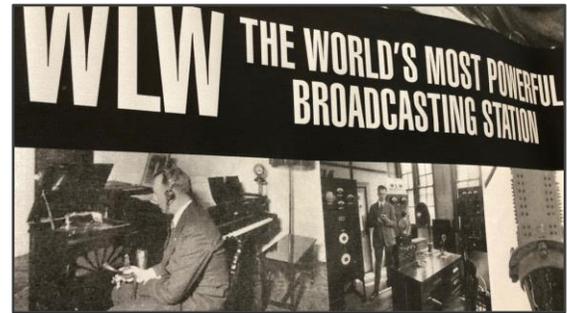


Lies, Spies, and Secrets Hidden History of Cincinnati Radio

Curiosity can be the engine of achievement. In Cincinnati, Ohio, Powel Crosley, Jr.'s fascination with shortwave radio and his aggressive entrepreneurial behavior enhanced the American spy network during World War II.

What links espionage to the Midwestern radio empire of Crosley Radio Corporation? What was unique about Cincinnati? Why is this story a best-kept secret to this day?

Many are familiar with Cincinnati's Crosley radio station WLW (The Nation's Station) and its long history of broadcasting beginning in 1922. Two years later, Crosley's curiosity with the *long haul of shortwave radio* began, and he acquired a shortwave broadcast license with call sign of 8XAL, changing to W8XAL after 1928 and becoming WLWO in 1939.



Crosley was not alone. From the beginning of radio broadcasting, shortwave radio had become an intense interest around the world. The ability to communicate over long distances—thousands of miles compared to a few hundred miles of a local AM broadcast station—provided tremendous opportunities to spread political agendas or other information. Russia began early in 1922 and was soon followed by Germany, Japan, and China, as well as many U.S. companies. Examples for commercial interest include General Electric (GE) in Schenectady, New York; the National Broadcasting Company (NBC) in cooperation with the Radio Corporation of America (RCA) in Bound Brook, New Jersey; and the Columbia Broadcasting System (CBS).

Over the next few years, broadcasters experimented with transmitter power, antenna design, target reception locations, and broadcast content, wanting to learn the best uses for such exciting media. The ability to influence people at a distance about public opinion, attitudes, and belief systems would forever change the world. Governments practicing repressive behavior were the first to recognize the strategic value of shortwave and began a broadcasting shower of black propaganda, which influences recipients without their knowledge using such forms of misrepresentation as disguising true sources.

After WWI, German military buildup was limited by the Treaty of Versailles but soon disregarded. By 1933, Germany was making use of radio for both military and private use. Adolf Hitler introduced the Volksempfänger radio, which meant *the people's radio*, subsidized by the government to be affordable to the people, in the same way that the Volkswagen was *the people's car*, and the Volkskühlschrank was *the people's refrigerator*.

Deliberately, the Volksempfänger radio was designed to receive only local broadcasts from Hitler's transmitting stations. Now Hitler had an



Shown is the first in a series of Volksempfänger radios produced by Hitler's minister of communications, Joseph Goebbels. By 1941 65% of German households owned a *people's receiver*. Although they were designed to receive only local stations, it was possible to get international transmissions like the BBC, WLWO and the VOA in the evening hours. Listening to these *enemy stations* became a crime punishable by death during World War II.

exclusive and direct communication path to the people of Germany and control of information to broadcast his black propaganda.

In 1935, Germany began a barrage of shortwave radio transmissions in Spanish to Latin America attempting to get several countries to go to war with the United States.

In the same year, Japanese criticism of the American government began with shortwave broadcasts about possible war with America resulting from the American policy in the Pacific.

The year 1937 marked a turning point in American shortwave broadcasting. Because the U.S. government did not engage in propaganda broadcasts and, therefore, would not establish international broadcasting operations, radio networks NBC and CBS decided to get serious about forming individual shortwave bureaus to cover international broadcasting. CBS used directional antennas aimed at Europe and South America.

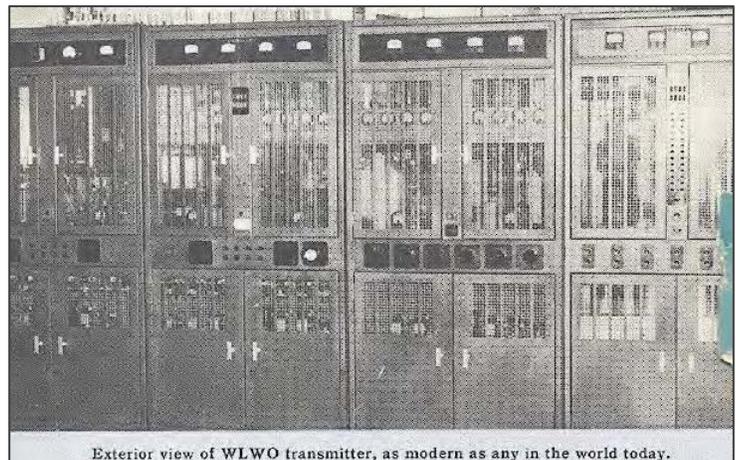
This international interest was fueled by the expectation of creating a worldwide audience for broadcast content and products, but shortwave was expensive and required funding to expand. Radio stations were not allowed to advertise on shortwave radio, so they lobbied the FCC for that privilege.

In July 1938, the Federal Communications Commission (FCC) converted the licenses of shortwave stations from experimental to commercial to allow for commercials and to be given regular call letters. The power limit was increased to 50,000 watts, and directional antennas were required. Stations could now sell commercials but were expected to promote “international good will.”

Crosley’s shortwave station W8XAL became WLWO (O for overseas).

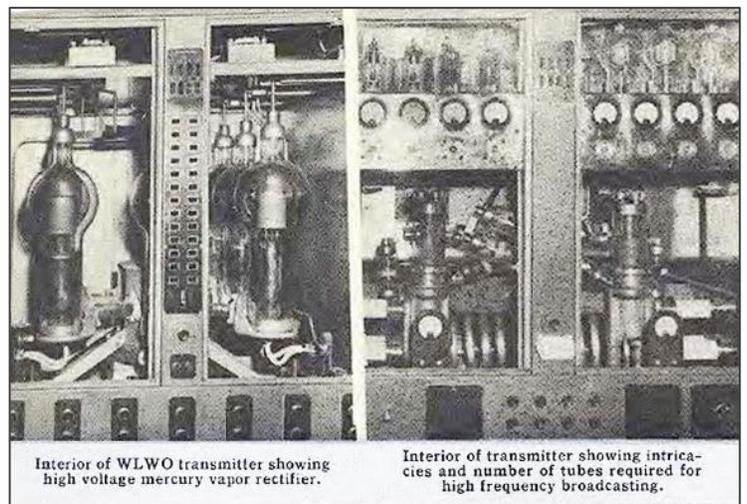
As a result of these changes, NBC, Westinghouse, and General Electric pooled their resources and established two networks—one for Europe and one for Latin America. The *RCA Review* of July 1938 cites NBC’s outlet in Bound Brook (W3XL) as relaying five daily broadcasts in German.

In February 1939, GE set up a shortwave demonstration station at the Golden Gate International Exposition in San Francisco using call sign KGEI (GE International).



Exterior view of WLWO transmitter, as modern as any in the world today.

Shown is the front for the Crosley 75,000 watt WLWO shortwave transmitter. Image from ontheshortwaves.com



Interior of WLWO transmitter showing high voltage mercury vapor rectifier.

Interior of transmitter showing intricacies and number of tubes required for high frequency broadcasting.

Shown is the interior for the Crosley 75,000 watt WLWO shortwave transmitter. Image from ontheshortwaves.com

It's not surprising that broadcasters were also shortwave listeners and understood better than most the influence of German aggression upon the world. CBS, NBC, Crosley, and others repeatedly tried to convince the U.S. to get involved with propaganda broadcasting. Congress did not understand or believe in the value of psychological warfare and would have nothing to do with it. President Franklin Delano Roosevelt had not yet accepted psychological warfare as a tool, but he was growing increasingly concerned about its worldwide success.

On September 1, 1939, World War II began in Europe when Germany invaded Poland. Great Britain and France responded by declaring war on Germany on September 3.

The German invasion of Poland kicked off a massive shortwave radio monitoring operation in much of the world. CBS in Queens, New York, was the first to set up a large foreign propaganda broadcast monitoring station by means of which CBS monitored 24 countries and provided linguists for translations.

Princeton University set up a monitoring station at the Princeton Listening Center in its School of Public Affairs. Lloyd Free of Princeton eventually became the first director of the U.S. Foreign Broadcast Monitoring Service in 1941.

Also, in 1939 the British Broadcasting Corporation (BBC) set up a large scale monitoring service named BBC Monitoring (BBCM). Alongside the BBCM in Caversham, Berkshire, England the U.S. established a monitoring organization called Open Source Enterprise (OSE), which was part of U.S. Intelligence. OSE was decommissioned June 28, 2019.

BBCM employed over 60 specialists who followed Soviet radio broadcasts, TV, and wire agency reports 24 hours every day, including Radio Moscow's shortwave signals in over 80 languages. OSE concentrated on China, and BBCM kept track of the USSR, although OSE always translated Soviet newspapers. Today BBCM handles open source media from 25% of the world while the former OSE, now CIA handles the remaining 75%.

On February 21, 1941 under the authority of the FCC, President Roosevelt allocated \$150K to create the Foreign Broadcast Monitoring Service (FBMS) under the OSE. The mandate of the FBMS was to record, translate, transcribe and analyze shortwave black propaganda radio programs that were being beamed at the United States by the Axis powers. By October 1941, the first monitoring stations were established in Portland, Oregon, Texas, Maryland and Puerto Rico. Eventually stations open in San Francisco, Silver Hill, Maryland, London, Stockholm, Algiers, the island of Kauai in Hawaii, and eventually Guam. The Hallicrafters SX-28 was the



CBS shortwave monitoring post
(May 1941).

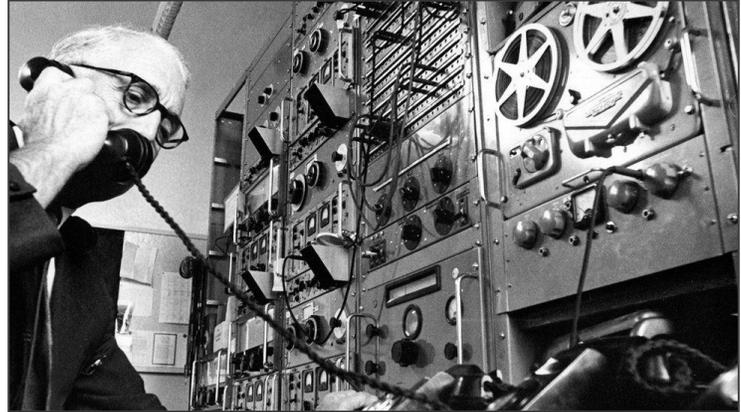


Professors John Whitton and Hadley Cantril set up an office for analyzing Axis broadcasts in a house on Alexander Street, which became known as the Princeton Listening Center. Illustration by Jeffrey Smith. Image from Princeton Alumni Weekly, December 2020.

favorite receiver and used almost exclusively in the F.C.C. Radio Intelligence Division (R.I.D) counter-espionage work

In December 1942, the name changed to FBIS (Foreign Broadcast Intelligence Service) growing to 20 monitoring stations. In addition to 350 in-house FBIS personnel the agency hired over 700 independent contractors. Many of the F.B.I.S. monitors had been amateur radio operators before the war.

Roosevelt benefited from this large-scale monitoring operation by receiving regular updates about foreign broadcasting. The U.S. was trying to avoid involvement in WWII, but these broadcasts caused Roosevelt to be genuinely concerned about the possibility of hostile encirclement of the western hemisphere. Propaganda was landing on American soil at a much greater rate than he ever imagined.



Based on monitoring reports received from the monitoring stations, Americans were listening: not a large percentage of the population but German Americans, Japanese Americans, and Chinese Americans (not to mention shortwave broadcasters) were listening. German broadcasts requested Americans to send a postcard if they listened and then aired a special program where their comments were read. Whether Americans sent postcards is unknown, but the program was convincing.

Shown is equipment used in the BBCM building at Caversham, Berkshire, England. Image from ontheshortwaves.com

This situation motivated Roosevelt and the government to take two decisive actions.

Because of these foreign propaganda reports provided by the monitoring stations, Roosevelt wanted to respond in kind but knew he was not allowed to engage in broadcasting. The laws of the U.S. prohibited the establishment of an official government radio voice. He was aware of the problem but not eager to engage a debate with Congress over what seemed to be a Constitutional issue. So a plan was hatched to work around this restriction.



General Electric's shortwave station, KGEI, in San Francisco had concrete walls three-foot thick to become bomb resistant. Photo by theradiohistorian.org

The next best solution was to provide government suggested programming to private shortwave stations like KGEI San Francisco and WLWO Cincinnati. Both had high-power stations.

Roosevelt encouraged his friends in industry to help support these broadcasts. Jell-O volunteered but was rejected because the product contained 60% sugar at a time when sugar was rationed, but offers were accepted from Hershey Chocolate, Planters Peanuts, Johnson Wax, Firestone Tire and Rubber, and large tobacco companies to buy commercial time on these

shortwave radio stations. This policy would eventually prove to be a deliberate cover for secret communications.

Roosevelt was eager for better intelligence about what was happening in Europe, Latin America, and Asia, but the U.S. spy network feedback was slow. The U.S. did not have a high-speed, efficient global method for secret communications.

So, once again, a covert plan was formed. The government was already using KGEI and WLWO for “suggested” broadcasts into foreign countries but needed a secret broadcaster to improve the speed of global communications for the U.S. spy network.

The government wanted to partner with a shortwave broadcast station without being obvious. The U.S. could not use news agencies like NBC and CBS or manufacturers like GE, Westinghouse, or RCA because of security concerns over a secret operation. To whom could the government turn?

Powel Crosley, Jr., had inadvertently created the perfect covert cover operation for the government’s spy network. Little did he know! Crosley already had WLWO on the air broadcasting into foreign countries. He was an aggressive entrepreneurial as demonstrated by the first low-cost one-tube radio called the Pup and by the world’s first 500,000 watt AM broadcast station in 1934, known as WLW. Such achievements would make almost anything he did appear believable and trustworthy.



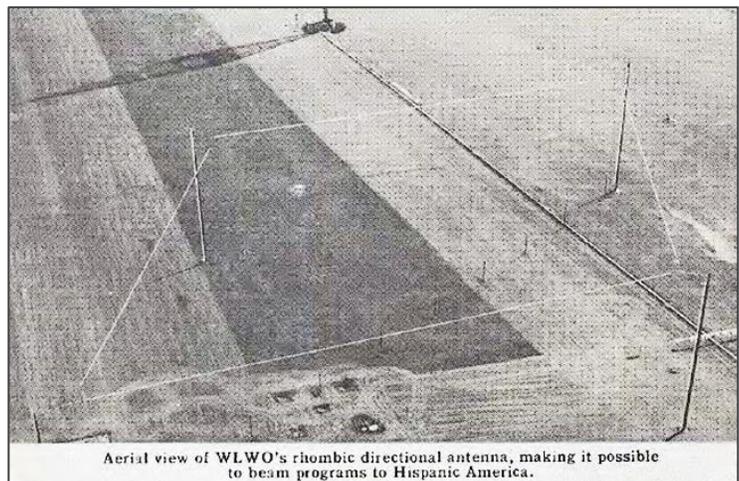
Powel Crosley, Jr. was the first to produce a low cost one tube radio, the Pup, affordable by most people.



On April 26, 1940, WLWO went on the air at the station’s new power limit of 50,000 watts. Shortly thereafter, WLWO increased its power to 75,000 watts, 50% over its license limit, and became the country’s most powerful shortwave transmitter.

Why was WLWO over its power limit? Read on.

In May 1940, WLWO was secretly taken over and funded by the U.S. government. Broadcast content was 100% controlled by the government, and, using the station’s six specially designed reentrant rhombic directional antennas, the information was aimed at South America in English, Portuguese, and Spanish and eventually targeted Europe, as well. This special antenna provided a gain of x 8 which caused the transmitted signal strength to be equivalent to 600,000 watts, which put a commanding signal into foreign countries. A special teletype from Washington, D.C., was installed at the station to print copy ready for broadcast with no editing. The copy was read exactly as received. More about this later ...



Shown is the WLWO diamond shaped reentrant rhombic antenna. Note the pole mounted reentrant feedline stretching the long length of the diamond that makes the antenna 98% efficient. Image from ontheshortwaves.com

The station was completely funded by Nelson Rockefeller's CIAA (Office of the Coordinator of Inter-American Affairs) and by Roosevelt. In August 1941, money also came from the government's Coordinator of Information (COI), forerunner of the OSS (Office of Strategic Services). OSS became the first independent U.S. intelligence agency. Lasting for three years and three months (1942–1945) OSS became the basis for the modern Central Intelligence Agency.

With this funding, Crosley then established a chain of local radio stations in 10 Latin America countries to rebroadcast WLWO programs. This appeared to be a perfectly normal expansion by an aggressive business person like Crosley but was secretly an enhancement to the U.S. communications network for spies.

In addition, government-written, – produced, and –hand-delivered songs, jingles and advertisements were broadcast at a specific UTC (Universal Coordinated Time). A special agent flew from Washington, D.C., to secretly deliver ads and musical broadcasts to a secret agent at the station.

This secret agent at the WLWO Mason station ensured specific information was aired at pre-arranged UTC times. Why was that?

In October (five months after WLWO became secretly funded by the U.S. government), a suspicious fire was reported in the WLWO tuning house.

Suspicious because the building is all metal and there was nothing combustible inside. More likely it was an electrical arc from the high power radio energy. The fire conveniently provided the cover to increase security at the station. A special guardhouse 75 feet high was built, a high metal fence enclosed the property patrolled by a staff of 12 guards 24 hours a day, and a battery of floodlights illuminated every foot of the property.



Smith and Wesson Victory Revolver used by Guards at WLWO.
Photo by Ben Chapman.



WLWO double walled, 16-foot square, Reentrant Rhombic antenna tuning house. All six sides are metal and the floor is covered with rubber. March 2021. Photo by L. Hite



The WLWO guard tower is positioned to the right rear of the WLW/WLWO building. The search lights have been removed. Photo from VOA Museum archives.

Early in the days of WLWO, Crosley engineers William Alberts and George Friedrich Leydorf improved the efficiency of the directional rhombic antenna from 55% to 98%. It was renamed the Reentrant Rhombic. When the government took control of WLWO, the reentrant rhombic was classified a *secret*, which provided an additional cover story for installing guards and constructing the guard tower and security fence.

To help conceal the real purpose of the station, WLWO's employees were instructed to tell people, if asked, that they worked at WLW. The "O" was never acknowledged in public. WLWO's commercial status was simply a cover story, but few knew. Many employees of the station were never aware of the secret operations. Even years

later, most employees had not learned about the covert operations, but a few had.

To legitimize the station and further conceal secret operations at WLWO, Crosley issued a brief statement to employees about the station in the form of a brochure. (See the WLWO Announcement Brochure at the end of this document.)

As mentioned earlier, broadcasts included advertising, but WLWO had no advertising staff. This fact was confirmed in an interview with former Crosley staffer Blanche Underwood.

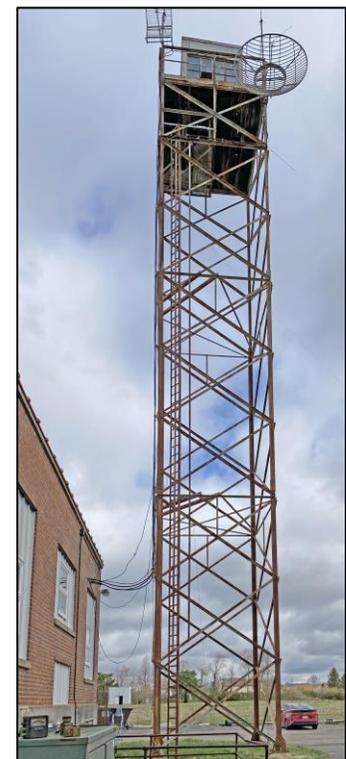
Listeners in Europe and South America that had heard the advertisements sent postcards asking why they could not buy those products in their countries.

What were the secrets? What was the real purpose of WLWO? How was secret information transmitted?

To best understand those answers requires knowing the ways secret messages were—and are—passed from spy to spy.

Then and now, messages are encoded using numbers by means of the truly unbreakable system called the One-Time Pad (OTP) cipher also known as a One Time Key (OTK) or One Time Tape (OTT) that used punched paper tape. Spies were trained to decode such messages and destroy the keys immediately after reception.

It may come as a surprise to learn that the OTP is still active today in the U.S. and the world. It is simple and unbreakable when properly implemented. In some respects, computer encryption is better, but it can leave a trail. There is no such thing as a completely secure computer.



Shown is the WLWO guard tower. Note the antenna tuning house in the background. Photo by L. Hite

In what way does the OTP work?

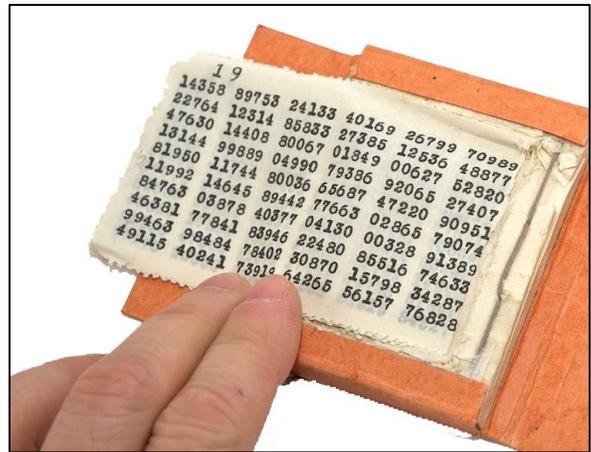
Suppose, for example, VOA Director Jack Dominic wishes to send the message “HELLO” to VOA Board of Directors (BOD) President Ken Rieser. Using the OTP, the encrypted message would be converted either to “EQNVZ” or to a number sequence of 4, 16, 13, 21, 25 accompanied by the OTP key of “XMCKL.” (See the explanation at the end of this document.)

The message could then be embedded in a song or a commercial. The number of words in a sentence, paragraph, or phrase can easily represent coded numbers. The first or last letter of each sentence, word or phrase could hide the message EQNVZ or the key XMCKL. Another secret message could be “the yellow dog flew with apples in the meadow” (YDFAM). Even if this information was intercepted, it remained a secret without the specified sheet from the OTP. Only two sheets existed: one from the sender’s pad and one from the pad for the receiving agent, and both were destroyed after receiving the ciphered text.

Every American embassy and most consulates had a shortwave monitoring station with a special person assigned and trained on the One-Time Pad. Prearranged weekly or monthly cyphered messages would be transmitted to the embassies, typically announcing that a military event was on schedule, delayed, or canceled.

The Zenith 1000 radios were popular with Radio Amateurs and SW-listeners, but also with the international spy-scene of the late 1950s and early 1960s. It offered a good alternative for the bulky and heavy spy radio receivers of the era. In many cases, East German spies, operating in West Europe or elsewhere, used the Zenith 1000 for receiving messages from their headquarters.

The scale of the Zenith 1000 is not accurate enough to set the exact receive frequency for reception of the secret shortwave broadcast. So, the crystal-based spy transmitter could be used to calibrate the receiver and tune it to the desired frequency.



Shown is the OTP of numbers used by East-Germany and the Soviet Union in the 1960s. Image courtesy cryptomuseum.com



Shown is a Zenith 1000 transistorized shortwave receiver first introduced in 1957. Their heavy-duty, high-quality construction and performance as shortwave receiver made them a favorite choice by spies. The complete spy package included a 50 watt continuous wave (CW) spy transmitter which includes the morse code key and six oscillator crystals. Image courtesy cryptomuseum.com

The cover story for the monitoring station was conveniently established as a VOA monitoring station where broadcasts from the VOA could be heard. The monitoring station provided valuable signal reports back to headquarters so that each relay station could learn about its performance and make appropriate adjustments if the received signals were weak.

Eventually, every VOA transmitting plant could listen in real time to its broadcast reception at a foreign location using the VOA satellite system, but the shortwave monitoring station remained as a link for cyphered messages.

During WWII and extending into today, shortwave radio is the preferred method for sending coded number messages. Often referred to as a *Number Station*, a real person or a synthesized voice reads numbers, typically in groups of 5. The origin of a number station broadcast is unknown to most, but the spy knows exactly what frequency and UTC time to listen. Early on, the cyphered messages were in Morse code.

Countries still spy on each other, and shortwave radio remains one of the safest ways to send OTP messages without leaving a footprint.

The VOA's Bethany Station used radio fax at the end of the normal broadcast day to send encrypted messages about troop movements, supply chains, and enemy locations. The fax signal could be received by anyone using a government-issued unsecured radio fax machine, but reading the message did not reveal the secret without the OTP.

Even after construction of VOA's Bethany station in West Chester, Ohio, WLWO remained on the air as a critical link to the American spy network.



Shown is a typical travel kit that can hide a One-Time Pad (OTP). Image courtesy cryptomuseum.com



Shown is the OTP hiding location in this travel kit. Image courtesy cryptomuseum.com

During WWII, the BBC also transmitted similarly coded bizarrely-worded messages in their scripts during their special language service broadcasts. The BBC ordinarily dropped a few phrases into a regular program script or foreign language news bulletin. This task was tricky because programs would soon be ruined, were they to include too many coded messages in their scripts.

Codes messages were hand delivered to the BBC station by a secret agent on a Gramophone record, often in several languages. With the record in hand, the agent returned to HQ after the broadcast was completed at a specific UTC time.

Learn how the One-Time Pad works! (See the example below.)

Suppose VOA Director Jack Dominic wishes to send the message "HELLO" to VOA BOD President Ken Rieser.

Assume two pads of paper containing identical random sequences of letters were somehow previously produced and securely issued to both.

Jack chooses the appropriate unused page from the pad. This was normally arranged in advance; for instance, instructions might say to "use the 12th sheet on May 1st" or to "use the next available sheet for the next message."

The information on the selected sheet is the key for this message. Each letter from the pad will be combined in a predetermined way with one letter of the message. (It is common, but not required, to assign each letter a numerical value, e.g., "A" is 0, "B" is 1, and so on.)

In this example, the technique is to combine the key and the message using modular addition. The numerical values for the corresponding message and key letters are added together, modulo 26. So, if key material begins with "XMCKL" and the message is "HELLO," then the coding is done as demonstrated here:

	H	E	L	L	O	message
	7 (H)	4 (E)	11 (L)	11 (L)	14 (O)	message
+ 23 (X)	12 (M)	2 (C)	10 (K)	11 (L)		key
= 30	16	13	21	25		message + key
= 4 (E)	16 (Q)	13 (N)	21 (V)	25 (Z)		(message + key) mod 26
	E	Q	N	V	Z	→ cipher text

If a number is larger than 25, then the remainder after subtraction of 26 is taken in modular arithmetic fashion; in other words, if the computations "go past" Z, the sequence will begin again at A.

The cipher text to be sent to Ken is thus "EQNVZ" or a number sequence of 4, 16, 13, 21, 25. Ken uses the matching key page and the same process—but in reverse—to obtain the plain text. Here, the key is subtracted from the cipher text, again using modular arithmetic:



Shown is a key-tape generator, produced by the Austrian company Mils Electronic. To guarantee that both key tapes are identical, the paper puncher on the right punches the tapes simultaneously. When used with punched paper tape, the OTP is often referred to as One-Time Tape (OTT) and the machine is commonly called a "mixer." Image courtesy cryptomuseum.com

E	Q	N	V	Z	cipher text
4 (E)	16 (Q)	13 (N)	21 (V)	25 (Z)	cipher text
- 23 (X)	12 (M)	2 (C)	10 (K)	11 (L)	key
= -19	4	11	11	14	cipher text – key
= 7 (H)	4 (E)	11 (L)	11 (L)	14 (O)	cipher text – key (mod 26)
H	E	L	L	O	→ message

As before, when a number is negative, 26 is added to make the number zero or higher.

By this process, Ken recovers Jack’s plain text message “HELLO.” Both Jack and Ken destroy the key sheet immediately after use, preventing reuse and an attack against the cipher.

The KGB often issued its agents one-time pads printed on tiny sheets of flash paper, paper chemically converted to nitrocellulose, which burns almost instantly and leaves no ash.

WLWO brochure.

STARS OF WLWO

- Concha Gandia, commentator of "Christus Amenas"
- Aristides Nodarse, Spanish Announcer
- Henley Hill, Portuguese Announcer
- José Mayoral, Spanish Announcer
- (above) Manuel Avila, Spanish Announcer, (below) Peter Grant, English News Announcer

● WLWO broadcasts in Spanish, Portuguese and English, three of the languages of the Americas. We try at all times to broadcast foreign language programs which will please the most listeners. Listeners' suggestions are carefully considered and often used.

● The Inter-Nation Station is permitted to operate in the 49, 31, 25, 19, 16 and 13 meter bands. Frequencies are changed throughout the day to afford best reception for WLWO listeners.

● WLWO is the only high modulated, high powered, high frequency station in the world. By means of its directional antenna it delivers a high fidelity signal in the center of its beam of approximately 600,000 watts.

● Another exclusive feature of WLWO is its automatic push-button frequency control, making it possible to switch from any one frequency to another almost instantly.

● One of the first services inaugurated by WLWO after operation with 50,000* watts began, was a hurricane warning system. Arrangements were made with the United States Weather Bureau in Washington to advise WLWO of all impending storms in the Caribbean. Such information is broadcast regularly in Spanish and English until the storm has abated.

* Application filed with the F. C. C. for 75,000 watts.

● WLWO has numerous news programs throughout the day, compiled from reports of the Associated Press and International News Service.

● Aristides Nodarse, Concha Gandia and Roberto Riancho are heard regularly on WLWO. Their programs have proved extremely popular with Hispanic American listeners.

WLWO
THE INTER-NATION STATION

By Leland L. Hite
National Voice of America Museum of Broadcasting
April 4, 2021

Disclaimers and Definitions

This article is not exhaustive. The documents and statements the author has gathered might not be accurate despite his best efforts to ensure accuracy and authenticity. Time, distance, and ideological differences tend to cloud the memories of past events. For security reasons, some agencies (including the VOA) admitted they deliberately instructed authors to skew dates and events during WWII and the Cold War.

This document occasionally refers to propaganda in various ways as used in shortwave radio broadcasting beginning in the early 1920s. Propaganda was categorized as black, white, or gray; as fast or slow; and as *propaganda of the deed*.

White propaganda espoused to tell the truth without bias, to identify the sources or sponsors of information, and to specify where the sources were located. Examples are the VOA and BBC.

Gray propaganda was not attributed to the sponsor, concealed the real source, and contained big lies and biases, but it occasionally identified sponsors or sources and locations.

Black propaganda consisted of big lies, contained biases, and misrepresented identities and locations; for example, the German program “The Voice of Free America” was identified as originating from the Midwestern U.S.

Fast propaganda was designed to exert a short-term impact on public opinion. It could be carried by radio, newspapers, or speeches; today, it is carried by television, video, email, or the Internet.

Slow propaganda cultivated—and still cultivates—public opinion over time through media such as books, cultural exhibitions, and educational exchanges seeking to influence ideas and attitudes.

Propaganda of the deed consisted of actions taken for their psychological effects on various populations. Such propaganda can still be inculcated through educational or cultural exchanges, economic aid, disaster relief, disarmament initiatives, international agreements, the appointment of an investigating commission, legislation, and other policy initiatives (those employed primarily for the effects they have on public opinion). An example of *propaganda of deed* is James Doolittle’s raid on Japan. The mission was pointless from a military point of view but exerted considerable psychological impact.

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