



R F News

July 15, 2020

Tidbits from Todd

Hello Everyone, I hope all of you had a great Field Day. If you have not submitted your logs to the ARRL, you have until Tuesday July 28th to do so. It was a good Field Day but it was a bit different running it from the home station. Even though the ARRL amended the rules to allow "1D" (home) stations to work each other this year, I saw a lot of complaints on Social Media groups complaining that home stations were unfairly advantaged compared to field stations due to their use of antennas and amplifiers in many cases. I can certainly see that argument but I still had fun anyway. I also became quite a fan of my Bioenno Lithium-Ion Phosphate battery because it is very lightweight and it was easily able to power my Yaesu FT-991 running 100 watts all day on Sunday during Field Day without even much voltage loss. I'm impressed!! I think I'll buy a second Bioenno battery to have as a backup.

In other news, with the latest mask Executive Order issued by Governor Edwards it looks like we'll be stuck in phase 2 for the foreseeable future. The library has notified me that we will not have access to the meeting rooms until we enter phase 3 whenever that will be. Until then, stay safe!! 73-**Todd (AB5TH)**

Upcoming Events Calendar

7/28 July club meeting "Over the Air".

We will be having our July club meeting on the 146.790 repeater at 7:00 PM.

Baton Rouge Amateur Radio Club

PO Box 4004, Baton Rouge, LA 70821
Web: www.brarc.org email: brarc@brarc.org

President	Todd Huovinen-AB5TH
Vice President	Jennifer Bordelon-K5NMT
Secretary	Thornton Cofield-K5HLC
Treasurer	Bill Smith-KE5TA
Directors	Vernon Morris, AA5O Brook Samuel, N5DGK Jeremy Gerald-AD5XY Jerry Cloutre-AG5AY Robin Hudson-KK5RH Ken Shutt-W5KQ Dan Lott KF5TQN

Repeaters: 146.790 - and 444.400 +
(PL tone 107.2) System Fusion

Nets: BRARC Club Net - Sunday 8:30 PM
146.790 (PL tone 107.2) System Fusion
Ten Meter Net - Monday 7:30 PM
28.450MHz USB

PLEASE NOTE!!

Club Dues
Payable January 1

- Dues are payable annually January 1.
- Regular membership is \$25 per year.
- Student membership is \$5 per year.
- Send dues to PO Box 4004, Baton Rouge, LA 70821 or deliver in person at a club meeting.

For your convenience club dues can now be paid on line via a link on the club website.

Major credit cards are accepted as well as PayPal. NOTE: Credit card payments for dues

CANNOT be accepted at club meetings at this time.

Breakfast



We meet for breakfast 3 days each week:

Wednesday: The Warehouse Restaurant
(12328 S Choctaw Dr, Baton Rouge, LA 70815) 6:30 AM

Friday: Frank's Coffee House (8353 Airline Hwy. Baton Rouge, LA 70815) 6:30 AM

Saturday: James' Restaurant (205 Florida Ave. SE. Denham Springs) 6:30 AM

The Warehouse Restaurant (12328 S Choctaw Dr) 6:30 AM

NOTE: On Wednesday July 22nd we will be meeting at Frank's Restaurant in Prairieville with Elmer (N5EKF) and the group from the Ascension Radio Club at 7:00 AM. If we get a good turnout, we will move the Wednesday morning breakfast to this location. Address: 17425 Airline Highway Prairieville, LA. (near Wal-Mart).

BRARC Facebook Page

If you haven't done so, please visit and "like" our BRARC Facebook page. You will find a link at the club's website: <http://brarc.org/>

We're using Facebook to keep the membership better informed in a timely manner about what's going on in your radio club. This page is also a good way for BRARC members to keep in contact with each other.

73,
Robin, KK5RH

Area Nets

Sunday-Post Office Net (3.905 MHz. 75m) 7:00-7:30 AM
Delta Net (3.905 MHz. 75m) 7:30-7:45 AM
QCWA (3.905 MHz. 75m) 8:00 AM
ARES Region 2 Net (146.790 PL 107.2) 8:00 PM
BRARC Public Service Net (146.790 PL 107.2) 8:30 PM

Monday-BRARC 10 meter net (28.450 MHz) 7:30-8:00 PM
Tuesday-LOHSEP 2 meter net (147.165 MHz PL 107.2 Hz)-Livingston 7:30 PM

Wednesday-MISSLOU 2 meter net (146.835 MHz PL 114.8 Hz)-Jackson, LA 8:00 PM. Echolink Node: KD5UZA-R
SELSA Net: 146.52 MHz Simplex-Wilson, LA 9:00 PM.

Thursday- LARS Net (146.730 PL 107.2 Hz) Walker, LA 7:00 PM
K5ARC Ascension Radio Club Net (147.225 MHz PL 107.2) 8:00 PM
EchoLink Node: K5ARC-R
Amateur Radio Newsline is also played during this net.

Do You Have Topics or Suggestions for the RF News?

Do you have pictures, articles, links or other ham radio related items for inclusion in the RF News?

Contact the club president/newsletter editor, Todd (AB5TH). Deadline is the 15th of each month.

BRARC Elmers

Todd Huovinen-AB5TH
E-Mail: ab5th@arrl.net

Jerry Clouatre-AG5AY
E-Mail: jerry.clouatre@gmail.com

Dan Lott-KF5TKN
E-mail: kf5tkn@gmail.com

Huntsville Hamfest 2020 (Huntsville, Alabama)

I have received the following information from the Huntsville, Alabama Hamfest:

June 5, 2020

The Huntsville Hamfest Board of Directors has been monitoring fallout from the COVID-19 pandemic, particularly large gathering guidance and mandates from the CDC and the State of Alabama. As our world turned upside down in March we held out hope that we could anticipate a brighter picture in August for the Hamfest: including relaxation of social distancing guidelines and strict capacity limits on venues where hams could gather socially to see and buy new equipment, attend interesting forums, network with friends, and barter for used equipment.

Unfortunately this is not the case and with deep sadness the Board has voted to cancel Huntsville Hamfest 2020. We make this decision for the safety of our Visitors, Vendors, and Volunteers.

We will be back and hope to see you back at "The World's Friendliest Hamfest"™ on August 21 & 22, 2021.

73,

Mark N4BCD – Chairman – Huntsville Hamfest

“OVER THE AIR” MONTHLY CLUB MEETING

I would like to thank Jerry Clouatre (AG5AY) for calling the June “Meeting on the Air” for me while I was on vacation on the way to North Dakota. Jerry had nine check-ins including one from a brand new ham and club member Chris Reine (KI5JSE). If you hear Chris on the air be sure to welcome him to the Baton Rouge Amateur Radio Club and to the exciting hobby of Amateur Radio—Todd AB5TH

BRARC Board Meeting Agenda
Mon. 13 July 2020, 6:30 pm
Zoom Teleconference

Members Present:

President- Todd Huovinen (1), Treasurer- Bill Smith (1), Secretary- Thornton Cofield (1),
Directors- Jerry Clouatre (2), Dan Lott (2), Jeremy Gerald (2)

Members Absent:

Vice-President-Jen Bordelon (1), Ken Shutt (2), Vernon Morris (1), Robin Hudson (1),
Brook Samuel (1)
() Number of years to serve on board in stated position.

Visitors: Pat Crawford, K5AHE

Minutes approval from 06/20: Bill moved we accept the minutes of June 20 and seconded by Jeremy.

Treasurer Report-Bill reported we had \$8,632.02 in the club's account and the treasurer's report was accepted as read.

Programs – see below

Committee Reports:

Education- No report

Equipment-No report

PIO/Outreach /Mbr-Thornton reported we have 63 paid members as of July 13. Jerry Clouatre and Dan Lott agreed to serve as Elmers along with Todd Huovinen.

EMCOM-No Report

Repeater- Todd gave an overview of Brook's email concerning the New Repeater on the WBR OEP Tower and we briefly discussed the first point of Brook's email- Club Station at the Observatory. No action was taken on either point.

USS Kidd Club- Todd mentioned there was nothing to report. At this date we are still in Phase 2 and operating in the museum is not feasible.

Old Business

Tax Exempt Status- Todd reported that we are a standstill due to the cost to rectify our previous filing as a 501©4 organization rather than a 501©3 organization.

Observatory Tower/Rotor Replacement Estimate-Robin-put on hold due to COVID-19

Field Day Follow-up- During Field Day Jerry went out to the Observatory and tested the ICOM 730.

New Business

Museum Antenna Replacement: Todd brought up the fact that the end fed antenna and antenna cable belong to Brett and he would like both of them returned.

Possible Repeater relocation update- See Repeater.

Social gathering/Transmitter Hunt- Not discussed

Grand Isle Trip in October- IOTA- Not discussed

Parks on the Air- While discussing the significance of Parks on the Air Jerry brought up an idea that perhaps a Special Event high lighting Mardi Gras and involving several clubs would spark quite a bit of interest nationally. Everyone thought it was a great idea with further discussion at our next board meeting.

Remote VE Testing- Todd picked up the testing material from Audry Brown and brought up the possibility of remote testing for BRARC. Jerry noted that there is a website in California on how to do remote testing. BRARC needs to conduct 4 VE tests a year to remain current with ARRL.

Comments/Questions/Concerns: July 22 BRARC is invited to breakfast with the Ascension Radio Club at 7am at Frank's in Prairieville, 17425 Airline Hwy. 70769.

July 28 is our next General Meeting which will held on 146.790 at 7pm.

It was noted that prior to Tom Harrell moving he donated several pieces of ham equipment to BRARC- notably an ICOM 9100 and an ICOM 7300.

Tentative Program Suggestions

August:	Skype Presentation Rob Sherwood	Rob Sherwood-KC0B Confirmed
September	Open Eating Meeting Reschedule??	
October	Topic to be decided	Elmer Tatum-N5EKF Confirmed
November-	Eating Meeting	Bluebonnet Library 6:00 PM

Backup options: Show and Tell

Meeting adjourned at 7:15pm

LWARN Linked Repeaters

Livingston- 444.350 + pl 136.5

West Feliciana- 443.625 + pl 156.7

Greensburg- 442.275 + pl 156.7

Washington Parish- 442.425 + pl 156.7

EBR (Central)- 442.400 + pl 156.7

St Tammany Parish- 443.425 + pl 156.7

These repeaters are part of the Livingston Office of Homeland Security and Emergency Preparedness (LOSHEP). Amateur operators are welcome to use them.

D-WARN (System Fusion) Linked Repeaters

Baton Rouge: 145.490 (-) PL 107.2

Baton Rouge: 443.375 (+)

Bush, LA: 443.400 (+) PL 114.8

Bush, LA: 145.470 (-) PL 114.8

Jackson, LA: 443.850 (+)

Livingston: 145.230 (-) PL 107.2

Madisonville: 444.875 (+) PL 114.8

New Iberia: 442.025 (+) PL 103.5

New Orleans 444.225 (+) PL 114.8

Parks, LA 443.200 (+) PL 103.5

Shreveport 444.875 (+)

Slidell 442.125 (+) PL 114.8

St. Francisville 147.285 (+) PL 107.2

Sunshine Bridge:443.275 PL 107.2

West Monroe: 444.700 PL 127.3 Use PL Tones for Analog FM Operation



USS KIDD News

Due to the CoVid19 outbreak we will not be able to operate in the USS KIDD Museum or ship radio room until further notice.

<http://brarc.org/photos/uss-kidd/>

Please keep checking the club website at www.brarc.org for the latest updates on club functions. John Krupsky (WA5MLF) is regularly updating the club Calendar of Events

Annual “Eating Meeting” POSTPONED

I will be working with Christopher Kersey (KE5PQO) at the Highland Road Park Observatory to reschedule our annual “Eating Meeting” for this Fall (Sept or Oct). I received word from Christopher that the Observatory is reopening on Friday June 19th. Todd-AB5TH

Go to <https://www.qsotodayhamexpo.com/> to learn more - get registered by July 24th!



We are reaching out to let you know that despite the closure of many ham radio events, there is a great opportunity to join your fellow hams and us at the first-ever

QSO Today Virtual Ham Expo on Saturday and Sunday, August 8 - 9, 2020.

Attendance is free and registration is now open at
<https://www.qsotodayhamexpo.com>
with early bird prize incentives for registering by July 24, 2020.

Built on a live, virtual platform used by Fortune 500 companies and major universities, this **ARRL-sanctioned** hamfest will let you:

- Learn from a packed line-up of 70+ world renowned ham radio speakers such as **Ward Silver, NOAX**, on Grounding and Bonding; **Glen Johnson, W0GJ**, on DXpeditions, and **John Portune, W6NBC**, on building slot antennas for HOA.
- See demos of the latest ham radio equipment from the world's top equipment companies. You can ask questions and engage with Exhibitors through video, audio, or chat.
- Share ideas and network with your fellow ham radio operators throughout the Expo.

And if you've never been to a Hamfest or Expo, you can participate from the convenience of your home or office without spending a dime on travel!

This platform simulates a full convention experience with an exhibit hall and exhibit booths staffed by live attendants, speaker auditorium, lobby, and lounges.

Go to <https://www.qsotodayhamexpo.com/> to learn more!
Don't forget to get registered by July 24th!

We look forward to having you join us at Expo for an amazing and engaging experience.

Father Murgas An Early Wireless Pioneer

Attached you will find an article titled “Joseph Murgas- The Neglected Wireless Pioneer” from “The Old Timer’s Bulletin” published on August 1989. One of the many magazines and journals pulled from my attic in my many cleaning excursions.

I found the article interesting from a historical perspective and hope that you will enjoy it also. Several of the major players in the field of electricity and radio waves are mentioned such as Guglielmo Marconi, Thomas Edison, and Reginald Fessenden in particular.

The burgeoning radio wave field was highly competitive in the business and theoretical sense during the late 1890s and early 1900s. George Westinghouse’s alternating current as a power source won over America and the World with the selection of AC to power the Chicago World’s Fair in 1893. In the meantime, recognition that information could be wirelessly transmitted was moving to the forefront in the science community. This is the story of one such pioneer, Father Murgas, and his contribution to wireless technology.

Thornton Cofield
K5HLC

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50TH ANNIVERSARY
OF
AMERICAN TELEVISION 1939-1989

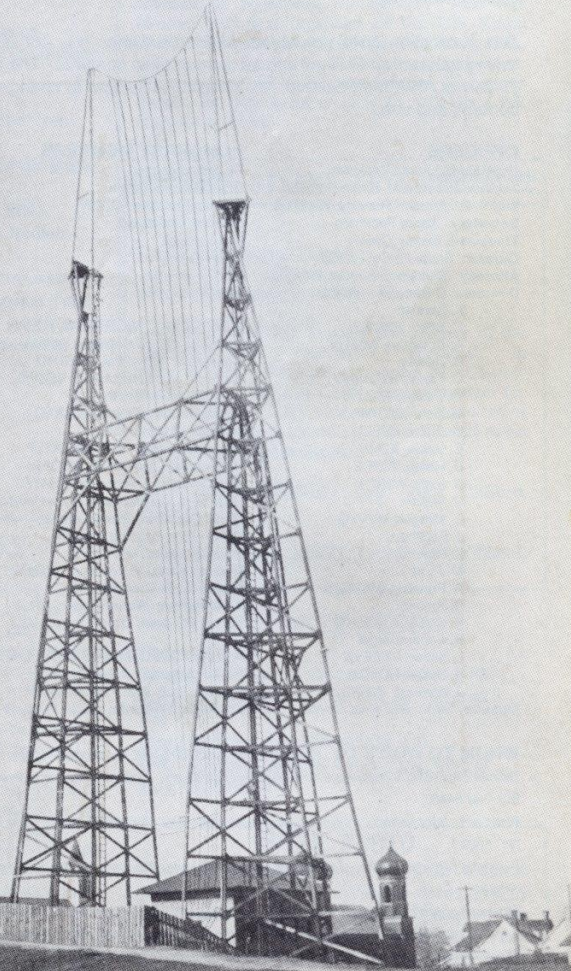
THE OLD TIMER'S BULLETIN

OFFICIAL JOURNAL, ANTIQUE WIRELESS ASSOCIATION, INC.
Published for the Old Time Wireless Operator, Historian and Collector

VOL. 30

AUGUST 1989

NO. 2



An Early Achievement in Wireless: Reverend Joseph Murgas and His Wireless Station, 1905.

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JOSEPH MURGAS - THE NEGLECTED WIRELESS PIONEER

Michael Novrocki and Scott Stefanides*

On April 27, 1905, a man in Wilkes-Barre, PA, using primitive home-built wireless equipment, successfully sends messages to a similar station in Scranton, PA, 32 km to the north. And on November 23, 1905, a public demonstration attended by government and media representatives is also successful. What was unusual about these tests is that the operator was able to send test traffic successfully at 50 WPM through heavy atmospherics, over land, compared to the existing Marconi capability of 15 WPM, in the absence of thunderstorm interference, over water. The man was Father Joseph Murgas, the "Radio Priest," pastor at the Sacred Heart Slovak Church in Wilkes-Barre, who had, according to the official report of U. S. Navy representative Lt. Cmdr. Samuel Robinson, the best wireless system then in existence.

While the Murgas system was protected by basic U. S. patents, the fates decreed that he would be almost forgotten by history, while Marconi and Fessenden would rise to the highest

level of recognition. Forgotten, that is, except by a few dedicated groups who have kept the story alive over the years.

In 1988 two juniors at the Wyoming Valley West High School in Plymouth, PA, entered the 1988 National History Day Competition - "Frontiers in History: People, Places and Ideas" - with a media presentation entitled "Why Can't They Hear the Truth?," the story of Father Murgas and his wireless experiments. The project, by Michael Novrocki and Scott Stefanides, astounded the judges, who were amazed to learn of the accomplishments of the "radio priest." After winning at both local and state levels, the entry took first place on June 16, 1988, in the national contest at College Park, MD, achieving a near-perfect score. In April, 1989, members of the AWA attending the regional meet at Tranquility, NJ, were privileged to meet the two authors and their teachers, and to see the slide-presentation portion of the project.

-Ed.

Joseph Murgas (pronounced "Muhr-gosh") was born in Tajovo, Slovakia, on February 17, 1864. While still a young boy he showed remarkable promise; as he grew, he developed interests in both the physical and the biological sciences as well as demonstrating gifts as a painter. As a young man he attended numerous schools, including the Electrical College of Vienna, where he pursued a strong interest in electricity, physics, and mathematics. He began experimenting with wireless, dabbling with mathematical equations.

However, he was destined for the priesthood. In due course, he was ordained in Slovakia as a priest in the Roman Catholic church. Unfortunately, his predilection for accuracy and truthfulness led to his exile from Slovakia when, as a recognized artist, he was asked to comment on and rendered an unfavorable opinion of an official historical painting sponsored by the Hungarian Magyar government.

He emigrated to the United States, arriving in April, 1896, and shortly thereafter became the pastor of the Sacred Heart Slovak Catholic Church in Wilkes-Barre, PA. Over the years he served his church with distinction, but his apparently insatiable curiosity led him to pursue his other interests, both as a naturalist and as an experimenter in the new discipline of "wireless." He also worked as an artist, selling paintings to

raise funds for his wireless experiments. In the spirit of the times, he built much of his apparatus.

After an unsuccessful demonstration by Marconi to the U. S. Navy, Murgas, who had already done much of the basic investigation, began work in earnest in 1902. After a year of intensive work with early mornings and late nights, the only time available to him, he had perfected his Tone System, an apparatus reportedly capable of transmitting signals for 70 miles over land and 700 miles over water. He applied for and received U. S. Patents Nos. 759,825 and 759,826, issued on May 10, 1904. In all he was to receive 17 patents.

Commercial interests were attracted, and on November 28, 1904, the Universal Aether Telegraph Co. was formed at Washington, DC to promote the "Murgas System of Rapid Wireless Telegraphy" with an eye to competing with the landline telegraph companies. Two large antenna towers were erected on a rise at the rear of the church, and an equally prominent structure was built in Scranton, some 19 miles to the north. A successful private demonstration of the "Tone System" was given on April 27, 1905, and an equally successful public demonstration on November 23, 1905, when the first words sent were "Glory be to God."

Marconi, the acknowledged expert and leader in wireless, was having difficulty in transmitting

*460 E. State St., Larksville, PA 18651

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signals over land, and on a trip to the United States asked Thomas Edison for advice. Edison referred him to Father Murgas. Over the next several years Marconi made several visits to the Wilkes-Barre area to meet with the wireless-priest and study his system. Murgas, who was older, not in the best of health, and with little or no financial backing, eventually decided that the interests of wireless could be served better by Marconi. The patent rights were transferred to him.

Murgas was finally forced to discontinue his work for a number of reasons. The Scranton towers were destroyed in a gale in late 1907 and funds to replace them were not available. Shortly thereafter, two of the principal backers died and the remaining investors were reluctant to commit further. Murgas stopped experimenting around 1912. Finally, in December, 1916, the Universal Aether Telegraph Co. disbanded, a victim of competition, politics, and lack of capital. Eventually, at the start of WW I, the government ordered the Wilkes-Barre towers taken down.

After Murgas ceased his investigations, Marconi introduced a wireless apparatus named the Sonorous System, which embodied the basic elements of the Murgas Tone System. Almost simultaneously, Professor Reginald A. Fessenden introduced his Tuned System. Ironically, Fessenden began suing any wireless interest which infringed his system, despite having borrowed from Murgas. In every court case Fessenden lost because the Murgas Tone System patents were brought up as an issue. He then sued Marconi, and the court cases dragged on

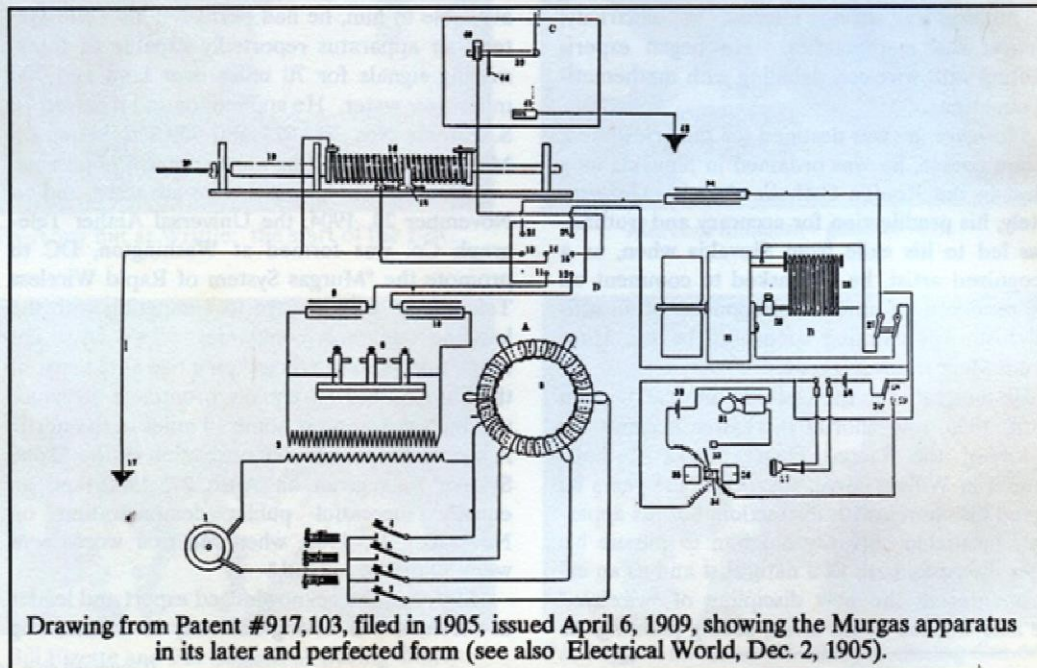
from 1914 to 1916. The eventual decision of Judge Julius Mayer, recorded in *The Federal Reporter* on January 7, 1916, was that neither Fessenden nor Marconi invented what they claimed, but that Murgas was the true inventor of the Tone System and should be given sole credit.

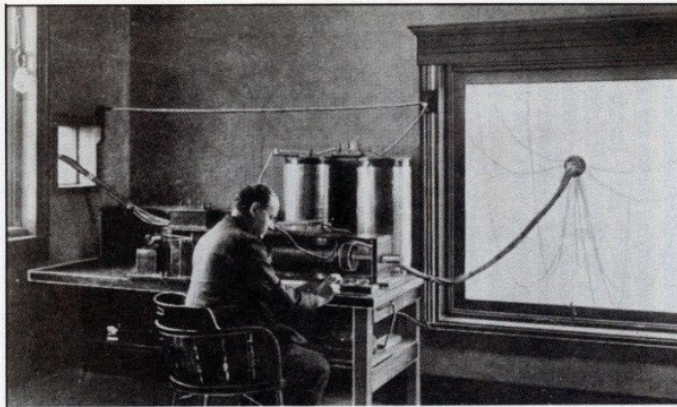
Unfortunately, it was too late for Murgas: time had passed him by. While the lawsuits were in the courts (Murgas was never directly involved in them in any way) Marconi was selling his system in Europe. Likewise, both Marconi and Fessenden systems were being sold in the United States, with the U. S. Navy adopting the latter. While Murgas was eventually recognized as the original inventor, he became the forgotten man who realized nothing from his work.

Murgas had many honors bestowed on him during his lifetime. He was reportedly named by President Calvin Coolidge to chair a federal commission on radio in 1925, but declined due to ill health. He died at age 66, on May 11, 1929. But the Reverend Murgas was not totally forgotten, and other recognition followed even after his death. In 1939 the only radio station in Slovakia was named after him, and also in 1939 a commemorative Slovakian stamp was issued, recognizing his wireless accomplishments. Another interesting honor: In 1944 President Franklin Roosevelt named a Liberty ship the Father Joseph Murgas.

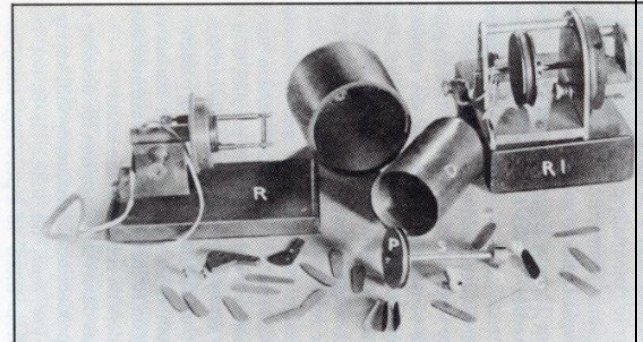
Joseph Murgas was a truly gifted man, and his ingenious ideas are a recorded part of an important frontier in the history of communications technology. Perhaps some day he will receive the recognition he most certainly deserves.

(Continued on p. 11)



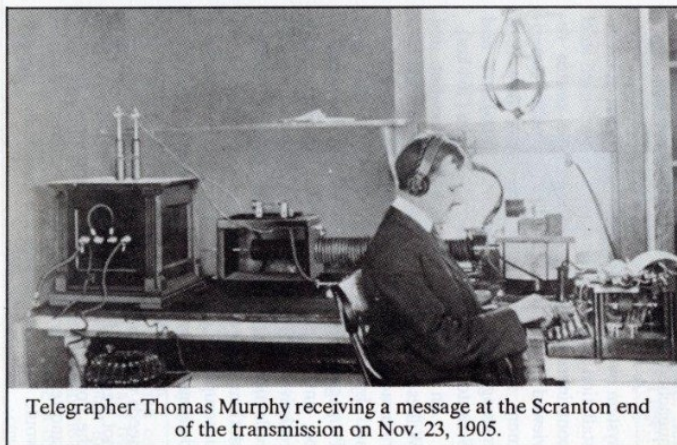


Fr. Murgas transmitting a message from his laboratory during the tests.



THE "SECRET PARTS"

The receiving instrument, disassembled



Telegrapher Thomas Murphy receiving a message at the Scranton end of the transmission on Nov. 23, 1905.

(Continued on p. 12)



HONORED BY HIS NATIVE LAND

One Of Two Postage Stamps Issued By The Independent Slovak Republic In 1939 Honoring Father Murgas For His Achievement In Wireless Science.

I rotated this one for you so you all wouldn't have to tilt your heads to the side.

Thank you Thornton for your contributions to the RF News. I'm enjoying your attic clean outs. *Todd-AB5TH*

MORE ON MURGAS

Some further notes on Father Murgas and his inventions may be of interest.

1. The double tapered wooden towers built to support the antennas were unique, measuring eight meters square at the base. They were spaced about 12 meters apart, and were joined by a crossbridge at the 30-meter level. Wooden poles were attached at the 46-meter points. The overall height of each tower was 61 meters (200 feet). The tops of the poles were joined by steel catenary cables from which ten insulated copper wires were suspended to form the radiating system (per D. K. deNeuf).

2. The 1904 Murgas patent drawings show a basic spark transmitter. The primary winding of a spark coil is fed battery current through either of two electrolytic interrupters of different operating frequencies. The operator's key selected between them. The result was two tones, a high tone for the Morse-code dot, and a low tone for the Morse dash, produced with great rapidity. The superior speed of the Murgas system over that of Marconi was due in large part to the code pulses, differing in pitch and not in length of time. The higher pitched signals were also much easier to read through atmospheric interference, compared to a conventional spark signal of the day; they sounded less like static. The use of high-pitched spark transmitters for plain on-off Morse (Marconi's "disc discharger" of 1907, the 500-Hz quenched gap, etc.) later became common.

3. A comment on the success of the Murgas system over land is in order. A key part of his installation was the ground system, six buried steel containers filled with water. One source reviewed stated that during the first public experiment in 1905 Murgas successfully forwarded messages not only between Wilkes-Barre and Scranton (32 km) but also to Brooklyn (164 km).

In realism, it is necessary to mention that Wilkes-Barre and Scranton were connected by a railroad with its usual telegraph and signal lines, and by a major AT&T telephone toll line. Propagation over this path could be expected to be unusually good, despite the high earth resistivity in eastern Pennsylvania. (No reflection on Fr. Murgas, but placing wireless stations near telegraph lines was used by an unscrupulous promoter in Europe to improve a demonstration of a marginal system [1].)

At the same time, Marconi's commercial needs were for improved transmission generally, not particularly over land. In the British Isles, the Post Office held a legal monopoly over all land telegraphy [2]. In North America, Marconi would have had to face the determined opposi-

tion of Postal Telegraph, the Western Union, and the Canadian telegraph companies, all of which were well established. Thus his market was ship-to-shore and transoceanic business.

4. Marconi had a practice of purchasing patent rights to potentially useful inventions, as a defense against competitors like Fessenden. Thus he bought rights to some marginally useful patents from Thomas Edison in 1903 [3]. The Universal Aether Tel. Co. held legal rights to the Murgas patents, so it is reasonable to assume that they were indeed sold to Marconi.

5. Early wireless "systems" were tied to particular types of detector: Marconi, the coherer and the magnetic detector; Fessenden, the electrolytic. Murgas used an imperfect-contact type involving steel against carbon, with a slight DC bias current from a local battery [4]. This was the basic design used by Popov and by Massie (the "Oscillaphone") [5]. Murgas' version used several carbon-to-steel contacts in parallel, with a steel needle slowly revolving against the carbons.

6. As a part of their award-winning presentation, the authors have prepared an annotated bibliography on Fr. Murgas. Copies are available to OTB readers on request to the editor.

7. Murgas deserves recognition for devising a three-state predecessor of frequency-shift keying: high tone, low tone, no tone. It is not far technically from there to a pure high-tone/low-tone system as developed by Edwin Armstrong in the Twenties [6] and used heavily since the Forties for radio teleprinter transmission.

8. The accompanying photos are taken from Stephen J. Palickar, Rev. Joseph Murgas: Pioneer Inventor in Wireless Telegraphy and Radio - A Pictorial Biography (Wilkes-Barre, PA: Murgas Memorial Foundation, 1953).

9. Finally . . . this is not a new story. For example, an excellent article by Alice Brannigan can be found in "Popular Communications" for June, 1985. Unfortunately, a key source, Gordon Shook, W3SZ, one of Father Murgas' last surviving students, became a Silent Key in 1987. -Ed.

REFERENCES

- [1] A. C. Lescaboura, Radio for Everybody (New York: Scientific American Publishing Co., 1922), pp. 45-48.
- [2] H. G. J. Aitken, Syntax and Spark - The Origins of Radio (Princeton, NJ: Princeton University Press, 1985), pp. 226 and 234.
- [3] M. Josephson, Edison - A Biography (New York: McGraw-Hill, 1959), pp. 281-282.
- [4] The Murgas System of Rapid Wireless Telegraphy (Philadelphia: Universal Aether Telegraph Co., 1904), pp. 19-21. (Copy by courtesy of Jim Kreuzer).
- [5] L. Cundall, "Early Detector," OTB, Vol. 22, No. 4 (March 1982), pp. 15-16.
- [6] E. H. Armstrong, "Methods of Reducing the Effect of Atmospheric Disturbances," Proc. IRE, Vol. 16 No. 1 (January 1928), pp. 15-26.