have the same dimensions but the construction of the mechanical attachment to the Tesla coil and the used materials are different. Like all Lakhovsky antennas there is no special gas used in the tubes but merely atmospheric air, since at least in the outer ring are holes to hold the suspension cords.

Antenna Metals

BV1	Aluminium Tubes
BV2	Multi metal Tubes
BV3	Aluminium Tubes

Attachment mechanism

BV1	Screw-construction
BV2	Hinge-construction
BV3	T-construction

Acoustical resonances

Ring	BV1	BV2	BV3
1	Bb(4th octave)	?	n.a.
2	D	A (4th octave)	n.a.
3	G	?	n.a.
4	A	?	n.a.
5	C	E (5th octave)	n.a.
6	?	B (5th octave)	n.a.
7-12	?	?	n.a.

Electric resonances

	BV2	BV3
Resonances	MHz	
1	26-49	25.8; 27.1; 82.6 [See Sec. 9.2]
2	122	122,3
3	156	n.a.
4	196	n.a.
5	240	n.a.
6	295	n.a.
7	349	n.a.
8	373	n.a.
9	Difficult to resolve	n.a.
10	530	n.a.
11	Difficult to resolve	n.a.
12	730	n.a.
13	1260	n.a.
14		n.a.

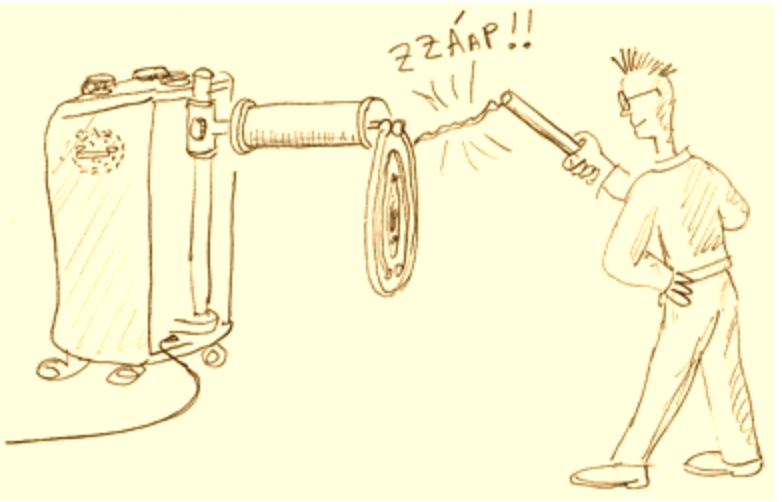
4.4.3 Coil resonances

Coil resonances with antenna attached

	BV2	BV1
Mode:	MHz	MHz
Fundamental	0.75	0.95
1st overtone	3.1	3.567
2nd overtone	4.4	4.941
3rd overtone	5.7	6.19
4th overtone	6.9	7.5
5th overtone	8.2	8.7
6th overtone	9.3	

4.4.4 MWO performance

The 3 MWO's can easily draw a 10 cm spark between the outer ring of the antenna and a handheld copper bar. In normal environment conditions one can estimate the voltage as 100 KV at the outer ring for a 10 cm spark. Depending on the intensity and especially on the spark gap setting different voltages can be set at the antennas. It can be set to generate a 20 cm spark. Overall we can say that the 3 MWO's are quite similar of construction and electrical performance.



5 Do it yourself: how to build your original-complaint MWO

Researcher constructing an original-compliant MWO

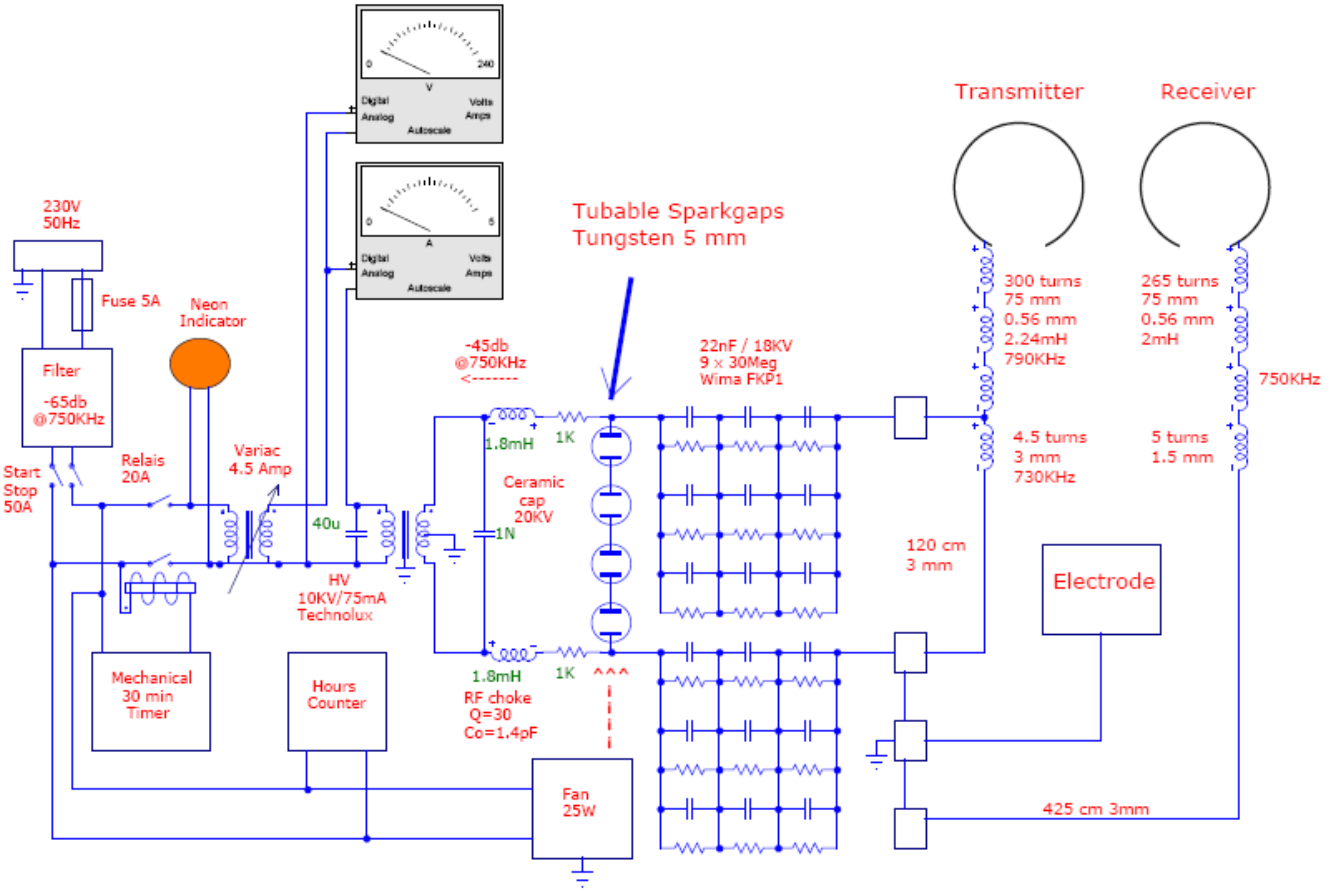
5.1 Project “T”

5.1.1 Description

In this project a GL compliant MWO is constructed. The schematic can be seen hereunder. Care has been taken to use heavy duty components so that the unit can be used for a long period.
The mains supply is filtered by a specific designed EMC (Electromagnetic compliant) filter to attenuate the generated RF pulses as much as practically possible. However one must be aware that a MWO creates quit a lot of EMI (Electromagnetic Interference) on the mains supply but also due to radiation by the generator and antennas. Such kind of equipment must be used in an environment that guarantees enough EMI attenuation towards the surroundings.
The on/off operation of the MWO is done by a magnetic controlled switch that is driven by an on/off switch and a timer who is used at the front panel to control the duration of the session.
The regulation of the intensity is done by a variable transformer which is in front of the high voltage transformer. The load current for the tank capacitors can be continuously regulated with this method. At the primary side a capacitor is foreseen to correct the phase difference between current and voltage and herewith reducing the reactive power drawn from the mains supply. This lowers the current that is drawn by the high voltage transformer. The high voltage transformer can deliver 75 mA in short circuit condition and can be regulated by the variable transformer to any voltage level. A robust protection filter is foreseen between the spark gap and the secondary of the HVT to reduce the high frequency spikes. We have used an inductor in series with a power resistor and a capacitor across the secondary of the HV to dampen the unwanted spikes. In this project we used 4 “Duflot’” style spark gaps. The Tungsten electrodes are 5 mm in diameter. A cooling fan is foreseen to cool down the spark gap since this one is generating considerable heat especially if the MWO is used for a longer period.
The tank capacitors are assembled with smaller valued capacitors. We have used commercial available switch capacitors from WIMA. This type of capacitor has a safety advantage in this way that they are self healing. So the overall value of a single tank capacitor is 11 nF. The tank capacitors have bleeding resistors to prevent accidental shock. This can happen when the Tesla coils are not connected and the MWO is powered.
The tank capacitors are further connected to the primary of the Tesla coils. Specifications of these coils can be seen at the schematic. The top end of the secondary of the Tesla coils are connected with the antennas while the bottom end is connected the MWO ground.
Several “ground” connections are foreseen to be able to connect other electrodes, like feet- and hand electrodes.

5.1.2 Electrical diagram

Electrical diagram of “T” model



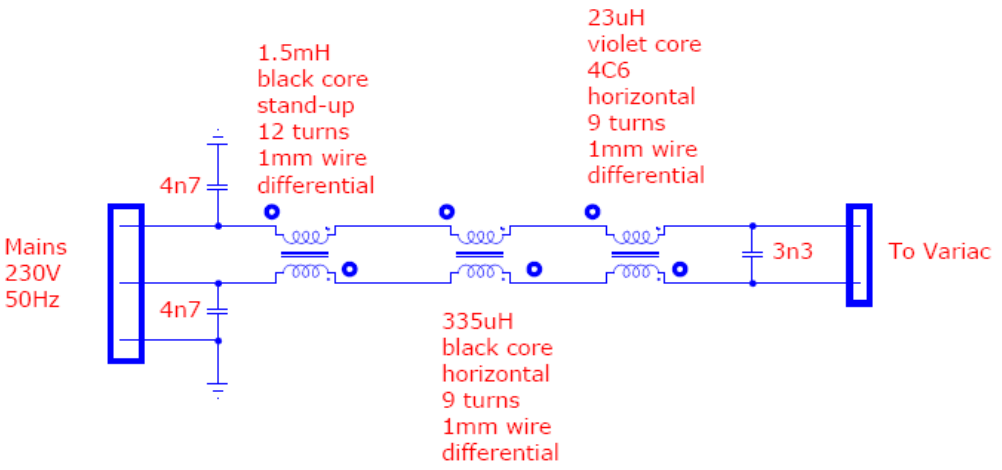
Most important parts:

EMI filter, this is a custom design but another filter can be used
Mechanical timer, maximum 30 minutes
Magnetic switch; 5 amps is sufficient
Variable transformer, 4.5 amps
HVT, 7 KV/75 mA is sufficient
Measuring indicators, amps meter is a minimum, Neon indicator
Protection filter, RFC inductors/ power resistors (need cooling) / HV ceramic capacitor
Spark gap, this is home made construction (see later)
Tank capacitors, from manufacturer WIMA
Tesla coils, home made construction
Antennas, home made construction
Antenna Holders, home made construction

5.1.3 Most important components

EMI filter Mains Supply

The EMI filter is designed for 85 db suppression at 1 MHz to reduce the interference of the pulse rate injected into the mains supply.



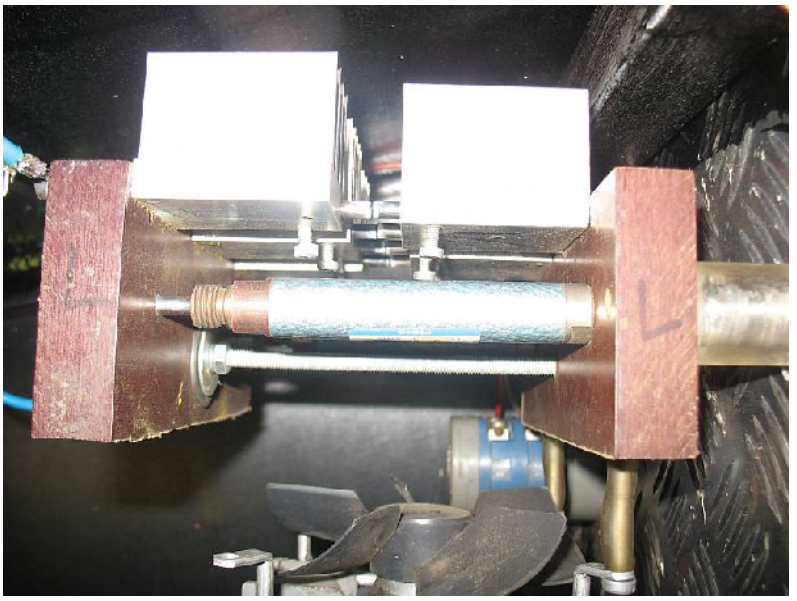
Variable transformer

HVT / PF capacitors / Mains EMC filter

Spark gap

The spark gap electrodes can be seen between the aluminium cooling plates. In operation, the distance between the spark gap electrodes is between 0.1 and 0.4 mm for complying with the original MWO design. Accurate alignment is possible in this construction due to the guidance of the cylinders that can be seen in front of the picture.

Spark gap



In the picture below the spark gaps can be seen in operation. The tank capacitors are loaded by a short circuit current of 75 mA until they reach a voltage of 6KV peak value where they break down. These kinds of measurements are easy to do once there is a variable transformer that can control the high voltage transformer.

Spark gap in operation

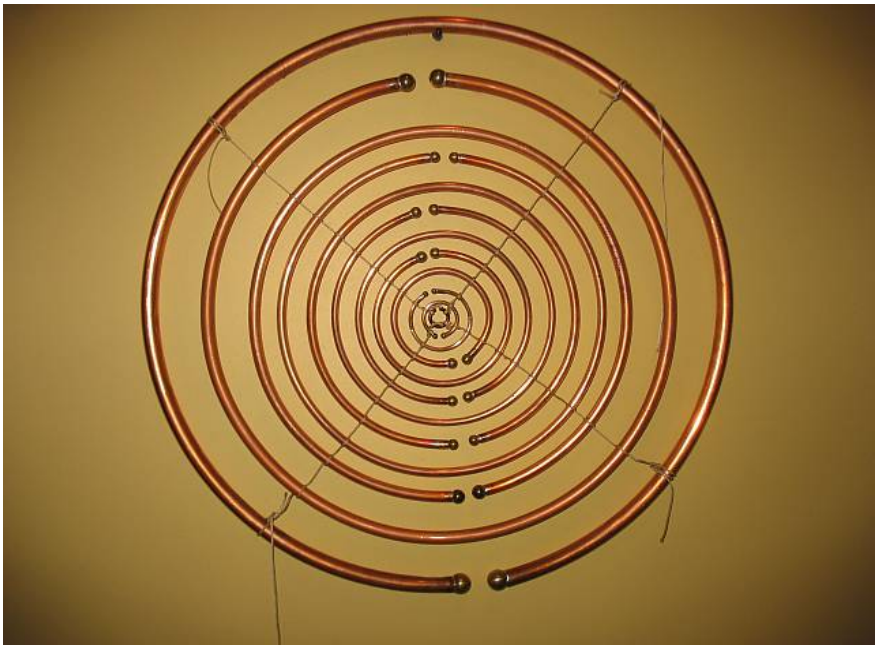
Tank capacitors

Tank capacitors and part of the protection filter

Antennas

The antenna dimensions are compliant with the Vassileff MWO's. The outer ring has a diameter of 50 cm. They are made from copper tubing.

Antenna "T" MWO

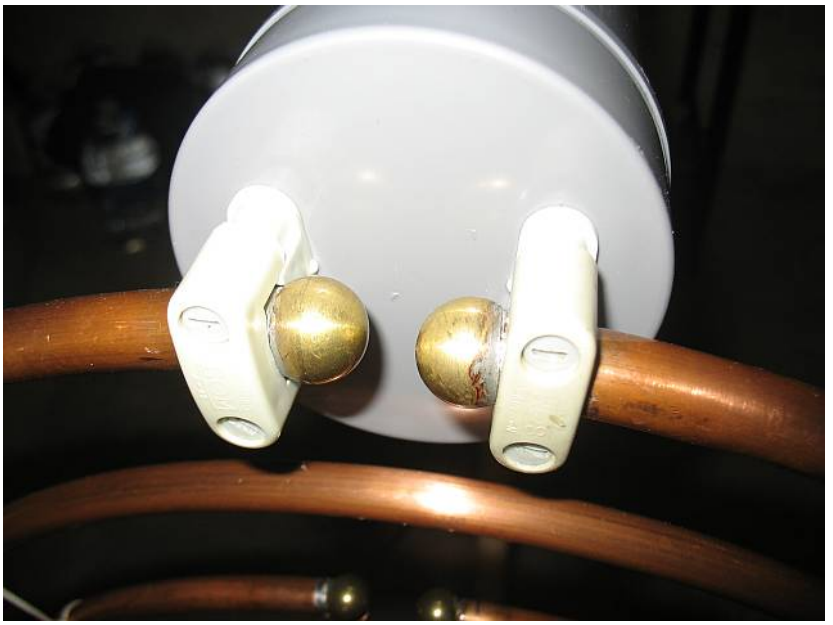


The antenna rings are constructed by means of a wooden mould.

Wooden mould

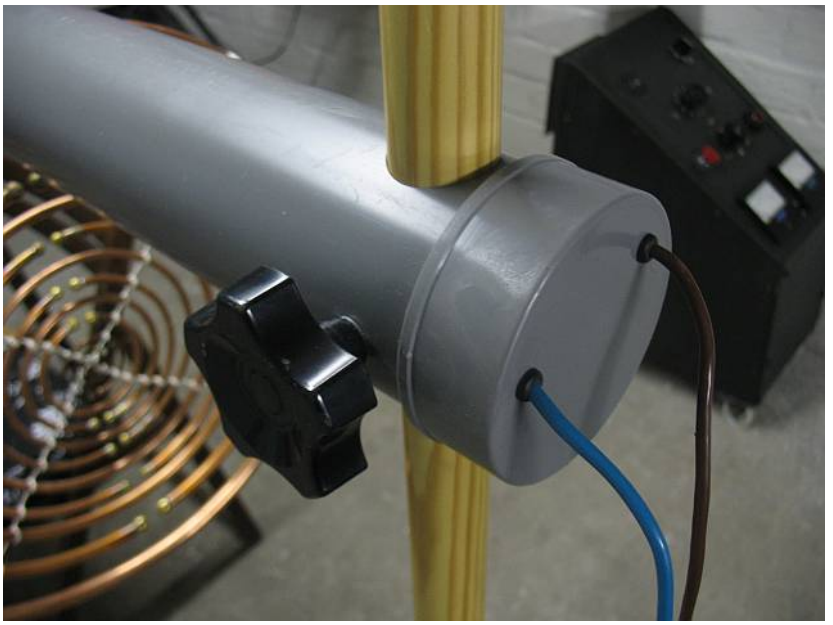
The antennas are attached to the Tesla coils by means of plastic holders. This is done to reduce corona effects when high power is used. In one of the holders an electrical connection is made to the top side of the secondary winding of the Tesla coil.

Connection of antennas to the Tesla coils



As can be seen in the picture below the antenna can be adjusted in height like the original designs. It is also possible to swap the antennas so the closed end of the antennas can be positioned facing ground or facing sky.

Connection of Tesla coil to antenna holder



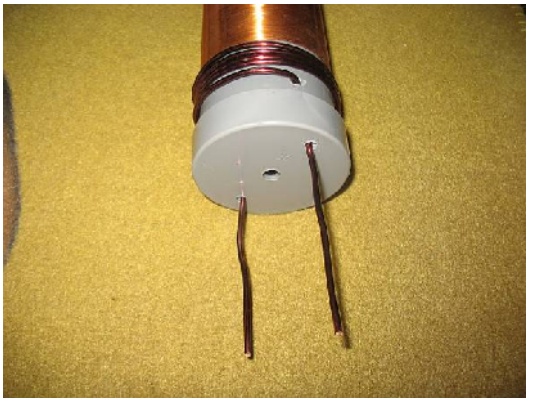
Tesla coils

Cover Tesla coil

clamping mechanism

In the picture below an open Tesla coil can be seen. The coil holder is standard PVC material with a thickness of 3 mm. The primary wire that is used has a diameter of 3 mm like in the original designs. The diameter of the coils is different from the original designs but the length and the amount of windings is adapted so to result in the same performance as the original designs.

Tesla coil



Below the Tesla coil can be seen, ready to be inserted into the PVC outer holder. It has been found that to reduce any corona effects inside the coil and coil holder it is advised to tape the secondary with PVC material. Especially at the top end of the secondary winding a thicker layer should be used (left side in the picture).

Tesla coil

Control Panel

The control panel can be seen below. It has several controls like:

- Regulation of pulse rate by means of the variable transformer
- Regulation of the spark gap distance
- On/off switch / 30 minutes timer
- Hours counter / Neon indicator / Amps meter / Volts meter

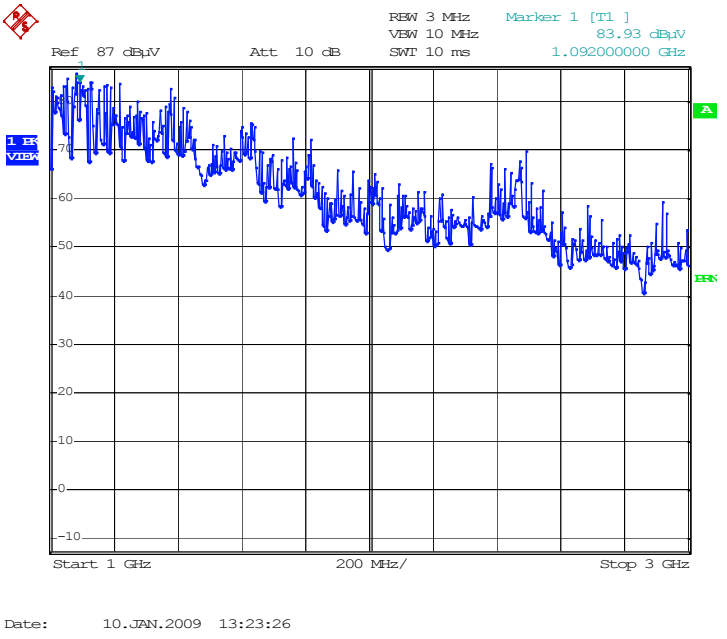
Control panel

MWO and transmit antenna

5.1.4 MWO in operation

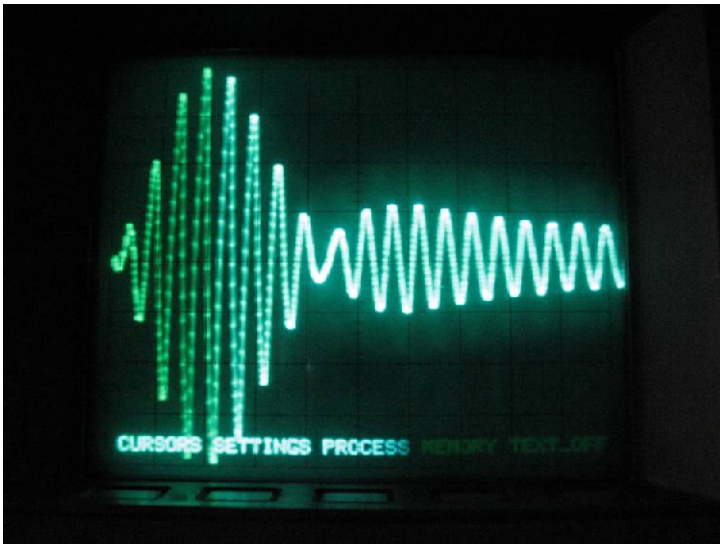
The electrical field strength is measured at 3 meter distance. In the graph below the frequency response from 1 to 3 GHz can be seen. This graph is merely here to show that high frequencies are generated.

Electrical Field Strength “T” MWO



The picture below shows the electrical field in the time domain; it shows 8 µseconds duration for the time of the “first” burst, complying with the original MWO.

Electrical field in time domain



The picture below shows the MWO at full power with a sufficient distance between the spark gap to create “effluvia”. This is only for demonstration purpose and is not a normal use condition.

MWO at full power

Below a measurement is shown of the magnetic field strength at 15 meter distance. The instrument makes an average over the frequency range from a few Hz up to 100 KHz. This only to show the reader that care has to be taken about the generated EMI and that a solid solution should be used to comply with the local legal EMI requirements.

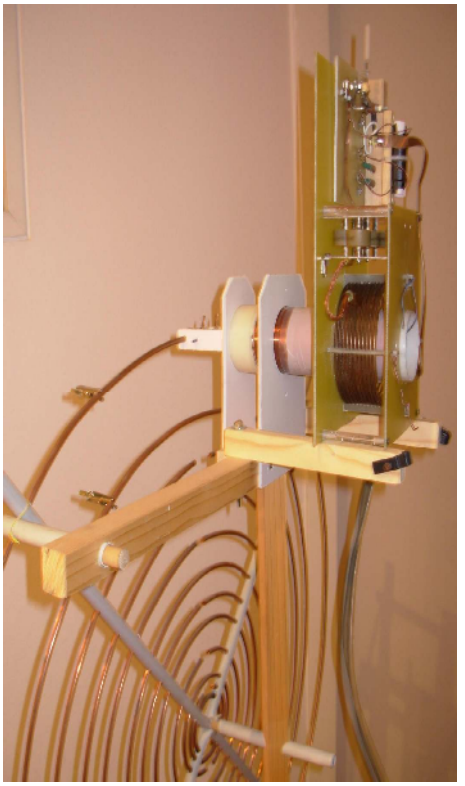
Magnetic field strength measurement

5.2 Project "B"

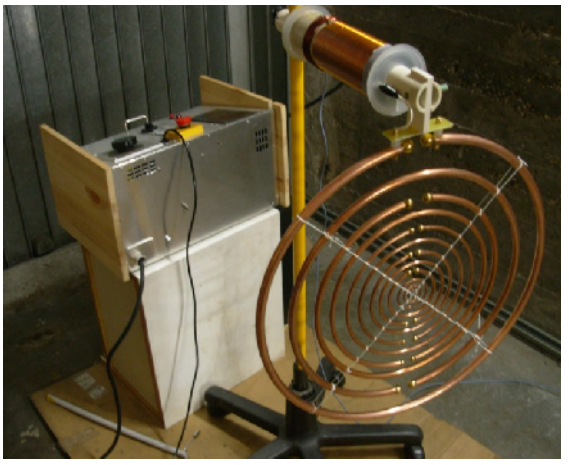
In this section another Do-It-Yourself project is presented, the “B (Bruno) version 2”.

5.2.1 Project history

- **V.1.0** This was my first attempt to build a MWO, based on the little info I had at that time. I did take inspiration from “*The Lakhovsky MWO handbook*” from BSRF. I spent literally days and nights in trying to understand what really could contain the strange “cylinders” (coils?) visible in the photos behind the original antennas, why only a single wire did feed the second cylinder (and why a second coil, since in the patent there was just one?), what diameters should have the antenna rings (I tried to scale them up from the original photos... but how big they actually should be? Did they have a special progression? Golden ratio? Logarithmic? …?? Did that make sense? Was there a rationale behind?). **What most puzzled me was the fact that in the USA a number of different experimenters had spent a lot of energy in developing many MWO designs that tried to figure out how the original MWO really was. But the MWO revival story begun when Bob Beck claimed to have discovered an original MWO stored in the basement of an hospital: so why all the above aspects (schematics, components values, ring sizes, …) were not disclosed?** What I did was to make a MWO implementation based on a merge of various ideas found on the Borderland's *Handbook*. The result was that I did build a bad MWO, based on a car coil, a wrong sized antenna, with too low power (12W), and many other differences.



- **V.2.0** I started this project when I read the “*LaRévélation*” e-book. It was my Rosetta Stone: I finally had the opportunity to know exactly how an original MWO was. My V2.0 project is where possible, compliant with the original device found in *LaRévélation*. I decided that I would first have to reproduce, the best I could, the antennas,

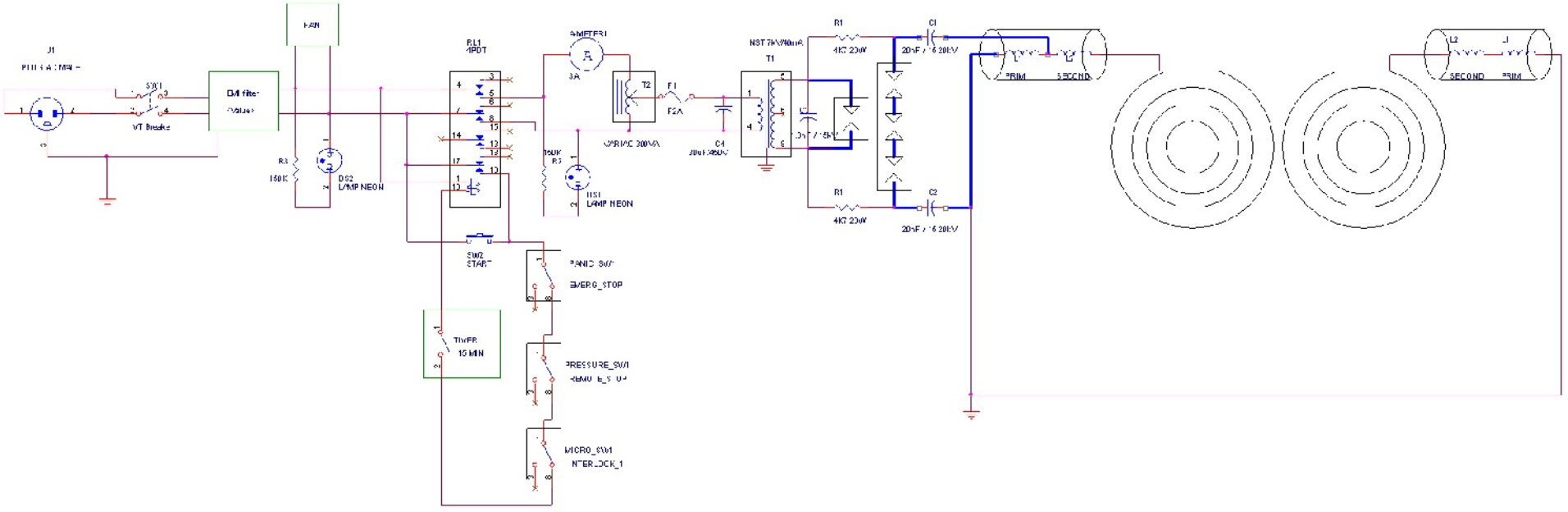


the coils, and the main subsystems. I allowed myself to modify only trivial schematic parts, with minor trade-offs. The details are reported below in this section.

- **V.2.1** This is a modification of the V2 project, in which I just updated the coils. Since the original coil diameter of 78mm is not easy to find, the coil formers have been remarked with standard PVC sewage tubing. The diameter is slightly different, so that the coil winding data have been re-calculated.

5.2.2 Electrical diagram

The electrical diagram is shown in the figure below. The basic diagram is from the *LaRévélation* device, but I made a number of small modifications in the “non critical” sections of the circuit, in order to improve the electrical safety, to reduce conducted interference and to use easy to find components.



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Size: <Document Number>		Rev: <Revision>
Date: Thursday, July 01, 2010	Sheet 1 of 1	

5.2.3 Most important components

Mains filter:

The filter is a commercial two cell EMI filter. Similar devices can be found on the market or can be obtained from surplus stores. The filter has 6 Amps or higher current rating. Two such filters can be cascaded for better conducted interference attenuation.
I did measure a Schaffner FN660-6/06 type with a signal generator and oscilloscope.
The resulting insertion attenuations at 700 kHz were:

- common mode: 70dB
- differential mode: 46dB

Control circuit:

The C.O.L.Y.S.A. MWO control circuit was simply a timer and a selector (Direct/Off/Timer).
Instead, a relay circuit was used here, in order to have more safety options.
The relay is wired in a self-hold configuration. The Start button activates the relay if some enable conditions are verified. Namely:

- Timer is armed;
- Remote Stop is not pressed;
- Emergency Stop is released;
- Interlock switch is not active.

On the other hand, the relay is readily released if one or more of the above conditions are verified. i.e.:

- Timer time elapsed, or
- Remote Stop pressed, or
- Emergency Stop pressed, or
- Interlock activated.

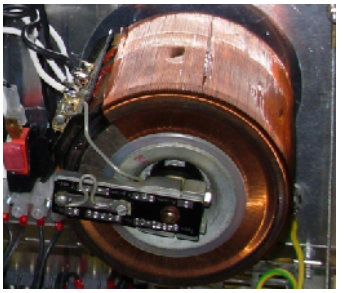
The Interlock switch purpose is to switch off the device - or to disable the start- if the MWO box is opened, or if the RF cable is missing.
The Remote Stop is a pressure switch that can be operated by means of a rubber pedal connected by a rubber tube. In this way no live conductors are near the antennas, where there is the risk that the patient could generate a spark that could pierce a live cable and “connect” him to the mains trough the spark itself. Insulating pressure pedal and pressure switch can be ordered on Radio Shack.
As a cheaper alternative, a washing machine water level pressure switch can be used. Air-pressure push-buttons can be obtained by plumber stores.
The timer has been purchased from an electric spare parts store: it is a 15 min timer originally used in a small oven.

Ampere meter

This is an AC (alternated current) ampere meter. DC models do not work. I personally bought it on EBay from a Far-East seller. 2 A full range is suitable for the purpose.

Variable transformer

The original MWO had a rheostat to control the current. We decided to use a variable transformer here, in order to have finer current control, and to have less heating.

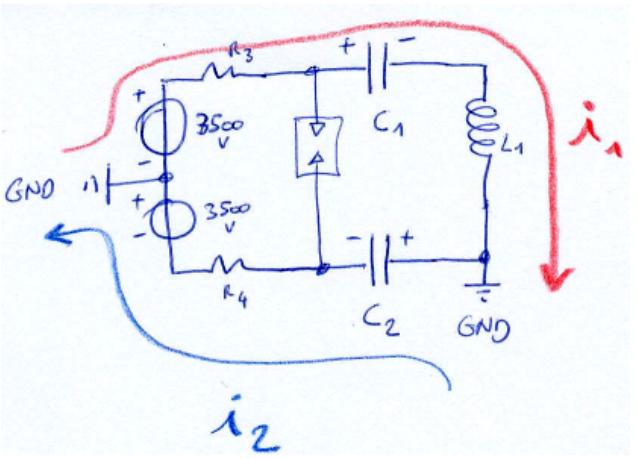


The advantage, in fact, is that with a variable transformer one can control the exact voltage to which the spark gap fires. However, after having examined others C.O.L.Y.S.A. devices (BV1, BV2), we saw that instead of a rheostat, C.O.L.Y.S.A. used a ballast inductor too.

With the ballast, of course, the current limitation effect is achieved without heating, and without reducing the mains voltage. So, I am considering further modifying my V2.x MWO and using switchable ballast, as e.g. in BV2. Mercury-vapour bulb ballast is a modern, commercial available item that could probably do the job... (To be verified).

High Voltage transformer

I used an old, tar insulated, 7 KV, 40 mA neon-sign transformer (NST). The secondary is fully insulated. Modern resin insulated NST's are ok, but they usually have grounded centre tap. At a first sight, I believed that such NST wasn't suitable, due to the fact that one leg of the HV output, via one tank capacitor, is grounded too in the schematic.

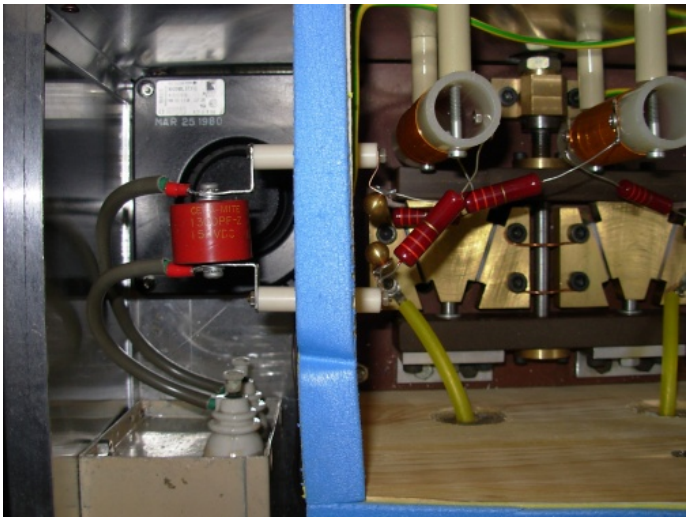


But let us consider the situation sketched in this drawing: in the first 50 Hz half-wave, the two secondary halves are voltage generators with the polarity indicated. R3 and R4 are the internal NST secondary resistance. In this condition, a current i1 (indicated in red) flows through R3 and L1 (the TX coil primary) while charging the tank cap C1 with the indicated polarity. In the meanwhile, the current i2 (blue) flows through R4 charging C2 with the indicated polarity. What happens then is known: spark gap fires closing the C1/C2/L1 path thus discharging the tank capacitors, charging again and so on a number of times (already explained before in this book).
In the negative half-wave, both "generators" polarities and i1, i2 current senses reverse, and all are repeated inverted. So, it was not tested, but is evident that grounded-centre-tapped NST should work as well as others.

Power Factor Correction capacitor

The HV transformer is intrinsically inductive. A power factor correction (PFC) capacitor has been inserted to compensate the reactive load. The capacitor value depends on the NST power. 30 µF, 450 V was suitable for the 280 Watt NST used.
In the datasheet of modern NST the required PFC value is indicated.

NST protection filter

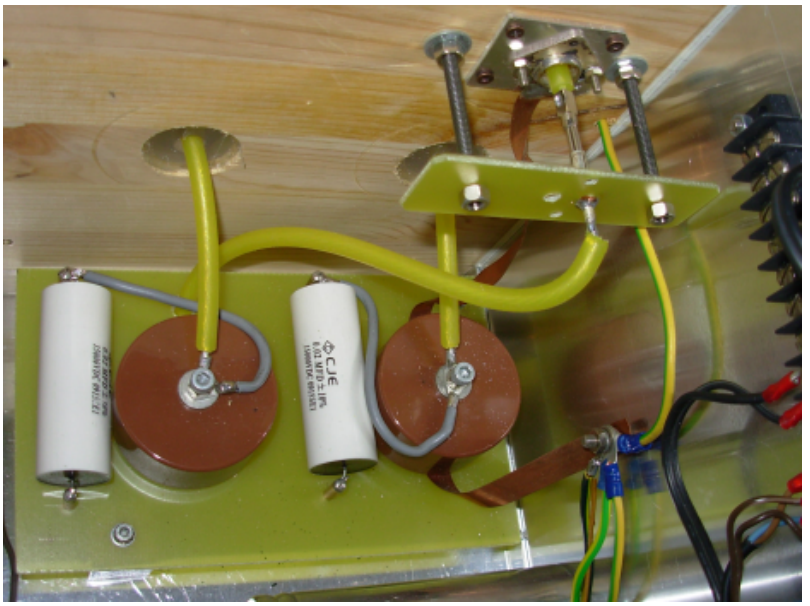


The HV transformer can be damaged by the extremely strong spikes coming from the spark-gap operation. In the Tesla coils works this is well known and discussed. It is strange that in LaRévélation scheme this filter is not present. Actually in others designs CO.L.Y.S.A. inserted a filter. In BV1, BV2, for instance, two air-cored coils are present to this purpose. According many Tesla coils gurus, resistors are very indicated here, since a bad designed inductor could have self resonances, or self-capacitance that can impair the choke effectiveness. So I did use 4.7 kOhm resistors (2k2 + 2k2 series each) instead, as indicated in the schematic. 10-20 Watt resistors are indicated; smaller could be used, as I did, if a fan is present. Actually, in my MWO prototype one inductor was left in series to each resistor. A 1.3 nF doorknob capacitor is in parallel to the NST secondary, for increased spikes attenuation. A two-ball safety gap has been inserted too, as shown in the photo, but it is probably not necessary.

Tank capacitors

Two 20 nF, 20 KV capacitors are present in LaRévélation MWO.
As already mentioned, such tank capacitors MUST be of high-current, high frequency (“pulse”) type components. Losses are a key parameter for this application. The selected capacitor must have low ESR (equivalent series resistor) at 1 MHz. In the photo here on the side, a commercial polypropylene that I used (see below) has been tested with an ESR meter, the read value is 0.02 Ohm at 1 MHz.
Make or buy? At first I considered to build them, but this operation is not easy as it can appear at first sight. Dielectric with high dielectric constant and strength, low losses at 1 MHz, is not easy to obtain at affordable cost.

E.g., mica is a nice candidate but it is difficult to find and expensive. Moreover, it is mandatory to pack the layers is such a way to deplete every possible air bubble, to avoid internal corona formation, that can cause internal corrosion.



To summarize, it is suggested to buy the capacitors. The MMC (multi-mini-capacitor) technique is very fine: see the previous (Tony) DIY project.
Other possibilities are doorknob capacitors (high power ceramic type) or polypropylene (MKP) anti-inductive types. I used a mix of both (see photo): the MKP element is a 20 nF nominal (actually: 18 nF), 15 KV bought from a far-east seller on EBay (be careful to chose non-"audio" type).
In parallel, a 2.2 nF doorknob is used (brown cylinders in the photo). It is expected that the latter give higher peak current in the short term. If space (and budget) allows, a bank of doorknob-only capacitors is preferred.

Spark gap

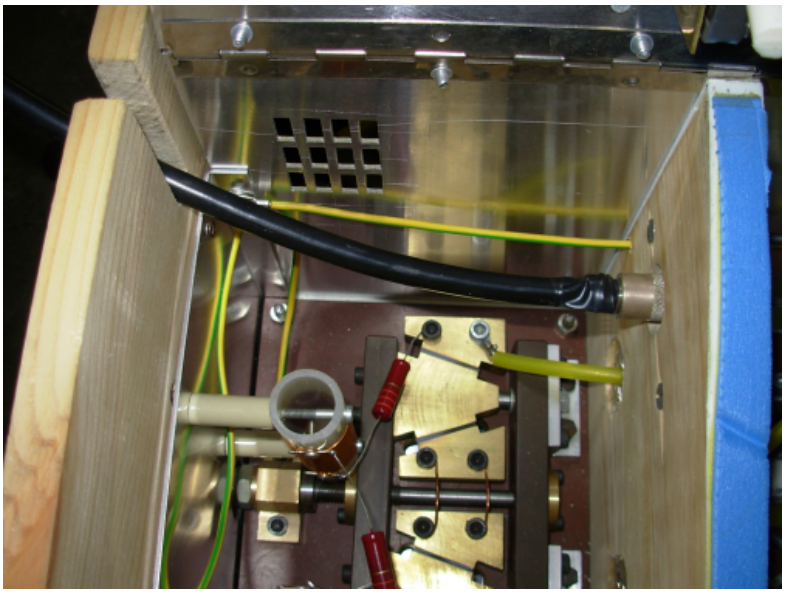
I was so fascinated by the original spark gap design that I decided to build one. The mechanical drawings are well documented in LaRévélation eBook. The reader can refer to it.
The brass pieces and the Bakelite parts were milled by a nearby workshop. The 3.2 mm diameter tungsten rods were obtained as TIG (plasma) soldering electrodes. The regular (green) type is used. Thoriated (red) type is not suitable.
If metal knob is used, as I did, the command shaft MUST be properly grounded, for operator safety. *Insulated* shaft is strongly advised.

Output Wiring

As can be seen in the schematic, the spark gap / tank capacitors / primary coil electrical path MUST be carefully designed for high current, low inductance wiring. I did use copper band for bare connections, and the inner part of RG213/RG214 coaxial cable for insulated wiring.

TX Antenna cables

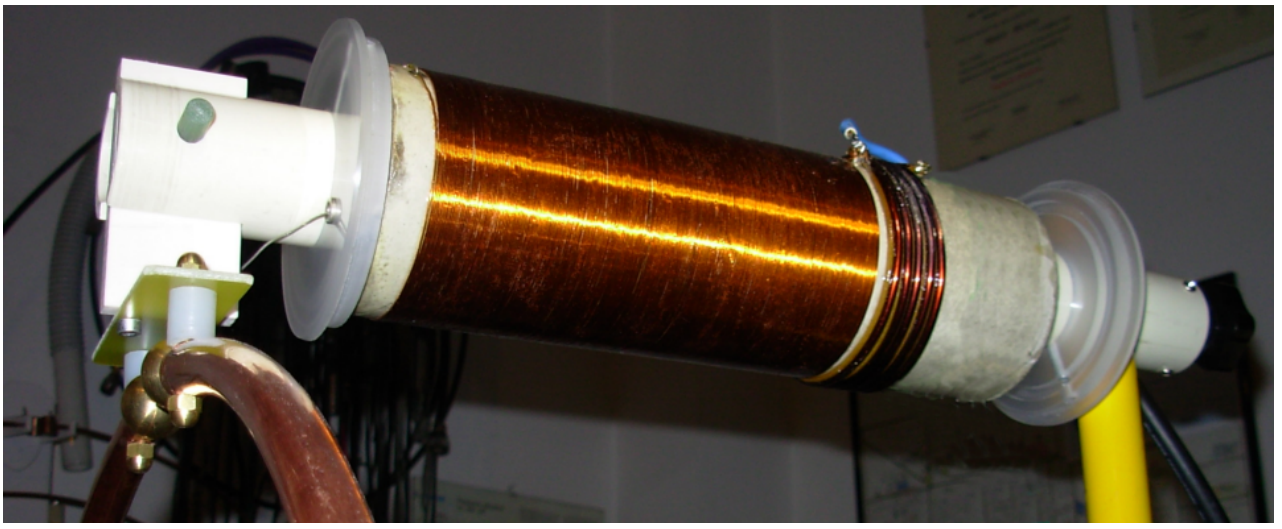
Here the original design made use of a high insulation, high current wires.
I spent some energy to redesign a bit the cable, in order to improve electrical safety.



What provides greater protection is to use a shielded cable: if the insulation is suitable, the “hot” conductor runs inside the cable, so that it is impossible to have accidental sparking in case of contact.
High voltage, high current coax cables are difficult to find and expensive. Instead, a more common RG214 (RG213 or RG8 can do the job too) has proven to withstand the voltage present in this section on the system. The voltage rating of such cables is nominally lower than the voltage present, but this cable has been used in many instances for much higher voltage applications, even at high frequencies. A pair of PL-259 / SO-239 coax connectors has been modified to improve insulation. The inner part of the PL-259 has been removed, the coax inner was mounted protruded in the coax plug, and terminated with a banana jack. The SO-239 socket too was modified by removing inner receptacle. A new banana socket, mounted on an insulating plate, did replace the original one. See detail in the tank capacitor photo, above, and in the one here aside.

TX and RX Tesla Coils (v2.0)

The LaRévélation MWO coils have been reproduced as similar as possible.
The first problem was to get a 78 mm diameter tube as coil former. The search was difficult; 78 mm seems not to be a standard size for tubes -at least in Italy- not to speak of Bakelite. Eventually I decided to abandon the Bakelite, but not the search for 78 mm tubes, because that would have meant to change dramatically the



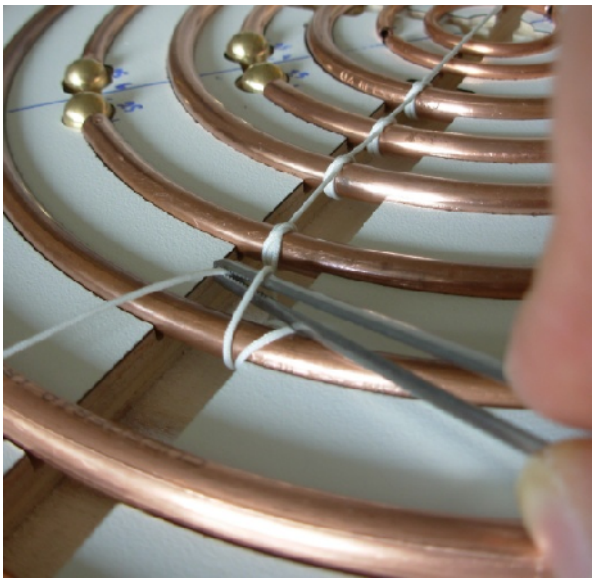
geometry of the original design. I finally found something suitable: the carton tube used as "core" of industrial cleaning paper rolls. The tubes have been varnished with urethane clear paint; to avoid water moisture could penetrate. The winding data are the same as LaRévélation, but I have to do a remark: *the number of turns of secondary winding is said to be 276, for a secondary length of 155 mm (wire: 0.56 mm): actually, when I wound my coil I could fit only 251 turns of 0.56 mm wire in 155 mm. So I suspect that the 276 was obtained as 155/0.56=276, but the actual value can be different. So I kept 155 mm length and that resulted in* ***251 turns****.*
The 3 mm enamelled copper primary wire and the 0.56mm double insulation enamelled copper secondary wire have been found from an electrical motors repair workshop.
Thick PVC 42 mm tube was used as internal support.
The wire windings have been covered by 6 layers of urethane varnish. Yet, when running the MWO, corona could stem from last secondary turns, if spark gap is "pushed" too much. Covering the "hot" end of the secondary with a few layers of electrical PVC tape (white preferred) can help to prevent corona.
It was found later that covering the coil with an external protection tube (e.g. PVC 100 mm diameter); the corona on the coil is no longer produced. In the above photo the external tube is not present.

Antennas

The original LaRévélation antenna rings sizes have been followed. Some other parameters, e.g. tubes diameters and spheres sizes have been kept if possible, otherwise the nearest available sizes have been used.
The original metals were not exactly known, so only copper tubing was used. A source for copper tubing various diameters are the industrial refrigeration stores. For the spheres, I have found -and used- only brass ones.

	Antenna parameters			Mold parameters		
Ring #	Ring diameter [cm]	Tube Diameter [mm]	Sphere Diameter [mm]	Groove diameter [mm]	Groove Width [mm]	Groove Depth [mm]
1	50	14	20	500	14,5	8
2	40	12	16	400	12,3	7
3	32	10	14	320	10,3	6
4	27,5	8	9	275	8,2	5
5	22,5	6	9	225	6,2	4
6	18,4	6	9	184	6,2	4
7	14,3	6	9	143	6,2	4
8	11,2	6	9	112	6,2	4
9	8,1	6	9	81	6,2	4
10	5,1	3	-	51	3,1	3
11	3	3	-	30	3,1	3
12	1,4	3	-	14	3,1	3

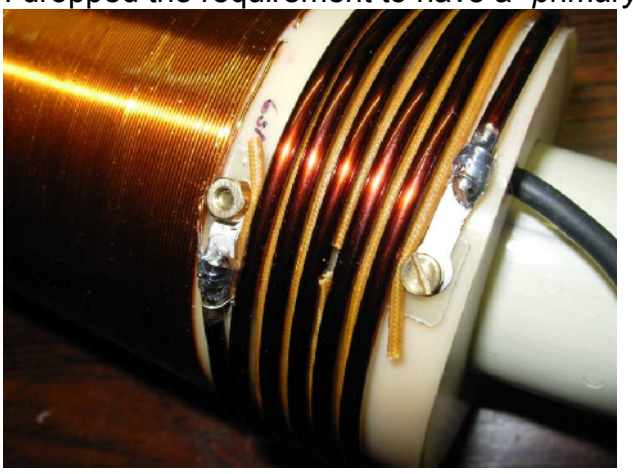
I asked a nearby mechanical workshop to mill a wooden mould, from CAD file provided by me. The mould is very useful both to bend the copper tubes into the right shape. It is important to have both TX and RX antenna identical and to assemble the rings with the silk wire (in the photo, knots are made with surgery tweezers, while rings are kept in position in the mould's grooves). To avoid oxidation, it is a good idea to handle the copper tubes with gloves while bending and assembling them.



The antennas are hanged by the first ring with a supporting insulating bar quite similar to the original one. An insulated wire with a banana jack connects the first ring to the Tesla Coil end. The insulation of such a wire is critical: corona may likely stem from here. A piece of high voltage double-insulation cable is advised here. Some plastic glue or silicone can be used to stuff gaps.

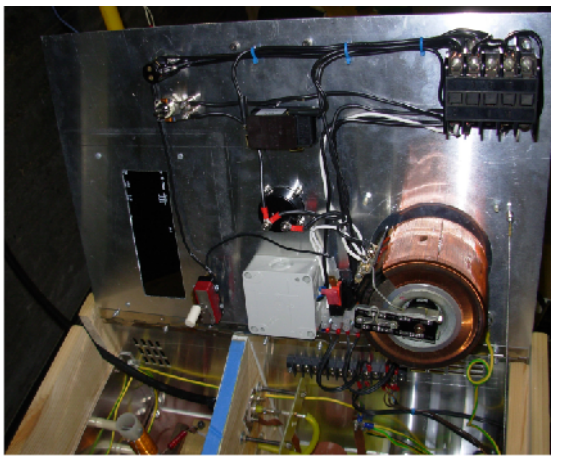
The second release of TX and RX Tesla Coils (v2.1)

Once the original-compliant Coils were made, I decided to try to find an implementation that could be done with more easy-to-find materials.
The basic problem was the tube for the former.
The most similar tube, at least in Italy, is an 82 mm white PVC drain tube. The tube is quite thin, about 1mm, but is suitable for Tesla Coils windings. An orange type exists too, but Tesla Coils gurus warn us that coloured (black, red, orange) plastic is not suitable due to internal losses.
The same type (white) of tube, but 100 mm diameter, was used as coil cover too (see photo).
This time I abandoned the statement that TX coils and RX should be identical. As found in BV1 C.O.L.Y.S.A. type, the coils can be different: so I tried to make two coils such that they resonate closer together, keeping into account the "ground wire" length. By try-and-error, I did identify suitable number of turns for the secondary.
I dropped the requirement to have a *"primary" in the RX coil*, too: so I removed it.

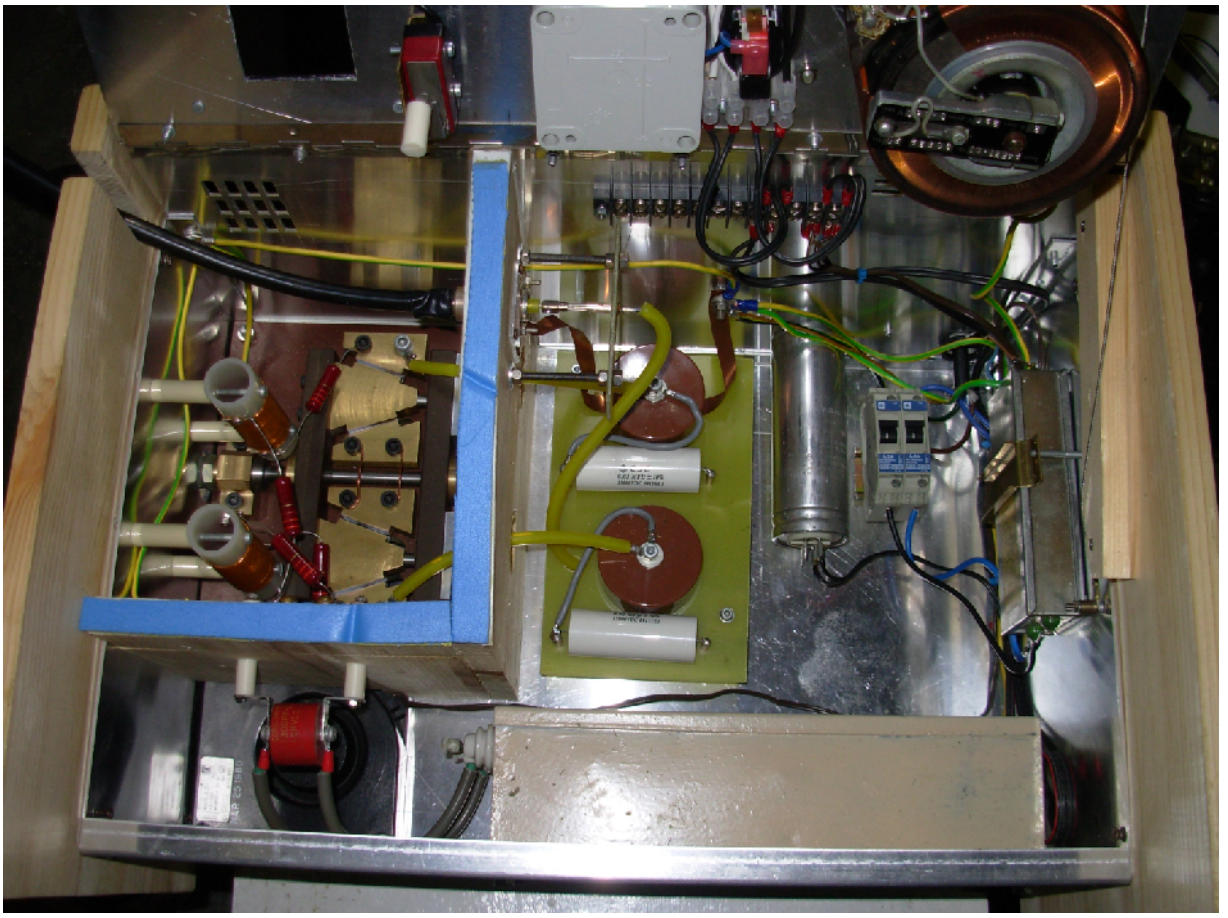


Front panel - case

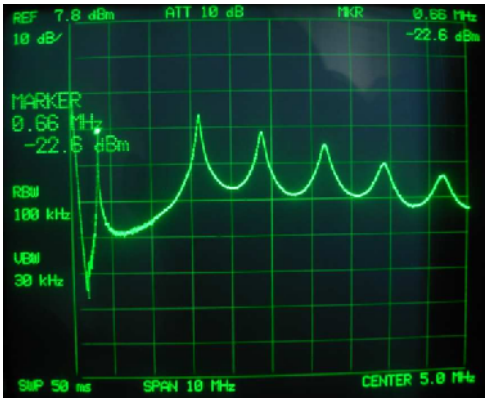
The front panel is visible in the photo.
Trough the dark window on the left (dark glass filter) it is possible to see the spark gap, to check it in operation. The start button is the small red one on the bottom left. Timer knob, ammeter, and the Panic Button are at centre. The variable transformer knob is on the right. The small hexagonal object between Panic Button and variable transformer is the socket of air-pressure switch, to which I connect the rubber tube for pedal stop switch. The whole panel can be opened by lifting the handle at the panel low end. The interlock switch (red/black, on the panel rear) protects against

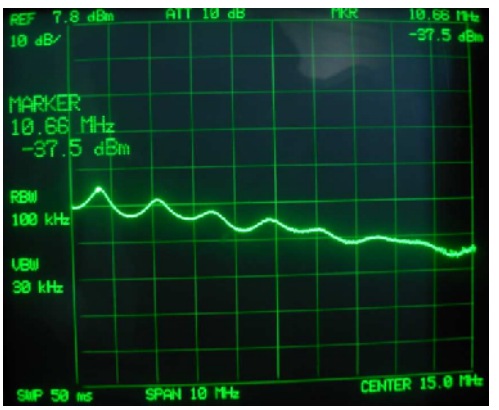


panel opening, and at the same time against the missing RF cable connection.
The spark gap assembly is placed in a compartment in which a fan blows air. This measure, though, has proven not to be necessary.



5.2.4 Measurements





Similar measurements as the ones done on the BV2 MWO have been done on this DIY model (v.2.1).
As in section 4.2.2, with second method, the spectrum analyzer's tracking generator was connected *directly to the coil primary*, and the sniffers, HP11941A or HP11940A according to the frequency range, were passed across the antenna horizontal diameter, as done before.
At frequencies lower than about 40 MHz, the frequency response is dominated by the coil's behaviour.
In the 0-10 MHz range (see figures for Coil1 and Coil2) well defined resonances are visible. The fundamental is about 0.75 MHz, the overtones are: 3.1, 4.75, 6.3, 7.8 and 9.3 MHz.

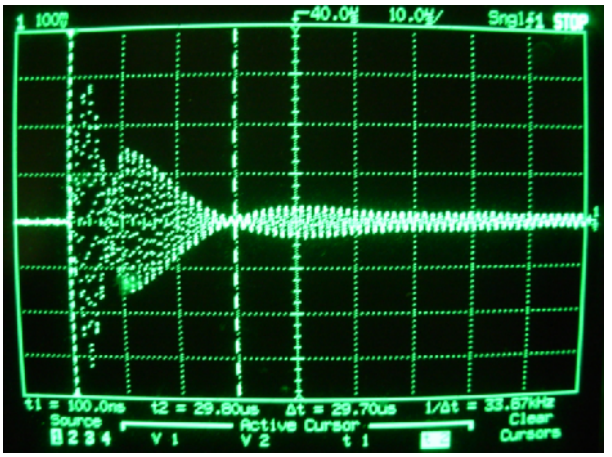
The photo on the right shows the 10-20 MHz range.
In the photo, the panoramic view of the whole response across 0-1GHz band is shown. The frequency response is dominated by the antenna behaviour at frequencies above 40 MHz
The identified resonances are:

- 58.2, 76, 91,5MHz
- 123.9 MHz
- 154.8 MHz
- 161-166 MHz
- 188-191 MHz
- 237-245 MHz
- 292-300 MHz
- ...

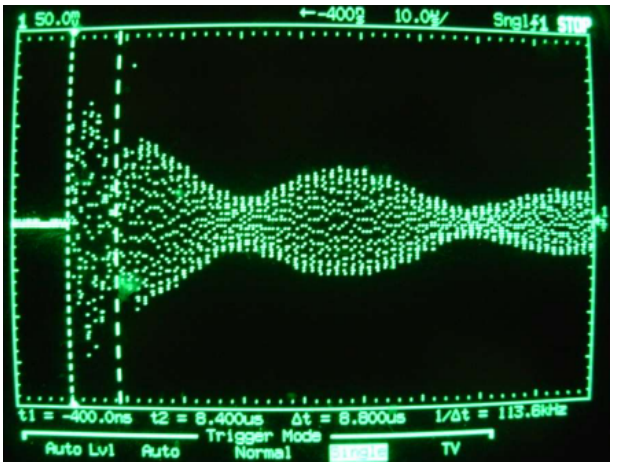
The following waveforms have been acquired as in 4.2.4 section, with both TX and RX connected.

This is for the v.2.0 coils.
The carrier frequency is estimated to be 787 KHz.
The first lobe duration is roughly 8 µs, as in BV1 model.

Here the system ground inductance was not known, but my "old" system ground was used, so fairly high value is expected.

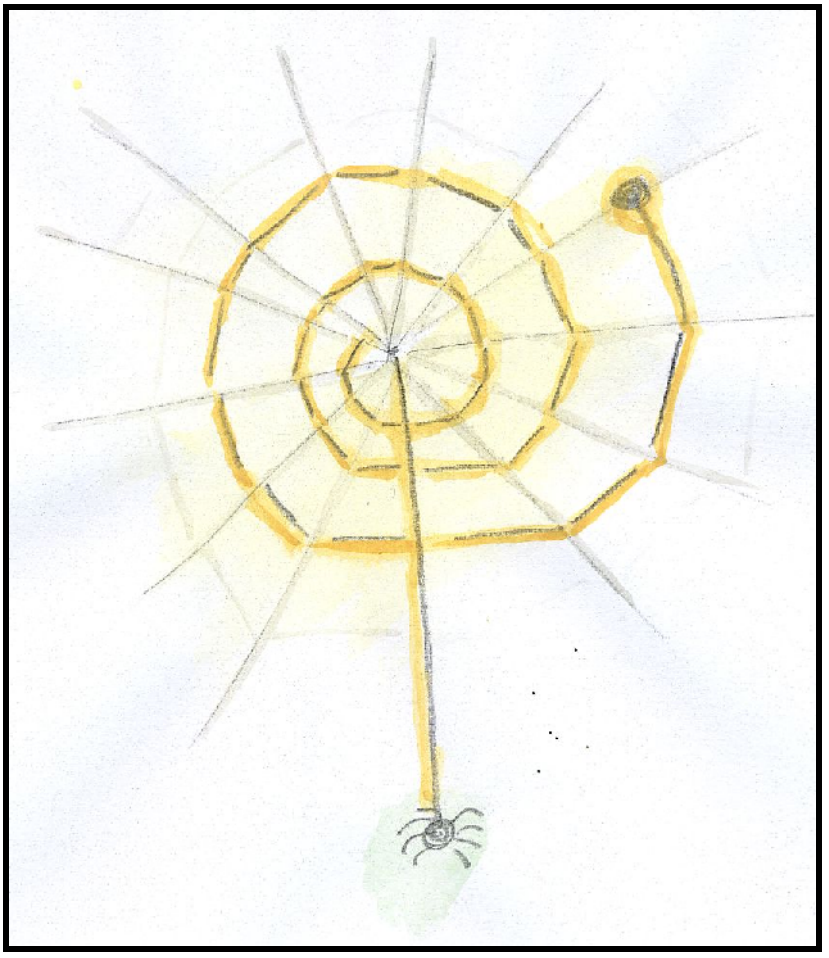


This is for the v.2.1 coils.
The waveform has been taken in a more attenuated condition, but apart from a vertical scale factor of 50 mV/div, it is the same as the previous one.
Note that the "envelope modulation" is stronger, that is due to the closer resonances frequencies of TX and RX.



6 Original Electrodes

Drawing of spiral electrode



In some of the original books and publications George Lakhovsky spoke about additional electrodes for enhancing the healing process. It is during this research that probably for the first time original electrodes where found. We have found different types of electrodes that where bundled with the BV3, the MWO in almost new condition.

The electrodes in bundle with Vassileff MWO's were:

- Footplates pair
- Hand-held insulated electrode
- Spiral electrode, with two interchangeable terminals: plate and ball
- Spiral electrode, older type, with two plate terminal

6.1 Footplates pair

Such electrodes are made by:

- A brass grid, circular, diameter of 17cm. Plastic envelope enclosing it.
- A high voltage insulated cable. Grid is soldered to centre conductor.
- Metal alligator.

Footplate electrodes

The footplates most likely should to be connected to the ground connection of the MWO, by means of the alligator. In the photo below, the footplates are visible. The person who is between the antennas has his feet on the footplates. The person is isolated from it.

The footplates most likely should to be connected to the ground connection of the MWO by means of the alligator. In the photo below, the footplates are visible. The person who is between the antennas has his feet on the footplates. The person is isolated from it.

MWO in operation with Footplates

6.2 Hand-held insulated electrode

The electrode is made by a 9 cm long, brass grid sleeve, wrapped around the end of a high insulation high voltage cable (same cable as Footplate electrodes). The centre conductor of the cable is soldered to the brass grid. A thick (14mm external diameter) glass test-tube, of the type used in chemistry laboratory, is used to enclose the electrode. A 7mm external diameter clear PVC tube covers the cable on the side of test tube. A further Bakelite/cardboard sleeve (16 mm out diameter) is present. It can be moved over the glass test tube. The other end of the cable is headed with an alligator.

Hand-held electrode

The hand held electrodes most likely should to be connected to the ground connection of the MWO, by means of the alligator. The person is isolated from the electrodes by means of the PVC tube.

6.3 Spiral electrodes

The spiral electrodes where used to make local, high intensity, applications of high frequency signal produced by MWO. Such electrode makes a frequency selection out of the available multi wave electromagnetic field. The electrode was positioned on a certain area of the body to increase the current at that position and hereby enhancing the healing process.

Both of the two original spiral electrodes analyzed are made by four parts:

- Spiral terminal
- Straight rod (tube, actually)
- Terminal (plate or ball)
- Insulated handle

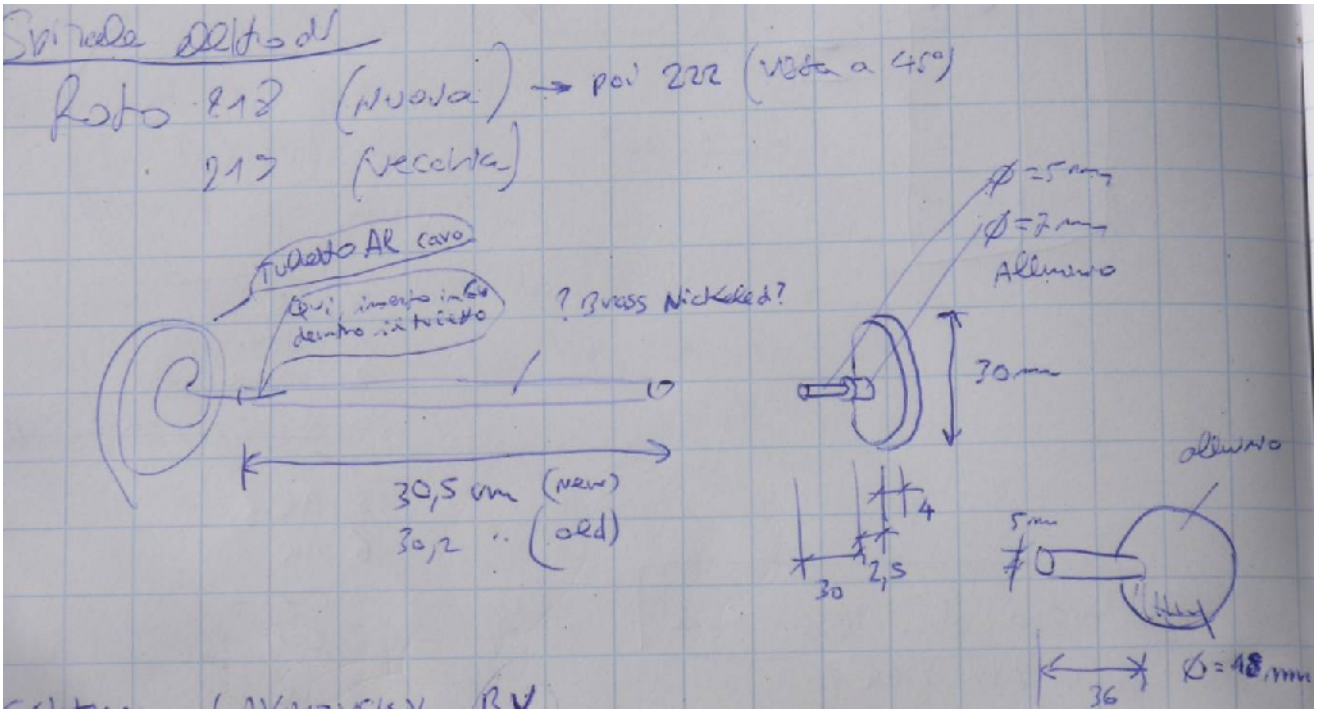
The picture below shows the method of interchangeable “plate or ball” at the end of the electrode. This is the part that is positioned against the body.

Spiral electrode

- The straight element is a "heavy" tube, probably brass with nickel or chrome coating. The internal diameter is 5 mm (external not measured... sorry- must be 6mm I guess). Length: 302-305 mm.
- Insulating handle: wood

Spiral electrode holder / “bal” and “plate” parts

The mechanical data are reported in the following figure. The plate and ball terminals are in solid aluminium.

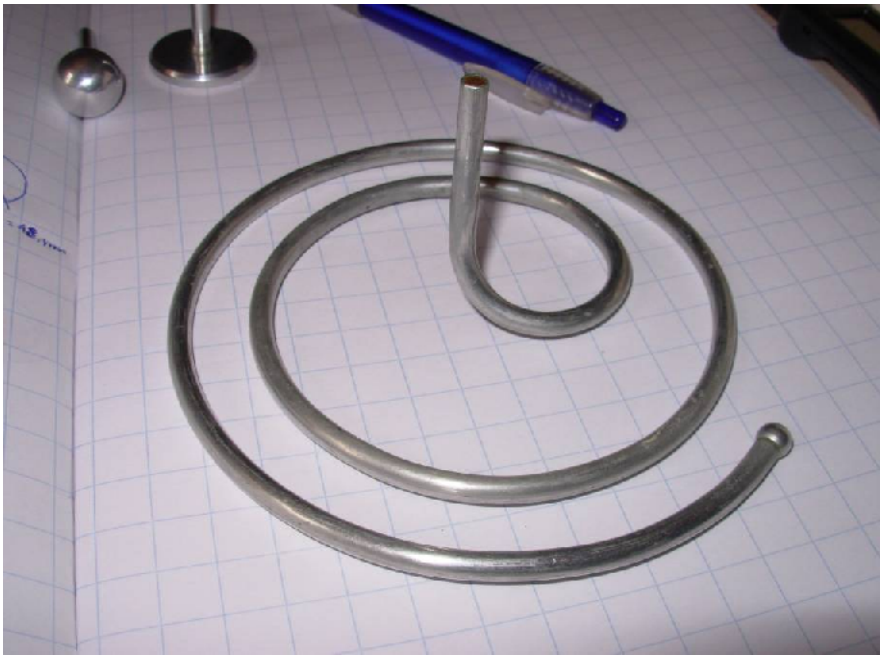


As we can see from the pictures below, the spiral has 2 turns / 2.25 turns. Please note that in the central end there is a copper inset filling the tube. The inset is tot present for the whole length of the spiral tube, in facts the weight of the spiral is light, as an aluminium tube. Most probably, the inset has been inserted before bending the

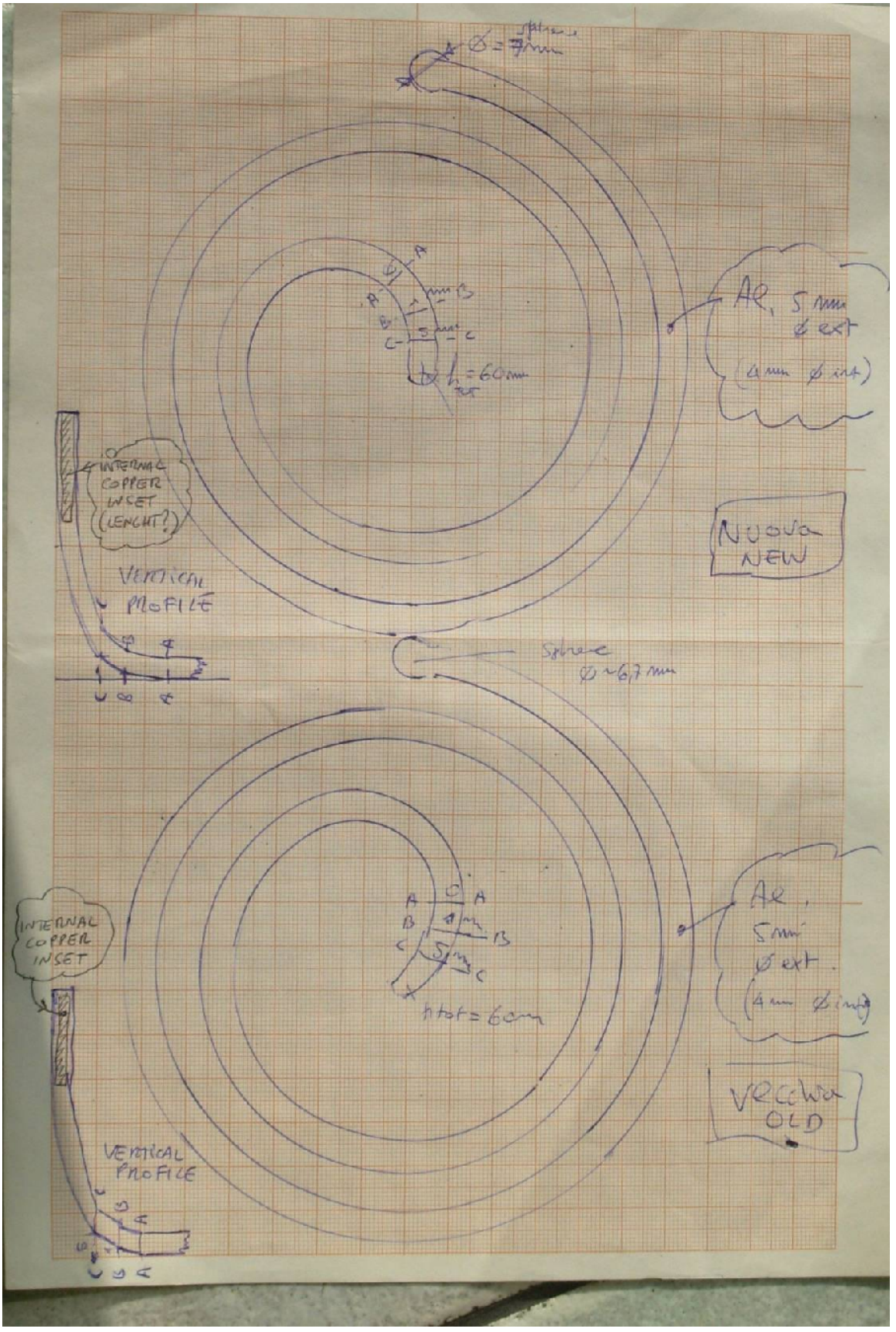
aluminium tube, in order to do a smooth work without risk of flattening the tube. The resulting "solid" end is indeed more robust for the insertion.

Top view spirals

Side view spiral



In the next picture the mechanical details of two spirals are reported.


Al, 5 mm ø ext
(4 mm ø int)
INTERNAL COPPER INSET (LENGHT?)
VERTICAL PROFILE
NUOVA NEW
Sphere ø ~67 mm
htot = 60 mm
INTERNAL COPPER INSET
VERTICAL PROFILE
Al, 5mm ø ext. (4 mm ø int)
VECCHIA OLD

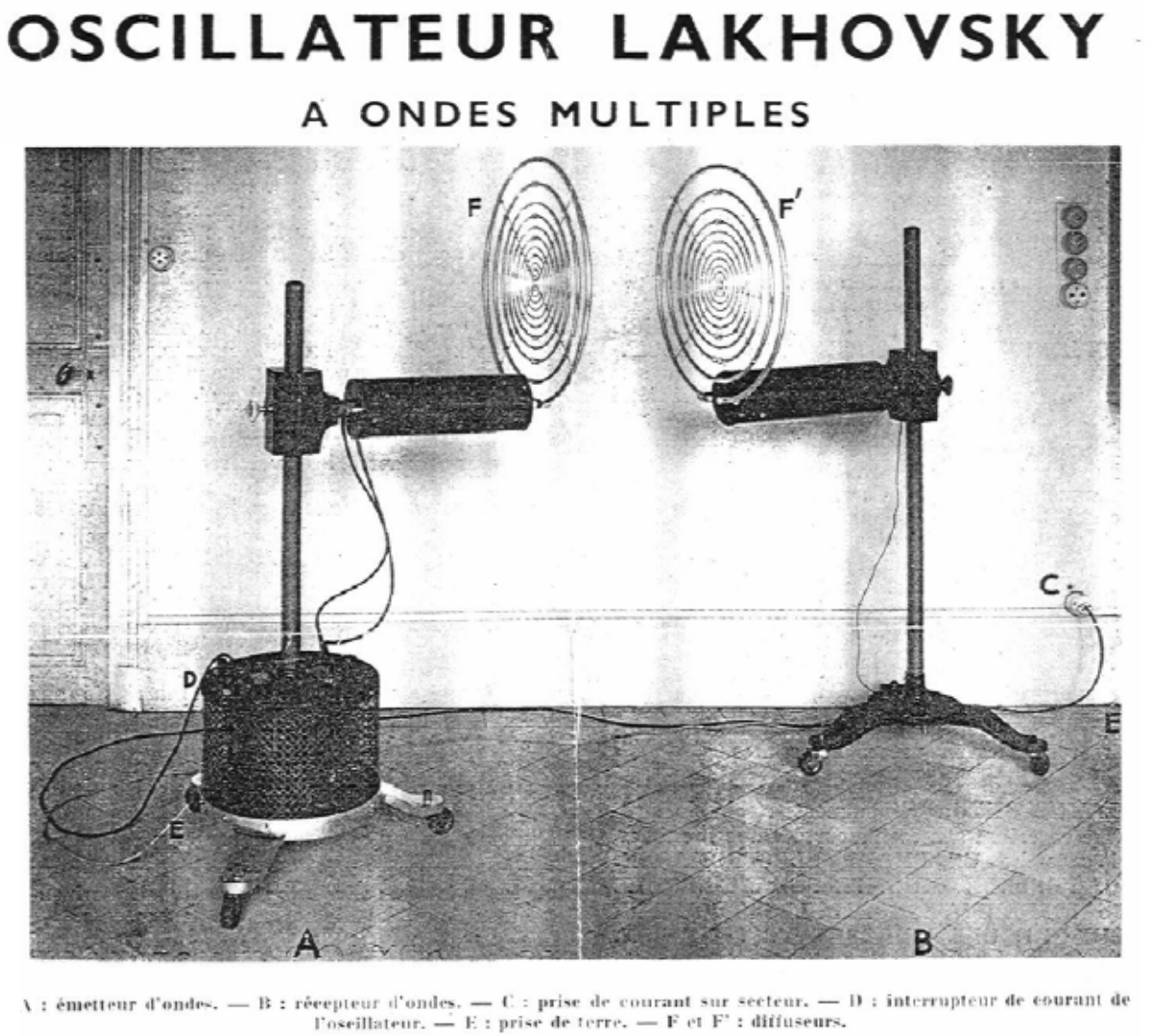
7 Some original documents

Researcher studying old documents

7.1 Original User Manuals

In the first part original documents and translations are given and the second part describes a summary based on the original documents.

7.1.1 System description Lakhovsky Multiple Wave Oscillator



A : émetteur d'ondes. — B : récepteur d'ondes. — C : prise de courant sur secteur. — D : interrupteur de courant de l'oscillateur. — E : prise de terre. — F et F' : diffuseurs.

A: Transmitter of waves
B: Receiver of waves
C: Mains Power socket
D: On-off switch of mains supply
E: Ground connector
F and F ': Antennas

A : émetteur d'ondes. — B : récepteur d'ondes. — C : prise de courant sur secteur. — D : interrupteur de courant de l'oscillateur. — E : prise de terre. — F et F' : diffuseurs.

L'OSCILLATEUR LAKHOVSKY A ONDES MULTIPLES se compose de deux parties : un émetteur d'ondes (A) et un récepteur (B).

L'appareil émetteur comprend un générateur d'ondes amorties de très haute fréquence, alimentant un diffuseur. Ce diffuseur est constitué par une série de circuits ouverts concentriques — circuits oscillants — suspendus et isolés les uns par rapport aux autres.

Le récepteur se compose d'un résonateur constitué également de circuits ouverts concentriques, isolés, absolument identiques dans leur forme et dans leur disposition à ceux du diffuseur de l'émetteur.

On obtient ainsi une énergie rayonnante qui peut atteindre 150.000 volts pour les appareils actuellement en service.

L'OSCILLATEUR LAKHOVSKY A ONDES MULTIPLES fournit toutes les longueurs d'ondes depuis 400 mètres jusqu'à 10 centimètres, soit toutes les fréquences de 750.000 à 3 milliards de périodes par seconde. Chaque circuit émet, en outre de très nombreuses harmoniques qui, avec leurs ondes fondamentales, leurs interférences et les effluves peuvent atteindre jusqu'à la gamme de l'infra-rouge et même de la lumière visible (1 à 300 trillions de vibrations par seconde).

The Lakhovsky MWO consists of two parts: a transmitter of waves (A) and a receiver (B).
The transmitter device includes a generator of damped waves of very high-frequency, feeding an antenna. This antenna is constructed by a series of concentric opened circuits, oscillating circuits suspended and isolated from each other. The receiver consists also of an antenna constructed by concentric and isolated concentric opened circuits, absolutely identical in their shape and in their arrangement to those of the transmitter antenna. One obtains radiant energy which can reach 150 000 volts for devices in service.
The Lakhovsky MWO generates all the wavelengths from 400 meters up to 10 centimetres; this is all the frequencies from 750 KHz to 3 GHz. Every circuit emits numerous harmonious who, with their fundamental waves, their interferences and effluvia's can reach the range of infrared and even visible light (1 to 300 trillions of vibrations per second).

7.1.2 Technology and Instructions

TECHNIQUE ET MODE D'EMPLOI

On sait, d'après les théories aujourd'hui célèbres de Georges Lakhovsky, que la cellule vivante peut être assimilée à un oscillateur de très haute fréquence, vibrant sous l'action d'ondes d'origine extérieure, sur une gamme de fréquences très étendue.

Les cellules de notre organisme cessent d'osciller sous l'influence de causes multiples : carence de certains minéraux (fer, phosphore, magnésium, etc.) dans la composition organique de la cellule, variation excessive des ondes cosmiques, radiations secondaires provenant du sol, etc... C'est ainsi que des milliards de cellules meurent journellement dans notre organisme. Dans ses ouvrages, Lakhovsky a expliqué par quel processus les cellules ainsi mortes pouvaient, dans certains cas, provoquer dans les cellules vivantes des troubles qui sont à l'origine des tumeurs cancéreuses. Il en a longuement développé les causes pathologiques et leurs conséquences dans son étude LA FORMATION NEOPLASIQUE ET LE DÉSÉQUILIBRE OSCILLATOIRE CELLULAIRE faisant suite à son ouvrage capital L'OSCILLATION CELLULAIRE (G. Doin et Cie, éditeurs, Paris).

Pour empêcher les cellules mortes de provoquer dans l'organisme des troubles de toute sorte, notamment le cancer, Georges LAKHOVSKY a cherché le moyen de donner artificiellement un choc oscillatoire apériodique à toutes les cellules vivantes, de manière que chaque cellule vivante de l'organisme trouve sa fréquence propre dans le champ des ondes créé à cet effet.

Pourtant, comme il existe environ 200 quintillions de cellules dans le corps humain, et que chaque cellule oscille sur sa fréquence propre, le problème paraissait insoluble. On imaginait difficilement, en effet, un appareil susceptible de produire toutes les fréquences nécessaires.

LAKHOVSKY a élégamment résolu le problème en créant son oscillateur à ondes multiples, qui engendre UN CHAMP ÉLECTROMAGNÉTIQUE D'ONDES MULTIPLES, DANS LEQUEL LES DIFFÉRENTES CELLULES TROUVENT LEUR FRÉQUENCE PROPRE D'OSCILLATION.

L'emploi de l'appareil ainsi constitué est extrêmement simple :

L'oscillateur étant branché sur le courant du secteur, on place le malade dans la position requise (debout, assis ou couché) entre les deux diffuseurs éloignés du corps du sujet d'environ 50 centimètres chacun.

Le sujet devra éviter, de préférence, de garder, pendant le traitement, des objets métalliques, trousseau de clefs, etc... susceptibles de provoquer des étincelles, sans danger d'ailleurs, dont le piquetement serait peu agréable.

Les deux diffuseurs sont montés sur des pieds-vertieaux à coulisse qui permettent leur réglage en hauteur. Les roulettes en caoutchouc dont ils sont munis leur permettent également de se poser sur les parquets de toute nature. Les sièges et lits de traitement doivent être conçus comme pour les appareils de haute fréquence et les mêmes précautions d'ordre pratique doivent être observées dans l'emploi de l'oscillateur.

Dans certains cas, pour que les ondes pénètrent plus profondément dans l'organisme, on peut faire tenir au sujet une électrode métallique, reliée à la terre (prise sur conduite d'eau, de gaz, de chauffage). On place alors l'électrode dans une des mains du malade en ayant soin de ne donner le courant qu'après lui avoir recommandé de ne pas la lâcher. On arrêtera de même le courant avant d'enlever l'électrode de la main du malade.

Tous les traitements de haute fréquence peuvent être envisagés avec L'OSCILLATEUR LAKHOVSKY A ONDES MULTIPLES, l'électro coagulation, entre autres, au moyen d'électrodes métalliques tenues par un manche isolant dans le champ électro-magnétique et appliquées sur la partie malade. Tous renseignements à cet égard, sont fournis sur demande directe adressée aux Laboratoires COLYSA.

L'OSCILLATEUR LAKHOVSKY A ONDES MULTIPLES peut être construit sur demande pour toutes les applications, de manière à être alimenté par toutes sortes de courants.

Enfin, l'on peut varier la position des diffuseurs et les monter, soit verticalement, soit horizontalement pour les divers cas de traitements.

Cet appareil, très maniable, simple et robuste, ne demande aucune connaissance technique particulière de la part du médecin qui l'emploie.

We know, according to the famous theories of Georges Lakhovsky, that the living cells can be synchronised to an oscillator of very high-frequency, vibrating under the effect of waves of outside origin, on a very wide range of frequencies.
The cells of our body stop oscillating under the influence of multiple causes: deficiency of certain minerals (iron, phosphor, magnesium, etc.) in the organic composition of the cell, the excessive variation of the cosmic waves, the secondary radiations resulting from the ground, etc. and so billions of cells die daily in our body. In his works, Lakhovsky explained by which process of dead cells, could, in certain cases, provoke in the living cells disorders which are at the origin of the cancerous tumours.

He developed for a long time the pathological causes and their consequences in his study « La Formation néoplasique et le déséquilibre oscillatoire cellulaire »" following upon his major work "L'oscillation Cellulaire ".
To prevent the dead cells to provoke in the body various disorders, in particular cancer, Georges Lakhovsky looked for the means to give artificially an oscillatory shock in all the living cells, in a way that every living cell of the body finds its appropriate frequency in the field of the waves created for that purpose.
Nevertheless, as there is approximately 200 quintillions of cells in the human body, and as every cell oscillates on its appropriate frequency, the problem seemed insoluble. We imagined with difficulty, indeed, a device susceptible to produce all the necessary frequencies.
Lakhovsky also resolved the problem by creating his oscillator with multiple waves, which generates an electromagnetic field of multiple waves, in which the various cells find their appropriate frequency of oscillation.

The use of the device constructed in this way is extremely simple:

With the oscillator being connected to the mains supply, we place the patient in the required position (standing or seated) between both antennas with 50 centimetres distance between the body and both antennas.
The subject will have to avoid wearing metallic objects during the treatment to avoid sparks, however without danger, would be a little unpleasant.
Both antennas are attached to vertical holders which allow their regulation in height. The rubber wheels with which they are provided also allow them to settle on every kind of floor. Seats and beds that are used for the treatment must be suitable for devices of high frequency and the same precautions should be taken for the oscillator.
In certain cases when the waves have to penetrate more profoundly into the body, we can connect the subject with a metallic electrode, connected with the ground (taken on main of water, gas, heating). We place then the electrode in one of the hands of the patient by taking care that the subject does not release it while in operation. We shall also disconnect the mains supply before removing the electrode of the hand of the patient.

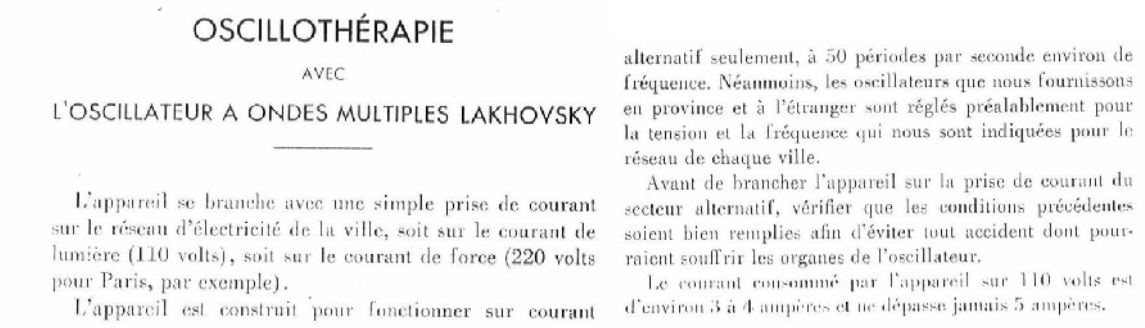
All the treatments of high frequency can be done with the Lakhovsky MWO, the electro coagulation, among others, by means of metallic electrodes held by an isolating handle in the electromagnetic field and applied to the sick part. Any information in this respect is supplied on inquiry direct sent to laboratories COLYSA.

RECOMMANDATIONS PRATIQUES. — 1° Établir la prise de terre (E) de l'oscillateur en la reliant à une conduite d'eau ou de chauffage : 2° Brancher la prise de courant (C) sur le secteur ; 3° Placer le malade dans le champ magnétique entre les deux diffuseurs ; 4° Régler la hauteur des diffuseurs en plaçant leur centre à la hauteur de la partie du corps à traiter ; 5° Ouvrir le courant avec la manette de l'interrupteur (D) ; 6° Laisser le malade dans le champ pendant 10 à 15 minutes (en principe deux à trois fois par semaine jusqu'à la sixième séance, ensuite par séance hebdomadaire) la fréquence des séances étant laissée à l'appréciation du médecin traitant ; 7° Fermer le courant en ramenant la manette (D) de l'interrupteur.

Practical recommendations

1 - Establish the ground connector (E) of the oscillator by connecting it to the conducting structure of the water distribution or heating installation.
2 - Connect the mains power supply to the inlet socket (C).
3 - Place the patient in the magnetic field between both antennas.
4 - Adjust the height of the antennas by placing their centre at the height the part of the body to be treated.
5 - Switch the mains supply on with the switch (D).
6 - Leave the patient in the field for 10 to 15 minutes (in principle two to three times a week until the sixth session, then by weekly session), the frequency of the sessions being defined by the regular doctor.
7 – Switch the mains supply off by returning the lever (D) of the switch.

7.1.3 "Oscillotherapie" with Lakhovsky MWO



OSCILLOTHÉRAPIE

AVEC

L'OSCILLATEUR A ONDES MULTIPLES LAKHOVSKY

L'appareil se branche avec une simple prise de courant sur le réseau d'électricité de la ville, soit sur le courant de lumière (110 volts), soit sur le courant de force (220 volts pour Paris, par exemple).

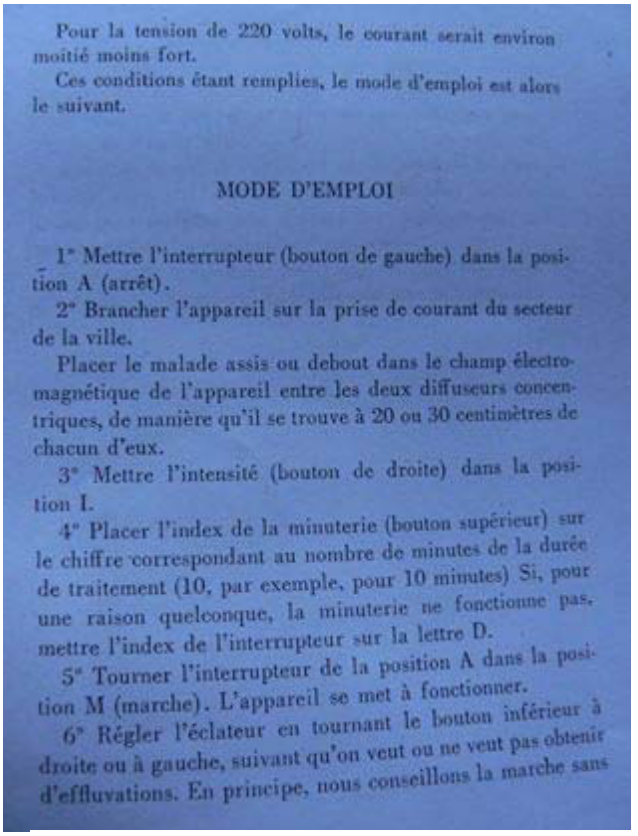
L'appareil est construit pour fonctionner sur courant alternatif seulement, à 50 périodes par seconde environ de fréquence. Néanmoins, les oscillateurs que nous fournissons en province et à l'étranger sont réglés préalablement pour la tension et la fréquence qui nous sont indiquées pour le réseau de chaque ville.

Avant de brancher l'appareil sur la prise de courant du secteur alternatif, vérifier que les conditions précédentes soient bien remplies afin d'éviter tout accident dont pourraient souffrir les organes de l'oscillateur.

Le courant consommé par l'appareil sur 110 volts est d'environ 3 à 4 ampères et ne dépasse jamais 5 ampères.

The device is connected to the electricity network of the city, either at 110 volts, or on 220 volts like for example in Paris.
The device is built to work on alternating current of 50 Hertz. Nevertheless, the oscillators which we supply for province and abroad are beforehand adjusted for the tension and the frequency that are indicated to us for the network of every city.
Before connecting the device to the electricity network it has to be checked that it is suited for 110 or 220 Volts, otherwise the oscillator could be damaged.
The current consumed by the device on 110 volts is about 3 to 4 amperes and never exceeds 5 amperes.

7.1.4 Instructions for Use



Pour la tension de 220 volts, le courant serait environ moitié moins fort.

Ces conditions étant remplies, le mode d'emploi est alors le suivant.

MODE D'EMPLOI

1° Mettre l'interrupteur (bouton de gauche) dans la position A (arrêt).

2° Brancher l'appareil sur la prise de courant du secteur de la ville.

Placer le malade assis ou debout dans le champ électromagnétique de l'appareil entre les deux diffuseurs concentriques, de manière qu'il se trouve à 20 ou 30 centimètres de chacun d'eux.

3° Mettre l'intensité (bouton de droite) dans la position I.

4° Placer l'index de la minuterie (bouton supérieur) sur le chiffre correspondant au nombre de minutes de la durée de traitement (10, par exemple, pour 10 minutes) Si, pour une raison quelconque, la minuterie ne fonctionne pas, mettre l'index de l'interrupteur sur la lettre D.

5° Tourner l'interrupteur de la position A dans la position M (marche). L'appareil se met à fonctionner.

6° Régler l'éclateur en tournant le bouton inférieur à droite ou à gauche, suivant qu'on veut ou ne veut pas obtenir d'effluvations. En principe, nous conseillons la marche sans effluvations, si ce n'est dans le traitement des affections pulmonaires (ozothérapie).

7° On peut augmenter l'intensité du champ électromagnétique en tournant à droite le bouton d'intensité (bouton de droite).

For the 220 volt tension, the current would be approximately half of the above values. When these conditions are fulfilled, the instructions for use are then the following one:

1. Put the switch (left button) in the position A (stop)
2. Connect the device to the electricity network of the city.
3. Place the seated or standing patient in the electromagnetic field of the device between both concentric antennas, in a way that he is in 20 or 30 centimetres of each of them.
4. Put the intensity (right button) in the position I
5. Place the index of the timer (upper button), on the figure corresponding among minutes of the duration of treatment (10, for example, for 10 minutes). If for some reason, the timer does not work, to put the index of the switch on the letter D.
6. Turn the switch of the position A in the position M (Start). The device starts.
7. Adjust the spark gap by turning the lower button to the right or to the left, as we want or do not want to obtain effluvia's. In principle, we recommend the use without effluvia's, if it is not a treatment of lung infections ("ozothérapy").
8. We can increase the intensity of the electromagnetic field by turning the button of intensity (right button) to the right.

7.1.5 Treatment Method

MODE DE TRAITEMENT

En cas de tumeurs ulcérées extérieures, nous conseillons l'application sur la partie malade d'une compresse bien imbibée d'une solution de nitrate d'argent à 30 pour 1.000

que l'on recouvre d'une autre compresse sèche. Appliquer la petite rondelle plate placée à l'extrémité de l'électrode à spirale directement sur la compresse en contact direct, de façon à éviter l'étincelage entre les deux.

Ou bien, sans mettre de compresse imbibée, entourer la tige supérieure de l'électrode munie de la petite boule, d'un morceau d'ouate hydrophile imbibée de la même solution et l'appliquer en contact direct avec la tumeur. Vous obtenez, dans ce cas, un très léger étincelage qui n'est pas nuisible et qui permet, parfois, d'atteindre un bourgeon charnu ou un bourgeon épithéliomateux. Ce procédé peut jouer le rôle d'électro-coagulation. Il est entendu que la spirale de l'électrode doit être placée à 15 ou 20 cm. de l'émetteur, en évitant, autant que possible, l'étincelage entre l'émetteur et la spirale; s'il s'en produit, aucun inconvénient, mais à éviter. (Fig. 4.)

En cas de tumeur hémorragique, la solution de nitrate d'argent doit être remplacée par une solution de chlorure de calcium à 50 pour 1.000.

Pour les tumeurs internes, vous pouvez exposer simplement le malade entre l'émetteur et le récepteur, ou bien avec la partie plate de l'électrode, appliquer directement cette partie plate contre le siège présumé de la tumeur, sur la peau.

En cas de prostatite, mettre le malade à cheval sur l'électrode, l'antenne bien placée dans le sillon inguino-scrotal et la petite boule dans le sillon anal.

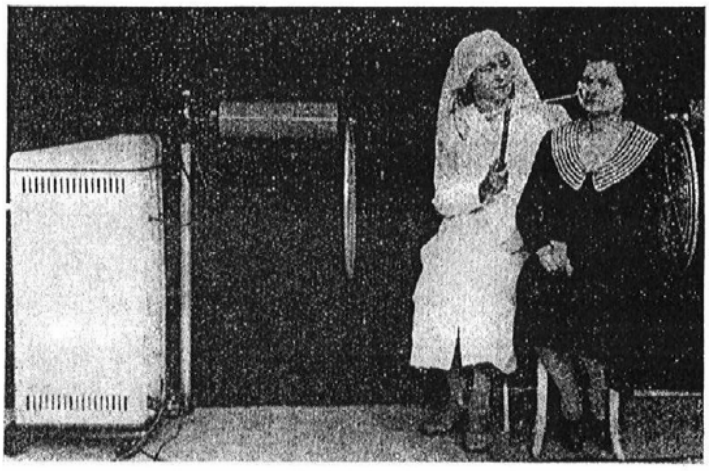
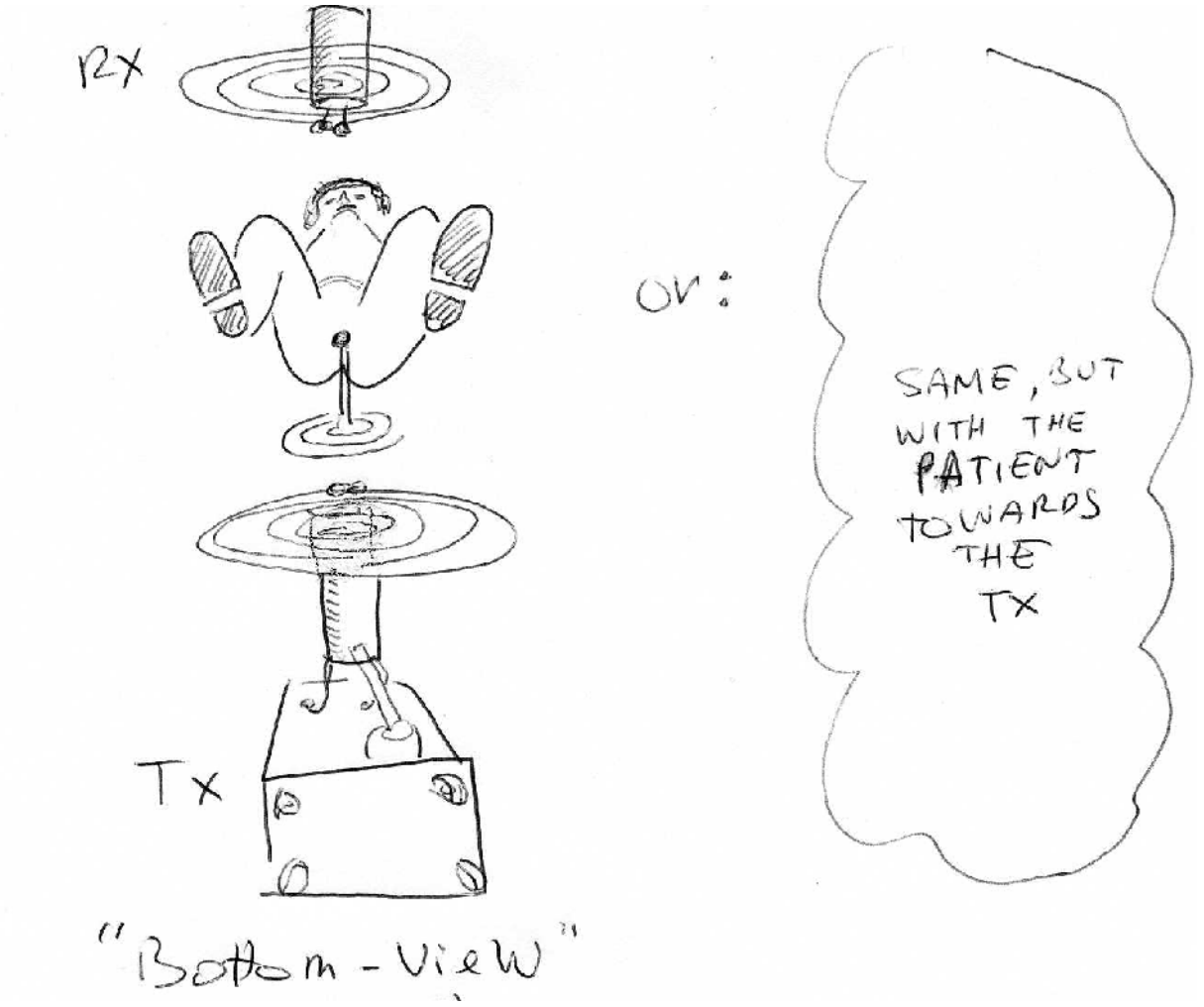


Fig. 4. — Application de l'électrode auxiliaire dans les cas locaux.

In case of external tumours, we advise the application on the sick part of a compress soaked well with a solution of silver nitrate of 30 for 1000 which we recover of another dry compress. Apply the small flat slice placed at the end of the electrode

with spiral directly on the compress in direct contact, so as to avoid sparks between both.
Either, without putting a soaked compress, with the electrode provided with the small ball, surround the ball with some cotton soaked with the same solution and apply it in direct contact with the tumour. You will obtain, in that case, a very light sparking which is not harmful and which allows, sometimes, to reach a fleshy bud or a bud “épithéliomateux”. This process can play the role of electro coagulation. The spiral of the electrode must be placed at 15 to 20 cm from the transmitter, to avoid as much as possible, sparks between the transmitter and the spiral; if it occurs, it is not dangerous but inconvenience.
In case of hemorrhagic tumour, the solution of silver nitrate must be replaced by a solution of chloride of calcium of 50 for 1000.
For the internal tumours, you can expose simply the patient between the transmitter and the receiver, either with the flat part of the electrode; apply directly this flat part against the presumed place of the tumour, on the skin.
In case of prostate, the patient is put horseback on the electrode, the antenna placed well in the inguinal-scrotal furrow and the small ball in the anal furrow.
[S*ee below an interpretation of this sentence. Bottom view, the chair is not shown. The back of the patient is towards the TX antenna*]



Pour intensifier l'action de l'appareil, nous conseillons l'emploi, pendant les séances, soit de la ceinture S. I., soit, ce qui nous a donné des résultats encore meilleurs, d'une ceinture système Georges LAKHOVSKY à ondes multiples.

Les séances sont réglées de 10 à 12 minutes, tous les jours, ou tous les deux jours, avec un repos prévu par périodes de quatre jours.

Si le cas est grave et qu'il y ait lieu de précipiter le traitement, il n'y a aucun inconvénient à continuer les séances tous les deux jours ou tous les jours, et même à raison de deux séances par jour, de dix minutes chacune, matin et soir.

Au bout de 10 à 12 séances, dans ce dernier cas, il est préférable d'arrêter le malade quelques jours (une huitaine de jours).

NOTA. — Dans les traitements pré-opératoires, munir le malade d'une ceinture à ondes multiples et le placer dans le champ de l'appareil. Faire six à huit séances avant l'opération.

On obtient ainsi des résultats remarquables car la numération globulaire devient normale, la cicatrisation s'effectue très rapidement. Il en résulte, de ce fait, des opérations sans accident.

To intensify the action of the device, we advise the use, during the sessions, either of the belt S, I, or, what gave us even better results, belt Georges Lakhovsky system with multiple waves.
The sessions are settled from 10 till 12 minutes every day, or every other day, with a rest planned by periods of 4 days.
For serious problems, it will be no inconvenience to continue the sessions every other day or every day, and even at the rate of two sessions a day, of ten minutes each, in the morning and evening.
At the end of 10 to 12 sessions, in this last case, it's better to stop for a few days (about eight days).

Noted - In treatments before someone has to undergo an operation, the patient is provided with a belt with multiple waves and he is placed in the field of the device. Six to eight sessions can be given before the operation.
We so obtain remarkable results because the spherical numeration becomes normal, the healing is made quickly. It results in less risky operation.

7.1.6 Front Panel Controls

Fig. 3. — La platine de l'appareil comporte quatre volants ou boutons de commande:

En haut, le volant de la minuterie qui permet de prédéterminer le temps de fonctionnement de l'appareil et dont l'index se déplace devant un cadran gradué en minutes, en plaçant cet index devant le chiffre 5, on obtiendra une durée de fonctionnement de 5 minutes, etc., etc.

Plus bas et à gauche, l'interrupteur à trois positions:

Position A: Arrêt,
Position D: Marche directe (sans minuterie),
Position M: Marche commandée par la minuterie.

A droite, le volant de réglage de l'intensité (cette intensité variant dans le même sens que les chiffres devant lesquels l'index peut se déplacer).

En bas, le volant de commande réglant la puissance mise en jeu dans l'éclateur et, par conséquent, l'intensité de champ à haute fréquence et de l'effluvation.

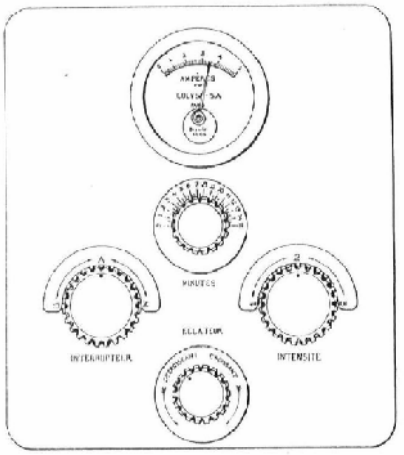


Fig.3 - The front panel of the device contains four controls:

At the top is the timer which allows predetermining the time of functioning of the device in minutes. By placing the index in front of the figure 5, we shall obtain duration of functioning of 5 minutes, etc. …
A bit lower on left, the ON/OFF switch that has three positions:

Position A: OFF
Position D: Direct ON (without timer)
Position M: ON via the timer.

To the right is the regulation of the intensity (3 intensity settings, 1/2/3)
Below, the steering wheel for adjusting the power by means of the spark gap and, consequently, the intensity of the high-frequency field and the production of effluvia's.

7.1.7 Use of Electrodes: photos

In this section we report a few photos showing the use of spiral electrodes.

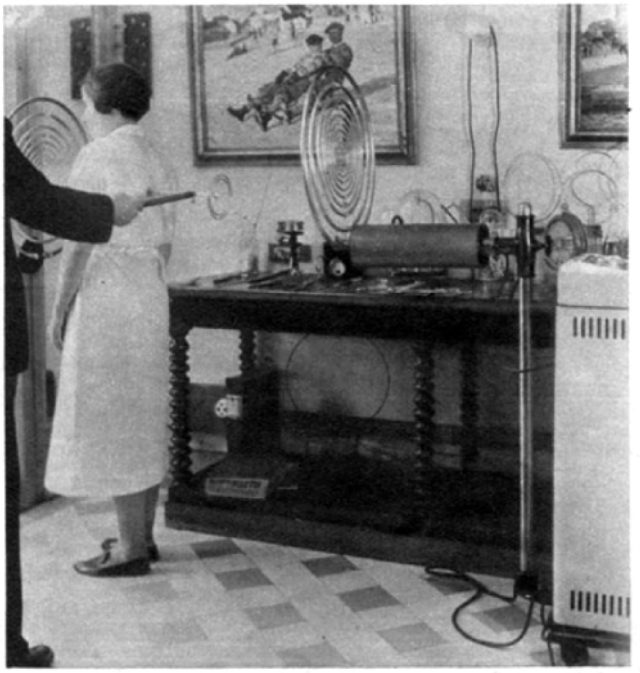
This photo has been already presented in the section “Treatment Method” above. The electrode's disk terminal is pressed against the sick part with a compress soaked with a solution of chemical.

Fig. 4. — Application de l'électrode auxiliaire dans les cas locaux.

The following photo is from a vintage French newspaper. Also notice the big number of different loops scattered on and under the table. Again the terminal with the disk is used.

UN TRAITEMENT PAR L'OSCILLATEUR A ONDES MULTIPLES DE LAKHOVSKY. LE SUJET EST MAINTENU PENDANT QUELQUES INSTANTS ENTRE L'ÉMETTEUR ET LE RÉCEPTEUR DE L'APPAREIL

(Photo Bernand.)



This photo is from an Italian magazine. On the left: Doctor Boris Vassileff. The electrode is held by the patient herself against the head. The terminal is not visible.

Below is another photo taken from an Italian magazine. Doctor Boris Vassileff holds the electrode. The electrode position here is not meaningful; probably the doctor position was dictated for the sake of taking a photo.
The terminal is the ball (usually used for prostate treatment).

7.2 Summary based on documents from G.Lakhovsky, Nicola Gentile

Many different configurations are possible with the MWO; the parameters that can be changed are:

- Duration and repetitions of the sessions
- Spark Gap setting
- Intensity I, II, III (Pulse Rate)
- Antennas distance
- Grounding
- Feet or hand electrodes
- Spiral electrode
- Direction in which the antennas are set

Antennas distance

The device is composed of a transmitter and a receiver in order to establish an electrostatic multi-wave field between the two antennas. The distance between antennas is 80cm; or can be enlarged to 150 cm for less intense applications. The patient is placed between the antennas, either standing or sitting on a non metallic seat. The distance between the patient and the antennas should be 20 to 30 cm. If required the antennas can be positioned in vertical or horizontal position. The antennas centre should be aligned in height to the area of treatment.

Grounding

It is very important that the MWO is connected to grounding facility. The obtained medical results have been much faster if the ground composition under the place of treatment is of good conducting nature.

Duration and repetitions of the sessions

Nicola Gentile:
Usually I do a session every 4 days, 5-15 minutes each.
This is the technique that gave me best results after I tried many.
If the result is late after 7-8 sessions, I continue with one every 8 days for 15-30 times. I never noticed any type of damage with all these sessions. The general health always improves, sometimes only for a while, in facts the same patients sometimes do insist asking to repeat the sessions. (Nicola Gentile)

G.Lakhovsky:
The duration of each session depends on the state of the patient and the degree of the disease. In principle, 15 minutes for each session. We obtained an excellent result by every two days with sessions from 5 to 7 minutes. Some doctors believe that each session should last 10 to 12 minutes.

The number of sessions varies depending on the state and the reactions of the patient. It is good practice to stop treatment after the fourth session (after 15 days approximately) and for 15 days to 3 weeks or so. Then resume at a rate of once week. This is to allow the neoplastic cells become necrotic. Exposure to radiation from the device once a week or even once every 15 days is a good practice for preventing colds and flu, but also for organic diseases and even cancer; it strengthens the body so it can fight against all pathogenic cause.

For increases performance it is advised to ware a G.L. oscillating circuit. Sessions of 10 to12 minutes every day or every 2 days with a rest period of 4 days. In serious cases even 2 sessions a day can be given, one in the morning and one in the evening. After 10 to 12 sessions it is advised to wait for 8 days.

Remarkable results have been obtained in case of pre-operative patients with 6 to 7 sessions given before the operation. It is advised to wear G.L. oscillating circuit.

Intensity and Spark Gap

The power I use more frequently is intensity III (1.5 Amperes), which gives an electric discharge of about 10cm. In less strong patients I do only intensity II (1 Amperes), which gives same voltage but less current. In weaker people and children I do intensity I (1 ampere) which gives an electric discharge of 2-3cm only (Nicola Gentile). A reference point is the electric discharge of 10cm. This is the spark been drawn between a piece of grounded metal and the outer ring of the transmitter antenna.

The spark gap can be aligned to generate “effluvia” or not. It is recommended to set the spark gap to that position that no “effluvia” is generated. Generation of “effluvia” is only recommended for lung problems since with this setting ozone are generated.

Feet or hand electrodes

For certain cases it is required that the waves are penetrating more deeply in the body. This can be accomplished by using electrodes which are further connected to the ground. One places the electrode in one hand of the patient before the MWO is switched on and when the session is finished, the MWO is first switched off and afterwards the electrode is removed from the patient hand.

Spiral electrode

For certain cases it is required that the wave are more concentrated on a sick part of the body. This can be accomplished by using the spiral electrode that is isolated from the ground and held in position by an isolated holder. One places the spiral electrode against the sick part of the patient before the MWO is switched on and when the session is finished, the MWO is first switched off and afterwards the electrode is removed from the patients.

In severe cases of ulcers and tumours it is recommended to use a compress that is foreseen of a solution of 3 % silver nitrate and that is covered with a dry compress. The “plate” at the end of the spiral electrode is then placed directly on the dry compress. Only after this is done the MWO can be switched on, otherwise small sparks are generated between the “plate” of the spiral electrode and the skin.
Another possibility is to use the “ball” at the end of the spiral electrode and to provide it with the mixture of 3 % silver nitrate and directly apply to the sick part. In this case a small spark can develop between the “ball” and the skin.
The backside of the spiral electrode, which is the spiral, should be at least 15 to 30 cm away from the antennas. This to prevent sparks between the antenna and the electrode.
In case of a tumour bleeding the 3 % silver nitrate solution can be replaced by a 5 % calcium chloride solution.
For internal tumour, the patient is placed between the antennas and the spiral electrode with the “plate” is positioned at the skin to the closed distance to the tumour.
In case of prostate is that patient put “a horse” on the spiral electrode that in this case is equipped at the end with the “ball”.

Needle electrode

G.Lakhovsky:

The method exists in making a selection of the desired short wavelength from the field of the oscillator, for example a wave of 20cm, 10, 5 or 1cm. This selection is made through resonators vibrating on a half-wave, easy to achieve.
It suffices to bend an L-shaped glass tube of 6 to 8 mm inner diameter approximately, to seal its end with a rubber rod and insert a heated needle to prepare the insertion of the electrodes.
The glass tube, perfectly isolated, can be used to support a range of different needle lengths, making it possible selecting all wavelengths.
The needles, isolated at their ends, vibrate half-wave. Thus a needle length of 3 cm, vibrate at 6cm wavelength.
The resonator is moved over the skin while it first captures a very short wavelength and secondary re-radiates considerable energy, which gives remarkable results.
So by touching the back of the hand with a needle insulated 5 cm in length, for example, we managed to reduce considerably the brown age spots, not only of the hand dealt with, but also those of the other hand.
Surprising results have also been obtained using these needles for the treatment of skin cancer; the result was much faster than the radiation of the MWO field without employed electrodes.

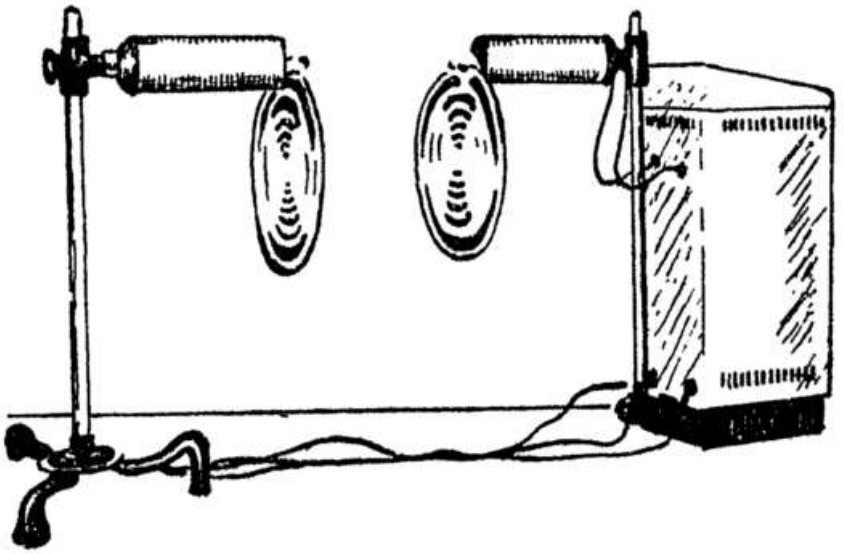
Direction of the antennas

In an interview with Serge Lakhovsky it is said that the MWO has a better efficiency if the transmitter antenna is pointed to the magnetic North.

7.3 List of illness treated by MWO (documents 1935-1950)

Written by Boris H. Vassileff

Come e quali malattie si curano coll'Oscillatore Lakhovsky



L'OSCILLATORE LAKHOVSKY

II EDIZIONE

QUALI MALATTIE SI CURANO COLL'OSCILLATORE

Volendo dare una breve, sommaria risposta alla domanda: « Quali malattie si curano coll'oscillatore a onde multiple Lakhovsky », diremo che:

L'oscillatore Lakhovsky, curando tutto l'organismo, mette il terreno organico in uno stato di resistenza psichica, fisica, biologica e quindi in perfetto grado di lotta, tale da poter difendere, arrestare e combattere tutte le malattie esistenti. Grazie alla dovuta e riacquistata energia reattiva e riparatoria l'organismo mette tutte le proprie riserve di lotta (reazione del sangue, del sistema nervoso, degli apparati, organi e tessuti) e sopratutto mobilita le cellule ed i rispettivi ormoni cellulari, che hanno molte caratteristiche in comune colle vitamine, cogli enzimi ecc.

E' inteso che assieme al miglioramento generale di tutto l'organismo interessando direttamente le cellule ammalate dal punto di vista equilibrio vibratile oscillatorio compromesso, nonchè ristabilisce il tono e la funzionalità psico-neuro organico e vegetativa dei due principali sistemi del nervo simpatico e del vago.

Abbiamo dato così una breve, sintetica risposta, ma so per pratica, e la psicologia ci insegna, che sia il semplice lettore, come chi è sofferente di qualche malattia, esigono e desiderano conoscere dettagliatamente, avere dati precisi sulle singole malattie da curare.

Darò quindi un elenco esauriente *delle malattie che si possono curare coll'oscillatore*, mentre in una prossima pubblicazione presenterò *una ricca e varia casistica di malattie trattate e curate coll'oscillatore a onde multiple*.

Which diseases are cured with the oscillator

Wishing to give a short summary answer to the question: " Which diseases are cured with the Lakhovsky multiple wave oscillator", we'll say that:
The Lakhovsky oscillator, treating the whole body, sets the organic ground in a state of mental, physical, and biological strength, and thus in a perfect position to fight, such that they can defend, stop and fight all the existing diseases. Thanks to the regained reactive and reparatory energy, the body puts all its reserves to fight (the reaction of blood, nervous system, apparatus, organs and tissues) and especially mobilizes the cells and their cellular hormones, which have many characteristics in common with vitamins, enzymes, etc.
It 'is understood that along with the general improvement of the whole organism, involving directly the diseased cells from the standpoint of the oscillatory balance at risk; and restore the tone and organic and psycho-neuro-vegetative features of the two main nerve: simpatic and vague.
So we gave a short, succinct answer, but I know from practice, and psychology teaches us, that the mere reader, as well as who is suffering from some disease, require and want to know in detail, have precise information on individual diseases to treat.
Then I will give an exhaustive list of diseases that can be cured with the oscillator, while in a forthcoming publication will present a rich and varied case studies of diseases treated and cured with multiple wave oscillator.

TESTA : Cefalea - emicrania - taluni tumori, ipertensione ed arteriosclerosi cerebrali, compressione dei centri nervosi da emorragie, essudati, fatti meningei cronici, amnesie, torbide o tardiva percezione e reazione intellettuale acquisite, ecc. nonchè la caduta dei capelli.

OCCHI : Emorragia o congestione della retina, ritardata e non pronta accomodazione visiva - debolezza della vista e dolori ai lobi oculari - fobie visive - tic e strabismo intermittente - *catarratte* (senza operazione), miosi, midriasi, anisocoria, esoftalmo, epifora - spasmi - paralisi - dolori a tipo di tensione.

BOCCA - NASO - ORECCHIE : Salivazione eccessiva boccale, spasmi del faringe, piorrea alveolare, ascessi dentali.
Rinite vaso-motoria, congestione dei cornetti e difficoltà respiratoria (naso chiuso), raffreddori, sinosite, otite cronica ed otite media purulenta.

APPARATO RESPIRATORIO : Attacchi d'asma, bradipnea, dispnea, senso di oppressione, modificazione del ritmo respiratorio, tosse stizzosa e nervosa.

APPARATO CARDIO-VASCOLARE : Polso irregolare, bradi e tachicardia, aritmie extra sistole, disturbi alle coronarie, dolori retrosternali e precordiali, battiti cervicali (cefalici, toracici, epigastrici), sensazioni di caldo e freddo locali e generali (vampe di calore, brividi), disturbi vasomotori obbiettivi (arrossamenti, pallori), dermografismo, aortite, ectasia aortica, miocardite, cardialgia, cardiopalmo, piaghe da varici, emorroidi, flebiti ecc.

APPARATO URINARIO : Senso subbiettivo di pienezza vescicale ingiustificata, minzioni frequenti o imperiose o frequenti e scarse, tenesmo, incontinenza, crisi di poliuria con urine chiare o oliguria.

APPARATO GENITALE : *nell'uomo* : Frigidità, impotenza e disfunzionalità psichica in genere o singolare o individuale, priapismo, erezioni subitanee, spermatorrea, prostatite, cistite ed ipertrofia della prostata. *Nella donna* : Leucorrea (perdite bianche), mestruazioni alterate, dolorose, scarse e irregolari come tempo e quantità, prurito vulvare ed astenia sessuale, dismenorrea pronunciata.

HEAD: Headache, migraine, certain cancers, hypertension and cerebral arteriosclerosis, compression of the nerve centers by hemorrhage, exudates, without meningeal chronic forgetfulness, cloudy or late acquired intellectual perception and reaction, etc. and the hair loss.

EYE: Retinal hemorrhage or congestion, delayed and not ready visual accommodation, weak eyesight and pain in the ocular lobes, visual phobias, tics, and intermittent strabismus, cataracts (without operation), miosis, mydriasis, Anisocoria, exophthalmos, epiphora pain spasms paralysis a kind of tension.

MOUTH NOSE EARS: excessive salivation mug, the spasms
pharynx, alveolar pyorrhea, dental abscesses.
Vasomotor rhinitis, congestion of croissants and breathing difficulties
(Stuffy nose), colds, sinusitis, ear infections and chronic purulent otitis media.

RESPIRATORY SYSTEM: asthma attacks, bradypnea, wheezing, tightness, change in breathing rate, cough and nervous.

CARDIO-VASCULAR SYSTEM: irregular pulse, Brad and tachycardia, arrhythmia, extra systoles, abnormal coronary retrosternal pain and precordial beats neck (cephalic thoracic, epigastric), sensations of hot and cold local and general (hot flushes, chills) vaso-motor disorders targets (redness, pallor), dermografismo, aorta, aortic ectasia, myocarditis, cardialgia, palpitations, sores from varicose veins, hemorrhoids, phlebitis, etc.

URINARY SYSTEM: the subjective sense of bladder fullness unjustified, frequent urination or frequent and low or imperative tenesmus, incontinence, polyuria crisis with clear urine or oliguria.

GENITAL: man: frigidity, impotence and psychological dysfunction in general or singular or individual, priapism, sudden erections, spermatorrhea, prostatitis, cystitis and prostate hypertrophy. In women: Leucorrhoea (white discharge), altered menstruation, painful, weak and irregular as time and quantity, vulvar itching and sexual asthenia, dysmenorrhea pronounced.

APPARATO DIGERENTE: Alterate digestioni, sensazioni dolorose, ipercloridria, bruciori, colite, tensione, rigurgiti, eruttazioni, ulcere gastroduodenali, colite spastica, diarrea, stitichezza, colecistite, epatite, calcoli biliari, gastroenterite, colite muco membranosa, gastralgie.

PELLE, PELLI E ANNESSI: Pelle rugosa, secca, asciutta, vecchia, sottile, appassita, senza freschezza e scarsa elasticità ed espressione; orticaria, pruriti, certe exemi e dermatosi, dermatosi da iponutrizione, da avitaminosi (da campo di concentramento); assidrosi, iperidrosi, seborrea, ipertricosi.

DISTURBI DELLA SENSIBILITA' E DELLE MALATTIE GENERALI: Eruzioni subitanee e passeggere, tremiti, pruriti, calori viscerali, vaghi spasmi, coliche, crampi fissi e mobili, nevralgie, mialgie, dolori artritici, paralisi infantile progressiva, sinovite, tabe, morbo di Parchinson, sclerosi a placche, sclerosi neuro spinali, artritismo, artitre deformante, reumatismi muscolari, articolari ecc.

RICAMBIO MATERIALE: Alterato ricambio (metabolismo, catabolismo), intolleranza ai grassi e agli idrati di carbonio, obesità, magrezza, acidi urici, diabete, gotta, auto-intossicazioni ecc.

MALATTIE MENTALI: Malinconie o ipocondria, abulia, mania di persecuzione, religiosa, idee fisse, modificazioni del carattere, fobie, emotività, angoscie, ansietà, pudori esagerati, instabilità, cattiveria, irritabilità psichica, impazienza, insonnia o sonnolenza, esaltazioni pluriformi, isterismo, anticocainismo ed antimorfinismo ecc.

VARIE: Ferite e piaghe torbide a lento decorso e a difficile cicatrizzazione, nevrite, sciatica, dolori muscolari, lombaggini, certi essudati e trassudati, ascessi, infiammazioni, capogiri, astenia o debolezza generale, meteoropatia, disturbi e disfunzionalità endocrine, gomme sifilitiche, ecc.

TERAPIA E PROFILASSI contro i tumori, fibromi, ecc.

DIGESTIVE SYSTEM: Altered digestion, painful sensations, Hyperchlorhydria, heartburn, colitis, tension, regurgitation, belching, gastroduodenal ulcers, spastic colitis, diarrhea, constipation, cholecystitis, hepatitis, gallstones, gastroenteritis, colitis, mucous membrane, gastralgia.

SKIN and ANNEXES: Skin rough, dry, dry, old, thin and dried without freshness and lack of elasticity and expression; hives, itching, and some Exem dermatosis, dermatitis undernutrition, by avitaminosis (concentration camp); assidrosi, hyperhidrosis, seborrhea, hypertrichosis.

DISORDERS OF SENSITIVITY 'AND GENERAL DISEASES eruptions and sudden passing, tremors, itching, heat visceral, vague cramps, colic, cramps, fixed and mobile, myalgia, arthritis, infantile paralysis progressive synovitis, tabes, disease Parchinson, multiple sclerosis, neuro spinal sclerosis, arthritis, deforming arthritis, rheumatism, muscle, joint, etc.

MATERIAL REPLACEMENT: Altered turnover (metabolism, catabolism), intolerance to fats and carbohydrates, obesity, thinness, acids unique, diabetes, gout, etc., self-poisoning.

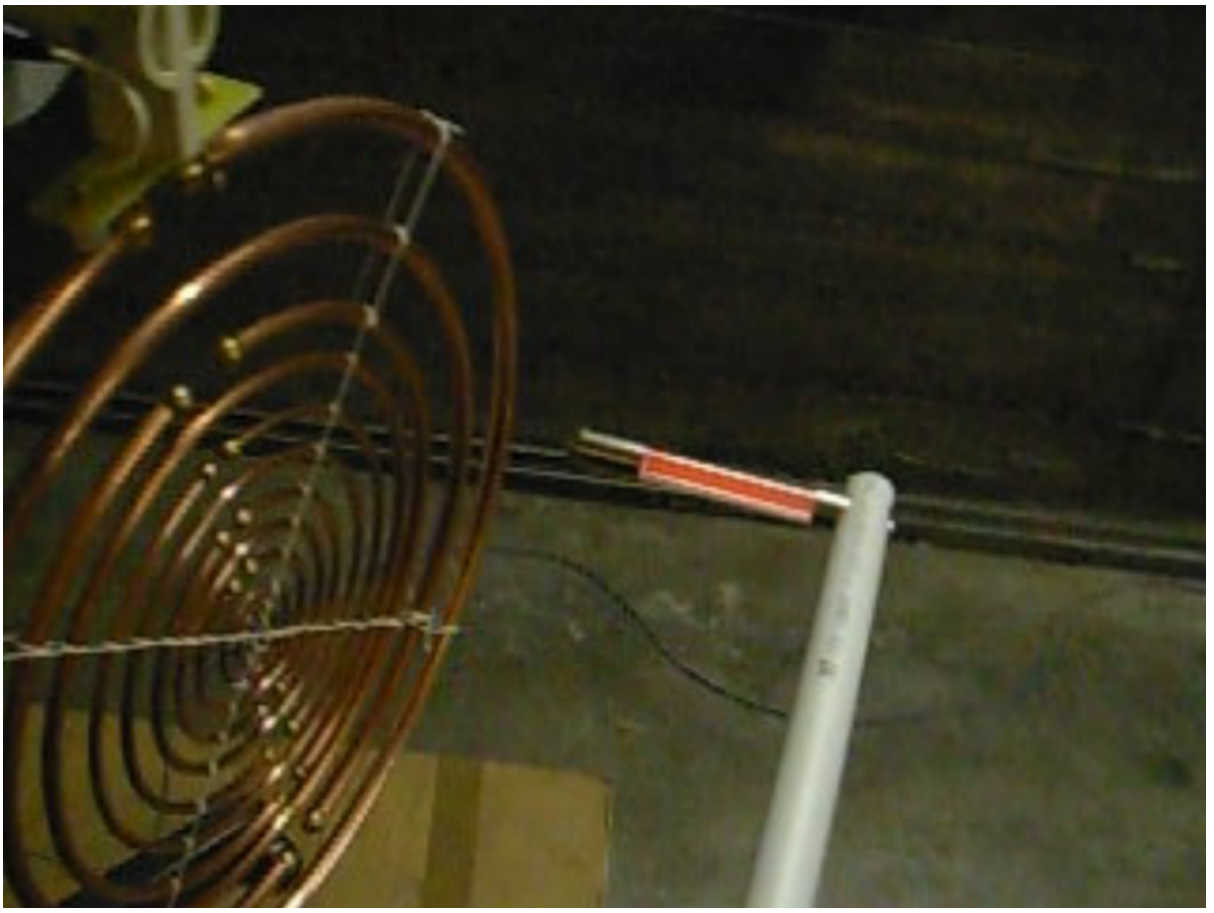
MENTAL HEALTH: Hypochondria or melancholy, apathy, delusions of persecution, religious obsessions, changes in character, phobias, emotional, anguish, anxiety, excessive modesty, instability, wickedness, mental irritability, impatience, insomnia or drowsiness, exaltations multiform, hysteria , etc. anticocainismo and antimorfinismo.

MISCELLANEOUS: Injuries and wounds slow to muddy and difficult course of healing, neuritis, sciatica, muscle pain, lumbago, and some trassudati exudates, abscesses, inflammation, dizziness, fatigue or general weakness, Meteorosensitivity, disorders and endocrine dysfunctions, gumma, etc..

THERAPY AND PROPHYLAXIS against tumors, fibroids, etc.

7.4 An ancient MWO E-field measurement document (1934)

A vintage document is presented regarding an interesting procedure to evaluate the electric field, E, in the MWO range and around the patient.
The photo below has been taken while using the same method on one of the Do It Yourself MWO presented in this book.



Dott. NICOLA GENTILE
MEDICO RADIOLOGO SPECIALISTA

Radiazioni umane provocate

SULLA DISPOSIZIONE MORFOLOGICA INTORNO AL CORPO UMANO DI RADIAZIONI EMESSE DALLA SUA PERIFERIA PER EFFETTO DI RISONANZA A CORRENTI DI ALTA FREQUENZA LANCIATE SU DI ESSO DA UN APPARECCHIO OSCILLATORE DEL LAKOWSKY

ESPERIENZE

eseguite nell' Ambulatorio Medico radiologico per Ammalati Incurabili di Roma delle Dame Apostoliche del S. Cuore di Gesù

Comunicazione presentata al 1° Congresso Internazionale di Radiobiologia di Venezia – Settembre 1934

Il corpo umano messo tra l'emettitore e il ricevitore del detto apparecchio assorbe campo elettrico, lo elabora e riemette corpuscoli elettrici in modo particolare ad ogni individuo, secondo : 1° le sue particolari condizioni fisio-patologiche ; 2° le sue particolari condizioni psico-emotive.

Assorbe campo elettrico :

Infatti il tubo néon, tra i due oscillatori a m. 1,50 di distanza, rivela un campo elettrico fino a 70 cm. dall'emettitore e a 40 cm. dal ricevitore. Se è interposto un corpo umano il primo diminuisce di 10–20 cm.

Riemette corpuscoli elettrici :

Infatti si può mettere in evidenza attorno alla figura umana un campo elettrico, che si dispone come un involucro irregolare attorno alla forma corporea, variabile nei diversi individidui.

I *dati tecnici* per la riproduzione delle esperienze sono questi :

1° regolazione dell'apparecchio non in tensione ma in intensità, o con 2 A, o con 3, o con 4 secondo la risposta che dà il soggetto in ampiezza di campo elettrico misurabile ;

2° distanza m. 1,50 tra emettitore e ricevitore ;

3° orientamento dell'emettitore al nord magnetico ;

4° isolamento del soggetto su predellina di legno più o meno alta ;

5° uso di tubo al gas néon, lungo cm. 10, del diametro di mm. 12, cilindrico, a duplice polo metallico, isolato su di un manico d'ebanite col quale viene manovrato ;

6° distanza del corpo umano dall'emettitore cm. 20 ;

MEDICINA NUOVA (1934)

Dott. NICOLA GENTILE
Specialist Radiologist doctor

Induced human Radiation

On the morphological arrangement, around human body, of radiation, emitted by its periphery by resonance effect at high frequency currents, thrown at him by a Lakhovsky Oscillator device

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EXPERIMENTS

Performed in the Radiological Medical hospital for the terminally ill in Rome Apostolic Sisters of the Sacred Heart of Jesus

Paper presented at the 1st International Congress of Radiobiology Venice-Sept.1934

The human body placed between the transmitter and the receiver of this unit absorbs the electric field, elaborates it, and re-emits electrical particles in a peculiar way for each individual, according to:
1) His specific physiological and pathological conditions;
2) His special psychic-emotional conditions.
It absorbs the electric field:
In fact, the neon tube, between the two oscillators is 1.5 m apart, detects an electric field up to a 70cm distance from the transmitter and 40cm from the receiver. If a human body is inserted, the first is reduced by 10-20cm.
Re-emits electric particles:
In facts, we can show, around the human profile, an electric field that is located as an irregular envelope around the body shape, variable among different individuals.
The technical data for repeating the experiments are as follows:
1) To control the device not in voltage, but in intensity, with 2A or 3A or 4A according the response that the subject gives in terms of measurable field strength;
2) Distance 1.5 m between transmitter and receiver;
3) Orientation of the transmitter to the magnetic north;
4) Insulation of subject on wood deck more or less high;
5) Use a neon gas tube, 10cm long, 12mm diameter, cylindrical, with double metal pole [*the type used with Violet Ray devices, note of translator*], isolated on a stick of ebonite with which it is operated;
6) Distance from the human body from transmitter: 20cm.

7° misurazione dell'ampiezza del campo di radiazione sulla parte opposta a quella bombardata dall'emettitore ;

8° adoperare il tubo néon tenendolo in direzione perpendicolare o radiale al segmento del corpo umano in osservazione ;

9° misurazione della distanza tra superficie del corpo e limite fino al -quale il néon è luminescente ;

10° misurazione metodica di detta distanza lungo la parte anteriore, quella posteriore, e le laterali del corpo, prima a destra poi a sinistra, sia a braccia in giù sia a braccia in su ; i campi anteriore e posteriore anche lungo la metà destra e la metà sinistra ;

11° attenzione particolare alle misure lungo i meridiani del capo, e vicino alle punte delle dita delle mani.

I fenomeni osservati sono :

1° *il tubo néon si colora in rosa* or solo in immediato contatto con la pelle, or fino a distanza di 5–20 cm. e più ;

2° talora *il néon non si colora* neanche tenendo il tubo poggiato sulla superficie cutanea, spesso in coincidenza di lesione ivi esistente ; i capelli e le unghie formano ostacolo relativo al passaggio di radiazioni neon-luminescenti ;

3° la colorazione prima e più costante si nota in prossimità del capo, delle mani e dei piedi ;

4° la colorazione o luminescenza si verifica *a distanza inuguale dalla punta delle diverse dita*, che è bene tenere divaricate per esaminarle una per una ;

5° riunendo su di uno schema con una linea le varie distanze d'illuminazione dalla superficie del corpo, risulta un tracciato grafico « *neon-elettrogramma* » che porta caratteristiche individuali ;

6° *nel sesso femminile* spesso il neon-elettrogramma mostra maggiore ampiezza nella metà inferiore del corpo, dal lato sinistro, nel polo occipitale del cranio ;

7° ciò si modifica per determinate condizioni fisiologiche e patologiche ;

8° nelle *emozioni a tipo depressivo* o a sfondo egocentrico il neon-elettrogramma tende a restringersi, specialmente verso il polo frontale del cranio ; mentre *in quelle a tipo d'esaltazione* tende ad espandersi, e *in quelle a contenuto spirituale* si espande sopratutto nella zona fronto parietale, mentre si assottiglia verso il polo occipito-nucale ;

9° il tracciato grafico suddetto mostra oscillazioni più o meno ampie nel periodo d'esame, ma dà sempre *alcune caratteristiche* che impartiscono la propria fisionomia individuale ;

10° il detto grafico è *modificabile* in esami successivi secondo il decorrere di una forma morbosa in cura ;

11° il tracciato spesso si modifica nettamente *dopo l'applicazione di un circuito metallico Lakowsky ;*

12° *i vestiti* hanno una certa influenza sul neon-elettrogramma, sia per

7) Measuring the level of the radiation field on the side opposite of that hit by the transmitter;
8) Use the neon tube keeping it in a perpendicular or radial direction, relative to the segment of the human body under observation;
9) To measure the distance between the body surface and the limit until the neon glows;
10) Systematical measurement of this distance along the anterior and posterior and lateral body, at right then at left, with both arms on, then with both arms down; fields anterior and posterior along the right half and left half ;
11) Special attention to the measures along the meridians of the head, and near the tips of fingers of hands.

Observed phenomena are:

1) Neon tube turns pink, sometimes only in contact with skin, sometimes until a distance of 5-20cm and over;
2) Sometimes *neon does not glow* not even keeping the tube contact with the skin surface, often in coincidence with an existing injury here; hair and nails gives barrier on the radiation neon-glowing;
3) The first and most constant glow is noted in proximity of head, hands and feet;
4) Color luminescence is seen at unequal distance from the tip of different fingers; it's good to keep expanded to examine one at a time;
5) Connecting in a scheme with a line the different glowing distances from the of the body surface, it results a graph plot "neon-electrogram" bringing individual characteristics;
6) In females often the neon-electrogram shows greater amplitude in the lower half of the body, in the left side, and in the occipital pole of the skull;
7) What above said goes modified for specific physiological and pathological situations;
8) In the depressive or egocentric-type emotions or neon-electrogram tends to tighten, especially to the frontal pole of the skull, while in those of excitement type it tends to spread, and in those with spiritual content extends mainly in the front-parietal area, thinning to the pole-occipital nuchal;
9) The said line graph shows the oscillations the more or less wide during the test, but it always provides some features that give it its own personal appearance;
10) The said chart can change in successive examinations, due to the evolution of an illness condition;
11) The plot often changes significantly *after the application of a Lakhovsky metallic circuit*;
12) Clothes have some influence on neon-electrograms^

la qualità della stoffa, sia per il tessuto, oggetti metallici, ecc. ma la loro interferenza può ritenersi per lo più praticamente trascurabile ;

13° talora, dopo p. e. forte concentrazione a contenuto religioso, è dato rilevare *la luminescenza del néon anche varii secondi dopo cessato il funzionamento dell'apparecchio.*

Con un tubo al néon più grande p. e. lungo 18 cm., diametro 15 mm., a polo metallico unico, è possibile mettere in evidenza intorno a segmenti del corpo umano, studiato nelle predette condizioni, oltre un *campo periferico* più vasto d'irradiazioni neon-luminescenti, un *campo mediale* più ristretto e vicino alla superficie del corpo d'irradiazioni particolari che sono atte ad oscurare il néon-luminescente. In questa zona più interna, cioè, ove il tubo più piccolo si colora in rosa, il tubo più grande si oscura – *radiazioni neon-oscure.* Risulterebbero così *due involucri d'irradiazioni* intorno al corpo umano: il neon-oscuro più centrale, il neon-luminescente più periferico, al tubo grande ; il primo di essi mostra anche radiazioni luminescenti al tubo piccolo.

Il loro studio appena iniziato non permette alcun orientamento indicativo.

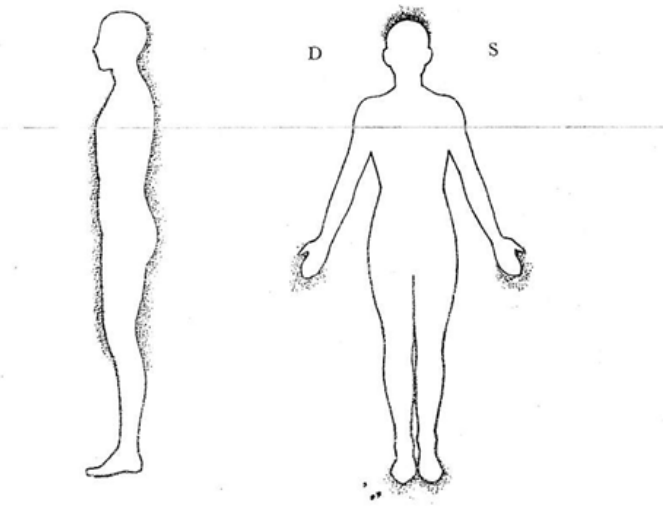
the quality of the cloth, or for fabric, metal object, etc... But their influence can be considered mostly negligible;
13) Sometimes, after e.g. a strong concentration with religious content, there is the *glow of neon even many seconds after the unit is turned off.*

With a longer neon tube, e.g. 18cm long, 15mm diameter, with single metal pole, it is possible to identify, around segments of the human body, studied under the said conditions, in addition to a wider *peripheral field* of neon-glowing irradiation, also a *medial field* tighter and closer to neighbor to the body surface of peculiar irradiations, who are able to dim the neon-glow. In this innermost region, i.e. where the smaller tube turns pink, the larger tube goes dark (neon-dark radiations). Therefore two irradiation-envelopes would result: the neon-dark more central, the neon-glowing more peripheral, to the large tube; the first of them also show luminescent radiation to the small tube.
Their study, which has just started, does not allow any indicative guidance.

Fig. I
Individual male (adult)

TAVOLA I.

Individuo di sesso maschile (adulto)



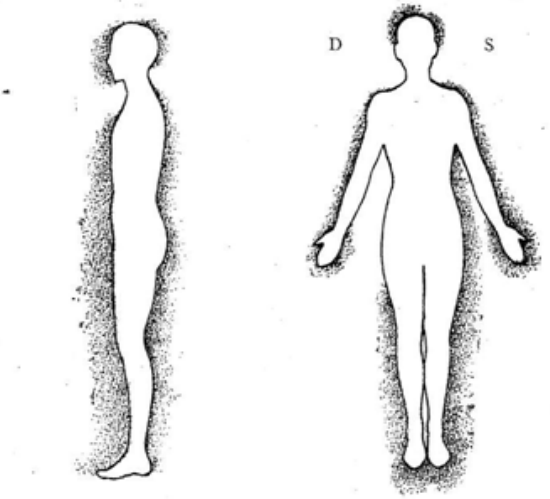
Emiparesi sinistra di indole tossica, ora guarita e residuata con difetto motorio lieve a sinistra (stato neurastenico)

Left hemiparesis of toxic type, now cured, which caused slight motional defect at left (Neurasthenic state)

Fig.II
Individual female (married)

TAVOLA II.

Individuo di sesso femminile (coniugato)

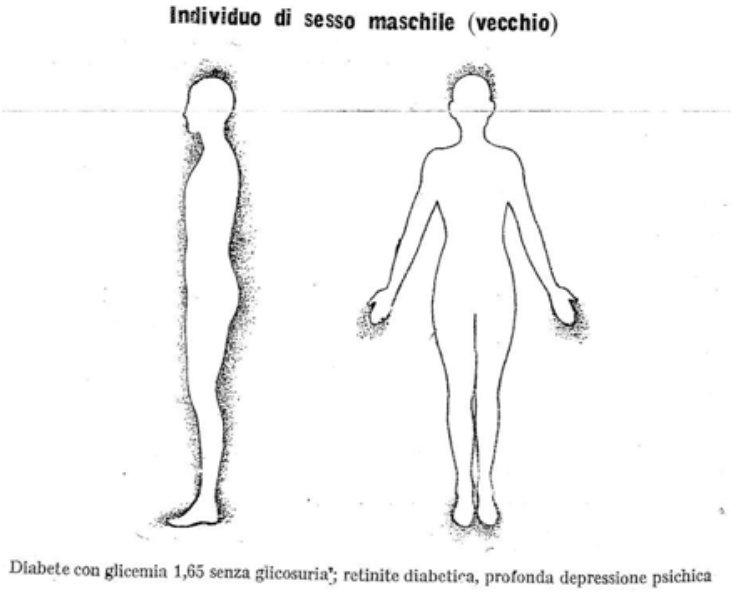


Nevralgia cervicale – Pregressa frattura di costole nel lato destro

TAVOLA III.

Cervical neuralgia - previous fractured rib right side
Fig.III

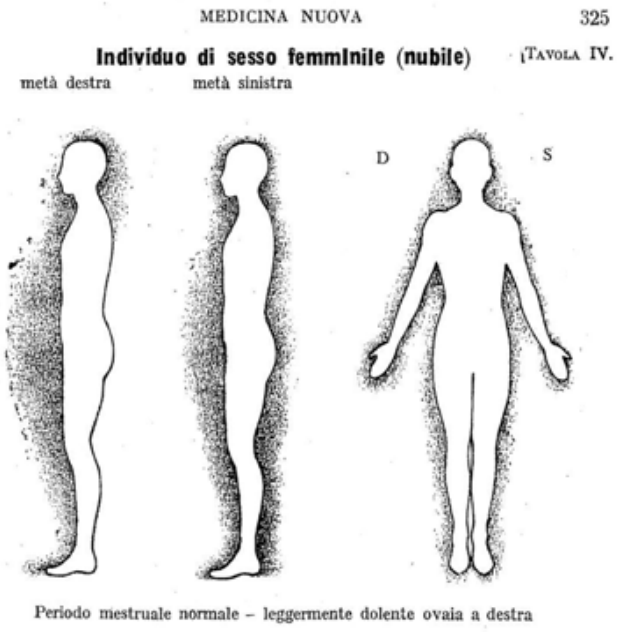
Individual male (old)



Diabetes with blood glucose 1.65 without glycosuria; diabetic retinitis, profound mental depression

Fig. IV
Individual females (unmarried)

Right half Left half



Normal menstrual periods - slight pain at right ovary

Fig.V
Individual male (adult)

R(ight) L(eft)

Suffering abdominal colicky - Leotta syndrome (appendicitis, peri-Colecistitis once duodenal ulcer)

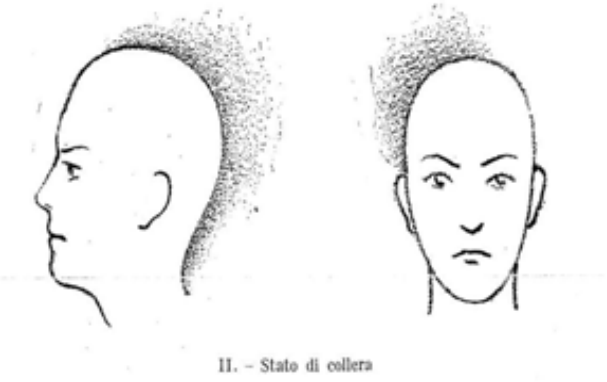
Fig...V-bis
Individual male (adult), the same of Fig. V

Not insolated with wooden chair, but has been completely grounded

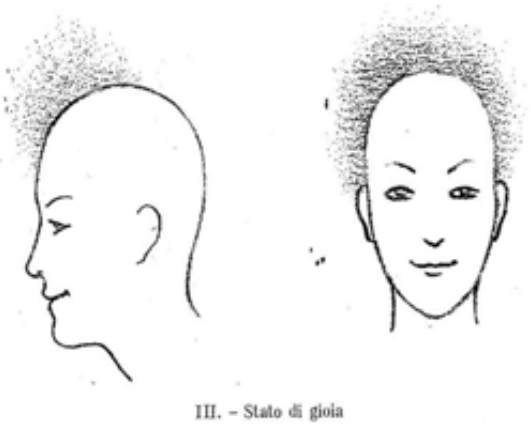
Fig. VI

Individual female (unmarried)

I- state of psychic calm



II-state of anger



III state of joy

Fig. VII
Individual female unmarried (nun)

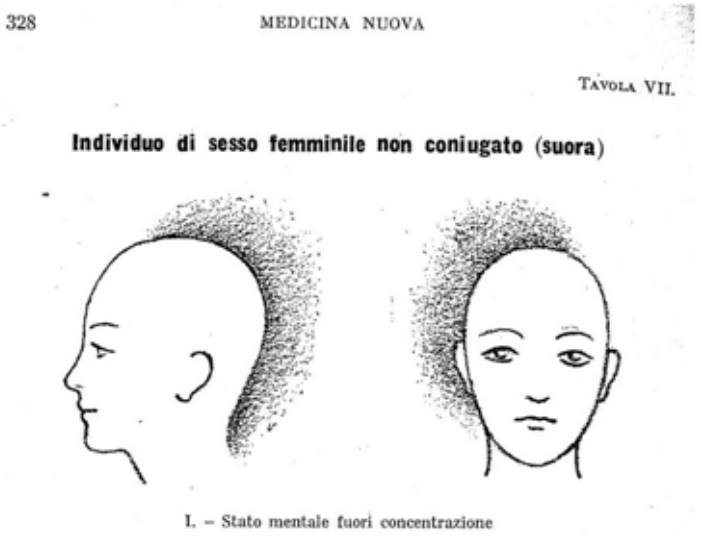

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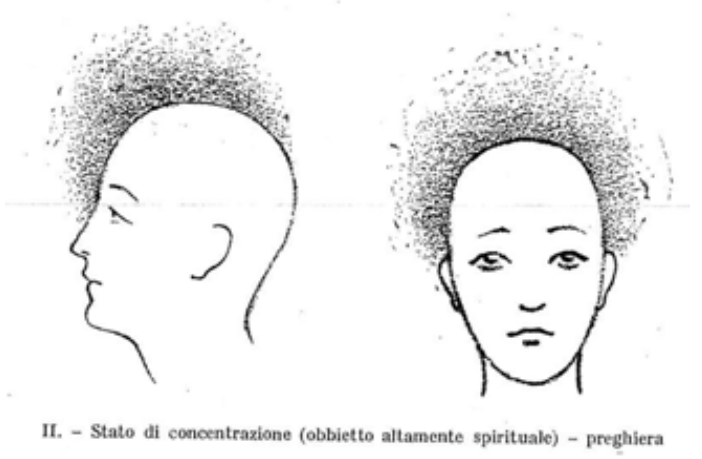
TAVOLA VII.

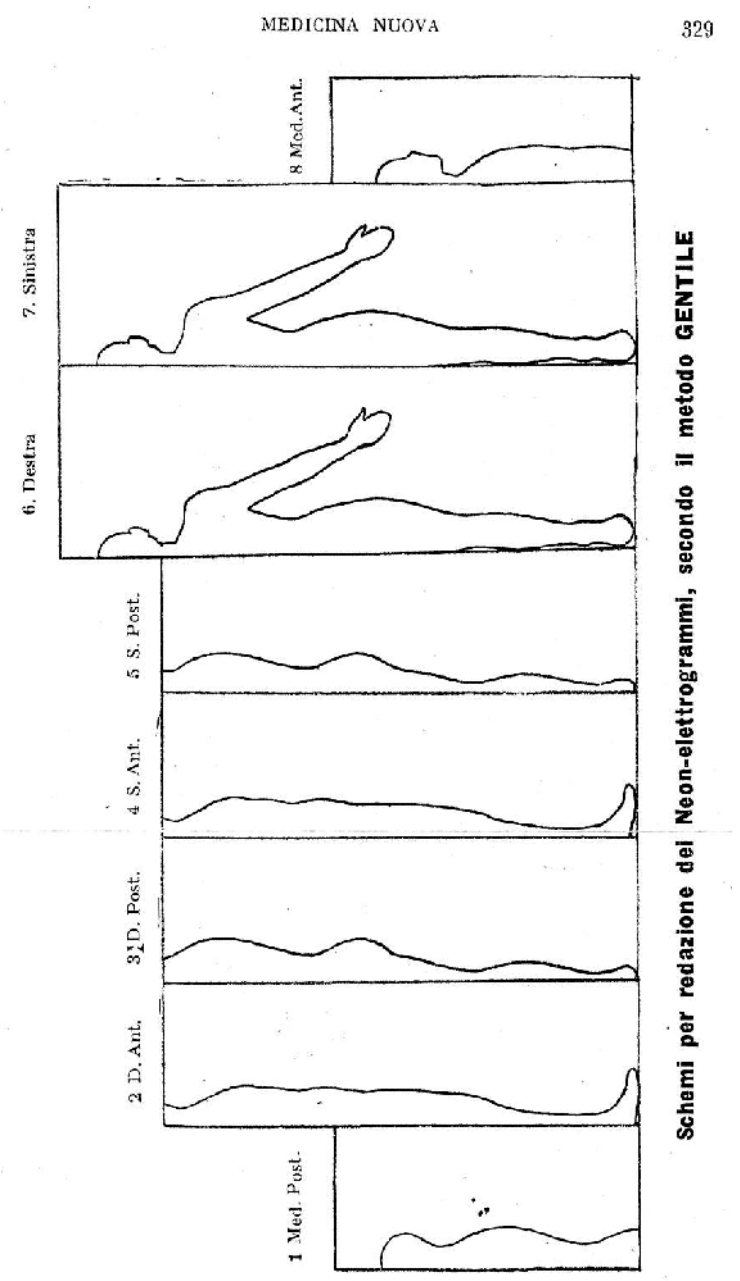
Individuo di sesso femminile non coniugato (suora)

I. – Stato mentale fuori concentrazione

I-mental state non-meditation


II. – Stato di concentrazione (obbietto altamente spirituale) – preghiera

II-state of meditation (something very spiritual) - Prayer



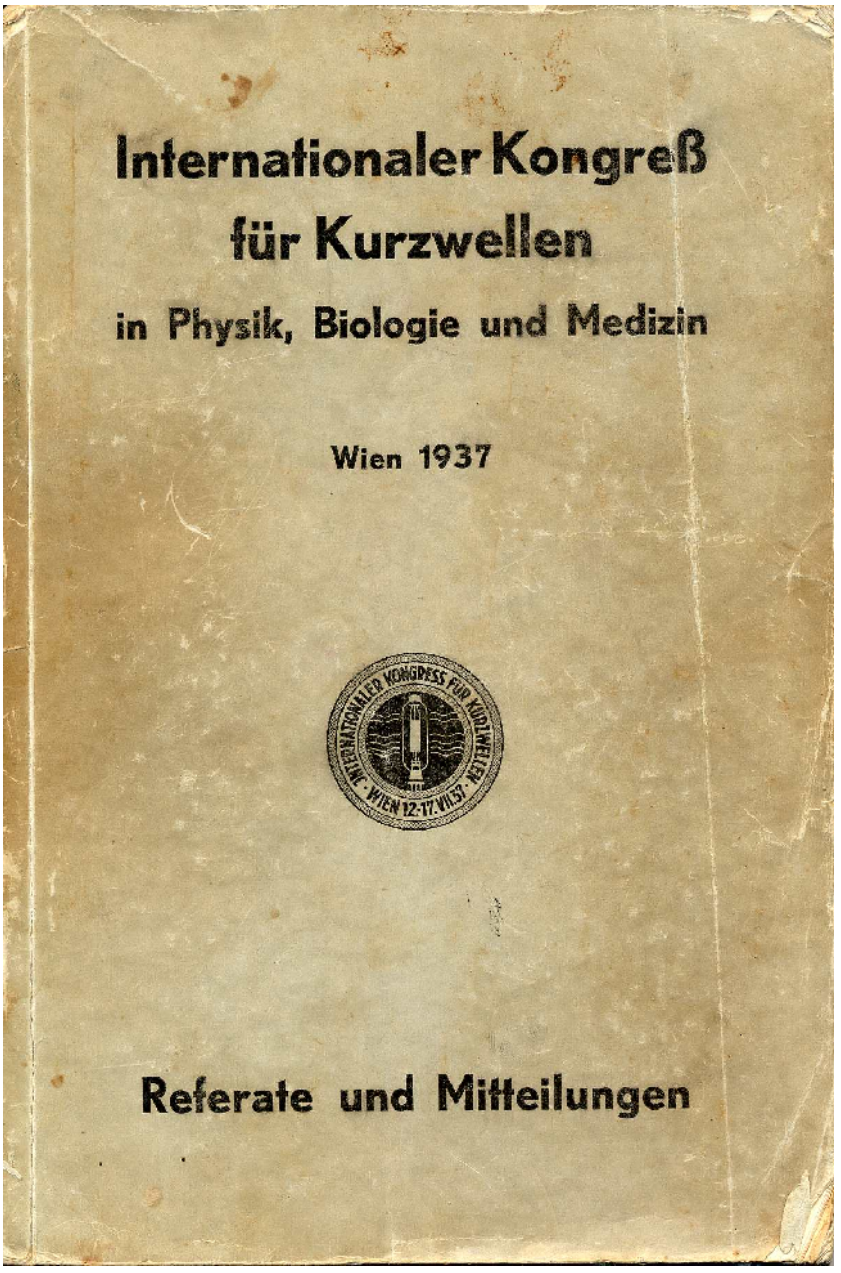
Models for the preparation of Neon-electrograms, according the Gentile method

7-left
6- right
5- left back
4- left front
3- right back
2- right front
1- med. back

7.5 Some original documents on clinical tests

International Congress
For Short Waves
in physics, biology and medicine

Wien, 1937



LAKHOVSKY Georges **Paris**

Nouvelles applications de l'oscillateur à ondes multiples Lakhovsky à l'équilibre oscillatoire cellulaire

Dans cette communication, Georges Lakhovsky, montre que les bases de la radiobiologie reposent sur l'oscillation cellulaire, théorie dont il est l'auteur. Chondriomes et chromosomes de chaque cellule sont des filaments tubulaires assimilables aux circuits oscillants.

Le déséquilibre oscillatoire cellulaire entraîne les phénomènes pathogènes de toute sorte, la maladie et la mort.

Partant du principe que l'oscillation cellulaire est entretenue par le rayonnement ambiant, Georges Lakhovsky a pensé qu'on pouvait rétablir l'équilibre oscillatoire par un champ de haute fréquence auxiliaire.

Il créa à cet effet en 1923 à la Salpêtrière à Paris son radio-cellulo-oscillateur, avec lequel il guérit le cancer des plantes (communication du 26 Juillet 1924 à la Société de Biologie). Par la suite à la Salpêtrière, il améliora et guérit même des cancers humains.

En 1925, l'auteur proposa également la création de la fièvre artificielle au moyen des ondes courtes, traitement qui a été réalisé par la suite.

Mais en 1930, il a pensé que le meilleur rendement biologique et thérapeutique serait obtenu en utilisant non pas l'effet thermique, mais l'effet de résonance électrique sur tous les éléments cellulaires. C'est alors qu'il a créé son oscillateur à longueurs d'onde multiples, ayant pour but de faire vibrer électriquement chaque cellule du corps sur sa fréquence propre. Cet appareil donne un champ très étendu de fréquences, depuis quelques centaines de mètres de longueur d'onde jusqu'à l'infrarouge.

Pour sélectionner certaines longueurs d'onde, Georges Lakhovsky a imaginé un support isolant sur lequel on adapte des électrodes de différentes longueurs qui, vibrant en demi-onde, résonnent sur la fréquence désirée.

L'auteur a obtenu grâce à son oscillateur à ondes multiples de nombreuses guérisons à Paris, tant à l'Hôpital Saint-Louis qu'au Calvaire, au Val-de-Grâce et à l'Hôpital Necker. Depuis

LAKHOVSKY Georges Paris

New applications of Lakhovsky Multi wave Oscillator to the cellular oscillatory balance.

In this communication, Georges Lakhovsky, shows that the bases of the radiobiology are based on the cellular oscillation, theory of which he is the author. Mitochondria and Chromosomes of every cell are tubular filaments comparable to oscillating circuits.
The cell oscillatory imbalance determines the pathogenic phenomena of any kind, disease and death.
Starting from the principle that the cellular oscillation is maintained by environment radiation, Georges Lakhovsky thought that oscillating balance could be restored by an auxiliary field of high-frequency.
He created for this purpose in 1923 at the Salpétrière, in Paris, his radio-cellulo-oscillator, with whom he heals plants cancer (communication of 26 July 1921 to the Société de Biology). Later at Salpétrière, he improved and cures even human cancers.
In 1925, the author also proposed creating artificial fever with short waves, treatment later realized.
But in 1930, he thought that the best biological and therapeutic performance would be obtained by using not thermal effect, but the effect of electrical resonance on all cellular elements. It is then that he created his multiple wavelengths oscillator, having for purpose to make electrically vibrate every cell of the body on its own frequency. This device gives a very wide range of frequencies, since some hundreds of meters of wavelength until the infrared.
To select certain wavelengths, Georges Lakhovsky imagined an insulating support on which have been adapted electrodes of various lengths which, vibrating in half-wave, resonate on the wished frequency
The author obtained with his multiple waves oscillator, numerous healings in Paris, in the Saint Louis Hospital and in the Calvaire and in the Necker Hospital.

1931, aucun cas de récidive n'a été enregistré et les sujets guéris vivent encore en bonne santé.

D'autre part, à Gênes, le Professeur de Cigna a traité avec succès de nombreux cas de cancer et autres maladies au moyen de l'oscillateur à ondes multiples Lakhovsky.

On a également signalé à l'auteur de nombreuses guérisons dans tous les pays où son oscillateur a été appliqué.

L'auteur indique ensuite le processus du traitement.

DE CIGNA Vittorio **Genova**

Terapia con l' oscillatore a onde multiple di Lakhovsky

L'A. ha presentato alla Reale Accademia Medica di Genova (seduta del 3 Maggio 1935) una relazione su lesioni di varia natura, trattati con l'Oscillatore a onde multiple di Lakhovsky, scegliendo fra le numerose forme curate, quelle i cui risultati potevano essere controllati e dimostrati obbiettivamente.

Forme esterne:

a) Epiteliomi basocellulari del viso:

1) Donna di 46 anni: diagnosi, esame istologico e fotografia eseguiti nella Clinica Dermosifilopatica della R. Università di Genova (v. foto N° 1). La lesione dura da oltre 10 anni: non fu mai trattata con agenti fisici: le numerose cure precedenti avevano tutte fallito. Le applicazioni della durata di 15' furono iniziate nell'aprile del 1934, complessivamente 10 applicazioni nelle spazio di un mese e mezzo. Dopo la 2° applicazione l'ulcerazione è già notevolmente ridotta, dopo la 4° alla distanza di 24 giorni dall'inizo della cura la lesione è epidermizzata (v. foto N° 2). Dopo la quinta, a 29 giorni dall'inizio la cicatrice è liscia e soto lievemente arrossata: virtualmente la lesione è già completamente guarita. Sono praticate ancora cinque applicazioni, ad abundantiam. La foto N° 3 fu eseguita dopo la decima applicazione (11 Giugno 1934). La malata fu presentata all'Accademia Medica un anno dopo: la guarigione permaneva perfetta. Oggi a distanza di 3 anni può considerarsi definitiva.

2) Uomo di 46 anni (v. foto N° 4): diagnosi c. s. Otto applicazioni: risultato dimostrato dalla foto N° 5. La cicatrizzazione è quasi completa: la cura fu interrotta dal malato.

Since 1931, no case of recidivism was registered and the cured subjects live still healthy. On the other hand, in Genova, Professor of DeCigna has treated with success in many cases of cancer and other diseases with Lakhovsky multiple wave oscillators. It was also reported to the author of many healings in all countries where his oscillator has been applied.
The author then indicates the treatment process.

DE CIGNA Vittorio Genova

Therapy with the Lakhovsky multiple wave oscillator

Author submitted to the Academy medical (sitting of 3 May 1935) Geneva a report on lesions of various nature, treated with the multiple waves oscillator of Lakhovsky, choosing from among many treated forms, those whose results could be controlled and shown objectively.

External forms:

(a) face epitheliomas basal cell:

(1) 46 Year old woman: diagnosis: histological examination and photography performed in the clinic Dermo-syphilopathic of the R. University of Geneva. (v. photo n. 1). The lesion lasts since 10 years. It was never treated with physical agents, many previous cares had failed. A duration of 15 ' applications were started in April 1934. Total 10 applications in the time span of a month and a half. After the 2nd application the ulceration is already significantly reduced after the 4th, 24 days after the beginning of the care, the lesion is epidermises (see photo n. 2). After the fifth 29 days after the start, the scar is smooth, slightly red; virtually lesion is already completely cured. We practice still five applications, "ad abundantiam" [Latin: for the sake of abundance]. Photo 3 was executed after the tenth (11 June 1934). The patient was presented to the Medical Academy a year after: healing remained perfect. Today, after three years it can be considered definitive.
(2) Human 46 years (v. n. 4 photo): diagnostic v. s. Eight applications: result shown picture n. 5. Healing is almost completely: the care was interrupted by the patient.

3) Uomo di 56 anni. Diagnosi istologica (Laborat. Ospedali Galliera): epitelioma b. c. dell'angolo orbitario interno di sinistra. La lesione dura 8 anni. Grave infiltrazione bulbare, panno corneale spiccato, miosi, visione abolita. Dolori atroci all'occhio, al fronte, al vertice. I dolori scomparvero dopo le prime tre applicazioni. Dopo un primo notevole miglioramento locale e generale, i fatti rimasero stazionari. La cura fu interrotta dal malato dopo 16 applicazioni.

4) Uomo di 80 anni: ulcerazione torpida all'angolo orbitario destro da oltre due mesi e mezzo. Manca il reperto istologico; diagnosi prudenziale di verruca ulcerata. A distanza di soli sette giorni dalla prima applicazione la ferita è cicatrizzata. La foto N° 6 è eseguita a nove giorni dall'inizio della cura. Fu praticata lo stesso giorno una seconda applicazione: la guarigione permaneva a sette mesi di distanza e poteva considerarsi definitiva.

b) Lupus eritematoso. Uomo di 47 anni. La lesione data da circa 20 anni e fu invano curata in varii Istituti di terapia Fisica con tutte le cure note, in fine con iniezioni di sali d'oro. La lesione ha reagito favorevolmente fin dalla seconda applicazione. 20 sedute complessivamente. Il malato fu presentato all'Accademia Medica un anno dopo: guarito (v. foto N° 7—8: le cicatrici visibili sono esiti delle cure precedenti, le lesioni curate con l'Oscillatore guarirono senza lasciare traccia).

Forme interne:

a) Ulcere gastriche e gastro-duodenali primitive o recidivate dopo operazione.

I casi presentati all'Accademia Medica furono sei: a quelli l'A può aggiungere altri dieci casi. Di tutti fu praticato un controllo radiografico prima della cura, di quasi tutti un controllo radiografico dopo la cura a distanza di qualche mese. Il numero delle applicazioni fu nella massima parte di dieci, in qualche caso di otto solamente, in qualche altro si praticarono due periodi di 10 con l'intervallo di una quindicina di giorni. Durante la cura con l'Oscillatore furono soppressi tutti i medicinali: fu in tutti sistematicamente prescritto il succo puro di limone. I dolori scomparvero rapidamente e in quasi tutti i casi definitivamente dopo la terza o la quarta applicazione: fu presto aumentata la dieta a questi malati affamati, ed estenuati dai dolori e dal digiuno, il peso del corpo andorò

(3) 56-Year-old man. Histological diagnosis (Laboratory hospitals Galliera): squamous b.c. left internal orbital angle. The lesion lasts for 8 years. Serious bulbar infiltration, marked corneal cloth, miosis, abolished vision. Atrocious pain the eye to the forehead, at the vertex. Pain faded after the first three applications. After the first, a considerable improvement has taken place, local and general. The fact remained stationary. Care was interrupted by the patient after 16 applications.
(4) 80-Year-old man: torpid ulcer at the orbit corner two months and a half. Missing the histologic report: ulcerated wart diagnosis. The wound is healing after only seven days of the first application. Photo 6 is taken nine days after the beginning of the care. It was practiced the same day a second application: healing after seven months could be considered definitive.

(b) Lupus Erythematosus. 47-Year-old man. The lesion lasts since about 20 years and was in vain treated in many Institutes of Physical Therapy with all the known cares, finally with injections of gold salts. The lesion reacted favorably since the second application. 20 sessions total. The patient was presented to the Medical Academy one year after: cured. (See photo n. 7 - 8: visible scars are results of previous treatments; the lesions treated with the oscillator did heal without letting trace).

Internal forms:

(a) Gastric and gastro-duodenal ulcers, initial or recurrent after operation.

The cases presented at the Medical Academy were six: the author can add ten more cases. For all, it was practiced a radiographic control before the care, and for almost everyone a radiographic control after the care, a few months later. The number of applications was in the majority of ten, for other cases eight only. During care with the Oscillator all medicines were deleted, it was always prescribed pure lemon juice. Pain faded quickly, and in almost all cases permanently, after the third or fourth application; the diet was soon increased to these patients hungry and distressed by pain and fasting, the body weight went

rapidamente aumentando da tre a sei kgr., in un caso fino a 10 kgr. a due mesi dalla cura. Di conseguenza ripresa rapida delle forze fisiche e psichiche.

L'A. non teme di affermare che fra tutte le cure proposte e praticate per l'ulcera gastrica o gastro-duodenale nessuna può star a paro con quella dell'Oscillatore. L'A. ha potuto seguire fino ad oggi alcuni dei suoi curati: a tre anni di distanza l'ulcera non è recidivata.

b) Un caso di emiplegia laringea sinistra da compressione del ricorrente per adenopatie tracheobronchiali, controllate radiologicamente in una bambina di anni, disfonica. Ha particate 10 applicazioni a gioni alterni: i movimenti del laringe ripresero dopo la seconda applicazione, e furono normali insieme con la voce dopo la decima, in 20 giorni.

c) Una recidiva per scirro della mammella in una signora in cui i raggi X non erano tollerati (malattia da raggi) con riduzione fino a scomparsa del nodulo di recidiva e miglioramento rapido e notevole delle condizioni generali (20 sedute).

d) Alcuni casi di otite media suppurativa cronica con indicazione per l'intervento chirurgico radicale, cicatrizzati (da sei a 12 applicazioni).

e) Un caso di fibroma uterino, con metrorragie, guaito clinicamente e anatomicamente (20 sedute). Due casi di amenorrea da oltre sei mesi in giovani donne (33—34 anni) con ricomparsa regolare dei mestrui.

f) Ultimamente un caso conclamato e controllato da specialisti prima e dopo la cura, di ipertrofia prostatica, guarito clinicamente e anatomicamente.

g) Assai numerose le forme di natura nervosa (astenia, abulia, insonnia grave di vecchia data, agorafobia, ecc.): alcuni casi di forme nevralgiche, reumatiche, di atonia gastrica e intestinale.

Fatto un breve cenno sul probabile meccanismo d'azione di queste radiazioni, in vista dei risultati ottenuti da varii sperimentatori e tutti concordi, sempre notevoli, talvolta insperati, conclude augurando che questo metodo di cura facile e innocuo richiami l'attenzione dei pratici e degli scienziati.

*

Quickly increasing from three to six kg, in a case up to 10 kg after two months of care. Therefore rapid resume of physical and psychical forces.
The author is not afraid to say that among all the care proposed and provided for gastric or gastro-duodenal ulcer, no one can compete with the Oscillator. Author could follow some cared people until today: after three years the ulcer is has not recidivated.
(b) A case of left laryngeal hemiplegia from compression of the recurrent [nerve] for adenopatia tracheo-bronchial adenopathy, radiologically controlled for a 10 years old child girl, with a default of pronunciation. She was given 10 applications on alternative days: the laryngeal movements resumed after the second application, and were normal, as well as the voice, after the tenth, in 20 days.
(c) A recidivating for breast cancer for a lady in which x-ray were not tolerated (rays disease) with reduction until disappearance of the recidivate nodule and extensive and rapid improvement of general conditions (20 sessions)
(d) A few cases of chronic suppurative otitis with indications for radical surgery cicatrized (from 6 to 12 sessions).
(e) A case of uterine fibroma, with metrorrhagia, clinically and anatomically healed (20 sessions). Two cases of amenorrhea since more than six months in young women (aged 33-34) with regular resumed menstruation.
(f) Recently a case of prostatic hypertrophy stated and controlled by specialists first and after the treatment, healed clinically and anatomically.
(g) a lot of diseases of nervous nature (asthenia, aboulia, severe insomnia since old date, agoraphobia, etc): a few cases of nerve, rhumatismal, gastric and intestinal atony, forms.

Having made a brief summary on the likely mechanism of action of these radiations, in view of the results achieved by several experimenters, all in agreement, always remarkable, sometimes unhoped-for, I conclude by wishing that this harmless and easy care method calls the attention of scientists.

nno XXVI Roma - 31 Maggio 1935-XIII N. 5.

MEDICINA NUOVA

RIVISTA MENSILE

DI MEDICINA E CHIRURGIA

AMBULATORIO RADIOLOGICO GRATUITO PER MALATI INCURABILI

(presso le Dame Apostoliche del S. Cuore di Gesù in Roma)

Dott. NICOLA GENTILE

Radiologo Direttore

Intorno all'Oscillatore a onde multiple del Lakowsky

Non posso riferire sugli estremi fisici dell'apparecchio, perchè non mi è stato dato di controllare la lunghezza delle onde, ch'esso effettivamente lancia sul soggetto. Il fabbricante assicura lunghezze da m. 400 a cm. 10, con frequenze da 750.000 a 3.000.000.000 di periodi per 1'' che con le numerose armoniche emesse dai circuiti, le interferenze e gli effluvi possono raggiungere la gamma dell'infrarosso e fin della luce visibile (1-300 trilioni di oscillazioni al 1'').

Riassumo invece l'azione terapeutica, che in questo Istituto, dove convergono per ragione stessa della sua fondazione, gli abbandonati dalla Terapia, è stato dato di constatare, e che ha permesso di sollevare talora infermi a cui nulla più restava di conforto umano.

1. — Azione sulle Algie simpatiche.

In genere ho osservato una spiccata attività analgesica dell'Oscillatore in tutte le forme dolorose, specialmente croniche. Esistono però delle algie non legate ad alcun processo infiammatorio o tossico dimostrabile con i comuni mezzi semiotici, le quali si sogliono mettere in rapporto con squilibri endocrino-simpatici non sempre chiaramente formulabili: in queste il risultato benefico è stato rapido e completo.

Ricordo una signora che da 10 anni portava una cefalea insorta dopo un violento trauma al cranio, studiata esaurientemente altrove e sottoposta invano alle più svariate cure: è guarita definitivamente dopo 5 applicazioni dell'Oscillatore. Un ragazzo dodicenne, linfatico, aveva anch'egli una cefalea, la quale, a detto della madre, era sempre esistita fin dal-

Roma, - 31 May 1935 N. 5.

NEW MEDICINE
REVIEW MEDICINE AND SURGERY

RADIOLOGICAL DEPARTMENT FOR INCURABLES
(Apostolic Sisters of S. Heart of Jesus in Rome)
Dr. - NICHOLAS GENTILE
Radiologist Director

About Lakhovsky Multiple Wave Oscillator

I cannot report on the physical aspects of the apparatus, because I couldn't control the wave length that it actually launches on the subject. The manufacturer assures lengths from m. 400 to cm. 10, with frequencies from 750.000 to 3.000.000.000 hertz that with the numerous harmonics emitted from the circuits, the interferences and the effluvia can reach up the range of the infrared and even visible light (1-300 trillions of oscillations to the second).

I summarize instead the therapeutic action that has been given to state in this Institute, where, for same reason its foundation, come the ones abandoned from the Therapy. Such therapeutic action has sometimes allowed raising ills to which nothing more remained than human comfort.

1. — EFFECTS ON THE SYMPATHETIC ALGIAS

Generally speaking I have observed a marked analgesic action of the Oscillator in all the painful forms, especially chronic. However, there exists some algias [localized pains] not linked to any inflammatory or toxic process, demonstrable with the common semiotic means, which are usually put in relationship with endocrine - sympathetic imbalances to us not always clearly definable: in these, the beneficial result has been complete and fast.

I remember a lady suffered for duration of 10 years from cephalalgia after a violent cranial trauma, thoroughly studied elsewhere and in vain subjected to a great variety of treatments: she is recovered definitively after 5 applications of the Oscillator. A 12 years old boy, lymphatic, he had a cephalalgia too, which, as declared by the mother, always had existed since

l'epoca nella quale il bambino fu in condizione di accusare un distu
E' guarito radicalmente dopo 2 mesi di cura: il miglioramento si no
già alla terza applicazione.

2. — Azione sulle infiammazioni croniche.

E' stata osservata un'azione risolvente dell'Oscillatore sui proce
infiammatorii cronici non specifici. L'*apparato genitale femminile* si
dimostrato particolarmente atto a giovarsi dell'Oscillatore. Non poch
casi di ovarite, salpingo-ovarite, metrosalpingite si sono presentati al
l'Istituto e la risoluzione dopo un paio di mesi di cura è stata la regola
Due casi di metrite verginale sono stati tutti due refrattarii.

I disturbi mestruali di qualsiasi tipo, purchè non sostenuti da pro
cessi morbosi, per i quali era indicata l'associazione di altra terapia me
dica o chirurgica (stenosi, flessioni, neoplasmi, ecc.) sono stati costante
mente regolarizzati dall'Oscillatore.

Buona, se non del tutto soddisfacente è stata l'azione di questo sulle
Periviscerіti, il cui numero, la cui varietà e complessità oggi la Clinica
e la Radiologia così frequentemente mettono in evidenza. Del resto l'ef
ficacia dell'Oscillatore nelle Periviscerіti supera un po' quella della Dia
termia e l'Oscillatore, con i raggi Röntgen piccolo intensivi, le norme igie
niche, la terapia spasmolitica, e la terapia alcalogena sono riuscito a strap
pare dai ferri del chirurgo infermi di periviscerite del crocicchio supe
riore e del crocicchio inferiore destro dell'addome, cui non restava altra
speranza.

Miglioramento trascurabile ho riscontrato nelle *pleuriti secche,* e su
quelle *essudative a lento decorso,* nelle quali invece più che i raggi Ul
travioletti adopero con vantaggio la Röntgenterapia a onde lunghe, a
piccola dose e senza limitatori.

Nelle *artriti* l'azione dell'Oscillatore mi si è rivelata assai superiore
alla Diatermia. Occorre associarvi qualche catalizzatore che varia secondo
l'etiologia stessa dell'artrite, or lo zolfo, or l'jodo, or un alcalogeno, or
un acidogeno. I risultati sono un po' tardivi, ma non ricordo nessuno
dei casi, che mi si sono presentati, il quale a lungo andare non abbia tro
vato un miglioramento spiccato. Il tempo dirà poi, se tale miglioramento
sia definitivo.

3. — Azione eutrofica del sistema nervoso centrale.

In un paziente di paralisi progressiva con cecità completa l'Oscilla
tore provocò sulla funzione della vista dei fenomeni sorprendenti: l'in
fermo cominciò a sentire un vago senso di luminosità, che durava un
paio di giorni dopo ogni applicazione dell'Oscillatore, poi riuscì a di
stinguere l'ombra degli oggetti, come p. es. di un fazzoletto, vicino alla

The age in which the child was in condition for telling the problem. It is recovered radically after 2 months of care: the improvement was noticed already at the third application.

2. - EFFECTS ON THE CHRONIC INFLAMMATION.

It has been observed a resolving effect of the Oscillator on chronic inflammatory processes of a non-specific nature. The Oscillator has proven to be particularly useful in treating female genital apparatus. Many cases of ovaritis, salpingitis-ovaritis, and metro-salpingitis have been presented to the Clinic and the cure has invariably resulted after a pair of months of treatment. Two cases of virginal metritis have been all and two refractory.

The menstrual disorders of all kinds, provided that not supported from pathological processes, for which the association of other medical or surgical therapy was indicated (stenosis, retroflexions, neoplasm's, etc) has been constantly regulated with the Oscillator.

Good, though not completely satisfactory, it has been the action of this on the perivisceritis, a disease that today the clinic and radiology so frequently put in evidence number, varieties and complexities. Actually the effectiveness of the Oscillator in the perivisceritis exceeds a little the one of the Diathermy, and the Oscillator, together with the small-intensity Rontgen rays, the hygienic measures, the antispasmodic therapy, and the alcalogenic therapy I was successful to avoid to send to the surgeon patients of perivisceritis of the upper abdomen junction and lower-right abdomen junction, to which other hope did not remain.

Negligible improvement I have found in the dry pleurisies; and on the exudative, slow-course ones, in which instead of the UV rays I use with advantage the Rontgen therapy long-wave, small dose and without limiters.

In the cases of arthritis, the action of the Oscillator has proven to be far more effective than the Diathermy. It is necessary to add some varied catalyst according to the aetiology of the arthritis: the sulfur, or the iodine, or an alcalogenic, or an acidogenic. The results are a little late, but I cannot recall a single case that has not shown, after a time, a marked degree of improvement. The time will say if such improvement then is definitive.

3. – EUTROPHIC EFFECT ON CENTRAL NERVOUS SYSTEM.

In a patient with progressive paralysis with complete blindness the Oscillator made amazing phenomena on the sight function: the patient began to feel a vague sense of brightness, lasting a pair of days after every application of the Oscillator, then he succeeded in distinguish the shadow of the objects, e.g. of a handkerchief, near the

finestra. Si sospesero le sedute perchè il soggetto non potè più frequentare l'Ambulatorio.

Una paziente di oltre cinquant'anni, che in seguito ad un'encefalite all'età di 3 anni era rimasta emiplegica e fortemente disartrica, dopo circa 5 mesi di cura ripigliava gran parte della motilità dell'arto inferiore, un po' meno dell'arto superiore, sì da meravigliare come mai si potesse esercitare un'attività curativa su esiti di processi morbosi stabilizzatisi oramai da decenni varii.

Un vecchio sofferente di paraplegia, bevitore, che a stenti camminava, dopo 8 applicazioni dell'Oscillatore saltava con sveltezza nel salire e scendere dallo sgabello isolante sul quale subiva l'applicazione.

Nessun beneficio ho riscontrato in due Parkinsoniani postencefalitici.

Nelle distonie neurovegetative sopratutto di natura vagotonica ho notato vantaggi apprezzabili, solo se contemporaneamente era suscettibile di rimozione la causa provocatrice: negli altri casi i miglioramenti sono stati effimeri. Nelle simpaticotonie, mentre ho visto regolarizzarsi il riflesso oculo-cardiaco, i disturbi per lo più sono persistiti.

Due casi di enuresi notturna sono guariti con poche applicazioni: un terzo non se ne giovava, ma sospese tempestivamente le applicazioni.

4. — Azione regolatrice del ricambio materiale.

Costantemente ho notato diminuzione della glicemia e della glicosuria nei *diabetici*. Tale diminuzione spesso è improvvisa e di grado impressionante. Non è però duratura. La cifra dello zucchero risale, per quanto non raggiunga più il grado primitivo. Ho tentato di cambiare in varie guise la tecnica, irradiando il fegato, l'ipofisi, i genitali: ma non ho migliorato i risultati descritti. La tecnica, che meglio mi ha corrisposto, è stata l'irradiazione locale sugli organi genitali.

I disturbi soggettivi degli *arteriosclerotici* spesso sono stati fortemente migliorati dall'Oscillatore, il quale abbassa sempre e di poco la pressione arteriosa massima ed eleva la minima.

Non ho visti mai forti oscillazioni di pressione. Nè ho mai constatati danni di sorta dell'Oscillatore sugl'ipotesi. Perciò ho abbandonata la precauzione di escludere gl'ipotesi dall'Oscillatore, come alcuni hanno raccomandato. L'abbassamento della pressione negl'ipertesi forti rimane definitivo se accompagnato ad una terapia acidificante del PH ed all'uso dell'Estratto alcoolico di Allium Sativum.

Sulla *calcolosi epatica* i risultati non erano incoraggianti; un deciso miglioramento dei detti ho constatato da quando nelle applicazioni aggiungo come catalizzatore il mercurio.

Parimenti nella *calcolosi renale* da quando aggiungo la glicerina per via orale.

window. The sessions were suspended because the subject could no longer attend the Clinic.

An over-fifty years old patient, that, due to an encephalitis at the age of 3 years, was remained hemiplegic and heavily disartric, after approximately 5 months of treatment re-gained most of the motility of the inferior limb, a little less of the upper limb: this is most astonishing, as never a curative activity could be exercised at this point on disease processes by then stabilized since decades.
An old man suffering of paraplegia, drinker, hardly walking, after 8 applications of the Oscillator jumped with agility in going up and down from the insulating stool on which he had the treatment.
No benefit I have found in two post-encephalitic Parkinson ills.

In the neurovegetative dystonias, especially of vagotonic nature, I have noticed considerable improvements, only if at the same time it was possible to remove the starting cause: in the other cases the improvements have been transitory. In the simpatico tonic conditions, while I have seen regularize the ocular-cardiac reflex, the disturbances generally have remained.
Two cases of nocturnal enuresis are recovered with a few applications: a third case had no benefit, but he suspended the applications earlier.

4. — EFFECTS ON METABOLISM

I have constantly observed diminution of the glycemia and glycosuria in diabetic patients. Such diminution often occurs unexpectedly and to an impressive degree. But it is not long-lasting. The value of the sugar rises again, though it does no longer get the initial value. I tried to change in several ways the technique, irradiating the liver, the hypophysis, and the genitals: but I have not improved the described results. The technique that gave me better results is the local irradiation on the genital organs.
The subjective troubles of the arteriosclerotic often have been strongly improved by the Oscillator, which always lowers a little the maximum arterial pressure and rises the minimum one.
I have never seen strong oscillations of pressure. Neither have I observed any kind of damages from the Oscillator on the hypertensives. Therefore I have abandoned the precaution to exclude the hypertensives from the Oscillator, as someone have recommended. The lowering of the pressure in the strong hypertensive's remains definitive if accompanied with an acidifying therapy of the pH and with the use of the alcoholic extract of Alliums Sativa.
On the hepatic calculosis the results were not encouraging; I have observed a remarkable improvement since when in the applications I am supplementing mercury as a catalyst. Likewise, in the renal calculosis since when I add the glycerin for oral way ["per os"].

In *tutte le braditrofie* ho rilevato un miglioramento dello stato generale dei pazienti.

La *stitichezza abituale* atonica o ipertonica è risolta dall'Oscillatore nel più dei casi. Talora fiori di zolfo affrettano i risultati.

Nell'*asma* in genere i risultati sono buoni, specialmente se accompagnati a irradiazioni Röntgen piccolo intensiva sulle pareti del torace. Nulli i risultati nell'asma cardiaco.

Non ho visti risultati soddisfacenti nell'obesità.

5. — Azione antineoplastica.

Nessun risultato ho visto favorevole nei tumori costituiti di cellule adulte, e nelle ipertrofie. Un'ipertrofia mammaria consecutiva ad un zona in una giovinetta non si è ridotta affatto. Nell'ipertrofia della tiroide non ho visto miglioramenti. Ho iniziato ora l'esperimento dell'aggiunta del catalizzatore jodio a dose infinitesimali quale le popolazioni delle regioni gozzigene adottano (KJ un grammo in un anno!).

Di due casi di fibromiomi dell'utero, uno risolvette completamente in tre mesi, l'altro non si modificò affatto, neppure con l'aggiunta di estratto mammario per via orale.

Ho visti tre casi di cancro, di cui due non più venuti dopo la prima seduta dell'Oscillatore. Una donna quarantacinquenne recidivata di carcinoma a cavolfiore della portio con stenosi della vagina ridotta a mezzo cm. di diametro, già trattata inutilmente con Radioterapia intensiva e Radium, in varie sedute dell'Oscillatore con nitrato d'argento e bleu di metilene per nulla migliorava. Ho aggiunto iniezioni di un sale arsenioso di rame e sedute settimanali d'irradiazione Röntgen piccolo intensiva sulla regione della milza. Cominciarono allora i miglioramenti soggettivi, non perdette più sangue e dopo 2 mesi il diametro della stenosi si mostrava allargato a 2 cm. Lo stato generale si fece ottimo e tutti i disturbi svanirono. Non posso dire se si tratti di semplice coincidenza.

* * *

I *cardiaci* scompensati, i *tubercolotici* evolutivi, le *aortiti*, le *flebiti in atto* non devono essere sottoposti all'azione dell'Oscillatore.

* * *

I sofferenti di *angina pectoris* hanno ricavato vantaggi insperati dall'Oscillatore, le crisi si sono ridotte di numero e d'intensità. Non tollerano la cura solo se concomita un'aortite in atto.

I postumi di *flebite* se ne avvantaggiano, tanto più se si unisce l'irradiazione Röntgen piccolo intensiva dei plessi simpatici.

Nelle *ulceri gastroduodenali* per quanto io abbia notato spesso risultati ottimi, specie accompagnando una terapia alcalogena, non ritengo

In all the braditrophies I have found an improvement of the general state of the patients.
The customary constipation -atonic or hypertonic- it is resolved by the Oscillator in most of the cases. Sometimes sulfur speeds up the result.
In asthma generally the results are good, especially if joint to small-intensity Rontgen irradiations on the thorax. Null are the result in cardiac asthma.
I have seen no satisfactory results in the obesity.

5. - ANTI NEOPLASTIC EFFECT

I have seen no favorable result in the tumors constituted by adult cells, and in the hypertrophies. A mammary hypertrophy consecutive to a zona [Herpes zoster] in a girl has not been reduced at all. In the thyroid hypertrophy I have seen no improvements. I have now begun the experiment of supplementing the iodine catalyst at infinitesimal dose, same as which the populations of the goiter regions adopt (KJ, one gram in a year!).
Of two cases of uterus fibromas, one did heal completely in three months; the other was not modified at all, not even with the addition of mammary extract for oral way.
I have seen three cases of cancer, of which two no longer came after the first sitting of the Oscillator. A 45-years old woman, recurred of cauliflower-carcinoma to of the portio, with stenosis of the vagina reduced to half cm. of diameter, already treated in vain with intensive X-ray, and Radium, in several sitting of the Oscillator with nitrate of silver and methylene blue didn't improve at all. I have added injections of an arsenious copper salt, and weekly sessions of small intensity Rontgen irradiation on the region of the spleen. The subjective improvements began then, she stopped bleeding, and after 2 months the diameter of the stenosis was shown increased to 2 cm. The general state become optimal and all the disturbances vanished. I cannot say if that is a simple coincidence.

[OTHER CASES]

People suffering from cardiac defect [? "Unbalanced cardiac's"], the evolutionary tuberculosis, aortitis, ongoing flebitis MUST NOT be subjected to the action of the Oscillator.

The angina pectoris sufferers have gained unhoped advantages from the Oscillator; the crises have been reduced of number and intensity. They do not tolerate the single cure if in concomitance with an aortitis in action.
The flebite consequences do benefit, especially if adding small intensity Rontgen irradiation of the sympathetic plexa.
In gastro-duodenal ulcers, although I have noticed often optimal results, specially accompanying an alcalogenic therapy, I do not think of having to attribute them to

di doverli attribuire all'Oscillatore, conoscendo i periodi anche lunghissimi di remissione spontanea di esse.

Nelle *adeniti* specie tbc i risultati sono buoni, ma inferiori all'irradiazione Röntgen e ai raggi ultravioletti.

Nulla è l'efficacia nella Psoriasi, nel Prurigo, mentre la profusa caduta dei capelli in 2 casi si è arrestata in otto applicazioni.

Un caso di Prostatite di vecchia data con discreta ipertrofia è migliorato rapidamente in quattro sedute di Oscillatore con contemporanea somministrazione dei sali alogeni di magnesio. Il volume della prostata si ridusse di un terzo.

* * *

La tecnica da me adoperata è quella dell'*irradiazione localizzata*. E vi resto fedele, perchè nella sede della irradiazione *io ho rilevati con il mio neometro effetti elettromagnetici distinti da quelli rilevati in altre sedi*, come dimostrerò a suo tempo.

Di solito pratico una seduta ogni 4 giorni di 5-15 minuti per volta. E' la tecnica che meglio mi ha corrisposto dopo di averne provate tante. Nei bambini, nei vecchi, nelle persone deboli dose minore.

Il paziente è isolato su sgabello di legno abitualmente.

Se il risultato tarda dopo 7-8 sedute, continuo con una ogni otto giorni per 15-30 volte. Non ho notato mai danni di sorta con tutte queste sedute: respingo come illusorii i pericoli accennati da qualcuno. Anzi lo stato generale se ne giova *sempre*, sia pure transitoriamente, tanto che gli ammalati stessi talvolta insistono per ripetere le sedute dell'Oscillatore.

La potenza che adopero più spesso è III×3 Ampères, che importa una SE di 10 cm. all'incirca. Negli individui meno forti mi fermo a II×2 che importa la stessa differenza di potenziale ma minore intensità. Nei più deboli e nei bambini resto a I×2 che importa una S.E di 2-3 cm. solamente.

La distanza fra i radiatori è di 80 cm. che spesso porto a 150 per applicazioni meno intensive.

In modo che regolando la quantità, l'amperaggio, la distanza, il tempo e la messa a terra io possiedo una gamma estesissima di potenza che adatto a tutti i pazienti.

In che modo opera l'oscillatore?

Per me ritengo si tratti di uno choc cellulare determinato: 1° da una forte corrente di spostamento che l'alta frequenza genera fra i radiatori, 2° dalle onde elettromagnetiche selezionate dai circuiti oscillanti specifici degli organi, degli apparati, dei sistemi e della massa corporea dal grande fascio di onde multiple dell'Oscillatore.

a) E' risaputo, che nell'organismo umano, specie nel sistema ner-

The Oscillator, knowing the even very long periods of spontaneous remission of them [what does it mean?].
In the adenitis specially TBC [caused by tuberculosis?] the result are good, but inferior to the Rontgen irradiation and the ultraviolet rays.
Null is the effectiveness in the Psoriasis, in the Prurigo, while the profuse fall of hairs in 2 cases has been stopped in eight applications.
A case of Prostatitis of old date with hypertrophy is improved quickly in four sessions of Oscillator with simultaneous administration of magnesium halogen salts. The volume of the prostate reduced of a one-third.

[USE OF THE OSCILLATOR]

The technique used by me is the one of the localized irradiation.
And I am faithful to that, because in the center of the irradiation I have found with my "neometro" ["neo-meter". We ignore what it is.] I have detected electromagnetic effects distinguished from those found in others centers, as I will demonstrate opportunely.
Usually, I make a 5-15 minute session every 4 days. This is the technique that gave me better results, the many tried. In the children, the old ones, the weak persons: smaller dose. The patient is usually insulated on wood stool.
If the result is late to come after 7-8 sitting, I do continue with one every eight days for 15-30 times. I have never noticed damages of any kind with all this sessions: I reject like illusory the dangers pointed out from someone. Indeed the general state always benefits, sometimes only temporarily, so that the patients themselves sometimes insist in order to repeat the sessions of the Oscillator.
The power that I more often use is III x 3 Amperes, that implies a SE [what does it mean? Most likely: "Scarica Elettrica" = "Electric Discharge"] of 10 cm approximately. In less strong individuals I limit to II x 2, which implies the same potential difference but smaller intensities. In weaker people and the children I use the I x 2 that imports a SE of 2-3 cm. only. The distance between the radiators is of 80 cm that often bring to 150 for less intensive applications. In this way, regulating the amount, the amperage, the distance, the time and the grounding I possess a most extensive range of power that I adapt to all the patients.

[DISCUSSION]

In which way operates the Oscillator?
I personally think it's a cellular shock, given by: (1) from a strong displacement current that the high frequency generates between the radiators. (2) from the electromagnetic waves selected from the oscillating circuits, specific of the organs, the apparatuses, the systems and the body mass, of the great beam of multiple waves of the Oscillator.

voso centrale, esistono numerose cellule allo stato embrionale, o allo stato di funzionalità loro specifica latente, ancora indifferenziate, che restano inoperose per la massima parte dell'umanità per tutta la vita. In esse gl'istologi vedono il divenire dell'umanità. Nello stato di evoluzione attuale rimangono come assonnate per svegliarsi solo in certe determinate circostanze per adeguato stimolo; esse saranno sveglie e attive negli stadi futuri dell'evoluzione umana. A una porzione minima di queste cellule si rivolge spesso lo stimolo oscillatorio, e le spinge a prendere parte alla vita fisiologica attuale dell'individuo, determinando riparazioni inattese e miglioramenti inesplicati e insperabili.

b) Lo choc oscillatorio multiplo si dirige pure, in grazia delle diverse lunghezze d'onda della propria gamma, alle cellule evolute e in equilibrio oscillatorio normale, e alle cellule in disquilibrio oscillatorio, rinforzando per risonanza le prime e rimettendo in tono le seconde, riportandole cioè all'oscillazione normale.

c) Non è da escludere anche un'azione antinfettiva per oscillazioni corte capaci di uccidere determinati batteri patogeni, come dai batteriologi è stato dimostrato, o di rinforzare batteri, fermenti organizzati, elementi cellulari antagonisti dei primi. Specialmente gli elementi cellulari degli organi endocrini, capaci di operare modificando il PH o l'attività delle vitamine o la produzione di ormoni, di cui abbia particolare bisogno un dato paziente.

Naturalmente il meccanismo d'azione dell'oscillatore a onde multiple è diverso dal meccanismo d'azione dei noti circuiti Lakowsky, secondo il mio avviso. Questi schermerebbero il complesso organico dalle oscillazioni nocive, secondo l'ipotesi dell'illustre Autore, quello, secondo le mie constatazioni fatte con una serie di esperienze non ancora pubblicate, meno la prima da me comunicata al Congresso internazionale di Radiobiologia di Venezia, bombarda il complesso organico con *radiazioni, che vengono assorbite, elaborate, riemesse.*

Tale concezione avvicina il meccanismo d'azione delle onde multiple a quello delle radiazioni Röntgen, luminose, e di tutte le altre lunghezze d'onda che finora hanno dimostrato di possedere un'azione biologica.

In complesso l'Oscillatore del Lakowsky per questo Istituto si è ad dimostrato di grande utilità, pur non avendo io ottenuto i risultati brillanti che altri osservatori affermano. E' strano quindi che esso sia poco diffuso nel campo scientifico e professionale, e di esso non manchino oppositori. Ciò, indipendentemente dalle diversità delle condizioni di conduttività del suolo e degli strati del sottosuolo immediati, che secondo l'opinione dello stesso prof. Lakowsky influiscono sui risultati, io credo di attribuire allo studio insufficiente dei fenomeni fisici dall'Oscillatore generati e dei fenomeni biologici connessi, fatto dagli sperimentatori.

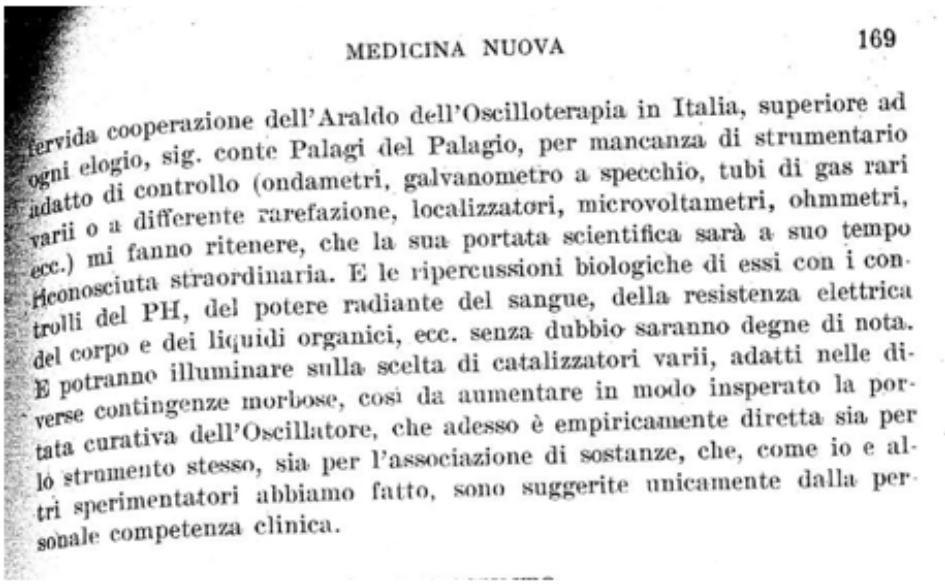
I fenomeni fisici importanti, che a me è stato dato di rilevare e non ancora convenientemente approfondire, nonostante tutta la intelligente e

a) “it is known that in the human body, especially in the central nervous system, many cells at the embryonic state, or in a state of latent specific functionality, still not differentiated, that stay idle for most humanity for the whole life. In them the histologists see the humanity future. In the present evolution state they remain in rest, to wake-up only in particular cases by suitable stimulus; they will be activated in the future stages of human evolution. At a minimal part of such cells the oscillatory stimulus is addressed, and it pushes them to take part to the person's present physiological life, obtaining unexpected repairs, and unexplained and beyond hope improvements.

b) The multiple oscillating shocks also aims, in grace of the different wavelengths of its own range, to the evolved cells and in normal oscillating equilibrium, and to the cells in oscillating unbalance, reinforcing for resonance the first ones, and restoring in tune the second ones, i.e. bringing them back to the normal oscillation.

c) It cannot be excluded, also, an antiseptically action by the short[-wave] oscillations to kill determined pathogenic bacteria, as it has been demonstrated by bacteriologists, or to reinforce organized bacteria, ferments, cellular elements, antagonist of first ones. Especially the cellular elements of the endocrine organs, able to operate modifying the pH or the activity of the vitamins, or the hormone production, of which a given patient need for.
Naturally the action mechanism of the MWO is different from the action mechanism of the famous Lakhovsky Circuits, in my view. These would shield the organic from the harmful oscillations, according the hypothesis of the famous Author [Lakhovsky], that one [the MWO], according my observations made with a series of experiences not yet published, except the first one that I have communicated the International Conference of Radiobiology of Venice, targets the organic complex with radiations that are absorbed, elaborated, re-emitted.
Such conception approaches the action mechanism of the Multiple Waves to the one of the radiations Rontgen, luminous, and of all the other wavelengths that up to now have demonstrated to have a biological effect.

Globally the Lakowsky Oscillator has proven to be of great usefulness for this Institute, even though I have not obtained the smart results that others declare. It is strange therefore that it is little diffused in the scientific and professional field, and it does not lack opponents. This, independently from the diversities of the conditions of conductivity of the ground and the layers of the soil, -that according to the opinion of the same Prof. Lakowsky influences on the result-, I believe to attribute to the insufficient study of the physical phenomena generated from the oscillator and of the connected biological phenomena, made by the experimenters.
The important physical phenomena, that to me it has been given to find -and not yet conveniently to study deeper-, in spite of all the intelligent



MEDICINA NUOVA 169

fervida cooperazione dell'Araldo dell'Oscilloterapia in Italia, superiore ad ogni elogio, sig. conte Palagi del Palagio, per mancanza di strumentario adatto di controllo (ondametri, galvanometro a specchio, tubi di gas rari varii o a differente rarefazione, localizzatori, microvoltametri, ohmmetri, ecc.) mi fanno ritenere, che la sua portata scientifica sarà a suo tempo riconosciuta straordinaria. E le ripercussioni biologiche di essi con i controlli del PH, del potere radiante del sangue, della resistenza elettrica del corpo e dei liquidi organici, ecc. senza dubbio saranno degne di nota. E potranno illuminare sulla scelta di catalizzatori varii, adatti nelle diverse contingenze morbose, così da aumentare in modo insperato la portata curativa dell'Oscillatore, che adesso è empiricamente diretta sia per lo strumento stesso, sia per l'associazione di sostanze, che, come io e altri sperimentatori abbiamo fatto, sono suggerite unicamente dalla personale competenza clinica.

and fervent cooperation of the Herald of the Oscillotherapy in Italy, advanced to every praise, Mr. Conte Pelagi del Palagio, for lack of suitable instruments of control (wavemeters, mirror galvanometer, tubes filled of rare gas or to different rarefaction, localizers, micro-voltmeters, ohmmeters, etc.), make me to think, that its scientific importance will be opportunely recognized as extraordinary.
And the their biological implications of with the controls of the pH, of the radiating power of the blood, the electric resistance of the body and the organic liquids, etc. will be without any doubt worthy. And they will be able to illuminate on the choice of several catalysts, suitable in the various pathological circumstances, in order to increase in unhoped way the healing capacity of the Oscillator, that is now empirically directed both for the device, and for the association of substances, that, as I and other experimenters have done, are suggested only from the personal clinical competence.

7.6 G. Lakhovsky: Failures endured over the many treatments

Now that you've seen these many cases of healing almost without failure, **we should not think that my oscillator can cure all cancer, whatever their status. In several cases, the cancer had destroyed a number of vessels and my apparatus is unable to restore the fabric of these vessels before the occurrence of a fatal hemorrhage.**

I will mention three cases, which illustrate the three failures I have endured over the many treatments that I made with my multi-wave oscillator.
First two cases of cancer of the throat very advanced, with edema and ganglia, Hopital Saint-Louis, then cancer of the chest at the Val de grace. Here are the comments I made on these three cases.

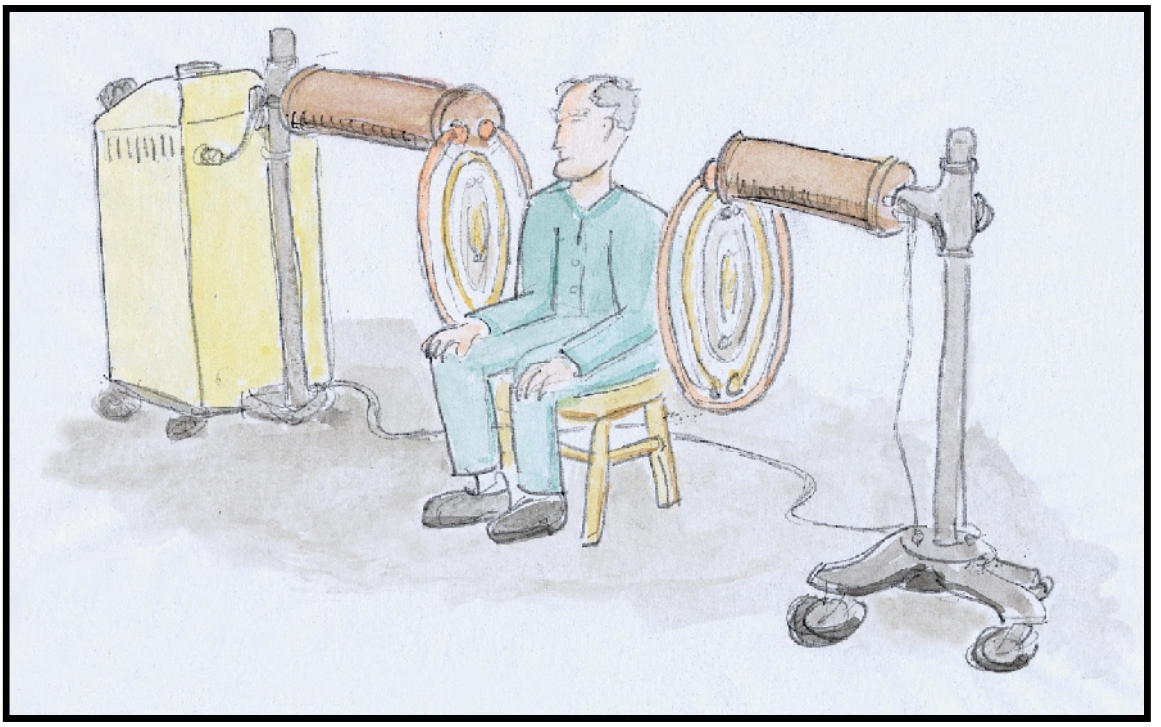
On 1 December 1931, a patient suffering from ulceration and leukoplakia tongue is introduced to me in the Hospital Saint-Louis. The diagnosis revealed a neoplasm of the tongue and mouth with induration, edema and lymph nodes. The patient said he suffered a lot and could not eat. He was treated with my multiple wave oscillator in four sessions 8, 10, 12 and 15 December. After the fourth meeting, the areas of indurations have softened and the patient said he suffered less and could eat. When I arrived for the fifth session nurse told me that the patient was lying down with heavy bleeding from which he died shortly after. I was a little discouraged this first failure. Fifteen days later a new patient whose diagnosis was similar was presented to me, induration, glands, severe pain, great difficulty with food. He was treated with my mwo. After the fourth meeting, he said he could absorb food more easily, he suffered much less and I noticed that the areas of indurations became more flexible. When I arrived for the fifth session, the nurse, as in the case precedent, "said the patient was in bed with heavy bleeding from which he not recovered. I was stunned by the almost identical repetition of this failure and I began to meditate on the conclusions from this double failure.
It is known that the submaxillary region is crisscrossed by numerous important vessels of which derive from the common carotid artery: internal carotid artery, thyroid artery, lingual artery, etc. It is conceivable that one or more of these arteries have been partially destroyed by the neoplasm and compressed by induration, which leads, moreover, unbearable pain. When the neoplastic tissue begins to undergo necrosis, induration disappeared gradually and the pain diminishes. But as the arteries were sectioned on a certain length by the neoplasm, there comes a moment when they are suddenly released, the pressure of blood causes bleeding.
We can not better compare this to what happens for a water pipe or a frozen radiator. The ice prevents the flow of water and no leakage occurs. But when the ice melts and due to that the pipe was cracked during the frost, the water begins to leak.
This is the classic end of all cancer patients whose malignancy has destroyed over a certain length of the vessels and significant arteries. It follows always external and even internal bleeding, which in infiltrating tissue, causing an imbalance of metastases and the agency, where unbearable suffering to the fatal outcome.
I believe that when the essential elements of the body, arteries and veins, maintaining the circulation of blood, are in any place, destroyed by neoplasia, no

treatment in the world, no physical or chemical agent can not come to save the patient.
The same phenomenon was observed in another case. In November 1931. Professor Chaumet, Val de grace, said:

I am currently treating an unfortunate officer, Professor Jameson, a cancer on the upper chest, which has caused a monstrous "cauliflower". This is a horrible disease; the suffering of this man is hard to see. You can not claim to cure such a case, but if you could only alleviate this suffering, you would make a good action. When we began the treatment the tumor that gave off such an odor that I had it often very difficult to stay with him. But that feeling disappeared because I had the hope to relieve his terrible suffering. I was in front of an educated man, aware of the seriousness of his illness, and who, having lost all hope of recovery, only asked one thing; disappear as soon as possible to shorten his suffering. I tried to encourage him and give him hope, as appropriate always in such cases. Indeed, after three to four sessions, he began to feel better and told me that he suffered much less, he could sleep at night. After five or six sessions, the stench that emanated the tumor had almost ceased and at the same time, the pain disappeared completely. The right hand was for a very long time completely paralyzed and he now could perform all the movements without the slightest embarrassment. The first goal was achieved, since the beginning of treatment I had never claimed to cure this patient, but only levitated. But the hope of healing increased day by day, because after a month half to two meetings a quarter of an hour a week, the tumor quickly began to become necrotic and we watched this show extraordinary: the cauliflower with monstrous weight was estimated at 8 or 10 pounds began to crumble. At each dressing, the professor told me we detached a piece as large as the head of a newborn. A moment arrived where almost all the tumor was gone and it was a flat surface and hollow covered with a greyish substance. This officer, who had hoped for dying, began to live, became very gay, and started to make jokes. He had found his strength, a good appetite, regular sleep, in short, had taken interest in life. He expressed to me his gratitude for saving his life. Prof. Chaumet, Professor Jameson and I, we were hopefully for his recovery, when in the month of January 1932, arriving
At a Monday morning at the Val de grace, the nurse told me almost with tears in Eyes: "The poor Captain died last Sunday after a hemorrhage bleeding. I was absolutely heartbroken. We sought the cause of this failure and explained by the same phenomenon that caused the bleeding in cancer, tongue and throat to the Hospital Saint-Louis. During the three years of cancer, the neoplastic tissue by a gradual evolution, had slowly developed in depth and had severed his subclavian artery or superior scapular artery. By wrapping the neoplastic tissue, the part damaged by the neoplasm of these arteries was maintained by the tumor. The day when the necrotized arteries were released by the tumor, internal bleeding led to a fatal outcome. Two similar cases of throat cancer with lymph edema were also reported by Dr. Rigaux. By a strange coincidence, it's always after the fourth session that hemorrhage and death occurred. But I think that in these cases my multiple wave oscillators may bring beneficial action for desperate patients who are condemned to die.

8 Eleven hypotheses on interaction of MWO with biological systems

Patient in position between the antennas



Why does the MWO work? Or: assuming that it actually have healing properties, which is/are it's action mechanism/s with biological systems?
In this section we will go through various hypotheses. Some are from George Lakhovsky himself, some from other scientists, others are ideas of ours.

8.1 Providing each cell with its own oscillation frequency

This first hypothesis is the claim from George Lakhovsky. In his books it is stated that the MWO generates a huge quantity of different frequencies "*including harmonics, interferences and effluvia*" that span from about 750 KHz to the infrared/visible wavelength. "*Each cell and mitochondri is able to gather the oscillation at the exact frequency it needs, to oscillate in resonance*".

8.2 Providing an oscillatory shock to the biological system

This claim is from George Lakhovsky too.
Given the electric and magnetic levels involved, a "shock" is indeed provided.
The word "shock" recalls a somehow short and intense energy pulse delivered to the system.
Did GL really mean "pulse". Did he refer to the single spark gap's discharge?
In the radar technology the pulse (sort time duration, high energy) is the basic item used. But it can be shown that a long lasting, lower energy signal can do the same job, provided that such signal has large bandwidth. In other words the signal includes many frequencies.
So this GL claim has twofold meaning: first, the MWO exposure is strong and short lasting, a few minutes usually. Secondly, in frequency-domain (spectrum), the signal content has some similarity to the one used in the radar technology, so it could virtually be like a very short pulse, a "shock". The radars are able to "compress" the wideband signal into a shorter pulse. The MWO, providing many cells with energy simultaneously, could (perhaps) build up coherently the system energy, as it did a much higher and shorter energy delivery.
Some examples of familiar physical means to "energize" our body are e.g.: have a shower / dip in a pool; get a massage session. In a sense, the MWO "oscillatory shock" is similar to an electromagnetic shower or electromagnetic massage.
Moreover, we know that when an oscillator is stopped, a practical way to restart it is to give it a shock. Once stopped, my pendulum wall clock can be restarted by bumping it. Once restarted, it has the internal energy, the spring charge, to continue alone. Most likely the same could do an electromagnetic shock to a cell that has lost his oscillatory activity.
Also, *wrong* cell oscillation, e.g. hearth fibrillation, can be reset to its normal rate with a strong pulse -the defibrillator discharge. On the other hand, a too long exposure could stress the biological system (Electromagnetic sensitivity of certain persons).

8.3 Providing cell polarization

Dr. Murzeau writes [Murzea1]: the transmitter produces pulses of high voltage in to an antenna system with many resonances. These impulses running repeatedly from a few hundreds to a thousand times every second carry a high frequency wave (from 750 KHz to one Megahertz maximum) characteristics of which must not necessarily be very accurate. These impulses of powerful energy lead to real shocks in the cell membrane hence modifying its polarization of the membrane and by the same its properties. The use of high voltage devices is imperative in the process of cell polarization.

What are the lessons?

Concept of Pulsed electric fields
Concept of high electric fields (this is an electrostatic field: the patient is isolated, no current flows through it).
Working in very high impedance, the current in the antenna is very small, small magnetic field, the power absorbed by the patient as well.
The wavelength is not critical: the antenna radiates a broad spectrum.
Concept of "harmony" that is resonant of the body according to what Lakovsky: the condition of maximum energy transfer.
Plus, the high electrostatic field potential gradient is not "balanced". Indeed the results are obtained by a spark gap transmitter delivering pulses of damped waves or a shortwave transmitter maintained symmetrical design, the subject is very close to the unit and is subjected to electric fields (as opposed to electromagnetic waves in the strict sense), related to the design of devices:

Conclusions:

- Importance of the field, the gradient of the potential, not current
- Importance of an asymmetric field
- Importance of pulse modulation

8.4 Increasing transmembrane potential

In recent years it has been determined that the cell membranes, having a characteristic of non-linear impedance, rectify an alternating voltage. Thus the high voltage electrical pulses generated by the multi wave oscillator enhance the transmembrane potential of the cell and its biological activities by inducing through cell membranes the necessary ions, according to the suggestions Bjorn E.W. Nordenstrom and the principles of the Nobel Laureate Albert Szent-Gyorgyi who as

early as 1941 established that structured proteins behave like solid state semiconductors or rectifiers [Pappas3].
According to the results of the studies by Szent-Gyorgyi, Cone, and others, a young and healthy cell has a transmembrane potential of the order of 70 millivolts. An aged cell or ill cell has a transmembrane potential considerably lower, as low as 50 millivolts. However, a cancer tumor cell has a transmembrane potential as low as 15 millivolts. A cancer cell is a cell in biochemical malfunction, which reflects as an electrical difficulty. At the same time, cells with low transmembrane potential are in an inflammatory state, are the sources of the pain signals which normally cause the sense of strong pain. The transmembrane potential is the measure of the internal Energy of a cell. This energy which is represented in the electrical potential of the cell membrane powers the sodium-potassium pump1 of the cell, which in turn is responsible for the ion concentration of the cell and the maintenance of the proper transmembrane potential.

8.5 Generation of air Eigenfrequencies

These claims are made by Professor T.Pappas [Pappas1].

"*A plasma is created by supplying energy to excite atoms of said element to oscillate at characteristic radio eigenfrequencies, applying these pulses of said radio eigenfrequencies to matter said biological to cause absorption of energy by atoms of said element within said matter biological due to resonance."*

"Plasma containing an element of biological matter which may produce Eigenfrequencies to tune with the same element in the biological matter – body (by the ("sympathetic") law of emission-absorption of Kirchoff)."

In the MWO we have a creation of plasma when the spark gap fires. According Prof. Papas eigenresonances originating from atmospheric air are produced that by means of resonance are coupled with the same elements in the body.
We must confirm that higher frequencies then the damped wave are present in the MWO. They change with temperature and pressure and have a frequency between 30 and 60 MHz. For this mechanism it seems to be important to have low inductance tank capacitors.

According Prof. T.Pappas is this mechanism responsible for negative effects from electromagnetic pulsed signals. This is the case when the plasma Eigenfrequencies are generated from materials not belonging to the human body, the so-called solid state plasma materials like used in thyristors and cell phone power amplifiers.

8.6 Producing NMR effects

These claims are made by Professor T.Pappas [Pappas2].

"Nuclear magnetic resonance is created by exposing the sample to a pulsed and damped wave alternating magnetic field while in the presence of the constant earth magnetic field and thus activating the nuclei and the electrons of a sample object"

"Very fast electromagnetic pulses, with the increased instant intensity, activate the internal degrees of freedom of molecules, and they might even cause a Nuclear Bio-Resonance and Bio-Excitation. While the short duration pulses and their limited energy per unit time, do not contribute to the increase of the motional energy (heat energy) that would have led to molecular decomposition. In this way, the pulses are ideal for accelerating the formation of complex molecules, for which the activation of internal degrees of freedom of matter and particularly, the Bio-excitation of nuclear components is required. The Biological Nuclear Reaction of the French Researcher Louis C. Kervran:

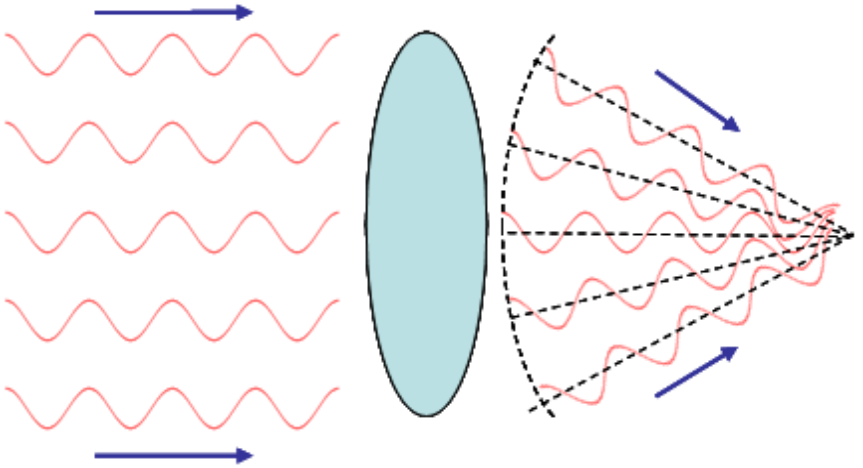
$$_{11}Na^{23} + \text{Electrical Energy} + {}_{8}O^{16} = {}_{19}K^{39}$$

implies that Sodium plus Oxygen plus (Magnetic) Energy, nuclearly transmutes into Potassium. However, this process is known in Biology as the Sodium and Potassium Pump, which is wrongly assumed to be an exchange and not a nuclear transmutation. It is wrongly assumed that Potassium continuously enters in to the cells and Sodium continuously comes out of the cells. These are obviously two impossible processes!
This nuclear process is accomplished with a no heat mode, in a no rate of thermal decomposition. This is the most important, and at the same time, the most commonly found phenomenon of Nuclear Fusion in Biology."

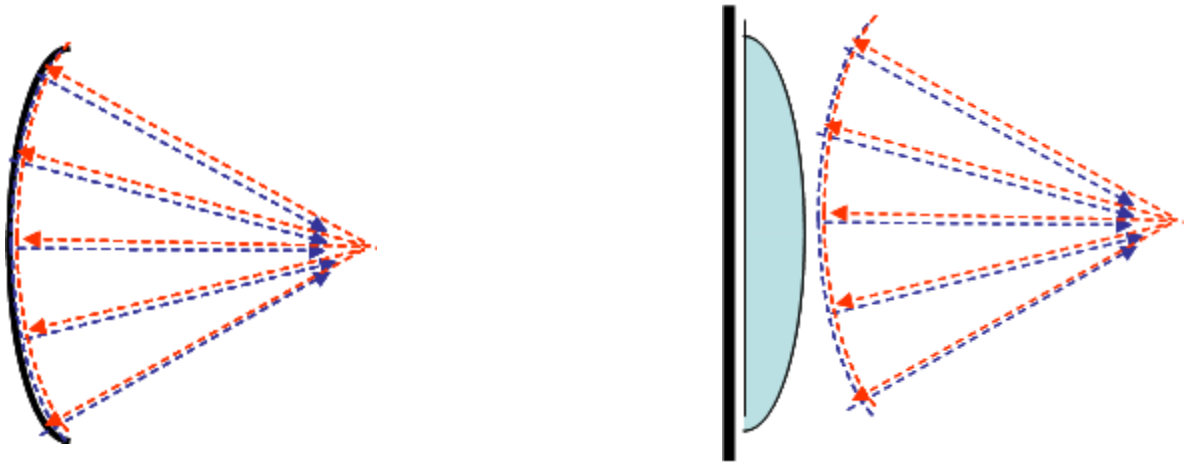
In the MWO we have a creation of very fast Electromagnetic pulses which according Prof. T. Pappas are responsible for nuclear transmutations. His claims can explain why placing the MWO in the north-south axis improves the results.

8.7 Split-Ring Resonator antennas as an electromagnetic lens system

In optics, a lens is a device "*with perfect or approximate axial symmetry which transmits and refracts light, converging or diverging the beam*" [Wikipedia].
In other words, it is able to distort the wave front, in a predetermined way, to achieve a given task. For instance a plane wave can be delayed by a different amount at the lens periphery more that at the lens axis. Delaying less at periphery allows focussing the wave, as it can be seen in the following figure.

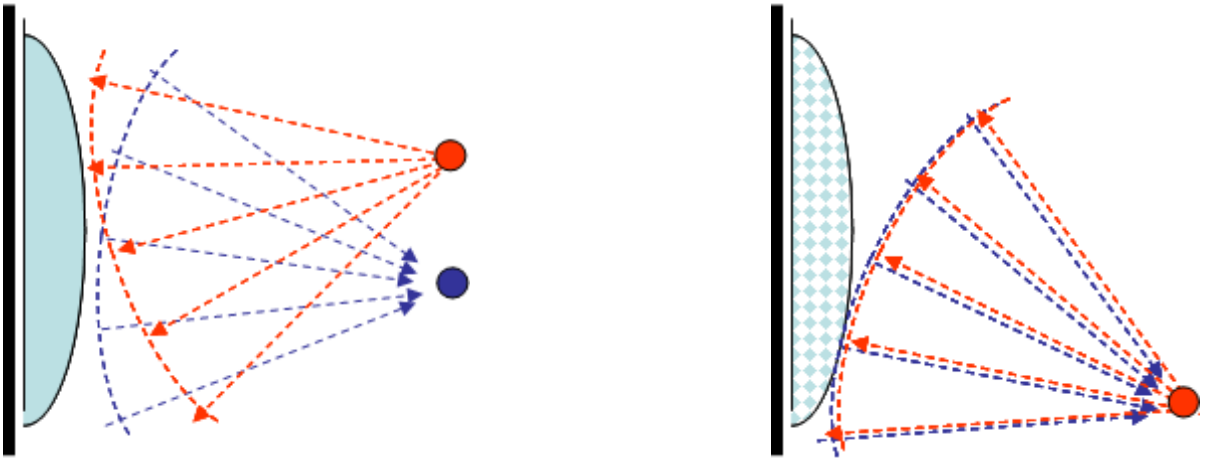


In this case it is the same as if new wave sources with progressive radial phase displacement were present after the lens. So the new wave front is curved, and the rays are bent towards a common point (focus). A spherical mirror, instead, is able to gather rays from a source and reflect it back towards it, as shown in figure below (left). Notice that the wave configuration at the right side is the same as in the lens case.
The very same result can be achieved by a combination of a flat mirror plus a lens similar to the above one (figure, right).



So, if we make a device *with perfect or approximate axial symmetry,* able to implement an axial "delay profile" in a given range of frequencies, such that the delay

increases towards the symmetry axis, we have a lens. And most probably it will behave as a concave mirror too.
Does this apply to MWO antenna?
In each ring (better: “split-ring resonator”, SRR), a wave with an off-tuning frequency hitting on it does induce an RF current, at the wave's own frequency, that re-radiates with a different phase. Such phase depends on the detuning of the wave frequency to the SRR resonance frequency. So, basically, yes, it could possible that MWO antenna behaves as an electromagnetic lens and/or mirror, although probably not in a very wide range of frequencies, and not in a very precise way.
It is not easy to figure out how is the global behaviour of such a complicated structure at different frequencies. An electromagnetic simulation would be useful to shed light on this mechanism.
Moreover, it could say if the resulting (concave) mirror is a regular one, or, instead, if it is a *conjugated* one. In the first case (figure below, left) the waves from an off-centre source are reflected and focused towards a different target point. Instead, a *conjugated mirror* would reflect and focus it back to the source itself (figure below, right).



The latter condition has important biological consequences: according [BeardenPH] the tracing-back of the wave due to a conjugate mirror can be viewed as a *time reversal* of the wave, and this, striking back the wave source, e.g. a cancer cell, could counteract the pathology itself. See next hypothesis.

3.1 Split-Ring Resonator antenna pair as a Metamaterial cell

When I first saw the MWO antenna, I was shocked by such a peculiar shape.
What is really striking is that such 80-years-old structure is used today, at least in *pairs* of SRR, to produce very futuristic structures, the Metamaterials.

Metamaterials are artificial materials engineered to provide properties which may not be readily available in nature. These materials usually gain their properties from structure rather than composition, using the inclusion of small in homogeneities to enact effective macroscopic behaviour.

The most used “inclusion” is the double-SRR. Each SRR behaves as a resonator at frequencies below the resonant frequency; the real part of the magnetic permeability of the SRR becomes large (positive value), and at frequencies higher than resonance it will become negative. This negative permeability can be used with the negative dielectric constant of another structure to produce negative refractive index materials.
In the photo on the left, a metamaterial is made by multiple cells of:

- double SRR, resulting in negative magnetic permeability μ, and
- straight metal bars, resulting in negative dielectric permittivity ε

Combining negative μ and ε, the refraction index become negative. It can be shown that such types of Metamaterials have extraordinary features. E.g. it is possible to use a slab of it to do a perfect lens, with no aberration [Pendry], [Wiki_metam].
Another interesting effect is that in the metamaterial the waves proceed backwards. Could this *time reversal* be yet another way of counteracting the pathology as T.Bearden claims?
[BeardenPH]

8.8 Generation of scalar/longitudinal waves

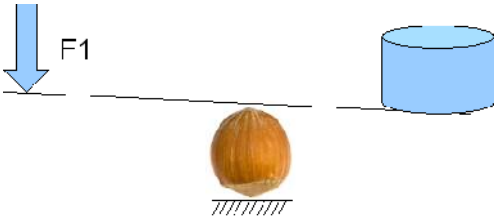
There are many clues of presence of *scalar* waves or at least *longitudinal* waves in the MWO. Let's list:

- MWO is a Tesla Coil like structure. In such coils there are two types of propagation modes: a transversal propagation along the wire and a longitudinal propagation, through the turn-to-turn capacity along the coil. For more details see e.g. [Dollard]. This longitudinal wave can protrude beyond the coil, towards the patient range and beyond.
- The dielectric displacement current between the two MWO antennas oscillates in longitudinal direction.
- According many authors, e.g. [VanVlaenderen], the scalar field is proportional to $d\Phi/dt$, where Φ is the electric potential; the latter, in our case, is due e.g. to the electrical charge on the antennas.
- According to [Meyl], the 2nd overtone of the Tesla's “wireless transmission of energy” setup, that is nearly identical to the MWO structure, produces scalar waves.

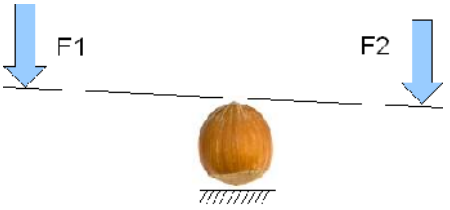
- Another aspect is that at 1st resonance (e.g. 750 kHz or so) the two antennas oscillate exactly on phase opposition. That means that at the patient location the two electric fields are equal and opposite vectors. So, according [BeardenEF] and [Evans], scalar field is generated here, by field annihilation.
- Moreover, the HV capacitors dielectric is surely piezoelectric, at this E field levels. That means that they can generate "acoustic" HF waves, scalar in nature. Can the orientation of such capacitors have a special role? If this is the case, though, G.Lakhovsky probably ignored it, since in different MWO models orientations are different!

8.9 Phased sources as a "nutcracker" against the pathologic tissue

This is the hypothesis I like more. First of all, let us review how a nutcracker works. Consider a simple "class 1" lever, as in the figure below.



The force F1 on the left can lift the object on the right, thanks to the fulcrum (the nut) present at the centre.

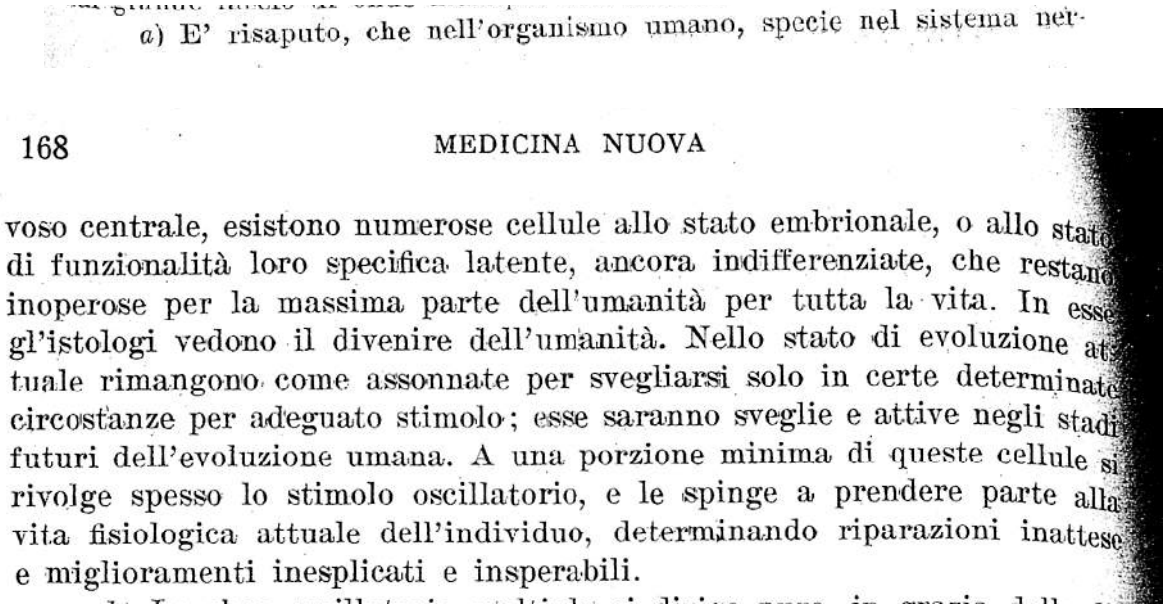


Instead, if on the right there is a suitable force F2, opposing to F1, the two forces sum up against the nut, eventually cracking it.

Now get back to the MWO. Suppose (but this is to be verified) that the pathological mass is itself a *metamaterial* with negative refraction index on a certain frequency range. As such, it is able to behave like an electromagnetic lens. Let us remove the receiving antenna for a moment.
The transmitting antenna, on the left, is an electromagnetic source; the metamaterial placed in the middle creates, as if it were an optical lens, an electromagnetic image on the right, at the receiver antenna location. Now let's put the receiver antenna again in its position: the electromagnetic field that it produces acts against the image one: therefore the situation is very similar to the nutcracker one: the metamaterial is "crushed", or it is conditioned to become "non-metamaterial" - (can that mean *healing*?)

8.10 Embryonic state cells development promotion

This hypothesis is from Doctor Nicola Gentile. He wrote [Gentile3]:



a) E' risaputo, che nell'organismo umano, specie nel sistema ner-

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voso centrale, esistono numerose cellule allo stato embrionale, o allo stato di funzionalità loro specifica latente, ancora indifferenziate, che restano inoperose per la massima parte dell'umanità per tutta la vita. In esse gl'istologi vedono il divenire dell'umanità. Nello stato di evoluzione attuale rimangono come assonnate per svegliarsi solo in certe determinate circostanze per adeguato stimolo; esse saranno sveglie e attive negli stadi futuri dell'evoluzione umana. A una porzione minima di queste cellule si rivolge spesso lo stimolo oscillatorio, e le spinge a prendere parte alla vita fisiologica attuale dell'individuo, determinando riparazioni inattese e miglioramenti inesplicati e insperabili.

"*It is known that in the human body, especially in the central nervous system, many cells at the embryonic state, or in a state of latent specific functionality, still not differentiated, that stay idle for most humanity for the whole life. In them the histologists see the humanity future. In the present evolution state they remain in rest, to wake-up only in particular cases by suitable stimulus; they will be activated in the future stages of human evolution. At a minimal part of such cells the oscillatory stimulus is addressed, and it pushes them to take part to the person's present physiological life, obtaining unexpected repairs, and unexplained and beyond hope improvements.*"

9 Miscellaneous curiosities and open questions

Picture from GL doing something mysterious here

9.1 What happened with C.O.L.Y.S.A. after the death of GL?

What about C.O.L.Y.S.A. after G.Lakhovsky passed away? What about the MWO production? What did Serge, the son of George, do?
Here under, some information extracted from two letters that Guy THIEUX, a co-operator of Serge Lakhovsky, sent us.

In 1952 I saw for the first time some Oscillating Circuits or Hertz Dipoles in applications on vegetables in Haute Savoie.

In 1960, in Glion sur Montreux (Switzerland) I did meet an old officer of the Chevaliers keepers Michael Vladimirovitch AKARIATINE, who was using antennas conceived by George Lakhovsky, compatriot that he did know in Paris during the first realisations of the MWO.
MVA have published at Cairo, and then with Dangles under the nickname ENEL: First steps in therapeutic radiesthesy – Radiation of shapes and causes; Action of shapes at distance. In these books he cites the works and realisations of GL.

In 1963 a user of O.C. [oscillating circuits] polymetallic, did put me in contact with Serge L., 25 Rue des Marronieres. This person, Helene TRICOT was engaged in therapy with the O.C. and the magnetism.
I did acquire, from S. Lakhovsky the available books of his father and some re-editions made by BERSEZ. A long friendship has arisen between SL and me that leaded us to do public conferences about realisations of GL.

Serge did stay in USA from 1941 to 1962 without ever being returned in France. A first wedding in America without child then divorced and again wedding in France with Monique, chemistry engineer at L'Oreal, then a son is born, George (that works as Chartered accountant).
From 1965 to 1983 a large number of meetings took place at C.O.L.Y.S.A. in my presence on Serge house and under the authority of professor E.Guillé at Orsay.

During this period SL asked me to write an historical book about his father work (the books, various notes, the 496 international publications, a 35mm movie etc.) I did realise such manuscript in the Serge office, devoting to it one day a week during 3 years. The edition design didn't start, I have no copy and during the events of succession of the family, the manuscript has disappeared.

During all this years, I learned that in France there was 54 MWO's built by COLYSA under the control of GL and one of his co operators: engineer GIVELET.
Arsene D'ARSONVAL did write prefaces to many GL books, and gave him many advices.

What I could know is that the first diffuser (GL did not use the word antenna) single, was made by eight dipoles in cooked copper of 6mm diameter. D=64cm (I did find this "diffuseur" in Marseille, among the stuff of Edmond Vernet, where Givelet did bring it, after the GL death in USA).
After, GL did consider a law of harmonics similar to a sound progression (many patents, microphone, Earphone, speaker at double liquid membrane etc.) to compose the different antennas with number variable oscillating circuits (dipole) variable for sections sizes, spaces, then the covering of antennas by electrolyse of various metals :
gold, silver, tin, zinc, nickel, and also one of the dipoles in bulky magnetic iron.

The reason of these choices are in the work on the vegetables done in Montpellier by Labergerie-Manguin, then by V.Rivera and A.de Pereirera-Foryag (respectively in Italy and Portugal).

The components ensemble was bought separately. = transformer, capacitors, Tesla coil, cables, crankcase sheet steel enamelled white, panel, etc. (I have a sheet with marked the providers addresses).
The assembly and adaptations were made after at ground floor and at the basement of Rue de Marronieres 25 where about 30 persons did work; the polymetallic colliers were made at 2nd floor.

The greatest difficulty was the choice and the realisation of the spark gap. The School of Electricity and Radio at Rue de la Lune in Paris was put in contribution because the spark gaps -the ones used in the industry- were not suitable to prolonged used during many hours. The model you realised, and the one found in that peculiar shape, is the one adopted in the 1933-1940; it was likely elaborated with non-orthodox process: Known dowsers working directly with GL. Serge has been very discreet about this point, stressing that his father had "huge intuition and he followed an idea step by step until the final realisation"

During the period outside France of the Lakhovsky family, COLYSA has been managed by Madam OZOUX.

In US, GL did work with the builder LEPEL who did make some crankcase in non-painted wood. One model existed in C.O.L.Y.S.A. before the sale of the building.
The LEPEL antennas had 12 dipoles of 64cm diameter, in sequence Copper-red-re-cooked / Steel / Brass/ C/S/B/C/S/B... 4 times.
C.O.L.Y.S.A. didn't have representation in USA, only Presbyterian Hospitals of New York used Lepel Devices, built according the GL directives, and for the use under the control of doctor Kobak Disraeli.
The steerable antenna was conceived with a steerable fork to treat patients in some beds adapted in wood, called "Lakhovsky beds", not patented.

Serge did not participate in these works but became a director of COTY perfumes in New York helped by Professor Albert VERLAY taken refuge to NY.

Serge practised the creation of perfumes with a column VIGREUX placed between both diffusers of the MWO under stress. This technique remained secret and was abandoned after the disappearance of COTY.

Upon his return in France, Serge did take alone the fate of C.O.L.Y.S.A., for subcontracting of a RCO (Radio Cellular Oscillator) model, (built by L.Gineberg), and the sale of bracelets, colliers, belts polymetallic under plastic tube.
I did participate to the negotiation for the manufacturing by FILOTEX of this wire, composed by tiny threads of golden copper, silvered copper, tinned copper, zinc-ed copper, recooked iron, nickel.
The order was accepted for 7000 meters of wire.

Just one MWO was rebuilt from 1940 to 1958 for the surgeon RICHANT for his esthetique clinic close of Palais de Chaillot. Richant did give it to Jacques RAVATIN then he was assistant teacher of mathematics at AMIENS in 1980. This last device, apparently identical to older ones, definitely did not have the same therapeutic performance.
The medicine doctor Eugène MANGEZ did give his device (built in 1938) to the research group "ARK'ALL" working in MONTIGNY. One night, SL did ask me to bring back the MWO to the C.O.L.Y.S.A. lab, and this was done.

A few days later, Serge did show me the old MANGEZ oscillator, which was in perfect working order, completely disassembled.
Before, SL did lend me the portable MWO. This model had just a single antenna completely in aluminium (built by Mr. Michel PERE – Holo Electron in 1935) and a single Tesla [coil]; after a few month of experience SL asked me to bring him back this model, that I modified in front of him by putting polymetallic wires around the antenna, and using as a reflector a metal grid. This oscillator has been kept at C.O.L.Y.S.A. premises – I don't know what happened with it.

Serge always said that all "copies" and adaptations made by different people "never worked".
That would mean that the therapeutic results obtained could never be same as those of C.O.L.Y.S.A. devices of the years 1931 - 1940.
According Serge the effectiveness was in the conception of the antenna, the orientation N-S and also the site where the MWO was placed, nearby environment (metal constructions) and more discreetly ground and underground.

Serge was strongly against the reconstruction of new MWO's.
The basement of Rue de Marronieres 25 was full of pieces of MWO's, wine catalysers, Tesla transformers, supporting tubes, various electric instruments, firsts RCO, radio tubes, spiral antennas, etc. At the ground floor, many chests of drawers with the commercial documents and all the design diagrams of the all built equipment, and those of different antennas.

Serge gave me the documents of foundation of "Lakhovsky Multiple Wave Institute of New York", and the Albert VERLEY report on the "Lakhovsky waves", and the variation of the molecular bonds regarding aromatics, and the list of official responsible.

S.J.J.L. Did arrange in his home many meetings of practitioners during three years with different persons known by me; about around thirty with the hope further to the manuscript to appear to see recognizing and updating the work of his father.

The doctor Jean Luis PORTES in 1983 did present a thesis at the Pitié Salpetriére on "The life and work of Lakhovsky", The Prof. RULLIERES being the presenter; it is there that we find traces of different electrodes used by GL, at the same time in an after-war publication.

GL had three children: Pierre, Nadine , Serge. Nadine died at 21. Pierre has married and he has children. Serge with his second wife Monique had a son, George.
The building of 25 Rue de Marronieres, the patents, the RCO's, the MWO's, the colliers, belts, bracelets, catalysers, water filters ...., etc. was to be divided among the inheritors of GL, i.e. his wife (died after coming back in France) the Pierre's sons (he was died too) and Serge.

A succession trial lasted a few years after 1993, implying liquidation by Serge of the archives (proposed to Genève and?) of the stock of books (bought by L'Arbre de Jessé – La Charitée sur Loire); the material of the cellar (bought by the company Tempera and scraped except for the catalysers. Since the building's sale was done after the trial, SL and his wife Monique and George had to go to live in St. Claud. Different persons or friends pushing for restore the C.O.L.Y.S.A. under the widow Lakhovsky and George L. Have simply received the same reply: "We had too many troubles, we don't want to talk about the past anymore"

Our good relation with Serge was relaxed according the new family situation. Some Serge friends, the doctor Eugène MANGEZ (having given cares to Serge's mother during long years and for free), some physicians, some radiesthesists, a personal advisor of Ch. De Gaulle and G.Pompidou, Lucien CHRISEMARTIN, asked me to continue to rebuild a "light" version of the MWO.

Through a relationships network having all the required skills, this group of friend gave to the company SELA-ABADIE at Vic-Bigorre to build a MWO equipped with a performing, "military standard compliant" and electronics. Ten devices were built under the name "GIRECOM". This very complex, performing, electronics did have on the ten devices as much problems as complexity;

Then the builder SELA-ABADIE did provide me in repair my antennas with two "Holo Electron"; although insisting to rebuild an "original" generator. But all

the users, doctors, veterinaries or privates did ask for a portable device, light and without difficulties to get CE mark.
Facing such demands, mainly the ones from practitioners, I gave up, staying - against my will- on the path you know. For the veterinary use, the users consolidated me in this choice, also privates for simple pathologies, fatigue varied, pains, cutaneous infringements, cracked, reshaped vertebra, etc... Back to fitness.

In another side I could recover the works of Joseph SALVAT, of which it is mentioned in the book of F.TROJANI and at present I make apply on the antennas the 14 metals of the method of J.S.
I am capable to note that these new parameters achieve a new action if one allows generating some sparks near the antennas. That was measured by R.DECAIX. One can note on the spectrum analyzer an 80% gain in frequency harmonics.

The spark gap that you rebuilt shows exactly such harmonic multiplication, due to the very nature of the air electric plasma. By using sea water with graphite electrodes, a plasma quality similar to the one of the earth electrical phenomena of the early antecambian age, and the Miller experience, can be obtained.

The adoption, on the metallic antennas, of metal dust sectors, the tele-action on the nucleotidic sequences of reception of DNA right-hand, left-hand, West Z, is increased as far as the metals surface exo-electrons are in the field of the multiple E.M. Waves. (See works by Etienne Guillé and "L'alchimie de la vie", ed. Du Rocher).

The Lakhosky family tomb is at Passy cemetery in Paris, near Palais de Chaillot, but the GL corps is not there: it is in the USA. On the stone it is engraved the full Universion prayer.
The George son, Pierre, is not in that tomb. Serge did not introduce to me his niece, daughter of Pierre, although it's she that did make the typing machine of the manuscript that I realized at C.O.L.Y.S.A.

Bernard HERZOG is pushing me to write -re-write such text- I did gather much info about GL life.
BH did address to me a new compilation of the results that he has obtained in cancerology by coupling the MWO and the Ionocinesis. On his side Ph. BOBOLA did re write a new text on Cancer and Quantum Physics.

At the time of the GIRECOM manufacturing, by SELA-ABADIE, I did make some boxes containing dipole electrodes from 1 to 10cm, by 5mm progression, usable on the skin and the acupuncture meridians, with a connection on an intermediate spiral.
The ten devices and the electrodes boxes disappeared too.
Maybe a day one will find on Internet some misled GIRECOM.

I think that in the Eastern Pyrenées the medicine doctor Gilbert GIGAREL still owns one GIRECOM.

The C.O.L.Y.S.A. Company made contracts with many people during the mandate of Madame Ozoux with M.Abt or the S.N.C. Baldy Giacopucci.

I did attend to some telephone calls during which SL explained to correspondent that the MWO use was forbidden in France. The documents of which I attach the photocopy come from the documents of Ed.Vernet in Marseille and from Tempera Company, in charge of cleaning the basement of 25 Rue de Marronieres.

Apart from our technical and historical commemorations concerning his father, SL did talk very little to me about his past, and refusing to mention how his father was dead – or after what – except to say "they have killed him! They have killed him!"

Serge did deplore too the loss of the family building 75bis Avenue de Foch in Paris, sold during the German occupation (taking of the Jewish goods) indicating a loss of a billion of after war 1945 - 1950.

It is possible that such will of making the whole MWO devices disappear, and of opposing with force to the reconstruction of the before-war devices -while the complete diagrams and components being at his premises were hiding the fear of the claims of legacy rights by the co-heirs. From that, the trial decided the sale of the building of Rue de Marronieres.

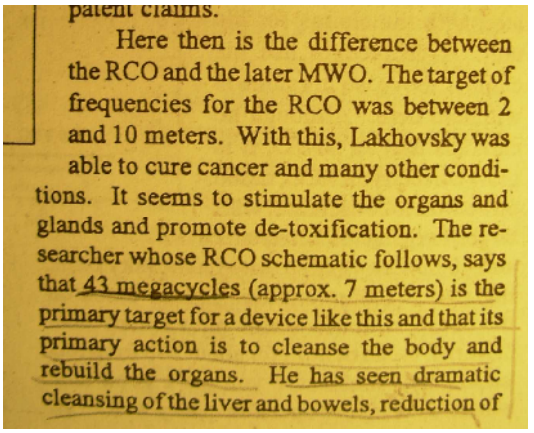
Hessel Hoornveld has come to visit me to exchange his fabrications (antenna and generator) versus the ones I built, and he did confirm to me that Serge did firmly refuse to allow him to examine the generator's components.

According to the list attached to this letter, about the MWO's spread in the world, SL did write to indicated addresses. None did reply, the question being to by again the ancients devices.

Note: It will be noted that about published documents according different sources, confusion exists between RCO and MWO. Also, only the GL publications underline the importance of keeping on wearing the OC during the MWO exposure.

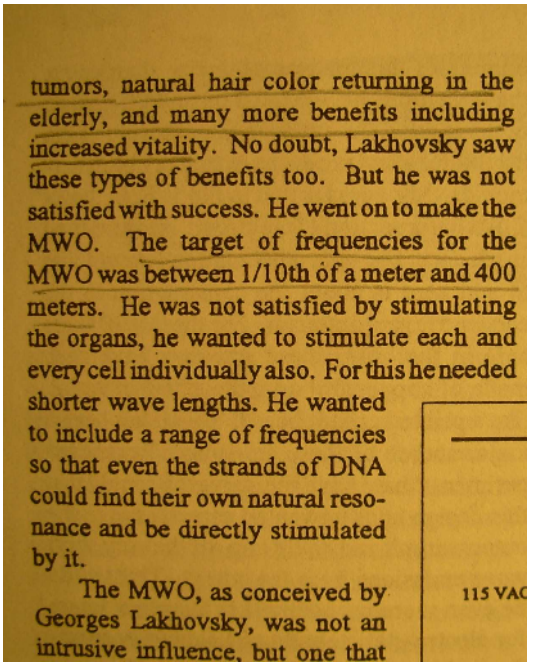
9.2 The 43 MHz question

Let us introduce the 43 MHz frequency. In the BSRF "The Lakhovsky Multiple Wave Oscillator Handbook", 1994 edition, it is reported (see text below) that an RCO made by the son of George Lakhovsky, Serge, was analyzed and the frequency emission resulted to be 43 MHz (i.e. 7meters wavelength).



patent claims.

Here then is the difference between the RCO and the later MWO. The target of frequencies for the RCO was between 2 and 10 meters. With this, Lakhovsky was able to cure cancer and many other conditions. It seems to stimulate the organs and glands and promote de-toxification. The researcher whose RCO schematic follows, says that 43 megacycles (approx. 7 meters) is the primary target for a device like this and that its primary action is to cleanse the body and rebuild the organs. He has seen dramatic cleansing of the liver and bowels, reduction of



tumors, natural hair color returning in the elderly, and many more benefits including increased vitality. No doubt, Lakhovsky saw these types of benefits too. But he was not satisfied with success. He went on to make the MWO. The target of frequencies for the MWO was between 1/10th of a meter and 400 meters. He was not satisfied by stimulating the organs, he wanted to stimulate each and every cell individually also. For this he needed shorter wave lengths. He wanted to include a range of frequencies so that even the strands of DNA could find their own natural resonance and be directly stimulated by it.

The MWO, as conceived by Georges Lakhovsky, was not an intrusive influence, but one that

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The role of the 43 MHz frequency seems very special, since wavelengths very similar to this peculiar one appear in other electro-therapeutic devices, e.g.:

In the "Oscilloclast", a therapeutic device developed by Dr. Albert Abrams[4].

- The Radioflector, see paper by Henry Copin (1934), reported here in Appendix
- In the "Oscilloclast", a therapeutic device developed by Dr. Albert Abrams[5]

Now let us go back to the MWO. It is easy to note that some original MWO antennas, the latest ones, had a special "T-shaped" fixture in the outer ring that was used to hang the antenna to the Tesla Coil. Apparently this fixture is closing the outer ring. However, as it was later confirmed by a close-view analysis in the BV3 device (see

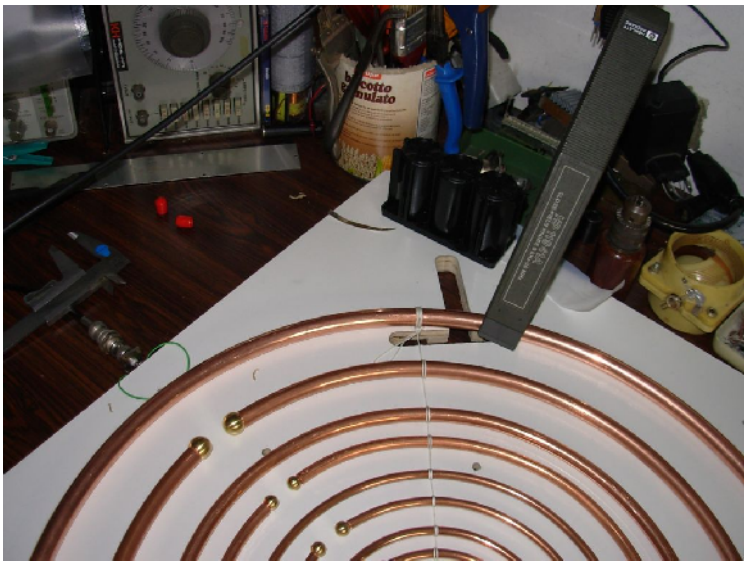
[4] 7 meter wavelength is mentioned in both classic Oscilloclast and in the "Short Wave" version. See www.electrotherapymuseum.com/2009/Oscilloclast/index.htm

[5] 7 meter wavelength is mentioned in both classic Oscilloclast and in the "Short Wave" version. See www.electrotherapymuseum.com/2009/Oscilloclast/index.htm

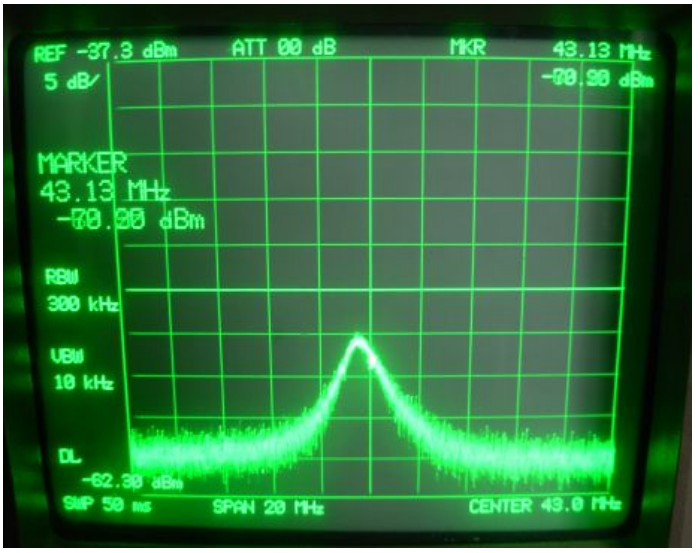
the relevant chapter) the fixture is *insulated one side.* As a result, we have the usual "split-ring resonator" electrical structure.
Was this T-shaped fixture just a new mechanical solution, or did it have an electrical meaning too? If so, was it aimed to tune the outer ring to 43 MHz?

We had no such original antennas to analyze, so we couldn't check directly. But is it possible that the capacity of the resulting gap (inside the "T") could tune the ring resonance to 43 MHz?"

We experimented to find out that a capacity obtained by a segment of coaxial tubing could bring the outer ring main resonance to 43 MHz. To do that, we removed the two end spheres from outer ring (see photo), wrapped the right end of the ring tube with a sleeve of 0.1mm thick Teflon sheet (4 turns total), and wrapped on it a layer of silvered brass foil, to simulate external tubing of the T fixture.
The silver brass foil was electrically connected to the left end of the ring tube by means of a short ribbon of the same silvered brass foil.

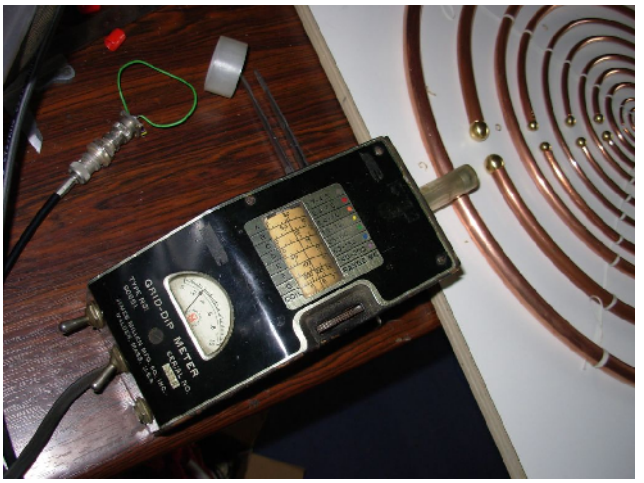


We measured the resonance with a Takeda TR4152 spectrum analyzer:
The tracking generator output was fed to a small 1-turn loop (see it in green wire in the photo). The loop was placed near the outer ring. A close field probe (HP11941A, "sniffer") was connected to the spectrum analyzer input.
The sniffer sensitive end was placed near the ring (see photo).



The metal sleeve was adjusted (moved coaxially, relative to the 1st ring tube) until the resonance peak was moved to 43 MHz (see photo).

The resonance was checked again with the Grid Dip meter to confirm the 43 MHz resonance frequency.



In conclusion, this simple lab test proves that capacitive loading of the 50 cm diameter outer ring with a coaxial metallic structure similar to the T-fixture **allows** moving its main resonance to 43 MHz.

Some month later, we finally had the opportunity to see and do measurements on the original MWO with T-shaped antenna fixture. The results, already presented in the section 4.3 above, are:

- Antenna1: f1 = 27.1 MHz (other resonances: 82.6 and 122.3 MHz)
- Antenna2: f1 = 25.8 MHz (other resonances: not measured)

What kind of conclusions can be drawn from these values?
I'd dare to conclude/observe the following:

- In spite of our expectation, the main outer ring resonance is not moved to 43 MHz, but to 27.1 MHz instead.
- The nominal frequency most probably was 27.12 MHz, a known standard industrial/scientific/medical value (used e.g. for medical Hyperthermia). The 25.8 MHz value could be the actual value affected by errors due to mechanical tolerances.
- Why changing the MWO 1st resonance to 27.12 MHz? Perhaps to conform to regulations on emissions issued by the Authority.

To summarize, the T-shaped antenna fixture was NOT designed to move the resonance to 43 MHz, but to a lower value, around 27 MHz, instead. Such value was probably 27.12 MHz, to conform to regulations (and to avoid interference to other services in low-VHF spectrum). So, apparently, the 47 MHz frequency was “more present” in the broad 26-49MHz resonance exhibited by the regular, old antenna of the BV2 device (see section 4.2 above) than in the newer “T” antenna.
If so, was the healing effect of this kind of antenna still as good as the older ones?

Any comment is welcome..!

9.3 Why is there a primary winding in the RX Coils?

When looking at overall schematic diagram and the way the coils are connected one is puzzled by the “strange” presence of an additional primary winding in the RX coil. What is the purpose of it, since:

- In older MWO’s (e.g. BV1), it is simply in series with the high-impedance (“secondary”) coil;
- In newer MWO’s (e.g. BV2), it is unused, since the far end is left unconnected.

Here some hypotheses:

- "*To reduce the number of items in the C.O.L.Y.S.A. warehouse*", but BV1 analysis revealed that TX coil and RX coil are very much different each other.
- *The primary is there to fulfil a Tesla statement:* Tesla made his Tesla Coils with a Copper Balance rule: the weight of copper in primary had to be equal to the weight of copper in the secondary. Actually, Tesla used very low frequencies, so skin effect was negligible. At higher frequencies the effective copper is just a superficial layer, the thickness of depends on the frequency. The rule we can use is: "the *surface* of secondary copper must be equal to that of the primary copper". If we calculate this Cu balance we notice that the ratio is not 1:1, but it is :
  - about 10:1 (LaRévélation, BV1-RX)
  - about 15:1 (for MWO owned by some French people)
  - about 18:1 (BV1-TX)

  If we had NO primary, the ratio would be much different.

- *The primary is there to provide test points for factory tuning check.* Perhaps at C.O.L.Y.S.A. they used the two sockets to connect a meter to check the correct tuning of the MWO. In Tesla's "wireless transmission of electricity" 1900 patent, the two TC were used to transfer energy from TX primary to RX primary. So if we connect a RF voltmeter to RX primary we will see high indication if properly tuned condition. Which meter? Which RF voltmeter was available in 1930? Some hypotheses:
  - Tube diode + galvanometer)
  - Hg vapours tube rectifier + galvanometer
  - Selenium oxide stack rectifier + galvanometer
  - Neon lamp (rough)
  - Carbon incandescence lamp

  A voltage divider (capacity partition or resistors partition) should have been placed before the meter, to reduce the voltage and increase impedance.

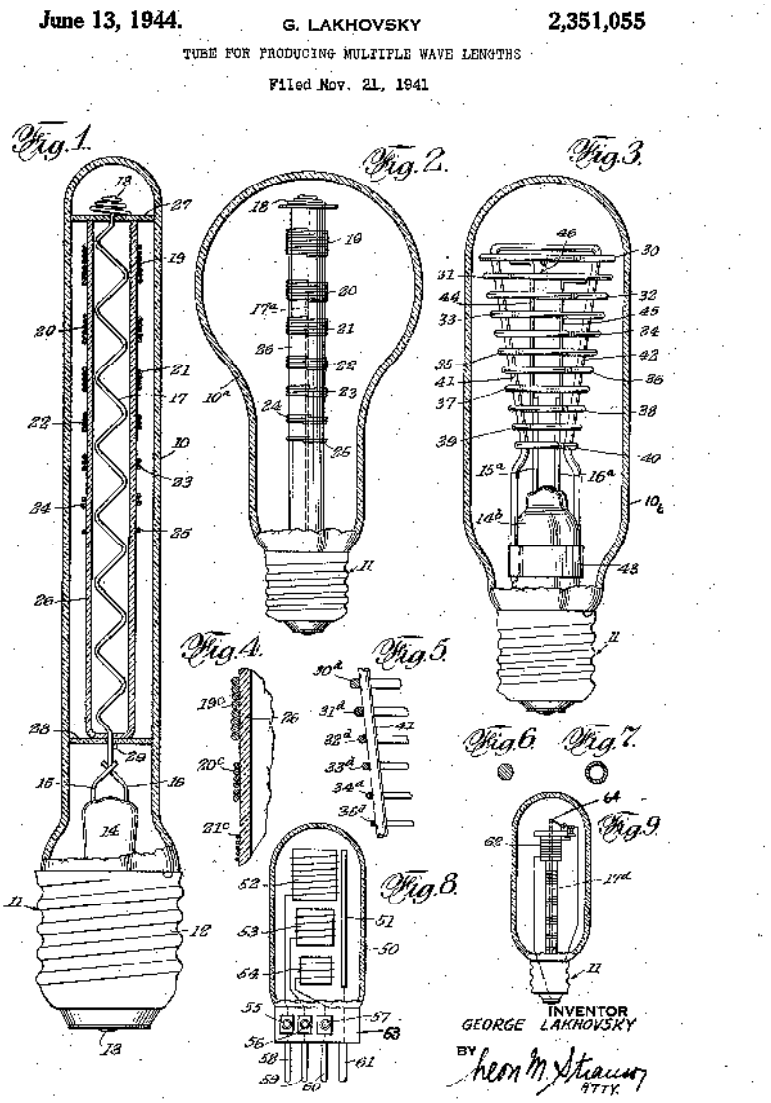
And finally: why such primary is made with thick copper?

Any comment is welcome..!

9.4 What is the purpose of the second GL patent?

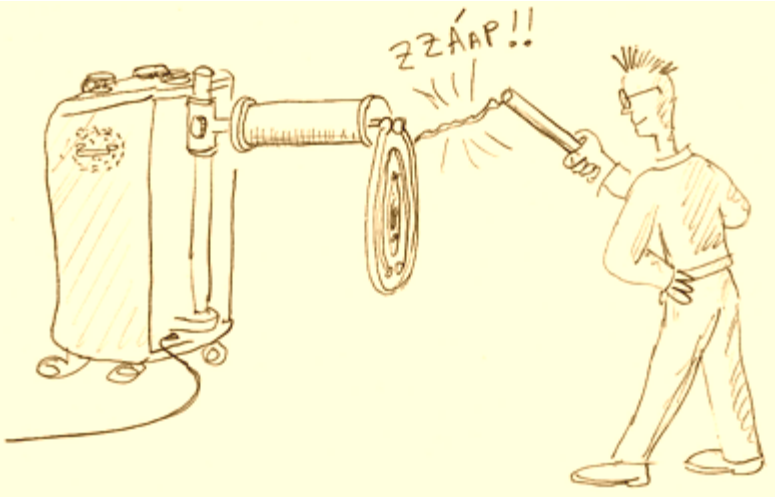
Here below the drawing from the strange GL US patent #2,351,055.
This is about tubes to produce “multiple waves”.
The structure is similar to the MWO antenna; a number of lumped resonators, tuned on different frequencies. But what are the industrial / scientific applications of them?

This is yet another open question...



Any comment is welcome..!

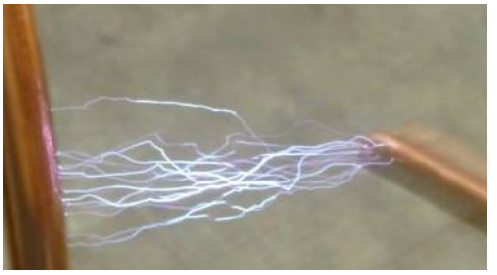
9.5 Strange sparks



Operating the original MWO's one can notice that when drawing sparks from the TX antenna outer ring, often the spark has a very peculiar look: the mid part of it is brighter than the ends. See photo.

This behaviour has been confirmed in original devices (BV2 and BV3 tested), as well as in the Do It Yourself device "B" (reproduction of LaRévélation original MWO).

It is not yet known why such strange shape, it could have to do with a sort of standing wave, the "wave" being actually a "step". When moving the copper bar at a distance near or far from the antenna, the brighter part length changes accordingly.
The step behaviour reminds the Tesla "Hairpin" circuit, where very sharp pulses are obtained, most probably by superposition of two counter-propagating steps of different polarity.



Any comment is welcome..!

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