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*How FCC's routine policing of the ether became in World War II a multi-purpose defense service and a far-flung counter-espionage operation.*

## THE U.S. HUNT FOR AXIS AGENT RADIOS

George E. Sterling

I hope that this country, particularly its intelligence agencies, has become better organized to handle a national emergency than it was in 1941. When the war, after slowly creeping for two years from Europe toward U.S. shores, suddenly exploded upon us at Pearl Harbor, thousands of new kinds of things had to be undertaken in desperate haste and with at times disorderly improvisation. Many agencies were given emergency duties for no better reason than that they were using equipment approximating what was needed for the war-time work. That they by and large discharged these extraordinary responsibilities well, at the same time helping cooperatively toward the gradual readjustment of temporarily assigned functions, is something in which all those who participated can take pride.

The Federal Communications Commission, because it had a network of radio monitoring and direction-finding stations to police the domestic airwaves, was given its full share of duties not called for in its job description. It ran a rescue service for planes lost in the black-out or bad weather, locating them by their radio signals and furnishing them their bearings; more than 600 planes, many of which would otherwise have been really lost, were given FCC emergency fixes before Army Air Force personnel were trained, with our help, to take over the job. It monitored enemy commercial radio circuits and furnished the Board of Economic Warfare with hundreds of leads useful in the preclusive buying program. To meet requirements of the Eastern, Gulf, and Western defense commands, the Commission's legal responsibility for apprehending unlicensed radio stations was extended to surveillance of the coast by radio patrols for signs of surrepti-

tious communication with enemy submarines. The network intercepted foreign weather traffic for our air forces. It monitored foreign radio broadcasts, setting up the organization which now has become the Foreign Broadcast Information Service, and published texts and analyses of broadcast news and propaganda for a variety of government consumers. It trained OSS personnel in radio methods and procedures and built equipment for their use.

For a year and a quarter the FCC's Radio Intelligence Division, as the monitoring network was known, carried the full load of military radio intelligence in Alaska, where the Army was not able to station a radio intelligence company until late in 1942 and got a monitoring station in operation only in the spring of 1943. It radio-patrolled the Alaskan coast by sea. It also participated at Army request in military intelligence elsewhere, most notably in Hawaii and on the west coast. In San Francisco it set up an Intelligence Center where officers of the military services were on duty around the clock. It identified and tracked the radio-equipped balloons which the Japanese launched against our west coast. It discovered and established the location of a Nazi weather station on Greenland, which the Coast Guard was then able to destroy. It trained the military personnel who eventually took over most of these duties, prepared instructional booklets and monitoring aids for them, and supervised their work until they became competent enough to operate without help.

The RID even participated from afar in the guerrilla movements in the Philippines. This activity began when one of our monitors picked up a signal using the call, PK1JC, of an amateur in the Dutch East Indies, where no amateurs could operate. We fixed its origin in northern Luzon. PK1JC sent a message coded, we determined, with a prewar Signal Corps cipher disk, giving the name and serial number of an surrendered American soldier trying to establish contact with MacArthur's headquarters. He requested acknowledgement by a signal from General Electric's powerful KGEI transmitter near San Francisco. The Signal Corps arranged for this acknowledgement and asked us to continue copying all his messages. Later, when the landing of transmitters by submarine created quite heavy traffic from the Philippine guer-

rillas, a primary monitoring station at San Leandro, California, was exclusively devoted, at Signal Corps request, to copying it and expediting it by private teletype circuit to Washington.

*Policing the Domestic Ether*

Although these spirited improvisations requested and supported by the military services lay far outside the Commission's proper charter, the Communications Act of 1934, they were undertaken eagerly when required and relinquished later gracefully but with reluctance by our radio men and women anxious to contribute to the war effort in any way they could. Our people had enough of their own proper work to do, for after Pearl Harbor the regular job of the Radio Intelligence Division took on a new and grimmer aspect. It was now not just a question of tracking down maladjusted transmitters, unshielded diathermy apparatus, or even the illegal communications of pranksters, smugglers, and racetrack tipsters, but of sealing the country's leaky ether against loss of war secrets over the radio circuits of enemy agents. Hitherto, with commercial communications to foreign countries free of surveillance, spies in this country had had no need to risk secret transmitters; now these commercial facilities were closed or censored and the whole spectrum had to be patrolled for furtive whisperings in Morse cipher. The RID was under challenge to live up to its initials.

The Division's equipment, personnel, and physical deployment were adequate to the task. During the state of national emergency that preceded Pearl Harbor the FCC had been authorized to begin an expansion of its radio detection facilities, which were ultimately stabilized in twelve primary monitoring stations, about sixty subordinate monitoring posts, and about ninety mobile units distributed through the United States, Puerto Rico, Hawaii, and Alaska. The fixed stations and many of the mobile units were linked by instantaneous communications. They were organized into three major networks based on radio intelligence centers respectively in Washington, near San Francisco, and in Honolulu; but in fixing the location of a source of radio signals the three networks were fused into one and directed from Washington.

Each primary station, in addition to its complex of rhombic and other antennae and its receiving and recording equipment, had at least one Adcock direction finder, a large rotating antenna sensitive to the direction of shortwave signals bounced off the ionosphere; this device had been invented in England, but was refined and improved by RID engineers. At short range, say within a few miles, a simple loop antenna can pick up the ground-wave component of a signal and determine its direction; our disguised mobile units included these in their equipment. And finally, for locating transmitters at really close quarters, we developed what we called a "snifter," a signal-strength meter that a man could carry in the palm of his hand while inspecting a building to determine which room a signal came from.

In the routine day-and-night operation of a monitoring station, the patrolman of the ether would cruise his beat, passing up and down the frequencies of the usable radio spectrum, noting the landmarks of the regular fixed transmissions, recognizing the peculiar modulation of a known transmitter or the characteristic fist of a familiar operator, observing an irregularity in operating procedure and pausing long enough to verify the call letters, or finding a strange signal and recording the traffic for close examination, and then sometimes alerting the nation-wide net to obtain a fix on the location of its source. More than 800 such fixes would be made in an average month, requiring the taking of some 6,000 individual bearings. For although mathematically the intersection of two bearings provides a fix, the 1% error that must in practice be allowed in the angle of a bearing, even when it is corrected for variations in propagation and site conditions, becomes considerable at distances that may run to thousands of miles; and at least four bearings are needed for a reasonably reliable long-range fix.

#### *Radio Spies in the United States*

With respect to Axis agents in the United States and its territories this close vigilance was almost purely prophylactic, and effective in its prophylaxis: out of respect for its enemy agents, as far as we ourselves were able to discover, made only two attempts during the entire war to establish radio communications across our ethereal frontiers, and in both cases

failed to get a single message through.<sup>1</sup> The stories of these two, although they have been told from other viewpoints elsewhere,<sup>2</sup> are worth summarizing here.

The first took place in the spring of 1940, long before Pearl Harbor had roused us to hunt for radio spies here in earnest. Our routine monitoring turned up an unidentified transmitter carrying on coded traffic with a distant station which used the call AOR. We asked the Army and the Navy if it might be one of theirs. They had no knowledge of it; the Navy thought it might be a St. John, New Brunswick, station. But our direction finders showed it to be on Long Island, and its correspondent AOR near Hamburg, Germany. We reported to the FBI.

The Bureau told us in confidence that it was indeed a German agent radio, but under their control. A German-American, William Sebold, had revealed that he was recruited by the Nazis and instructed to set it up. The FBI built and now were manning the station for him, feeding Hamburg false or innocuous information and identifying its agent sources. The deception continued for more than a year under our joint surveillance, until at the end of June, 1941, 33 German agents to whom the traffic had furnished leads were arrested. At their trial that fall, when the defense tried to maintain that AOR was not a German station but an FBI entrapment device in the United States, RID engineer Albert McIntosh produced charts showing the fix on Hamburg. His public testimony must have been one factor in the German decision not to risk agent transmitters in the United States.

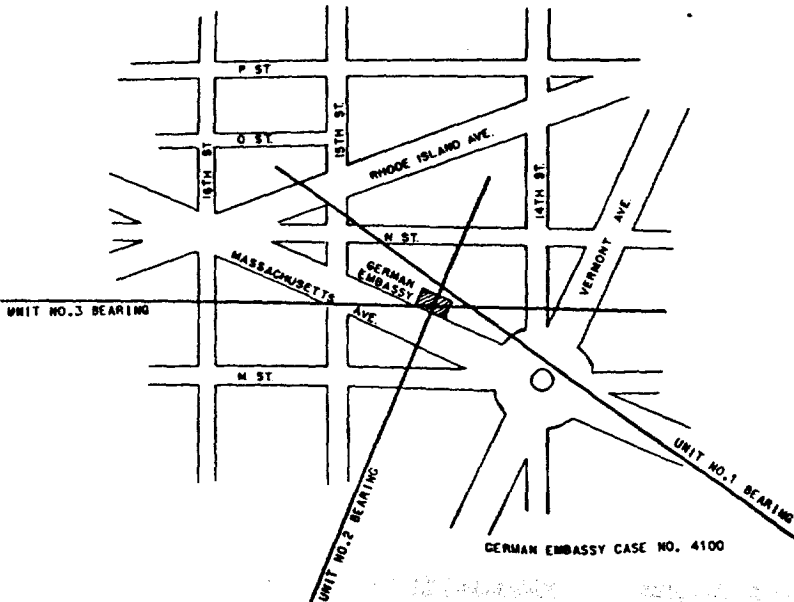
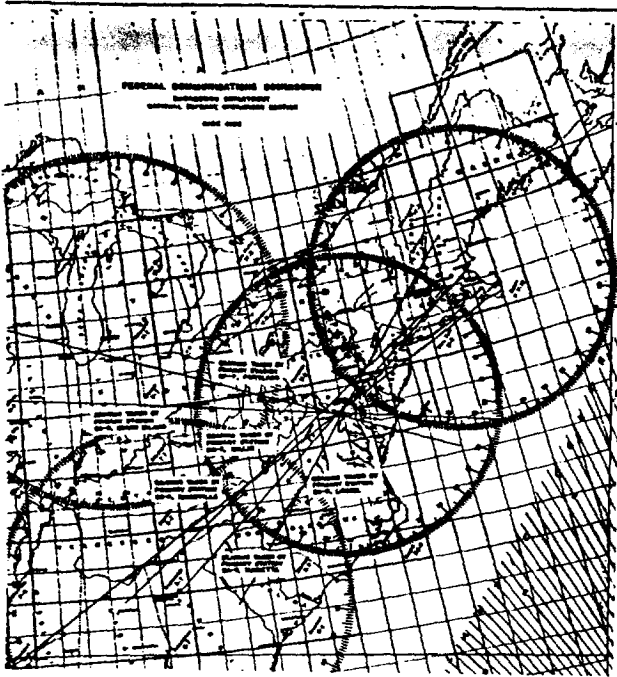
They did try it once more, though, right after Pearl Harbor, apparently on local initiative, impromptu. In the general alert which followed that shocking Sunday morning we had put several mobile monitoring units out cruising the Washington streets. These were equipped not only with loop direction finders but with a device we called the watch-dog, an

<sup>1</sup> Wilhelm Hoettl, one of the German foreign intelligence area chiefs, affirmed during his interrogation by 3rd Army in June 1945 that the Sicherheitsdienst had not been able to establish a single wireless connection either in the United States or in England.

<sup>2</sup> Notably in Don Whitehead's *The FBI Story*.

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Axis Agent Radius



FIGURES 1 AND 2

aperiodic receiver we had developed which would sound an alarm when it received a strong signal on any of a wide range of frequencies. (It was patented by two RID engineers and later used by OSS and the Navy.) In the wee hours of Tuesday, December 9, one of these watch-dogs was triggered by signals on a transatlantic frequency. At the same moment three thousand miles away our monitors in Portland, Oregon, heard them too—station UA briefly and vainly calling a distant control center. Five other direction-finding stations were set to watch the frequency; and when a few hours later UA tried it again, they reported the bearings projected on the chart in Figure 1. This fix confirmed the uncertain supposition of the watch-dog that the transmitter was in Washington.

Now three mobile units were given the scent, and they quickly narrowed down the location to the German Embassy, as shown in Figure 2. It was a problem to pin-point the transmitter without entering the Embassy because the antenna was stretched between two buildings, with equal signal strength at each end and apparently lead-in wires to both buildings. This problem was solved in a pre-dawn conference with the FBI, who arranged, in cooperation with the Potomac Electric Power Co., that we could go down into a manhole in the street and cut the power to each building separately in turn when UA began to call. In the end, however, because the State Department was afraid for our own diplomatic mission still in Germany, we did not seize UA but simply set up two jammers to drown him out if he should try once more. He never did.

This beginning was the end for Axis radio agents within our borders; any German agents picked up by the FBI thereafter were found to have been using secret ink or some other communications than radio to get information out of the country. And we learned that some Japanese agents who requested their headquarters' permission to set up a transmitter here were turned down on the grounds that the FCC would nab them as soon as they got on the air. Outside our own states and territories it was a different story, one in which also the RID became intimately concerned.

### *The Portuguese Net*

One day in September 1941, monitors at the secondary RID post in Miami heard a station using irregular procedures and signing the call UU2, one not in conformity with those used on commercial and other authorized circuits. It was therefore made a case for investigation. Bearings fixed its location near Lisbon, Portugal; and as it continued to call almost nightly without receiving a reply, RID units were instructed to be on the lookout for the answering station. After more than a month monitors at the secondary posts in Pittsburg and Albuquerque simultaneously picked up the answer from a station signing CNA; bearings were taken which located this transmitter in South Africa.

A few days later another station using the UU2 procedure was intercepted, this time with the call BX7. It was also in Lisbon, and the characteristics of its signal showed that without question BX7 was the same station which had previously signed UU2, apparently the control station of a network. After a week an answer with the call letters NPD was picked up by our Rhode Island monitoring post. This station proved to be in Portuguese West Africa.

The messages exchanged between the Lisbon control UU2/BX7 and the two out-stations in Africa were of course enciphered. RID did not maintain a cryptanalysis laboratory, decipherment being the responsibility of the FBI, of the Army's Signal Intelligence Service, and, on behalf of the Navy, of the Coast Guard; but in order to facilitate the identification of intercepted traffic we had interested a couple of our staff in cryptanalytic work. These men attained a considerable skill and in some cases were able to furnish leads for the FBI decipherment. The Lisbon cipher was one of these cases. It was an up-and-down transposition whose key length varied from day to day.

The texts of the messages showed this network to be one channel by which German agents in the neutral countries and colonies of Africa reported on the movements of ships, troops, and materiel and on political events. On March 26, 1942, for example, the South Africa station reported ship sail-



ings and the concentration of Allied troops which later took Madagascar. As translated from the Portuguese:

TWENTYSIXTH. AMERICANS "NISHNAHA" AND "SOLONTU-SHAW" SAILED WITH ORE FOR NEW ORLEANS, ALSO ENGLISH "CITY OF N. CASTLE"; "ANGOLA" AND ENGLISH "ISIPIEGO" FROM DURBAN ARRIVED WITH PASSENGERS. TROOPS STILL CONCENTRATED; TRYING TO LEARN DETAILS.

From Portuguese West Africa an agent with the code-name Armando sent similar information intermingled freely with operational reports. On December 4, 1941:

ARMANDO REPORTS ENGLISH CONSUL RECEIVED LONG EN-CIPHERED TELEGRAM RELATIVE ENFORCING STRICT VIGILANCE AGAINST ESPIONAGE. OFFICIALS CLAIMED ENGLISH STILL COMMAND CAPE VERDE SUBMARINE CABLE. MANY MEN GO TO FREETOWN OWING APPROACH TEN CONVOY SHIPS, LARGE TROOPS, AMMUNITION AND TANKS. HOWEVER INFORMER DOES NOT KNOW IF THEY REMAIN LAGOS OR FREETOWN AND BATHURST.

On January 7, 1942:

WEST INDIA ARRIVED BATHURST FOURTEEN WITH PILOTS AIRCRAFT MECHANICS DISASSEMBLED TANKS ANTI-AIRCRAFT MACHINE GUNS MUNITIONS LARGE QUANTITY GASOLINE CAMPAIGN TENTS. NEXT MONTH WE WILL HAVE REGULAR CONNECTION DAKAR THROUGH INTELLIGENT NATIVE GOLD-SMITH AUTHORIZED TO ENTER COLONIAL SERVICE UNDER GOVERNOR TO HELP MY WORK. ARMANDO

On February 5:

CHIEF OF POLICE LIEUTENANT UNDERCOVER IMPRUDENTLY WORKS FOR ENGLISH. CONVENIENT TO OBTAIN HIS RETURN LISBON. HE CAN DAMAGE US. ARMANDO

But the Germans were growing dissatisfied with Armando's work. The Lisbon station radioed him on February 11:

SAID THERE IS TO BE DISEMBARKMENT ENGLISH AMERICAN TROOPS DAKAR NEXT FIFTEEN DAYS. WHY NO REPORTS MOST URGENT.

On February 12:

DISEMBARKATION TROOPS FREETOWN NOT DAKAR. I ORDER YOU INVESTIGATE. NOT SATISFIED REPORTS WHICH I CALL FOR. HAVE RECEIVED BETTER REPORTS FROM OTHER PERSONS.

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And most indiscreetly, on 27 March:

SECURE EXPEDITIOUSLY RECENT REPORTS DAKAR FREE TOWN RELIEVE CAROLINA OF HIS DUTIES. USE NEW INK BEARER SHOULD DELIVER LETTERS PERSONALLY TO PORTER HOTEL DUAS HACOES VICTORIA STREET FOR MR MERCKEL. WE ARE EXPERIMENTING CONTINUATION ORGANIZATION TWO MORE MONTHS. USE YOUR BEST REPORTS FOR MY VINDICATION.

The organization did not in fact last much longer than two more months, but it was not the Germans who terminated it. Revelations like this one enabled Allied intelligence officers to clean out the Portuguese group in the summer of 1942.

#### *Nazi Agent Training and Procedures*

Having thus demonstrated its capability in the European theater, the RID was approached early in 1942 by its British counterpart, the Radio Security Service, with a request for the establishment of regular liaison and exchange of information. From then on to the end of the war we maintained a most harmonious and fruitful relationship which served to build up a pretty complete picture of the German diplomatic and espionage networks and their activities. The characteristics of individual transmitters and individual operators were recorded and catalogued so that they could be recognized when they were used on a different circuit. Nearly all the codes and ciphers were broken, and the great bulk of the clandestine traffic could be promptly read. During the most critical period of the war in Europe the RID was monitoring 222 frequencies used in clandestine intra-European circuits.

After the Lisbon net was closed down the Germans had five major networks, with control centers in Berlin, Hamburg, Bordeaux, Madrid, and Paris. The out-stations were located in practically every European country, in Africa and the Atlantic, and in the western hemisphere. The operators of these out-stations were in general not skilled radiomen, we learned from captured spies, but agents who had been trained in radio and codes and ciphers along with other tradecraft—for example photography and microfilm, secret writing, explosives and demolition—at a school near Hamburg. Their radio

training embraced the use of International Morse and the construction and operation of transmitters and receivers.

Student operators were required to achieve the modest transmitting speed of twelve words a minute (as compared, for example, with our Merchant Marine requirement of 20-25 words a minute). Then they would make a five-minute sample transmission on a device which recorded graphically their speed, touch, and characteristic fist. On the basis of this graph they were assigned a permanent transmitting speed and given another week's training at this speed. Then a second graph was made as each operator graduated, this one to be filed as a specimen signature against which his later messages would be verified as genuine and not the deception of enemy counterespionage. This procedure was apparently adopted after the Germans learned that the FBI had fooled them with the Sebold station on Long Island.

The agents were furnished portable transmitters and receivers, usually of the type built into a suitcase, complete with antenna wire, tools, and all the accessories necessary for going into immediate operation. They were given precise instructions for constructing a directional antenna which would afford a maximum signal to their control center and a minimum to eavesdroppers. Then they were dispatched to their posts by neutral ship, by submarine, by parachute, or over clandestine land routes.

The first sign of their safe arrival would be their call letters on the air; and this would signify their presence to us, too, for it is difficult to disguise an agent radio's call. At one time, when the control of one of the German nets passed from the Abwehr to the Gestapo, its transmitters adopted the call letters and frequencies of commercial stations in South America; but other characteristic procedures of clandestine traffic still betrayed them, and this device was later abandoned.

Not being able to disguise their calls, the agent networks made a practice of changing call letters, usually every day, in an effort to spoil continuity for their pursuers. But very few had a rota which remained nonrepetitive for a year, say, and we were able to work out in advance the call letters which many espionage transmitters would be using on any

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particular future day; sometimes we even caught the out-stations making mistakes in their own system. Some worked with a list of 31 different calls which repeated itself every month. Some had two such lists, one for odd and one for even months. One system was worked out with such little forethought that a spy once had to call with the international distress signal, SOS. This was one of the systems that determined call letters in connection with the cipher key for the day, a connection that sometimes led our part-time cryptanalysts into the decipherment of messages.

One group, we learned from one of its indiscreet first messages sent blind, based its calls and transposition cipher on the Albatross edition of Axel Munthe's *The Story of San Michele*, a book excluded by copyright arrangements from the British Empire and the United States, using a different page each day. The page to be used was determined by adding to a constant number assigned each agent the number of the month and that of the day in question. The last line on this page contained the calls to be used—the first three letters, reversed, for the control center and the last three, reversed, for the out-station. An example of this procedure may be of interest.

Shortly before midnight, eastern standard time, on March 12, 1942, one of our monitors at Laredo, Texas, copies the following slow hand-keyed message on 11,220 kilocycles.

VVVV EVI EVI EVI  
IWE OF WONUG IUVBJ DLVCP NABRS CARTM IELHX YEERX  
DEXUE VCCXP EXEEM OEUNM CMIRL XRTFO CXQYX EXISV  
NXMAH GRSM L ZPEMS NQXXX ETNIX AAEXV UXURA FOEAB  
XUEUT AFXEH EHTEN NMFXA XNZOR ECSEI OAIN E MRCFX  
SENSD PELXA HPRE

We know from our analysis of previous messages that the call EVI is due to be used by an operator of the San Michele group whose assigned constant number is 56. Checking, we add the month and day—this would be March 13 by Greenwich Mean Time—and turn to page 72 of the novel. The last word on the page is "give," so EVI is right. The first word on the last line is "like"; the control center will sign KIL.

The message sent in the early hours of March 13 was probably enciphered on March 12, so we go back to page 71, shown here opposite, for the key. Here the first line reads, "I would

I would have known how to master his fear, and would have been the stronger of the two as I have been in later years more than once, when I have stayed a hand clutching a revolver in fear of life.

When will the anti-vivisectionists realize that when they are asking for total prohibition of experiments on living animals they are asking for what it is impossible to grant them? Pasteur's vaccination against rabies has reduced the mortality in this terrible disease to a minimum and Behring's anti-diphtheric serum saves the lives of over a hundred thousand children every year. Are not these two facts alone sufficient to make these well-meaning lovers of animals understand that discoverers of new worlds like Pasteur, of new remedies against hitherto incurable diseases like Koch, Ehrlich and Behring must be left to pursue their researches unhampered by restrictions and undisturbed by interference from outsiders. Those to be left a free hand are besides so few that they can be counted on one's fingers. For the rest no doubt most severe restrictions should be insisted upon, perhaps even total prohibition. But I go further. One of the most weighty arguments against several of these experiments on living animals is that their practical value is much reduced, owing to the fundamental difference from a pathological and physiological point of view between the bodies of men and the bodies of animals. But why should these experiments be limited to the bodies of animals, why should they not be carried out on the living body of man as well? Why should not the born criminals, the chronic evil-doers, condemned to waste their remaining life in prison, useless and often dangerous to others and to themselves, why should not these inveterate offenders against our laws be offered a reduction of their penal servitude if they were willing to submit under anæsthetics to certain experiments on their living bodies for the benefit of mankind? If the judge, before putting on the black cap, had in his power to offer the murderer the alternative between the gallows and penal servitude for so and so many years, I have little doubt there would be no lack of candidates. Why should not Doctor Woronoff, the practical value of his invention be

have known how to master his fear" etc. We take the first nine letters and number them in sequence:

I W O U L D H A V  
1 2 3 4 5 6 7 8 9

Substituting these figures in the first four groups, with nulls for any missing letters, we get

I	W	E	O	F	W	O	N	U	G	I	U	V	B	J	D	L	V	C	H
1	2	x	3	x	2	3	x	4	x	1	4	9	x	x	6	5	9	x	x

or "12 March, 2304 hours, 149 letters in 659th message following." There are actually 154 letters following, but the first group of five is simply a special indicator identifying the agent.

This is as far as the RID needed to go for its own purposes before turning the message over to the FBI. But the text could be worked out from the same page of the novel. Lay out a blank message in lines of twenty letters each, keeping the columns straight. 149 letters in rows of 20 make nine columns of eight letters each followed by eleven columns of seven each. Write across the top the first twenty initial letters of the lines on page 71, skipping indented lines. Number these in alphabetical sequence, and then go down the columns in the indicated order with the encrypted text. This arrangement gives the clear German text:

i	b	m	r	a	a	t	m	a	t	s	u	n	e	u	f	f	n	p	t
8	4	9	14	1	2	16	10	3	17	15	19	11	5	20	6	7	12	13	18
S	P	R	U	C	H	x	S	E	C	H	S	N	U	L	L	x	V	O	N
V	E	S	T	A	x	A	N	x	S	T	E	I	N	x	x	Q	U	E	E
N	x	M	A	R	Y	x	Q	U	E	E	N	x	M	A	R	Y	x	A	M
x	E	L	F	T	E	N	x	E	I	N	S	A	C	H	T	x	U	H	R
M	E	Z	x	M	E	Z	x	V	O	N	D	A	M	P	F	E	R	x	C
A	M	P	E	I	R	O	x	C	A	M	P	E	I	R	O	x	A	U	F
H	O	E	H	E	x	R	E	C	I	F	E	x	R	E	C	I	F	E	x
G	E	M	E	L	D	E	T	x											

In English:

TEXT SIXTY FROM VESTA TO STEIN. QUEEN MARY REPORTED OFF RECIFE BY STEAMSHIP CAMPEIRO ON ELEVENTH AT EIGHTEEN O'CLOCK MIDDLE EUROPEAN TIME.

*The Latin American Infestation*

The Queen Mary message, from an agent in Rio de Janeiro, came at a moment of climax in RID's most active and critical theater of counterespionage operations, Latin America. There were in March of 1942 six agent transmitters in Rio

alone, and three of them reported the *Queen Mary's* arrival on the twelfth. The espionage messages were full of news about her until after she sailed on March 20, but these were the last messages most of the agents sent. By the time she was again in mid-Atlantic on a safely altered course, the Brazilian authorities had arrested some 200 of the German spies. The story behind this roundup is first of all an RID story.

Signs of the Nazi effort to create an espionage base in Latin America began to be apparent as early as the fall of 1940. On October 27 our primary station at Allegan, Michigan, picked up a strange maritime signal using the unregistered call BCNL. Other monitoring posts were alerted, and quite a number of similar calls were traced to ships in the Gulf of Mexico and Caribbean Sea. The FCC's Tampa office succeeded in identifying these vessels as small ones operated by a firm called Gough Bros. and controlled by a coastal station near Belize in British Honduras. The U.S. Caribbean Defense Command, after developing evidence that this fleet was being used to refuel German submarines and pass information, arrested a Canal Zone employee who was a member of the ring and was able to arrange a trap for nineteen others, including the ringleader, prominent British shipping executive George Gough, in Belize.

Meanwhile in Mexico a German spy was sending out intelligence reports in private code over Chapultepec Radio, the same transmitter used for clandestine communication with Berlin during the first world war.<sup>2</sup> After Pearl Harbor, when the use of code on commercial facilities was prohibited in Mexico, this man, a properly registered amateur, resorted to his own clandestine radio, but made the mistake of communicating first with the FBI's deception station on Long Island.

The concerted German drive to establish radio agent nets in this hemisphere, however, and our struggle against them, began in the spring of 1941. One of our monitors at Millis, Massachusetts, detected the faint signals of a station that was trying to hide its transmission in a transatlantic radiotelephone circuit operating on the same frequency. It was repeating the call letters REW, but the signal sounded quite like that of AOR, the FBI-operated Sebold transmitter's re-

<sup>2</sup> See H. O. Yardley's *The American Black Chamber*.

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spondent. Other monitoring stations, asked to help identify the suspicious and noise-shrouded signal, discovered that when REW paused to listen a station on a different frequency would start sending the call letters PYL. The two transmitters put on the same performance at the same hour the next day, and for several days; they were apparently trying without success to communicate with each other. One of our monitors became so engrossed that he wanted to go on the air and help them out. Our fixes showed that REW was indeed in Hamburg, and PYL in Valparaiso, Chile, an espionage station discovered before it could make contact with its base.

For the present, however, there was nothing that could be done about agent radios outside U.S. jurisdiction except to listen in, and more and more of them began to appear, setting up in a half dozen of the Latin American republics. Chile and Brazil held the principal concentrations at this time. There were three main agent networks in Brazil, centered on transmitters that we designated LIR, CEL, and CIT, from the call signs they were using when first heard; the EVI of our decipherment example was LIR. Evidence of the damage they could do began to mount.

The German control stations, for example, sent exhaustive lists of requirements for naval information, asked PYL in Chile if it could "place a suitable man for us among students going to the United States for air training," complimented agents as "exceptionally correct" in their reports on technical details of English and American cruisers' equipment, and assigned agents to investigate "USA parade and air bases Colombia and Venezuela" and "air units Trinidad and Lesser Antilles and flights via those places to West Africa; airplane types, movement, dates." The agent radios sent back reports like these:

5 JULY. NINE BOEINGS FLEW WITH MIXED CREW ENGLISH AND AMERICANS. IN NEXT FEW WEEKS 20 MORE TO BE FLOWN ACROSS. DETAILS FOLLOW.

19 JULY. LM REPORTS 15 LOCKHEED HUDSONS FLEW ACROSS. ENGLISH REGISTRY AND CANADIAN-AUSTRALIAN CREW. BOEING CLIPPER LEFT NATAL ON SEVENTH ALLEGEDLY FOR BOLANO WITH 19 LOCKHEED MECHANICS AND 11 CREW.



7 AUGUST. USA STEAMER URUGUAY ON LAST VOYAGE TO UNITED STATES LEFT RIO 25 JUNE. WAS CONVOYED BY BRITISH AUXILIARY CRUISER CARNARVON CASTLE TO TRINIDAD. TRIP TAKES 7 DAYS. CRUISER TRAVELED SOMETIMES AHEAD SOMETIMES ASTERN OF SS URUGUAY.

8 OCTOBER. BMM REPORTS SEVERAL HUNDRED US AIRCRAFT OF VARIOUS TYPES AND 8000 SPECIAL TROOPS ALLEGEDLY LANDING CORPS BEING ASSEMBLED PORT OF SPAIN.

In November PYL identified a network courier as "daughter of Clarke, secretary in USA embassy Quito since 1 November." And ten days after Pearl Harbor an agent offered details on the torpedo safety nets with which ships were being equipped and also "absolutely safe men . . . who will send to bottom two or three large armed English ships . . . without any suspicion falling on us. If we are interested payment only after sinking, nothing in advance." The control station in Germany of course approved: "Proposal for destruction of ships very interesting." Reports on plane production also now began in earnest:

1 JANUARY. CURTISS COLUMBUS FACTORY WILL BEGIN MASS PRODUCTION SERIES SB2C SINGLE SEATER STUKA FOR NAVY. ARMAMENT ONE CANNON FIVE MACHINE GUNS, MOTOR 1700 HP WRIGHT. BUILT FOR 2000 HP WRIGHT IN EXPERIMENTAL STAGE. PRODUCTION SO3C BEGUN IN COLUMBUS FACTORY AT BEGINNING DECEMBER. EMPLOYEES ALL CURTISS AIRCRAFT FACTORIES DECEMBER TOTAL 27000. PROPELLER PRODUCTION NOVEMBER 1042.

Our Government finally took action. On January 15, 1942, the Rio conference of foreign ministers of the American republics recommended immediate measures to eliminate the clandestine stations. An Emergency Advisory Committee for Political Defense was established with headquarters in Uruguay, and under its auspices we dispatched some of the best RID monitoring officers to the six countries where we knew agent radios to be operating (Brazil, Chile, Mexico, Cuba, Martinique, Paraguay). They had a two-fold mission—to locate the hide-outs of known agent transmitters with mobile direction-finding equipment they took along, and to help the governments of these countries establish monitoring networks which could keep them free of radio spies in the future.

For this second purpose we sent men also to six other countries (Haiti, Venezuela, Colombia, Ecuador, Peru, Uruguay). Forty men from eighteen Latin American republics were at the same time brought here for training at our school in Laurel, Maryland.

The man we sent to Brazil was Robert D. Linx. He helped lay the groundwork for that arrest of 200-odd spies after the Queen Mary left her dock in March. This roundup apparently cleaned out the LIR and CIT organizations, the latter led by a man named Christiansen; they were never heard again. Some members of the CEL net escaped to the interior, but two series of arrests after they ventured twice at intervals to reactivate their transmitter put an end to them too. By mid-year Brazil was permanently cured of its agent radio infestation. Linx stayed on to direct the establishment of the monitoring service, and became known as "the father of Brazilian monitoring."

Although our men in Latin America worked quietly by themselves as much as possible, the German agents were not always unaware of what was going on. We heard one of them telling his control that he knew at least six Yankee direction finders were beamed on him and he was going to cool off in the woods for a while. (He cooled off in a Central American jail.) In Chile, the PYL organization took the precaution of establishing a stand-by transmitter to assure continuity of communication if one should be seized. On March 9 PYL sent a message informing Hamburg that "Pedro," whom they had employed to operate the new transmitter, would be ready to get on the air the following day. On March 10, although RID had not yet received the decrypted text of this message, our monitors picked up Pedro's test transmission with the call GES and fixed his location in Antofagasta.

The arrival of our man, John de Bardeleben, in Valparaiso on March 19 was the signal for the main PYL transmitter to go mobile. De Bardeleben spent weeks tracking its changing locations in the area within a ten-mile radius of Valparaiso. It developed that every second week, however, a transmission would be made from the house at Avenida Alemana 5508, Cerro Alegre. This house belonged to one Guillermo Zeller, a radio technician and licensed amateur who was often

seen in the company of Hans Blume, manager of the Valparaíso branch of the German company Transradio. In April 1941, shortly before PYL was first heard trying to contact REW, Blume had bought from the radio supply store Casa Widow a complete set of transmitter parts and two Halli-crafter receivers. A tap was now placed on the Zeller telephone.

The Chilean authorities were persuaded to raid the Zeller house on June 25. Their perfunctory search discovered no transmitter, but Zeller was indiscreet enough to telephone afterwards to one of his agent colleagues and report his narrow escape: "Lucky they didn't search very good, especially in the basement." With some trouble and delay another search warrant was obtained, again to no avail; the officers didn't bother to open a box they noticed in the basement purporting to contain a sewing machine. PYL went off the air after this, and nothing could be done until after many weeks De Bardeleben found the transmitter in its sewing-machine box stored in a grocery on Cerro Alegre. Finally, on October 23, most of the agents of the PYL organization were arrested; but the man who actually operated the main transmitter and operator Pedro at Antofagasta had disappeared.

Neutralist Argentina, which did not participate in the Emergency Advisory Committee, posed a delicate diplomatic problem with respect to the elimination of clandestine enemy transmitters, and one of critical importance as the clean-up in Brazil and Chile made the Argentine the main base for espionage activity in this hemisphere. Not only agent radios but the powerful Argentine commercial transmitters were carrying quantities of compromising information to Italy, Japan, and Germany, and we could only copy their transmissions, hundreds of messages daily. Many of these were at speeds too high for manual copy; we recorded them on tape and trained selected typists to put them into page form. A strong memorandum from the U.S. Government on January 4, 1943, enabled us to send two men to Argentina to try to do what we had done in Brazil and Chile, but our earlier successes were not repeated here. The agent operations had become much more sophisticated. While our men were taking bearings on a signal the transmission would be cut off at

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that location and picked up by another transmitter several miles away. And the cooperation of Argentine officials under the Castillo and Ramirez-Peron regimes was less than eager. They finally became so resentful of U.S. Government pressures that we had to withdraw our men.

One spy who escaped in Chile, however, did not get as far as Argentina. Almost a year after the incomplete catch of the PYL ring in Chile, monitors at three different RID posts heard a new station with the call PQZ, and all three were sure they recognized the fist of operator Pedro of the GES station at Antofagasta. Bearings placed the transmitter at Santiago, Chile.

De Bardeleben's successor in Chile, William Fellows, was notified, and he picked up the signal the next time it came on the air. Working alone, he had to move around and take bearings from different locations in order to get a fix; but after two more PQZ transmissions he had the house located. To my considerable personal satisfaction the operator Pedro, a graduate of the Hamburg spy school, who had the effrontery to use my own initials as his clandestine call, was arrested and his equipment seized. With this postlude there ended, except for the Argentine hold-out, the story of radio spies in the Americas.