



DIGITAL DISPATCH

A publication of the
West River Radio Club



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VITAL STATISTICS

The West River Radio Club, an ARRL Special Service Club, was founded in 2004 through the efforts of KA1ZQX, Tim Bell, and N1JSG, Richard Pierce.

Our 48 members pride themselves on belonging to an active and productive organization with involvement in many aspects of this great hobby: public service, special events, Field Day, repeaters, emergency communications, contesting and chasing DX.

Current officers are:

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KA1ZQX, Tim Bell; President

KB1J, Rich Austin; VP

N1TOX, John Borichevsky; Secretary/Treasurer

WK1L, Bro Frank Hagerty ED/VE Liaison

K1KU, Darrel Daley; Newsletter Editor

KA1ZQX, Tim Bell; Public Relations/ARES

W1CWB, Chas Baker; Technical Consultant

as I write this. Check your gear, clear your calendar; let us know what you can do this year to help out. The pot luck dinner is always a big hit on Saturday night each year. Won't you plan to join us this year? Even if you can't come for the whole time, let us know and we can schedule you in a block of time.

Okay, we have talked about being a doer "a lot". . . come to the next meeting and get your feet wet. Our meetings always have a program. If you have a topic you want gone over, let me or one of the board members know. We will get your topic on the screen. So, see you at our next gathering on the 2nd Tuesday of each month at the Grace Cottage Hospital EMT Training room.

Till then, 73
KA1ZQX/Tim

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THE PRESIDENT'S KORNER

Last month I left you with "Will you be a doer?" I hope you have been thinking of what you can do this year with Ham Radio. Is it time to upgrade your license, fix your antenna, buy a new radio, or is it giving a hand with Emergency Communications event? That's the beauty of this hobby; there is always something to do. It won't be long before warmer weather arrives. Will you be ready?

Right now Bro. Frank Hagerty is leading the charge in our General Class upgrade endeavor. We have had quite a few people get their ticket and or upgrade through our classes, but few seem to ever get on the air. Would you consider being an Elmer? If you know of someone who has a ticket, but is not on the air, give him or her a helping hand getting on the air. If you can assist Bro. Frank, please give him a call or email @ hager-tysse@myfairpoint.net.

On the 4th of February, a bunch of sun deprived Hams got together at the New England House for our "Annual" winter blues dinner. We had a good turn out and about the best weather you could have for the middle of winter. A good time was had by all and we plan to do it again next year! If you are able, please make a space on your calendar for next year.

The subject of Field day has already come up this year. Can it be that it's only a few months away? Well if you haven't checked your calendar, it's only 4 months away

PLAN AHEAD

Anyone for Boxboro? Never been, you say? Allow me to provide some elucidation.

Boxboro is the New England ARRL Convention and is held every other year in Boxboro, MA. 2012 happens to be one of those *other* years. The dates are August 24 – 26. The location is the Holiday Inn in Boxboro.

There is a banquet Friday and Saturday night, tons of forums, and commercial sellers. Special overnight rates are provided for members of the Ham community.

Find out more at <http://www.boxboro.org/>

Just something to think about.



UPCOMING EVENTS & LOOKING AHEAD

Ongoing: WRRR ARES net...19:30L, 147.015, positive offset and 100 Hz PL tone. Curious as to who the NCS will be? Go to http://www.westriverradio.org/WRRR/WRRR_Pages/ARES_Net.html

Ongoing: Every Sunday evening at 19:30L we hold an informal net on 28.425 MHz, a frequency that Technician Class licensees can use.

Ongoing: WRRR General Class at the Entergy HQ on Old Ferry Road in Brattleboro every Tuesday through March. Contact Bro Frank, WK1L for more details—hagertysse@myfairpoint.net

March 13: Regular meeting of the WRRR. Come out and join the fun.

April 3: VE Session at Entergy HQ on Old Ferry Road in Brattleboro. Technician, General and Extra accommodated.

March 31: Monthly luncheon meeting of the WRRR at the PanAsian restaurant in Brattleboro, next to Staples.

Also check out WRRR events on the club calendar at <http://www.westriverradio.org/> and scroll down the page a bit.

(Ed: In lieu of my highly acclaimed Runnin' on Empty column I bring you a bit of history—sort of radio related.)

A SMART BEAUTY

This one was born in Vienna in 1914 as Hedwig Eva Kiesler. She studied acting in Berlin at a famous acting school in Berlin run by Max Reinhardt and in 1933 showed the world her acting skills as well as a lot of her own flesh. The movie was called *Ecstasy* and gained a lot of publicity because of its many nude scenes. (Don't go away. This article is really about radio – I think.)



The movie played in America, but only after a LOT of cutting, and in 1937 Eva came to the US and went to work for MGM Studios. Louis B. Mayer, the head of the studio, gave her the name Hedy Lamarr. Some considered her the most beautiful woman in Hollywood. Hedy once said, though, "Any girl can be glamorous. All she has to do is stand still and look stupid."

The film star belied her own apothegm by hiding a brilliant, inventive mind beneath her photogenic exterior. Hedy Lamarr married Fritz Mandl, the first of six husbands, in 1933. During their marriage, which broke up in 1937, Madame Mandl was

an institution in Viennese society, entertaining—and dazzling—foreign leaders, including Hitler and Mussolini. Her husband specialized in shells and grenades, but from the mid-thirties on he also manufactured military aircraft. He was interested in control systems and conducted research in the field. His wife clearly learned things from him, because she and her co-inventor, George Antheil, later went on to invent the torpedo guidance system that was two decades before its time.

Hedy Lamarr's co-inventor, George Antheil, was born in Trenton, New Jersey, in 1900. His parents were from East Prussia. After studying music at what is now the Curtis Institute, in Philadelphia, he went to Europe to pursue a career as a concert pianist, heading first to Berlin and then settling in Paris in 1923. He became one of the top avant-garde composers of the time, writing and playing machinelike, "mechanistic," rhythmically propulsive pieces with names like *Airplane Sonata*, *Sonata Sauvage*, *Jazz Sonata*, and *Death of Machines*. His *Ballet Mécanique* was scored for sixteen player pianos, xylophones and percussion and was first performed in Paris in June 1926, in a version that had only one player piano but also had electric bells, airplane propellers and a siren. It caused an uproar.

Antheil knew practically everybody in Paris's literary, artistic and musical circles, but in 1933 he returned permanently to the United States. He became a film composer in Hollywood and a writer for *Esquire* magazine, producing a syndicated advice-to-the-lovelorn column and articles about romance and endocrinology. He even published a book titled *Every Man His Own Detective: A Study of Glandular Endocrinology*. In 1939 he set an article to *Esquire* about the future of Europe that proved impressively accurate: It predicted that the war would start with Germany invading Poland, that Germany would later attack Russia, and then the United States would be drawn into the conflict.

He met Hedy Lamar in the summer of 1940, when they were neighbors in Hollywood and she approached him with a question about glands: She wanted to know how she could enlarge her breasts. In time the conversation came around to weapons, and Lamarr told Antheil that she was contemplating quitting MGM and moving to Washington, D.C., to offer her services to the newly established National Inventors Council.

They began talking about radio control for torpedoes. The idea itself was not new, but her concept of "frequency hopping" was. Lamarr brought up the idea of radio control. Antheil's contribution was to suggest the device by which synchronization could be achieved. He proposed that rapid changes in radio frequencies could be coordinated the way he had coordinated the sixteen synchronized player pianos in his *Ballet Mécanique*. The analogy was complete in his mind: By the time the two applied for a patent on a "Secret Communication System," on June 10, 1941, the invention used slotted paper rolls similar to player

-piano rolls to synchronize the frequency changes in transmitter and receiver, and it even called for exactly eighty-eight frequencies, the number of keys on a piano.

Lamarr and Antheil worked on the idea for several months and then, in December 1941, sent a description of it to the National Inventors Council, which had been launched with much fanfare earlier in the year as a gatherer of novel ideas and inventions from the general public. Its chairman was Charles F. Kettering, the research director of General Motors. Over its lifetime, which lasted until 1974, the council collected more than 625,000 suggestions, few of which ever reached the patent stage. But according to Antheil, Kettering himself suggested that he and Lamarr develop their idea to the point of being patentable. With the help of an electrical engineering professor from the California Institute of Technology they ironed out its bugs, and the patent was granted on August 11, 1942. It specified that a high-altitude observation plane could steer the torpedo from above.

Putting the idea into practice was not so simple. Despite the enthusiasm that Antheil said Kettering expressed, others were skeptical. One examiner at the Inventors Council doubted the clockwork mechanism that moved the perforated tape could be accurate enough. Antheil lobbied for support for further research from among others, William C. Bullitt, Special Assistant to the Secretary of the Navy. He argued that the Germans were superior to the Americans in naval technology and that something had to be done about it. He seemed driven in part by an urge to prove his patriotism after all his years in Europe. Hedy Lamarr meanwhile demonstrated her loyalty by raising seven million dollars in a single evening selling war bonds.

Despite Antheil's lobbying, the Navy turned its back on the invention, concluding that the mechanism would have been too bulky to fit into a torpedo. Antheil disagreed; he insisted that it could be made small enough to squeeze into a watch. And he thought he knew why the Navy was so negative: "In our patent Hedy and I attempted to better elucidate our mechanism by explaining that certain parts of it worked like the fundamental mechanism of a player piano. Here, undoubtedly, we made our mistake. The reverend and brass-headed gentlemen in Washington who examined our invention read no further than the words 'player piano.' 'My god,' I can see them saying, 'we shall put a player piano in a torpedo.'"

In other words, it was a culture clash: the thick-headed brass hats were incapable of considering the idea that musical technology could play any part in a complicated piece of weaponry. But Antheil's explanation is too simple; the invention had other problems. Describing them requires looking at other developments in torpedo control at the time, especially in Germany.

In the United States Hedy Lamarr and George Antheil, shunned by the Navy, no longer pursued their invention. But in 1957, the concept was taken up by engineers at the Sylvania Electronic Systems Division, in Buffalo, New York. Their arrangement, using, of course, electronics rather than piano rolls, ultimately became a basic tool for

secure military communications. It was installed on ships sent to blockade Cuba in 1962, about three years after the Lamarr-Antheil patent had expired. Subsequent patents in frequency changing, which are generally unrelated to torpedo control, have referred to the Lamarr-Antheil patent as the basis of the field, and the concept lies behind the principal anti-jamming device used today, for example, in the U.S. government's Milstar defense communication satellite system.

Information Source: American Heritage of Invention & Technology, Spring 1997, Volume 12/Number 4

The Past Presidents Circle...

I am making the plans for the springtime overhaul of the ham shack, I've been pondering antenna placements, antenna types, and expansions. I had a tree come down across my G5RV dipole and it snapped one of the legs. But now I have realized that it did more than snap the line, it stretched the leg before it snapped. So the legs are now uneven making the SWR soar through the roof. Now being a Mechanical Engineer I love the study of static and strengths of materials, I know what will happen with elongation and the tensile strength of materials will do under force, so I was sure it got really stretched out before it snapped. How long, I don't know, it all depends upon the speed of the drop and how much resistance there was to slow it down. Nope, I am not even going to calculate this one. I'll use the real scientific approach and measure it with a tape! I may "adjust" it at a later date to OEM spec's and see if that brings it back into tune. But now I have a Cobra Senior waiting to replace it.

Then there is my issue with getting my 2 meter signal to the Marlboro Repeater. Stick season is usually a good transmission season, and I to look forward to it. But this year has been up and down. Mostly down. So I am planning on moving my 2m / 70cm Diamond antenna to another location on the house. Basically, I will swap its present location with that of HF vertical antenna. It changes the geometry of the land, adds a little bit more height and who knows, if I reflect off the proper house, barn, mountain or parked car, it just might work. I now have a Yagi to try to make things better.

So what is going to happen to my HF Vertical? Maybe nothing, as far as signals go. It works very well where it is and I'm sure it will work at its new location also. Just have to try to get to Marlboro better. So the swap must happen.

So why bring this up? Because it is something we need to do as a licensed radio operator. Remember, being an amateur radio enthusiast includes the experimentation and the enhancement in the art of radio communications. So in my case, I have a situation that I wish to make better so I need to exper-

iment. Like Darrel, K1KU's best friend Marconi demonstrated with his spark heard across the way with his transatlantic transmissions. Somebody needed to do it!

Hey all of you Google lovers.... Did you see the dedication to Heinrich Rudolf Hertz's 155th Birthday on 22-FEB-2012? Check it out at <https://www.google.com/doodles/heinrich-rudolf-hertz-155th-birthday>. Just another fun fact for you to look up! I think once you see it you will know about Hertz.

For all of you VEM RACES folks, the new VEM EOC Communications Center is coming along very well. I was up there just last week programming the computers with new software to run the radios. The tower has a new height, a new 2/440 antenna is sitting on top of that, and the coax is being run to the four (4) masts on the roof, three (3) poles, and the tower locations. All of the radios are in place and waiting for the coax to be connected. There are temporary antennas which are setup in the attic of the building now so some communications are functioning now. More details to come as the progress continues.

Until next month!

73

de N1TOX

John Borichevsky – Past President WRRRC



UPGRADE TIME?

Thanks to Jack, N1HOS, for getting this information to your editor.

Our compatriots up north, AKA the Connecticut Valley FM Association, are holding test sessions on the following dates in 2012.

March 10 June 2
September 8 December 8

Tests are held in:
Buckley Conference Room
Valley Regional Hospital
243 Elm Street
Claremont, NH

For all sessions the door opens at 8:30 am and close at 9:00. Testing begins immediately thereafter.

If you need any other information contact N1RX, Bruce, at n1rx@arri.net

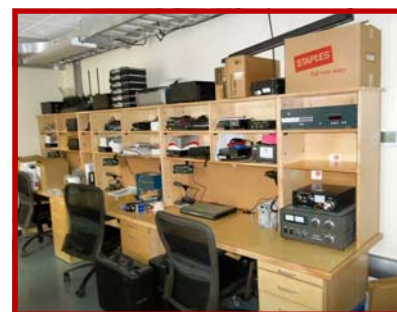
Our club will hold its next session on April 3 at the end of our General Class. If you did not take the class, but wish to test at this time get in touch with hager-tysse@myfairpoint.net

NEW EOC STATION

On a recent trip north John, N1TOX, Frank, WK1L, and Tim, KA1ZQX, had the pleasure of visiting the new EOC station in Waterbury.

Looks pretty classy to me and a definite improvement over the old station. I had seen that one, and, as Johnny used to say, "How small was it?" "It was so small that you had to go out in the hall to change your mind."

Photos courtesy of Tim, KA1ZQX.



Notes on Propagation—Bro. Frank Hagerty, S.S.E. WK1L

Your ability to communicate by radio is based on four factors:

- 1) Your skill as a radio operator (knowing procedures, band plans, repeaters, rules, etc.
- 2) Your equipment and how you use it (radios, tuners, amps, grounding and filtering, settings, etc.
- 3) The antennas you use (type, height, radiation pattern, polarization, orientation, etc.
- 4) Your understanding of radio wave propagation

Propagation is about how radio waves travel from point A to point B, and the events occurring in the transmission path that affect the communications between the points, stations, or operators. Radio waves, as part of the Electromagnetic Spectrum, tend to travel in a straight line (unless acted upon by some outside force) and have two components: **a magnetic field and an electric field**, both of which are perpendicular to each other and to the direction of propagation of the wave. (see Fig. 1) As waves spread out from their point of origin, they decrease in strength, in an “inverse square” relationship.

All electromagnetic waves, including radio waves, are transverse waves; that is, the vibration is from side to side, perpendicular to the direction in which they travel. It is the plane of the electric field that determines the polarization of the wave. Vertical antennas are usually vertically polarized and horizontal antennas are usually horizontally polarized.

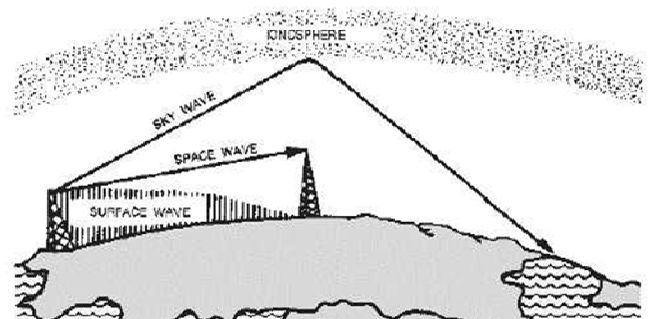
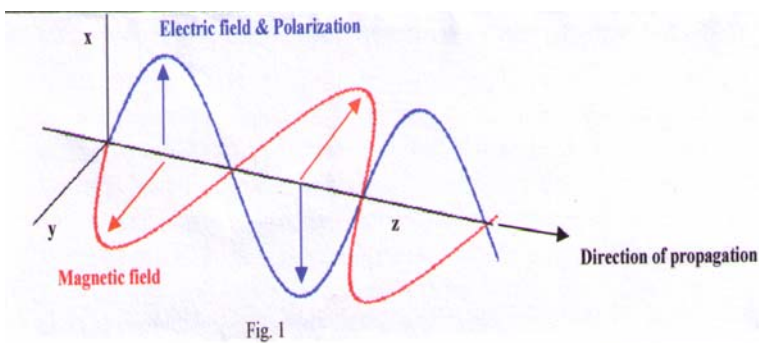


Fig. 2

Here are some definitions of some simple propagation methods:

Ground Wave or **Surface Wave** propagates or travels close to the surface of the Earth, and they will, to some extent follow the Earth's curvature; but the distance that ground wave reaches is limited.

Line of Sight, or **Direct Wave**, is propagation of waves travelling in a straight line. These waves are deviated (reflected) by obstructions and cannot travel over the horizon or behind obstacles. Most common direct wave occurs with VHF modes and higher frequencies. At higher frequencies and in lower levels of the atmosphere, any obstruction between the transmitting antenna and the receiving antenna will block the signal, just like objects block the light that the eye senses.

Space Waves: travel directly from an antenna to another without reflection on the ground or refraction by the ionosphere. Occurs when both antennas are within line of sight of each other, distance can longer that line of sight because most space waves bend near the ground and follow practically a curved path. Antennas must display a very low angle of emission in order that all the power is radiated in direction of the horizon instead of escaping in the sky. A high gain and horizontally polarized antenna is thus highly recommended. (See Fig. 2)

Sky Wave (Skip/ Hop/ Ionospheric Wave) is the propagation of radio waves bent (refracted) back to the Earth's surface by the ionosphere. Long distance HF radio communication (3 to 30 MHz) is a result of sky wave propagation. When sky waves come down to Earth (this constitutes a “hop”), they may then be reflected by the Earth's surface and travel again as sky waves. The areas of the Earth's surface between the transmitter and where signals come back to Earth, where no signal is present, are “skip zones.” (see Fig. 3) During the day, there are two parts of the F-layer of the ionosphere, and signals are refracted at a lower altitude; but at night these merge into one layer that is higher in altitude, and skip zones lengthen.

Here are definitions of some terms we use in describing what happens to radio signals when they leave the antenna.

Reflection: HF and MF waves are **reflected by the surface of the Earth**. As longer wavelengths (80 meters and longer) contact a surface, they don't "see" small obstacles like cars, trees or buildings. These objects are proportionally too small and can't reflect its energy. These longer waves pass across these materials without being reflected. However, VHF & UHF waves are very sensitive to small obstacles and, depending of their thickness, metal objects can be used as reflectors. So, too can large buildings and hills.

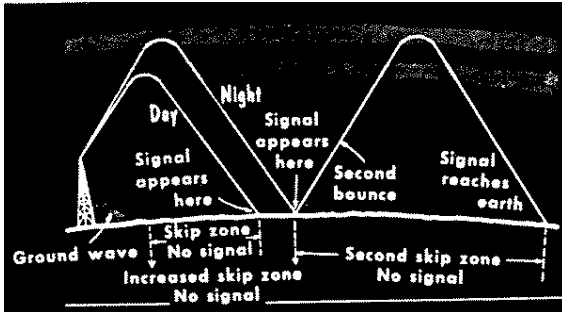


Fig. 3

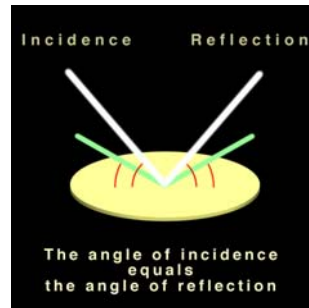


Fig. 4



Fig. 5

Fig. 4 illustrates reflection off an object or the Earth. On a flat surface, the angle of incidence equals the angle of reflection.

Refraction: the bending of waves that occurs when they pass through changes of medium that produces a variation in the velocity (change of speed) of waves making them go further, or dropping sooner than expected. Look at Fig 5. The light waves coming from the straws are bent as they go from air to water. The straws are really straight, but the light waves change velocity and are refracted. Radio signals that are refracted by the ionosphere change velocity and are "bent," too. Wherever they return to earth, usually communication is possible. Because the F_1 and F_2 layers of the ionosphere merge at night signals travel higher before being refracted. This leads to longer skip zones. (see Fig. 3)

Attenuation: When the distance doubles (*remember inverse square relationship?*), or obstacles are placed between the transmitter and receiver, the signal becomes half as strong. **Radio waves lose their energy as they are forced to bend to follow the earth curvature.** There is also a loss of signal strength received when antennas of different polarization are used for ground wave or space wave propagation. Signals are subject to **fading and attenuation** each time the radio wave is reflected or partially refracted at either the ground or ionosphere resulting in loss of energy. Signals may be stable and show little attenuation effect if the ionospheric absorption is very weak.

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Let's close off this issue with two pictures from our February dine out at the New England Restaurant in West Brattleboro. Everyone had fun—honest! Your much beloved retiring secretary/treasurer even received a nice certificate, which he is proudly displaying. Maybe you'll be motivated to attend the next one.

