

SECRET SIGNALS - THE EURONUMBERS MYSTERY

By Simon Mason

The author extends his thanks to

V. Nevdachin for the Lincolnshire Poacher lyrics

and to Dr. D. Lightowler for help with the word processor.

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Layout and Design: *Next Wave Graphics*, Caledonia, NY

Published by Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147, USA

ISBN: 0-936653-28-0

Introduction

If you've ever ventured outside the shortwave broadcast and ham radio bands and tuned around the areas allotted to so-called "fixed" stations you may have heard voices reading out long lists of numbers in either four or five digit groups. These transmissions are generally called "numbers stations" and appear in a variety of languages. Transmissions in Spanish are heard most often in the United States but, in Europe, German, English and French, as well as a variety of Slavic languages are the most commonly heard.

What are they? Finding the answer to this question is not an easy task. For a start, none of these stations operates "legally". And, with two exceptions, no callsigns are used. Consulting frequency listings does no good either since the publications that do list such stations give their origins as "unknown". Relatively few people in the radio industry know about these stations, as this item from a recent issue of the British publication *Shortwave Magazine* shows: A letter from a Mr. B. Greater recalls the days in the early 1960's when Greater, then a teen, used to enjoy receiving and decoding weather reports. These transmissions are sent over shortwave in a format not unlike that used by the number stations. But he couldn't decode the data being sent in what he assumed were weather transmissions so he wrote to the meteorological office to ask where he was going wrong. The reply, from the senior signals officer, said the transmissions were German river soundings being transmitted in voice format from automated equipment! Other explanations suggested over the years include coded information for drug smugglers, lottery numbers, weather data, commodity prices and so on.

The most likely explanation is that these transmissions are coded messages sent to espionage agents. In various spy cases over the years agents have been caught in possession of certain items of "tradedcraft". These have included shortwave radios, microdots, invisible ink and the so-called "one-time" pad. This pad consists of a number of pages of randomly generated four or five figure groups. The pages are made of a special material that can be easily destroyed by burning or perhaps even eating. As the name suggests, each piece of paper is used only once. When the station broadcasts it usually sends a numerical identifier to single out the page of the pad to be used for that particular message. When the message has been sent the recipient subtracts the number sent over the air from the corresponding number on the sheet (or vice-versa). This is the key to the pad's security. Without the particular sheet in question the message is unbreakable. Other methods of encryption could include the use of a book available to both sender and recipient, with a code to indicate individual words on a page. For example, "312 02" would denote the second word on page 312. It has been suggested that one particular station that has a 3/2 figure format may be using this system.

It has been noted that some stations send the same numbers up to a year apart -in one case even two years. This might suggest that practice traffic is being sent to agents for training purposes. Also, stations could be transmitting "disinformation" and time-wasting traffic to try and bog down the electronic eavesdropping efforts of an opposing intelligence service. Whatever the real explanation, a shroud of mystery surrounds these stations and only rarely is one allowed a glimpse into this shady world. One such occasion was during the trial of British spy Geoffrey Prime. It was revealed that Prime received his instructions via shortwave radio. His traffic was encoded in five figure groups and sent over the air in Morse code. This type of revelation is rare however and one can only guess at the full story behind these mysterious and fascinating broadcasts.

My own interest in number stations goes back some years. But it was only with the advent of shortwave receivers with digital frequency readout that I have been able to take an active interest in them. I decided to analyse these stations and perhaps figure out their purpose. This was no simple task since there were no frequency guides to refer to. It was a case of starting from square one. The first job was to separate the different types of stations and it soon became clear which stations were on a given frequency. Operating schedules were drawn up and it was exciting to hear a station pop up at the predicted time. Of course their locations, purpose and the meaning of the messages were practically impossible to deduce from merely listing times and frequencies. But this, at least, was a start and better than nothing.

Part One
SILENT STATIONS

THE FOUR NOTE RISING SCALE STATION

I began with a station I had first heard in 1971. It was a German station using a female voice machine. It is easy to tell if a machine is being used as all the numbers are spoken with an identical delivery. This female German numbers station had a rigid schedule and format. It also used a musical marker or interval signal - a four note tune rising up the scale: "so-la-te-do" played on some sort of electronic organ. This tune was aired for a five minute period before the hour. On the hour the woman would send the headings of each message to follow, for example:

34324/05 67545/07 55433/11 34534/15
11244/18 53466/21 32124/26 12334/29
15566/33 12456/38 98676/41 75555/47

The stroke symbol (/) was spoken as the word trennung. These headings were sent for exactly five minutes. As you can see, the two figure number after the first trennung symbol is "05", which indicates when message number 34323 is due to start.

At five minutes past the hour there was a pause and the woman said "achtung" and then the first heading was sent again but this time the "05", was replaced by the number of five figure groups in the message. For example, 34324/22 meant that 22 five figure groups were in message 34324.

Example:

"Achtung34324/22. Achtung34324/22 11223 24566 55454 46578 25555 33367 57567 45585 34665 66477 58577 54888 01123 63645 58999 10122 46547 09991."

After this, "achtung" was sent again, followed by the heading for the second message -67545/39, for example. As can be seen, the final message has a suffix "/47, which means that this message starts at 47 minutes past the hour. Presumably the recipient would listen to all of the headings in the first five minutes and then not need to listen again until the time his message was due to begin if, indeed, a message was intended for that recipient on that night. After the last message the word "ende" was sent and the station fell silent until five minutes before the next hour when the sinister-sounding electronic tones were sent again, heralding a new set of headings and messages.

3217 kHz at 1800, 1900, 2000, 2100
3820 kHz at 2000, 2100, 2100, 2200

During the summer months in Britain the station kept to British Summer Time, i.e. UTC plus one hour. The same messages sent on 3217 were re-broadcast two hours later on 3280 so if the first airing was missed there was still an opportunity to hear it. This was one of the very few numbers stations that changed its schedule when daylight savings was in effect. Most kept to the same UTC time so here was a tiny clue that the messages and the station were genuine. One could imagine that the agents involved would have a set monitoring routine somewhere in West German society and the schedule would be ordered so as to produce the least inconvenience to their routine. The same station also appeared during the day using the same format but with perhaps only half as much traffic as in the evening.

This was the normal daytime schedule:

5820 - 1000, 1100, 1200
6450-0800, 0900, 1000

(UTC times in winter, British Summer time in summer)

There was apparently no connection between the traffic on the two frequencies. Only on three occasions did I note any additional broadcasts: once on 3820 the woman was heard with some kind of test transmission at 0500 but the signal kept switching on and off in the middle of the transmission, making it impossible to copy the full text. On another occasion the station was on 7625 at 2000 and 2100. The last unusual transmission was heard on 7430 at 2100. These were apparently "one-off" broadcasts and were not repeated.

The great changes taking place in East Germany as the 1980's neared an end also changed the output from this station. Gradually the traffic lessened to a point where perhaps only two transmissions per night were heard - sometimes none at all. In the last days of this station the schedule became even more erratic and eventually fell to only once per week. Then, towards the end of April, 1990, the station vanished. It made me wonder if perhaps the whole shadowy world of numbers broadcasts was about to end, along with the careers of all those thousands of former East German agents. It certainly seemed so when another numbers station disappeared.

This station had a very distinctive interval signal (musical marker) and it is difficult to describe the eerie feeling one got when hearing it. People who live near the sea know the sound of bells used to warn ships of foggy conditions. This inter-

val signal sounded like a lightship bell recorded on tape, except that the tape sped up or slowed down which made the bell sound very distorted. The tune was of eight notes, the first four descending down the scale, the last four rising, as: Fa - Me - Ray - Do - Ray - Me Fa - So." With all of the dynamic "wow" on the tape the whole thing sounded very strange. The female voice machine used was also unique.

The woman had a very clipped, abrupt delivery - almost like a sergeant major barking out orders on a parade ground. The actual messages had a simple format. After the musical marker the woman would shout out the headings for the five figure groups to follow, which was usually for three or four separate addresses. As:

34344/33 45455/22 35577/26

Again, the "/" symbol was said as "trennung". After repeating these group headings for about two minutes, "achtung" was sent and the message for the first recipient (34344) followed - in this case 33 five figure groups. After the transmission the gongs would usually start again, after which new texts were sent. This station used only 3258. It had an early morning schedule of 0400-0600 UTC and a main evening schedule of 1700-2100. It also popped up once on 5415 at 2100 but to my knowledge this was not repeated. I might add that this station may have had extra transmissions during the middle of the day but reception on these frequencies at my location was usually not possible, making it very difficult to check.

As with the previous station, towards the end of 1989 the schedule became increasingly chaotic, with the amount of traffic diminishing so that near the end the transmissions were aired only weekly. The station finally left the air around May, 1990.

NUMBERS NEVER CEASE

These two stations, for decades daily broadcasters to thousands of presumed spies in the west, had finally signed off for good. At the time it seemed the unification of Germany would end the need for these broadcasts. But a quick scan through the shortwave bands proved this was not the case! As it turned out, the two stations I've described were the only ones with apparent connections to Germany which closed down. Many others were still sending coded groups. What was going on? Later, it turned out that the amnesty given by the German government to ex-members of the East Germany spy agency was not being taken advantage of to any great degree. Apparently only a few hundred of the former Stasi agents had turned themselves in.

But this left thousands of spies still at large, probably with their cover still intact and able to provide their new masters with priceless economic and technical information at greatly reduced cost. The alternative would have been for the KGB or whoever the new masters are to have to set up a new spy network which could take years to develop. By recruiting the former East German spies who were already in situ the new bosses would save a great deal of time and money. The KGB was probably the ultimate beneficiary of the spy's information anyway. The East German middleman had been cut out.

This was all not quite as straightforward as it seems, however. It turns out that the transmitter site for the two previously mentioned stations was a place called Wilmersdorf, just outside Berlin. Now, of course, the site is in unified Germany and therefore cannot be used as a sender of coded messages to spies in the west anymore. The locations of the transmitters used for stations that continue to broadcast is another puzzle. They may be using more remote sites or perhaps transmitting facilities at embassies located in the west. Certainly some of the roofs of these embassies look like enormous antenna farms. These antennas are part of a communications system used to transfer information to and from the home country. All of this is quite above board and widely practised. It would, however, be relatively simple to hook up a voice machine, which, instead of communicating with home, would transmit coded messages to spies in the surrounding countryside. This would go some way toward explaining why so many monitors, on hearing numbers stations, have observed that the signals strengths were extremely high. I have often been amazed at the sometimes stupendous signals strengths involved, even when those from high power international broadcast stations were mediocre. The embassy explanation goes some way toward explaining this. It has also been said that mobile transmitters could be used. Anyone who has seen the antennas used by various countries' shipping might agree.

Part Two
STATION TYPES
AND FORMATS

The transmission modes used by numbers stations are very diverse. In earlier years the AM full carrier mode was the most common type, with upper sideband a close second. Nowadays, USB probably just shades it. Only one station has been noted using lower sideband. Of course, Morse code stations (CW) are used and they transmit mostly in full carrier mode rather than the CW mode used by commercial Morse code stations. This means that an ordinary shortwave receiver can be used to pick up these Morse signals and no beat frequency oscillator (BFO) is needed. The use of AM mode, of course, means that a normal-looking receiver can be used by the recipient so it will not attract undue attention, although this isn't always true. The 3258 station mentioned earlier was often interfered with by another German numbers station using 3262. When both stations were in operation it was possible to hear two signals at once, making it difficult to copy either one. So a receiver with a narrow bandwidth had to be used. Similarly, there was a Slavic language station on 3228 which now and again suffered interference from a German station on 3232.

THE SWEDISH RHAPSODY STATION

So what are the stations still in operation? Here is one. As suggested by the heading this station's marker is the "Swedish Rhapsody". It's the same tune that was once used by Radio Sweden as its interval signal. The version used here is not the famous Mantovani rendition popular in the 1950's, but a version played on a rather cheap-sounding music box. The music box plays the first couple of bars of the tune until five minutes after the hour. Then a very soft-voiced woman calls out the five figure group for a minute or so and then says "achtung" and goes into the five figure text. No group counts are given in the preamble and the number of headings seems to depend on the time of the broadcast. For example, every Saturday evening there are messages for three addresses. On other occasions, notably in the midweek period, the messages are intended for perhaps only one recipient.

The schedule:

Sunday at 1800, 2300
Tuesday at 2100
3850 - Tuesday at 2100
4779- Sat/Sun at 1900, 2000, 2100
4832- Tuesday at 2200
5340 - Saturday at 1900, 2000, 2100
5748 - Wednesday at 1600, 1700, 1800 Tue/Wed/Sun at 2000 Mon/Wed at 2200, 2300
6200 - Mon/Wed at 2200, 2300
6507 - Saturday at 1900, 2000, 2100
6901 - Sunday at 1400
8188 -Sunday at 0800
9457- Sat/Sun at 1000
11618 - Wednesday at 1300, 1400

Some of these broadcasts are, of course, repeats. For example, the Saturday 1000 transmission is repeated at 2000 on the same day and also on Sunday at 1000. In addition, the Saturday 1900, 2000 and 2100 broadcasts are all sent on three frequencies at the same time: 4779, 5340 and 6507. However, broadcasts running on three frequencies simultaneously, as this one does, are quite rare.

Another oddity are the 2200 and 2300 Wednesday transmissions on 6200 (which, incidentally, can be heard accidentally by people listening to the BBC World Service on 6195). The woman on this occasion pops up between the tunes and counts "1-2-3-4-5-6-7-8-9-0" in German. On all other broadcasts the five minute period before the traffic is all music.

A very strange incident occurred one Saturday in June, 1990. At 2000 on 4779, 5340 and 6779 the musical marker played as usual and at 2005 the woman gave out the three headings which, on this occasion were 68803, 73719 and 20059. When the woman went into the five figure text for the first heading (68803) the groups were either 64646 or 46464! These two groups were repeated over and over again from 2005 to 2010 when the text abruptly changed to the usual random numbers. The five figure groups for the other two headings were also the usual random numbers. The repeat at 2100 produced the same things. Shortwave monitors who decode radioteletype signals will instantly recognise 6464646464 as the numerical equivalent of RYRYRYRY, which RTTY stations send as a test transmission.

THE N N N STATION

This is the first multilingual station we shall look at. Its marker consists solely of the letter "N" sent in Morse Code CW, repeated slowly for five minutes. The station has been on the air for sometime and is still very active. Over the years it has appeared on many different frequencies at many different times. The station uses three languages: English, French and either Yiddish or German - probably Yiddish, as the numbers used resemble Yiddish more than any other station. 1-2-3-4-5-6-7-8-90 in Yiddish is:

"eins zwei drei vier funf sechs siben acht neun null"

There is some doubt about whether some German numbers stations are in fact in Yiddish. It is difficult to say, one way or the other, just by listening to the numbers themselves. Similarly, certain Slavic language stations are difficult to identify positively as the numbers are so similar. I will agree that the numbers used by this station more closely resemble Yiddish. One thing is certain: no German or Yiddish station uses the official pronunciation for number "2". The "zwei" sounds too much like the number "3" (drie) to be readily differentiated over shortwave so every station uses the word "zvo" or "svo" instead. In addition, many stations change certain numbers to improve the chances of being correctly received. For example, the number "5" (funf) is often said as "funnef". This makes it sound like the Yiddish number "5", so one has to be careful.

In the mid-80's the woman's voice used on the station was high-pitched, with a staccato delivery. The same woman was used for all three languages. It seems strange that the operators of this set-up couldn't do better. It was hard not to laugh at her delivery, it was that bad. Around December, 1988, she was replaced but the change was barely an improvement. They went to the other extreme - a slow, lazy, laid-back sound, as though the woman was on powerful tranquillisers. This woman's voice continues in use today. One other minor change occurred with the changeover: at the end of the French messages the old voice would say "fin". Now the word "finis" is used.

The formats of the three different languages are identical. On the hour the CW "dah-dits" are sent until five minutes past when the woman announces the group count ("Groups 21, Groups 21") and then goes straight into the five figure text. The termination is either "end", "ende" or "finis". The mode used is mostly AM, although the upper sideband is usually enhanced.

Over the years the schedule has altered somewhat so all the frequencies given may not be active at this time.

Schedule:

(EE=English, FF=French, GG=German)
4021 - 0500(GG), 2100(GG), 2200(GG)
4054 - 2000(GG), 2100(GG)
4545 - 2000(GG), 2100(GG), 2200(GG)
4630 -2100(FF)
4645 - 2100(FF)
4740 - 1900(FF), 2000(FF)2
4925 - 2100(GG)
5177 - 1900(FF), 2100(GG), 2200(FF)
5425 - 2000(GG)2
5880 - 1800(GG) 6765 - 2000(GG)
6850 - 0600(EE)
6997 - 0100(EE), 12900(EE), 2000(EE)
7655 - 1900(EE), 2000(EE), 2200(EE)

Again, repeats are common. For example, the 1900FF text on 5177 on Tuesday is repeated at the same time two days later. The weekend German broadcasts are noteworthy. All the following times and frequencies are the same texts:

Saturday 2000 - 5425 & 6765
Saturday 2100-4925
Sunday 2000 - 5425 & 6765
Sunday 2100-4925

It is amazing that in all the years the numbers stations have been in operation a very tight lid has been kept on the locations and agencies behind them, especially as far as those in Europe are concerned. Only in North America has much progress been made towards finding some of the transmission sites. This is due in no small part to the great efforts of certain dedicated monitors in the United States. Through their use of direction-finding equipment, expeditions to likely transmitter sites and the filing of Freedom of Information Act forms much information has come to light.

Unfortunately the same cannot be said of the European scene. In Great Britain there are no radio hobby magazines which have covered the subject in anything other than a passing mention of their existence. This is not the fault of the magazines. British law governing listening to radio broadcasts is very clearly defined: one must not listen to radio transmissions other than broadcast, amateur and citizens band stations. The popular UK monthly, *Short Wave Magazine*, did not even have a column covering utility communications stations until January, 1991 and only started printing information about pirate broadcasters in the middle of 1991. In the case of the pirates the editorial policy was to ignore them because of their illegality. It is unusual, then, that the general news media publish anything about the subject of numbers broadcasts.

However, during the trial of an alleged Dutch art dealer named Erwin Van Haarlem, certain facts relating to numbers broadcasts came to light. Even the popular tabloid sheet papers carried the story. Officers of the British Special Branch burst into the spy's flat and caught him while he was copying a message in five figure groups being transmitted in Morse code from Prague. In addition to the partially transcribed message certain "tradecraft" items were discovered. These included six decoding pads (three of which were concealed in a bar of soap), chemicals, equipment for sending invisible ink messages and magazines addressed to Czechoslovakia which contained hidden messages. The British government had evidence that showed Van Haarlem had been receiving secret messages from Prague since 1975, with about 200 messages sent over 13 years. Also found was a list of places where messages could be left and contact made with other agents. These accounts were another positive link between the number stations and the hidden world of espionage.

THE FIVE DASHES STATION

This is a bi-lingual operation. Although the majority of the transmissions are in German, there is a small segment in English. Both languages have the same format and use the same female voice machine. The broadcast starts on the hour with the woman repeating a three figure number three times, followed by a five figure number and then a group count of the message to follow. At five past the hour slow dashes are sent, followed by the five figure groups of the actual message. Here are some headings that have been sent over the years:

948 948 948 71667 122
251 251 251 82385 109
901 901 901 29003 40
331 331 331 59900 72
211 211 211 26318 53
064 064 064 19250 94

The three figure group probably identifies the intended recipient and the five figure group is probably the key to decoding the message. The final numbers are the group count.

The woman used originally had a very sharp delivery; again, like someone barking out orders on a parade ground. This woman was practically shouting. Then, in March, 1991, the voice was changed. The new voice was the audio equivalent of those ransom notes you see on television cop shows where the letters have been cut from a newspaper.

Some letters in the broadcast were sent slowly, some quickly, within the same five figure group. Also, the number nine was sent as "noyner". So, the number "12955" would be sent like:

Ems - zvo - noyner - funffunf

The spacing above gives some idea of the kind of delivery the woman uses. Also, each of the five tones sent before the message is preceded by a rush of white noise, as though an ancient tape recorder with automatic gain control is being used. The whole thing has a very amateurish sound. Around March, 1991 an English version of this station turned up using the same voice.

Schedule: (in German except where noted)

Monday - 1300 - 6708

2000 - 7650/18490

2100 - 4395

2200 - 4395/16235

Tuesday - 1800 - 9377(EE)

1900 - 10255

2000 - 4395/16708

2100 - 4395/15325

2200 - 6355

Wednesday

0600 - 7375

1100 - 7650/18970

1200 - 11190/114930

1400 - 14930

1600 - 6708

1900 - 53151/7830

2100 - 11190//14930(EE)

2200 - 4395

Thursday

0400 - 6520

1700 - 7375

1800 - 9377(EE)

1900 - 10255

2100 - 4395

2300 - 4395

Friday

1000 - 8970

1100 - 8970

1200 - 11190/114930

1900 - 84901/10255

2100 - 7650

2100 - 11190//14930(EE)

2200 - 4395

Saturday

0600 - 6708

1100 - 98701/10255

1500 - 11190

1700 - 7375

1800 - 53151/7830

2200 - 6355

Sunday

1000-8970

1100 - 8970/110255

1500 - 6708

1600 - 10255

1700 - 7375

2200 - 4395

THE COUNTING STATION

This operation is certainly the largest of all the numbers stations in terms of different frequencies used, messages sent and hours of operation. The languages used are German, English and Spanish. Spanish stations are discussed at length in the book *Uno, Dos, Cuatro - A Guide to the Numbers Stations Tiare Publications*) so the other two will be discussed here. The formats for all three types are identical. On the hour the female voice counts "1-2-3-4-5-6-7-8-9-0" followed by a three figure identifier, "1-2-3-4-5-6-7-8-9-0 566 566 566". This is repeated over and over for ten minutes. Then ten long tones are sent. The woman then gives the group count: "Count 155, Count 155" or the German equivalent "Gruppe 155, Gruppe 155". The voice then goes into the text which can either be four figure or five figure groups with a pause between the third and fourth digit, a feature which has led to their being called 3/2F stations. After the last group is sent the woman says "repeat Wiederholden 155" or simply "Wiederholden 155", and the entire message is repeated. The usual terminators are "end" and "ende".

According to monitors in the United States these transmissions have something to do with the Central Intelligence Agency or National Security Agency. The woman used on the English broadcasts has a noticeable American accent. The voice in German has a normal German accent. U.S. monitors also state that a large proportion of the English traffic is merely for practice purposes and that there is a difference between the 3/2F stations and the four figure ones. This may be so but over the last couple of years some agency has been going to an awful lot of trouble to prevent these transmissions from being easily heard. Around the end of 1989 both the English four figure and the 3/2F were starting to be affected by what are known as "bubble" or "warble" jammers. These are unlike the jammers used for years by the Soviet Union which sounded like a room full of diesel engines or someone blowing into a microphone hooked to a powerful public address system. These warblers sounded like a rapid oscillating signal, a sort of very fast "woo-woo-woo". One evening on 9251 it seemed that the woo-woo machine was in trouble - it was jamming another English station. The warbling noise kept slowing down and speeding up. I imagined technicians scrambling around with oil cans trying to keep the woo-woo machine rotating at full speed!

All of these counting stations use parallel frequencies and finding the pair of a certain signal can be difficult. But tuning perhaps a few megahertz above or below the initial frequency will often uncover its twin. The theory of practice traffic is boosted when one realises that the same messages have been repeated - digit for digit, often more than a year apart! Professional though these stations appear, some apparent errors have been noted. The most unusual has been the 383 broadcast. There also seems to be an analogue in the Spanish numbers equivalent. This is the 545 broadcast. The first time I noticed the 383 station was around the end of 1988, though of course it could have been on before this. The woman counted out "1-2-3-4-5-6-7-8-9-0-383-383-383" as normal. However, after the ten minutes were up the station just went off the air. This wasn't the only time this happened. The same thing was noted at the following times and frequencies.

5415//7860 at 2000... 4NOV88, 10NOV88, 15DEC88, 5JAN89, 9 FEB 89, 10MAR89, 17MAR89, 21APR89, 29JUN89
13390 at 2200... 15MAR89
8176 at 1800... 16JAN90, 3MAR90

Whoever sends these messages spends a lot of time and money sending out nothing much in particular, but they are not the only ones to seemingly waste a frequency by broadcasting silence, as will be seen later. A nice twist to this story happened when the warblers started jamming these broadcasts. During the 1 to 0 count and 383 preamble two warble jammers started up on each of the frequencies. Normally these warblers are very astute and can seek out and destroy a signal and its pair in the ten minutes before the text begins. But with the 383 station the warblers were jamming the frequency an hour after the woman's voice had disappeared. This happened on many occasions and was very odd. Even I, a non-professional, knew that when the 383 station started up it would go off the air at ten past so why couldn't the jamming agency figure this out? They must monitor their effectiveness because usually when a normal broadcast is being jammed, i.e., one with an actual message, the warblers leave the air about five minutes after the message ends.

Another strange thing is that the German version of this station is never jammed. So why not just get your agents to learn 1 to 0 in German, send out bogus messages in English and the real ones in German? That way the needed signals won't be jammed and the message will get through. Probably that is too simple. Whatever is going on may be much more complicated than my scenario assumes.

These stations also share at least two frequencies with the British Broadcasting Corporation. Firstly, 6840 which as been used as a BBC feeder frequency for world-wide programs, especially during the Gulf War when special programs for that region went out nightly on that frequency. 6840 is also home to several other number stations of varying descriptions. Another BBC frequency, 7325, has also been used. This prompted a letter to the BBC from a lady listener in Andorra. She wrote to the "Waveguide" program complaining that her listening had been spoiled by a female voice reading out numbers in English and she asked the announcer what this interference was. Could it be spies? The BBC presenter laughed at such an idea. He had consulted the experts at Bush House (BBC headquarters) who declared that the voice was reading out nothing more sinister than snowfall figures for the ski-slopes near the listener's home. Highly unlikely! A similar incident occurred while I was listening to Radio Moscow on 9325. A German number station was causing interference. I sent a tape of this to Moscow and their reply will be dealt with later.

Here is a list of the paired frequencies discovered:

3188.5/3880 5440/6370 7740/9435
3188.5/4052 5413/6784 8120/10135
3188.5/4196 5440/6900 9049/10508
323214455 5413/7588 9254/10243
3213/4022 5330/7740 9865/10655
3384/5440 5750/6370 10135/11237
3880/5225 5750/7320 10135/11273/11685
3880/5960 6370/7320 10243/11450
4011/5137 6825/7667 10655/11685
4050/6370 6875/7588 11560/13488
4281/5297 6785/7740 11455/13420
4415/5090 6850/8190 13518/14811
4455/6920 6860/8565 14420/17370

4990/5750 6900/9465 15938/20524
4990/5440 7375/9465 16395/18356
5046/6840 7410/10735 17370/19105
5225/7665 7655/9120 17522/19105
5330/6784 7662/8312 19095/24978
21811/24978

Additional unpaired frequencies: 9041, 10508, 11123, 12285, 15938, 16395, 16453, 20525
It has been noted that the maximum number of groups sent by these stations is 225.
Here are some examples of traffic sent during the early 1990's

Frequency UTC Lang Addressee Group Count Remarks

7320/5750 2300 EE 835 137 3/2F
7375/9465 2000 GG 106 106 3/2F
8120/10135 2000 EE 399 210 4F, jammed
4011/5137 1900 EE 788 159 3/2F, jammed
13518/14811 1500 EE 960 225 3/2F, jammed
7410 0900 GG 268 142 3/2F
10135/11273/11685 1900 GG 843 198 4F
10135/11273/11685 1900 GG 844 175
5440/6900 2300 GG 086 203 3/2F
21811/24978 1600 EE 279 225 3/2F
16395/18356 1600 EE 671 225 4F, jammed
5415/7860 2000 EE 383 nil no traffic
7740 0200 EE 836 168 3/2F
6785/7860 0100 EE 826 110 3/2F
7585 0400 EE 004 160 3/2F
6800 0400 SS 545 nil no traffic

As can be seen, these stations appear on a wide range of frequencies at any time of the day or night.

THE LINCOLNSHIRE POACHER

The only other target for those warble jammers is this English language five figure station. It began comparatively recently (end of June, 1989) and has kept the same format from the beginning.

On the hour the woman repeats the five figure header three times, then repeats it five times. The interval signal is then sent five times. This preamble goes on for ten minutes, after which two musical notes are sent three times. The woman then sends exactly 200 five figure groups. At 45 minutes past the hour the interval signal is sent once again and then the station stays silent until the start of the next hour. For example: "59574, 59574, 59574 (pause) 59574, 59574, 59574, 59574, 59574. Then the tune sent five times. At ten past - tone, tone, tone, tone ,tone, tone. Then into 200 five figure groups.

The woman has a distinct British accent. As noted before, these transmissions are always jammed by warble jammers which are extremely powerful and effective and have followed the station around during its frequency changes.

The tune used is a very old English folk song called "The Lincolnshire Poacher" The county of Lincolnshire is in eastern England, just south of the river Humber and is mainly flat agricultural country. The tune itself dates from around 1776 but might belong to an even earlier time. It is the most famous of all English county songs and is not only the signature tune for Radio Lincolnshire, its rousing chorus has been sung wherever "Yellow Bellies" (Lincolnshire folk) have travelled. Here are the lyrics of the song:

*When I was a bound apprentice in famous Lincolnshire
Full well I served my master for more than seven year
Till I took up with poaching, as you shall quickly hear:
Oh, 'tis my delight on a shiny night in the season of the year.
As me and my companions were setting of a snare
'twas there we seed a gamekeeper- for him we did not care,
For we can wrestle and fight my boys, and jump o'er everywhere
Oh, 'tis my delight on a shiny night in the season of the year.
As me and my companions were setting four or five
And taking on him up again, we caught the hare alive
We caught the hare alive, my boys, and through the woods did steer:
Oh 'tis my delight on a shiny night in the season of the year
Bad luck to every magistrate that lives in Lincolnshire
Success to every poacher that wants to sell a hare
Bad luck to every gamekeeper that will not sell his deer
Oh 'tis my delight on a shiny night in the season of the year.*

The choice of a folk song is interesting. Another numbers station uses a folk song of Romania. Perhaps they are intended to instill a patriotic feeling in the people concerned?

When I first heard this station on 21 December, 1988 it was using 6485 and 5422 in parallel from 1700-2200. The warblers then discovered it and it then moved to 5422/ 5756 in March, 1990. After awhile it moved again, this time to 8464. Eventually it settled on these five frequencies:

14487/15682 anytime between 0500-1800

7887/8464/9251 - anytime between 1500-2200

There was a brief flirtation with 6959 for awhile but this has ended. Many additional transmissions outside these times have been noted, for example at 0300 it was on 6959/7887/9251 and also at 0500 on 7887/8464/9251. There have also been many tests.

Some errors have been noted, the most common being when the transmissions change frequency at 1800. Prior to 1800 14487/15682 are used and sometimes the 1800-1845 transmission begins on these two frequencies by mistake. The jammers then start up on 14487/15682, ready to block the message. At about 1803 someone realises the evening schedule is in operation and switches to 7887/8464/9251. The warblers are then "woo-woooing" away on 14487/15682 until they wake up and move to the other frequencies. It is not known who is responsible for the jamming but the station could well be in Britain as a strong signal is usually noted.

CZECH DRUMS AND TRUMPETS

Imagine a scene at a military funeral when the lone trumpeter sounds "The Last Post" and you will have some idea of the musical signal sent by this Czech language number station. This plaintive bugle sounds about an hour before the transmission of the spy messages begins. Just before the actual message starts a different signal is sent. This is played with drums and trumpets and is a very up-tempo military marching tune similar to those played before the beginning of a battle. The woman then announces (in Czech) "Noma 12671, Gruppi 44; Noma 12671, Gruppi 44., and then goes into the five figure text, ending with the word "Krai". The Czech figures are: "Jedno, Dva, Tri, Ctyri, Pet, Sest, Osm, Devet, Nula." The woman pronounces the numbers like this: Edno, Dva, Dree, Seti, Pet, Ses, Seden, Octen, Deda, Nula. The station uses three main frequencies: 4740, 5500 and 6675 although it has also appeared on 8070 and 5600. Here is an example of traffic sent over the last few years:

Tue 3-1-89 6675 2200

Fri 27-1-89 6675 2300

Sun 12-2-89 6657 0000

Thu 6-4-89 5600 2100

Mon 17-4-89 4740 2245

Tue 23-4-89 5500 2200

Tue 21-11-89 6675 2100

Sun 21-1-90 6675 2100

Fri 27-4-90 6675 2300

Mon 7-5-90 6675 2100

Mon 26-6-90 6675 2230

Tue 21-8-90 6675 2100

Thu 7-2-89 5600 2200

Tue 12-3-90 6675 0000

This is a true reflection of the appearances and, as can be seen, they are quite infrequent but, still, it is an active station.

THE SKYLARK

This is probably the strangest of the European numbers stations, not the least because of the distinctive interval signal used. The tune itself lasts for 2 minutes, 42 seconds and is played on a violin and pan pipes. It called Ciocarlia. and is titled "The Skylark" in English. By coincidence, one evening at 2300. I was listening to the BBC's domestic Radio Four. After the program ended the studio announcer said that the next program was going to be all about traditional Rumanian folk music. Not my cup of tea, I thought, so I headed across the room to switch off the receiver. Before I got to the off switch a piece of music stopped me in my tracks. It was the same tune as used by the Romanian number station. After the song ended, the announcer identified the music and went on to say that it was a very popular melody of Romania and was instantly known to natives of that country. Not surprising perhaps then, that this tune should be chosen for such a clandestine activity.

The next encounter with the station came in a newsletter issued by the DX Club of Radio Budapest. A member from Britain, a Mr. Palmer, had written to the club asking if any of its members could identify a strange Gypsy tune that could be heard on certain frequencies. A few months later a club member from the Soviet Union, a Mr. Skarzhinsky, gave this explanation: Very unusual station. You have heard a transmission in Romanian which can often be heard in the band up to 10 MHz, on "outside band" frequencies very clearly and distinctly. It broadcasts a Skylark melody which is followed by groups of figures in Romanian. The transmission ends with the word terminat, terminat. There are several similar trans-

missions, however these usually are not interesting to DXers due to the closed nature of their activities." Despite what the Soviet contributor said, the majority of these broadcasts do not contain any traffic in 5 figure groups or otherwise. The usual format is that the tune is played twice, which lasts until six minutes past the hour. A male voice in Romanian then says "terminat" three times and the tune is repeated twice again, followed by "terminat, terminat" again. If traffic is being sent then a taped, real male voice reads out the five figure text in Romanian. These are "unu, doi, trei, patru, cinci, sase, sapte, opt, noua, zero." These sound like: "oonu, doy, Trey, patru, sinch, sassay, shaptay, noah, zero." The numbers come after the two Skylark tunes and end again with "terminat, terminat" repeated three times. It is certain that "live" announcers are used, as different male voices have been noted. Again, over the years the schedule has changed, so this listing will inevitably contain some non-active frequencies. However, despite a lull after the Romanian revolution in late 1989, the station is now transmitting more traffic than ever!

3885 - 2200
4585 - 2000, 2200
5145 - 2000
5425 - 0000, 1900, 2000, 2100, 2200, 2300
5835 - 2100
5889 - 1800, 1900, 2000, 2200
6824 - 0400, 1800, 1900, 2000, 2200
6840 - 2100, 2200
7385 - 2000
8170 - 1900, 2000

PAPA NOVEMBER

Here is a case of "where to begin?" There are over 80 callsigns on nearly 40 different frequencies, all of which indicates a very big set-up. I can recall hearing these transmissions in the early 1970's and they certainly date back further than that. I remember tuning into a station in 1971 and being almost hypnotised by the strange interval signal (it is a different one now). It consisted of a female voice repeating "Papa November" over and over continuously with a sort of snake charmer's flute playing in the background. This went on for five minutes, after which a woman would start sending messages in five figure groups.

When I started to actively listen to number stations this was one of the first I studied. It is unique in that it broadcasts on four frequencies at the same time, but not simultaneously. By this I mean that there is a time lag between the four frequencies. It is as though four different machines are started, one after the other. Until 1989 real female voices were used, that is, a woman would be giving a list of German five figure numbers and she would sit down and read the whole thing out into a tape recorder. The tape could then be transmitted at the appropriate time. At the time of eventual conversion to a voice synthesiser machine, four different women were being employed in the mind-numbing career of number reading. More about them later.

The frequencies used are 2707, 5015, 7404 and 11108. The choice of frequencies is interesting as it insures that at least one will be propagated at any given time. As it happens, the schedule is designed to give a wide geographic coverage. The station transmits every day, even on Christmas, at 0000, 0030, 0600, 0630, 1200, 1230, 1800 and 1830. The transmissions on the hour are in the AM mode, whereas the broadcasts on the half hour are all in upper sideband. These data suggest that maybe a world-wide operation is in force. After all, a station that transmits on four frequencies every six hours using both AM and USB is trying to get its messages through at any cost. On the whole this operation is very professional. The broadcasts begin precisely on the hour or half hour and very few mistakes are made. It is not totally perfect however. Here are two errors that have been noted: (1) when the stations were being converted to auto-voice on a few occasions both live voice and auto-voice messages were being sent out on the same transmission.

It was as though no one had told the female readers that they were being replaced by machines. They carried on, broadcasting on top of the auto-voice, thus making the whole transmission unintelligible. (2) On another occasion a sister station (DFD37 which is part of the same set-up - see below -) was being sent out over Papa November frequencies instead of its normal channel of 3370. This was final proof, if any was needed, that they are all part of the same organisation. As will be shown later there could be some doubt about this. After all, DFC37 is, on the face of it, a legitimate callsign of the Federal German Republic (formerly West Germany). Indeed, certain publications have this and its twin, DFD21, in their listings as legitimate stations. Anyway, back to Papa November: as shown, the station is pivotal to whatever agency operates it and the format it uses reflects this.

This is unique amongst number stations. As with other set ups, a 3 figure identifier is used, followed by a group count. The difference is in the daily workings of the station. Papa November has allocated to it a series of 3 figure identifiers which are specific to the station and are not used by any of the other stations in the network. After the callsign is sent a woman sends out the list of identifiers/group count, like this

PN 1800 25 JUL91:

824 4
695 13
771 11
372 12
525 10
717 8

824, for example, is the identifier and 4 is the number of groups. This is said as "824 824 4 gruppen, 695 695 13 gruppen", etc. Alter the last heading the message for 824 would be sent which, in this case, is four groups of five figures, e.g. "12334, 12334, 89856, 89856, 29964, 29964, 13277, 13277 ende. Achtung! 695 695 13 gruppen" and so on.

Now, this represents one transmission (at 1800 on 25 July, 1991). The next day a new message may have appeared. It will take the first place on the rota of messages, like this:

(new message) 543 12

824 4
695 13
771 11
372 12
524 10

Note also that the last message on the previous day's rota has dropped off the bottom. If we look at the rota for several days the picture becomes clearer:

| SUN | MON | TUE | WED | THU | FRI | SAT | SUN |
|--------|--------|--------|--------|--------|--------|--------|--------|
| 997 11 | 717 12 | 233 17 | 622 10 | 117 11 | 697 9 | 335 12 | 477 12 |
| 524 8 | 977 11 | 717 12 | 233 17 | 622 10 | 117 11 | 697 9 | 335 12 |
| 543 11 | 524 8 | 997 11 | 717 12 | 233 17 | 622 10 | 117 11 | 697 9 |
| 771 22 | 543 11 | 524 8 | 997 11 | 717 12 | 233 17 | 622 10 | 117 11 |
| 825 7 | 771 22 | 543 11 | 524 8 | 997 11 | 717 12 | 233 17 | 622 10 |
| 372 16 | 825 7 | 771 22 | 543 11 | 524 8 | 997 11 | 717 12 | 233 17 |
| 543 11 | 543 11 | 543 11 | 543 11 | 543 11 | 543 11 | 543 11 | 543 11 |

New messages appear daily and the old ones are discarded. This is not always the case, however. Notice the message 543 11. It is stuck on the bottom of the rota for a few days, perhaps for as long as three weeks. Also, message 233 17 joins it at the end. This sort of thing is a regular occurrence. Presumably the message is retained on the rota until the agent contacts the senders to say that the message has been copied. Then the heading will finally disappear from the rota. Certain identifiers have a tendency to stay around for a long time. For example, 543 messages can stay on a rota for several weeks. Maybe agent 543 or whomever cannot acknowledge easily so the message has to be repeated over a period of time.

Traffic analysis is easy with this station as the number of messages changes considerably. Sometimes there may be only five messages, at other times perhaps ten. Here is a selection of headings and group counts sent over the last few years. Perhaps the changes in traffic relate to events in the real world.

Note: The three figure number is the addressee, the one or two figures after the addressee is the group count.

| 21MAR90 | 16APR90 | 16MAY90 | 21JUN90 | 19AUG90 | 2DEC90 |
|---------|---------|---------|---------|---------|--------|
| 683 6 | 706 8 | 853 6 | 351 7 | 269 10 | 352 15 |
| 462 11 | 321 15 | 307 35 | 974 9 | 564 8 | 563 14 |
| 383 7 | 178 2 | 923 10 | 156 12 | 133 6 | 868 12 |
| 318 12 | 084 6 | 321 9 | 064 18 | 620 9 | 935 11 |
| 096 8 | 464 11 | 243 12 | 541 13 | 713 7 | 736 7 |
| 484 11 | 997 8 | 582 7 | 572 13 | | |
| 948 5 | 563 4 | 494 8 | | | |
| 825 23 | 688 16 | | | | |
| 307 19 | 825 10 | | | | |

Note how the traffic varies. Also, some of the messages consist solely of two-five figure groups. For 20APR91 the traffic for addressee 484 was only 48285 and 36187. It is difficult to imagine what the purpose of such a brief message might be.

Addressees: Here are all of the addresses used by Papa November. The number of different addressees will give some idea of the scale of this station compared to other stations in the same organisation.

007/0 18/040/046/052/057/064/078/084/092/096
109/1 12/126/133/144/156/160/174/178/179/18 1/197
212/217/219/220/23 1/233/238/243/269/275/280/293

307/312/318/321/337/348/351/352/367/372/376/383/399
406/422/438/448/462/464/468/479/484/487/49 1/494
525/535/541/543/544/552/563/564/569/572/58 1/585/587/595
602/6 16/620/637/657/669/678/683/687/688/690/695
706/713/717/725/736/749/765/771/799
805/809/825/843/849/853/868/877/88 1/887/891
905/9 16/923/927/935/948/965/966/974/994/997

Of course Papa November is not listed in any available frequency list and its callsign is not issued by any telecommunications authority. However, there are two numbers stations, indeed, the only ones, that have, on the face of it, legitimate callsigns and these are discussed next.

DFC37 And DFD21

These stations are on two frequencies - 3370 for DFC37 and 4010 for DFD21. They are, to all intents and purposes, the same station. However, as will be shown, the history of these stations goes back to at least the early 1970's, as does that of Papa November. The interval signal in those days was a complete musical scale of ten descending notes, after which a woman said "Hier ist DFC37" or "Hier ist DFD21". When they were converted to auto-voice in 1988 the interval signal was changed to electronic tones followed by a woman with "Delta Foxtrot Charlie Drie Sieben" or "Delta Foxtrot Delta Svo Eins".

Schedule: DFC37: 3370 - 1500-2200
DFD21: 4010 - 1500-2200

Messages begin on the hour in the AM mode and are repeated on the half hour in single sideband. The stations have their own addressees unique to them and not used by Papa November or the other two letter stations. Here is a typical day's broadcast:

| DFC37 | DFD21 |
|--------------------|--------------------|
| 1500-036 236 450 A | 1500-698 154 C |
| 1600-387 400 832 B | 1600-413 356 D |
| 1700-698 154 C | 1700-036 236 450 A |
| 1800-413 356 D | 1800-387 400 632 B |
| 1900-036 236 450 A | 1900-698 154 C |
| 2000-387 400 832 B | 2000-413 356 D |
| 2100-698 154 C | 2100-036 450 236 A |
| 2200-413 356 D | 2200-387 400 832 B |

As noted, broadcasts are repeated in upper sideband on the half hour. I have added the letters A, B, C and D to indicate identical messages, that is, message "A" on DFC37 at 1500 is the same as on DFD21 at 2100, etc. You can see that they really are the same station and that, on any particular day, there are four opportunities in the AM mode and four in USB for addressees to receive their traffic.

As with Papa November, DFC37 and DFD21 have unique three figure identifiers. These are:

002/12/20/36/44/47/62/65/69/74/79183/85194195
107/14/16/17/21/29/30/34147/54/57
204/11/25/29/36/37/5 1/59161/73/78/91/95
316/23/30/36/54/56/87/97
400/11/13/14/23/26/28/3 1/35/50/71/83/90
619/23/41/44
651/80 735/84/92
811/17/21/23/27/32140/46/51/52/67/72/80/90
904/14/25/34
991

Because DFC37 and DFD21 have seemingly legal callsigns you would expect them to appear in such utility station lists as the Guide to Utility Stations by Joerg Klingenfuss and the Confidential Frequency List compiled by Geoffrey Halligay. And, indeed, they do! You might think that this is a breakthrough - two numbers stations listed in these publications, with the operator's identity exposed and transmitter locations listed. Unfortunately, the inclusion of these stations does nothing to explain the mysteries. Indeed, the opposite is true. Their inclusion only adds to the intrigue. Take the Klingenfuss Guide first. According to this book DFC37 and DFD21 are operated by the Deutsche Bundespost (the German Post Office). Fair enough. Far-fetched though the idea may be, let's suppose that a company as technically advanced as the German Post Office has a use for a station sending numbers - the telecommunications equivalent of talking drums or smoke signals. We already know that Papa November and the other two letter stations are part of the same organisation as DFC37 and

DFD21. Here is the proof:

- 1) The same four female operators were used (until the conversion to voice synthesisers) on DFC37, DFD21, Papa November, etc.
- 2) The stations do not duplicate three figure identifiers, as would be the case if they were from separate organisations.
- 3) Mixing errors have caused DFD37 to be transmitted on Papa November's frequency.

Now, of course, although DFC37 and DFD21 are proper callsigns, allocated to Germany, Papa November, Papa Zulu, Charlie November and all the rest are not. An organisation such as Deutsche Bundespost would not, I think, operate these illegal callsigns. The Confidential Frequency List states that DFC37 and DFD21 are part of an "internal net" and places the transmitter site at Frankfurt, Germany. Intrigued by this, I wrote to the Deutsche Bundespost but received no reply. I next wrote to Herr Klingenfuss and asked why he listed DFC37 and DFD21 but did not list Papa November, etc. His reply didn't really answer the question:

"Since several decades nobody has ever succeeded in the exact location and purpose of these stations. Nobody has ever been able to contact such a station or to get a verification for reception, etc. All what especially those SWLs from America, etc. write and state about these stations are presumptions, guesses and nonsense. From our point of view, monitoring these stations is a waste of time and you get more from reading Bracknell Meteo's Teleprinter coded weather during 24 hours than from monitoring these number stations' for 24 seconds. Consequently, we cannot answer your questions because Klingenfuss Publications considers to give facts and not guesses."

But is it therefore a fact that DFC37 and DFD21 are operated by the Deutsche Bundespost? Almost certainly not. It would be interesting to know were, exactly, these callsigns are registered, if, indeed, they are. As mentioned earlier, before automation four distinct female operators were employed in reading out the numbers. They had their own characteristics and delivery styles. One even sounded as though she had a Welsh accent. It became possible to know when certain women were on vacation or perhaps ill. One could often hear them pausing to swallow or take a deep breath, but to their credit I never heard them cough. They were mystery ladies and I tried to imagine them outside the work environment -would anyone else have the slightest idea what they did for a living? What would they say if anyone asked? In one way their voices live on. The voice synthesiser now in use is modelled on one of the real voices. This woman's voice must have been "sampled" before technology made she and her colleagues unnecessary. Imagine being able to switch on a radio and hear your own synthesised, disembodied voice coming out of the speaker!

TWO-LETTER GERMAN

As we have seen, Papa November uses four frequencies and DFC37/DFD21 use one each. The other members of this set-up use many frequencies in the 2.0 to 30 MHz range. There are many different callsigns, each of which has its own three figure identifier, although nowhere near as many as Papa November. The format is similar to Papa November. The woman repeats two letters from the international phonetic alphabet four times, after which random electronic tones are played for a few seconds. This goes on for five minutes after which the woman gives the three figure identifier and then the group count. Example:

"Yankee Sierra" 4 times, electronic tones (5 minutes, repeated), "635 635 27 gruppen. 516 516 78 gruppen. Achtung, 635 63527 gruppen." Into five figure text.

2690 2707 2745 3228 3262 4543 4594 4821 4888 5015 5182 5732 5770 6370 6765 6853
7404 7532 7661 7740 7752 7858 8063 8173 9040 9325 9450 10177 10460 10500 10740 11108
11545 11617 12092 12210 12314 13362 13413 13752 13775 13890 14622 14945 15610 16055 16220
16220 16414 17430 18195 18575 19295 19755 20240 20350 20675 22885

There are at least 40 different frequencies used by these stations. Here is a complete list of all the stations noted on these frequencies, along with the three figure identifiers they use:

YS-635, 516, 027, 907
CT - 884*465, 223, 286, 032
ST-481, 755
AL-043, 969, 023
PL-855, 131, 679
LG-224, 484, 761
ZO-209, 391, 475, 681
ZB-589, 926, 203
JB-606, 995, 239
TE-460, 103
LE-633, 910, 262
BI-191, 721
SB-527, 962
ZG-763, 405

ER-573, 885
CN - 158, 430
PZ - 143, 625, 374
PB-917, 263, 709
PT - 118, 551
KW-884, 091, 908
UI-443, 778
LA-873, 355, 363
AM- 119, 791
YB - 042, 979, 676
EL-928. 510, 063
ZT-250, 863
LU-998, 031, 456
KR - 737, 171
UL - 137, 781, 218
PG-217, 424, 732
IT- 139, 525
BE-558, 903
TP-004, 975, 738, 696
AU-600,349, 244, 385, 006, 554, 691
UF-234,655, 049
BU-608,073, 492
VO - 141, 283, 507
VB-088, 415, 697
ZP -505, 125, 703
AB-804, 299, 531
GC-082, 808, 334
FS-099, 361, 816
FB-009, 382, 653, 361
BJ - 358, 591, 152, 879
DF-281, 718
HK-393, 621
WP- 989, 716
NZ-202, 649, 955
RO-941, 098, 660
LD - 482, 677, 146
JD - 534,
HS - 639,
RK- 104,702 (English)
MN - 628
AO 142, 113
DB-038, 329, 848
FP- 081
CD -059
CI**444, 555, 666,
XL-381, 427, 610
JU-271, 667, 499
EG-472, 795, 267
GZ-628, 803, 285
MH-013, 255, 604
DO -167 (English)
QL-410, 028
NU - 264 599 368
JW-521, 081,123
WL- 115, 522, 026
OK-319, 617, 812
JO - unknown
UG - unknown
PJ - unknown
DT - 809, 015, 503

All traffic for this identifier starts with either a 1 or a 0, e.g. 01222, 19988. This applies to 884 only, the others use random five figures.

** CI seems to have been a test broadcast. Its distinctive identifiers point to this and it was heard only once, during the changeover to voice machine.

There are, strangely enough, one or two English language versions of these stations. Those noted so far are "Romeo Kilo", "Juliet Oscar" and "Delta Oscar". The woman announcer on these says "Message for 167, 167 88 groups. Attention!", and then goes into the five figure message. The English variant, apart from being very seldom heard (at least in Europe), is unusually faint and distant-sounding, as though the transmitter site is not on the European continent. The woman's voice has an oriental accent, not German at all. This may suggest that the activities of the organisation behind this station have a world-wide involvement. My own theory is this: DFC37 and DFD21 are aimed at personnel in Western Europe. The times of the broadcasts (afternoons and evenings in Europe), the frequencies used (3370 and 4010) and the large number of addresses seem to back this up. These signals are not readily heard outside of Europe so this would seem to be the case. The traffic is fairly substantial; each addressee has between 20 and 50 five figure groups in each message.

Papa November would seem to be a general alert broadcast. The low five figure group counts (2 to 20) mean little information can be sent to the agent. The message would seem to be on the nature of "Pick up a message at (place)" or "Tune into a broadcast at..." The real information would be sent by all the other two letter stations world-wide as their group counts are always about 100 groups in total.

The suggestion of a world-wide operation is backed up by the frequencies used. 19295 at 1400 is not a combination meant to be heard in Europe. Also, certain stations never appear below about 10 MHz, while others keep below 10 MHz. This would suggest that "Bravo Uniform", for example, which never appears below 10 MHz is meant for agents outside Europe. Similarly, Yankee Sierra", which never broadcasts above 8 MHz, is meant for agents closer to Europe.

The 2 letter stations have been heard at every hour and half hour during the 24 hours in a day. The vast majority broadcast between 1800-2000, suggesting that the recipients of the messages are located mainly in Europe.

THE "STRICH"

This station may be the most pointless waste of time in the history of radio. Quite a claim, but when one considers the mind-numbing banality of these transmissions it would be difficult to think of other candidates for such an award. The station, like many others, is multilingual - in this case, Russian, English and German.

When I first heard the German version I couldn't believe my ears! The woman used has an impossibly high pitched voice, almost like the yapping of a small dog. The voice was repeating "acht ,acht, drie, strich, zero, zero" The word "strich" is German for the / stroke sign. After five minutes the voice stopped. No traffic followed and in the years since then no traffic has ever been heard-just s women repeating 883/00 for five minutes and then off the air. Later on, more German stations appeared-317/00 117/00 493/00 and 897/00 , all with the same format. No traffic was ever sent.

Then an English version using the same female voice popped up. This 00, time the voice repeated "Two, eight, eight, oblique, zero, zero" and left the air after five minutes. Then a Morse code (CW) version appeared repeating 971/00. Again, no traffic was sent. Then on 4370 kHz one Wednesday evening at 2300 the familiar woman's voice was repeating something like "jezinta, osem, sedni, presta, dvonta, sedm" (or 187/27). And, miracle of miracles, 27 five figure groups were sent. The language was hard to determine but it seem to be a form of Russian specially adapted for radio (akin to English operators saying "fower" (4) and niner (9). The 1 to 0 figures seemed to break down as:

0= zero 1= jezinta 2= dvonta 3=trunta 4=czdiri 5= peyonta 6=sesh7=sedm 8= osem 9= prunka

This was the only time that I heard traffic being passed, in any language. The frequencies and times for this station are:

3247 at 2000, 2300
3823 at 2000, 2100
4015 at 2100
4090 at 2100
4370 at 2300
4540 at 0600, 2100
4723 at 2300
4780 at 2000
5090 at 2000
5500 at 1700, 1800, 2000, 2100
5550 at 2000
5624 at 2100
5830 at 2100

A mistake in one of these transmissions was noted on 4015 at 2100. The German voice was repeating "75-100". The third digit was obscured by a sound like some-one keying a mike over that figure. After three minutes the fault was noticed and the voice then said "751/00" until five past the hour when, of course, it went off the air.

A Russian broadcast similar to the previous station and using altered numbers was noticed one night at 0000. An unfamiliar voice was heard on 7537 - a woman repeating "Edna, sednitzer, nula" very, very slowly. At 0005 the voice said "Norm

162, Gruppi 22" and then sent 22 five figure groups, ending with "nula, nula, nula". The number breakdown seemed to be:

0=nula 1=edna 2=dvoytze 3=tri 4=chetryi 5=pedartze 6=sest 7=sednitzer 8=asem 9=devet

Again, this was either enhanced Russian or another Slavic language.

Early the next morning I continued the hunt. On 10180 I noticed exactly the same voice I'd heard a few hours earlier, repeating the same numbers. Again, the transmission ended with "0,0,0". Since then the same station has been noted on 5580 at 2230, 6750 at 2200 and 5668 at 1930. The format has remained the same; e.g.

repeating "121" for five minutes, then "norma 69, gruppi 13" and always ending with "0,0,0".

BULGARIAN BETTY

The nickname of this station, which only went off the air in December, 1990, was given to it by various American numbers station monitors. In fact, because of its all night broadcasting schedule, it became a regular logging for listeners in the United States. The language used was variously described as Russian, Polish, Bulgarian, Serbo-Croat and - on a Radio Netherlands report, even Macedonian. The interval signal used was a five note rising scale tune which was followed by the group headings. The messages were sent in the five figure format. It was a very monotonous and boring transmission, even as numbers stations go. At the end of its life it was using two frequencies: 4030 and 4882.5, not in parallel. However, these transmissions were sent at various times between 1600 and 0600. Other frequencies noted during Betty's career were 2805 (unusually low), 3225, 4006, 5157, 5247, 5445, 5860 and 7740. Betty is gone now, but not forgotten.

READY, READY

This English language station would appear to be part of the same set-up as the Czech "drums and trumpet" station in that the main frequencies used are exactly the same: 4740 and 6675. The woman announcer tries very hard to sound British but unfortunately the letter "R" in "four" is rolled far too much to sound convincing. The broadcasts start with the woman repeating a five figure identifier. An unusual feature of these identifiers is that they seem to be related. See how many of them are similar in the list below:

10491 36511 35702 62794 43101 43473 69421 62467 10361
62683 62453 62378 17682 70100 17462 45690 17399 45260
43381 15181 04397 15521 43470 15371 40690 32684 43181 32831 15431

After the five figure identifier has been repeated for five minutes, the woman says the group count ("22, 22") then, "Ready, Ready" and goes into the five figure groups.

'Times and frequencies noted so far:

4740 - 2000, 2100, 2200
5695 - 2200
6515 - 2200
6655 - 2100
6675 - 2100, 2200 6935 - 2200
8070 - 2200, 2100

THE RUSSIAN MAN

One of the few stations using a male announcer is this Russian language station. The male voice sounds very formal and military. Another feature is that the station uses a large number of frequencies, many above 10 MHz, again suggesting a near global signal coverage. The format is simple: the announcer repeats a 3 figure identifier for a few minutes. Sometimes the identifier is followed by a figure "1" as in "147, 147, 147, 1". If no messages are to follow then three "nulls" are sent, such as "442, 442, 442, 0,0,0,..". If text is to be sent then after the preamble the voice gives another identifier, then the group count and then into the five figure groups, as - "419,419, 419,1.728, 728, 728, 36, 36, 32222, 32222" etc. The whole thing usually ends with five nulls. These transmissions have been heard at various times between 0600 and 2300. Many of the three figure identifiers, believed to be the recipient's code name, are repeated. Noted so far have been 825, 419, 442, 147, 854 and 305. The frequencies so far recorded are:

5135 6765 13406
5175 6820 13890
5400 6840 14360
5718 6995 14408
5760 8200 15610
5891 8395 15702
6528 8536 16243
6630 9141 21862
6640 10135
6660 12470
6680 13380

In mid-1991 the voice could be heard every day on 14408 and 15702 with a plaintive cry of "55555" or "00000" with no messages following. These signals are heard on the hour between 0600 and 1600.

There is an English language version of this station which uses a female voice and is heard on a similarly wide range of frequencies. The voice has one notable characteristic: the number "8" is pronounced as "ate", as a Scotsman would do. The other figures are said clearly and precisely in a near perfect British accent. The format is the same as for the Russian Man station. Three figure identifiers noted for this station are: 619, 748, 236, 897, 152, 468, 724, 734, 139. Some traffic examples:

897, 897, 897, 00000
468, 468, 468, 00000
468, 468, 468, 235, 235, 97, 97
734, 734, 734, 169, 169, 29, 29
724, 724, 724, 695, 695, 123, 123

The frequencies noted for this station:

3888 6845 12671
4830 6855 12945
5640 6875 13395
5725 8140 13950
5800 8180 14620
6325 8240 15060
6610 8880 16460
6660 10130 18810
6825 12320

Transmission times have been noted on the hour between 1200-2200.

What seems another version of the same set-up uses the German language. The format is the same as the previous two. Traffic noted includes:

329, 329, 329, 00000
774, 774, 774, 1, 985, 985, 192, 192
792, 792, 792, 00000
458, 458, 458, 1, 7254, 7254, 88, 88
723, 723, 723, 1, 2049, 2049, 78, 78

As can be seen, the frequencies tend to be lower, suggesting an operation in or near Europe

4285 5775 10126
4315 5880 10346
4580 6708 13385
5183 6775 17420
5440 6967
5740 7434

THREE NOTE ODDITY

On Wednesday, 20 September, 1988 on 4818 at 1900 I heard three musical notes rising in scale. Expecting a numbers transmission I continued to listen and, sure enough, at 1905 a woman speaking German said "achtung, achtung" and went into these five figure groups:

42787 02708 80648 01317 33226 29367 93212 68626 11404
51222 18294 33406 98108 51308 22365 02299 39645 68823
48444 64371 98455 70941 96316 76999 00748 57165 14571
58073 ende, ende.

Nothing remarkable about this perhaps, but this was the last time I heard this station until a Sunday evening more than two years later - 30 September, 1990. I recognised the three note musical marker and waited for the five figure message. When it came it was exactly the same, digit for digit, as the message sent more than two years earlier! Since then it has been noted on three other frequencies: 4040, 4160 and 7830 - with different messages, I might add.

RAPID DOTS

The callsign of this station lacks imagination. It consists solely of a series of rapid Morse code dots. These are sent for about five minutes before each broadcast, which may start at 05, 10, 15, 20 past the hour and so on. After the didididits a woman repeats a three figure identifier for another five minutes. If any traffic is to be sent the woman then gives the group count. If there is no traffic the station simply goes off the air. This must be slightly annoying to the recipient since there's no way of knowing if traffic will follow the repeating three figure identifier. Other stations give a suffix -38311 or 33228/22 to indicate that messages are to follow, and a suffix - 383/000 or 33228/00 to indicate no messages. With this station the recipient has to endure five minutes of didididits followed by brain-numbing "DVA, TRI, OSM", ad nauseam, only to be rewarded by a sudden departure from the air.

The same identifiers turned up again and again over the years and there was also a fast Morse code version of the station which had the same sign on format. Here are some frequencies noted for the voice transmissions, along with some of the traffic that has been passed on them:

| Freq. | Time | Ident. | Groups |
|-------|-------|----------|--------|
| 3238 | 2100 | 145/81 | |
| | 2100 | - 085/08 | |
| | 2100 | - 185/68 | |
| | 2130 | - 272/64 | |
| | 2200 | - 042/02 | |
| | 2200 | - 269/69 | |
| 3380 | 2015 | - 242/49 | |
| | 2045 | - 729/58 | |
| | 2115 | - 052/0 | |
| 3458 | 2200 | - 204/0 | |
| 4065 | 2100 | - 204/0 | |
| | 2200 | 507/0 | |
| 4104 | 2000 | - 052/0 | |
| | 2025 | - 626/8 | |
| | 2030 | - 707/08 | |
| 4160 | 20800 | - 085/0 | |
| | 28100 | 069/0 | |
| | 2200 | - 208/08 | |
| | 2200 | - 269/56 | |
| 4790 | 1930 | - 707/0 | |
| | 2200 | - 158/ 0 | |
| | 2200 | - 108/0 | |
| | 2355 | - 092/0 | |
| 5770 | 1100 | - 311/0 | |
| 6780 | 0900 | - 288/0 | |
| 10180 | 0400 | - 061/0 | |

Note how many times no traffic was sent; another case of wasted time and money. It seems pointless to go to the trouble and expense of transmitting a marker and identifier only to go off the air. The Romanian "Skylark" station is the worst offender in this department. It seems that even when no traffic is sent it has to transmit its near three minute long violin tune no less than four times. Surely it is not necessary to go to this extreme. Why not just pop up on the frequency and say "No messages today" or something? It would take only a minute. But instead they go to ridiculous lengths to waste frequency space for no good reason. There is a theory that frequency occupation is part of the purpose of sending markers and identifiers but no messages. Perhaps, but what is gained in occupying a frequency like this? You are sending no useful information and your station will not magically assume an air of legality because of the "custom and practice" of using a specific part of the radio spectrum.

The "Rapid Dot" station was last heard in late 1990 and disappeared around the same time as "Bulgarian Betty". Russian language transmissions continue to be unpredictable, as the next station shows.

THE RUSSIAN WOMAN

On 20 March, 1991 at 1910 UTC a CW station was heard in AM mode on 4425 kHz sending the letters Y-T (- .- -) very slowly. After this a Russian-speaking woman which was obviously not a computer voice but a real person, sent a three figure identifier followed by a group count (e.g. 019 gruppi 19). Then the five figure text was sent. After this the station resumed sending YT in Morse. Further traffic followed in five minute intervals:

1920 - 019 Gr. 19
1925 - 001 Gr. 12
1930 - 281 Gr. 14
1940 - 154 Gr. 17
1945 - 993 Gr. 14
1950 - 231 Gr. 13

Each time the letters "YT" were sent in CW between each message. This was the only time this type of transmission has been noted and it seemed to be one of the many "One-Off" stations, such as this next one.

FIFE FREE

As implied in the heading the woman in this broadcast pronounced the numbers five and three as "fife" and "free". This station was noted on 8072 kHz at 2000 on 3 September, 1989 and on the same frequency 24 hours later. This was the full broadcast:

2000 - "453/2005 Number 107 Groups 28"
2006 - off the air
2009 - "453"
2010 - "Number 107 Groups 28"

28398 88153 27594 27329 76115 81658 06287
57612 17438 28089 81164 27859 47530 80888
54304 62774 88810 66611 44889 68458 28868
85276 42127 65524 05232 40444 03357 03132

This station has, to my knowledge, never been heard since. It, along with the next station, is a good example of how number stations can pop up anywhere at any time, never to be heard from again. Because they are heard so briefly we can't pigeonhole them so neatly.

JAZZ PLAYER

A jazz-style, multi-instrumental piece was playing on 10606 at 1900. At 1905 a woman in German started repeating "40309" for a few minutes, after which "achtung, achtung" was sent and the woman went into five figure groups. The transmission finished with "ende, ende". It, too, has not been heard since

FEMALE PHONETIC ALPHABET STATIONS

These stations, alleged to be operated by Israeli intelligence (the Mossad) are covered comprehensively in Tom Kneitel's book *Guide to Embassy and Espionage Stations* (CRB Research) so they'll get only a brief mention here. The current theory is that these are *run* by the Israeli Secret Service. They are commonly heard on a very wide range of frequencies at most times of the day.

The stations each have their own three letter callsign, such as "Uniform Lima Xray", which is repeated before each message. If a suffix ("2") is included, as "ULX 2", then no traffic is to follow. A "1" suffix indicates a test transmission. A typical transmission would be: ULX ULX .."message message group 47 group 47 text text. .

WASSD..HJJHF...RYGDD..." etc - then, "end of message, repeat, repeat, group 47, group 47 text text WASSD..."

After the repeat the woman says "end of message. end transmission."

Sometimes more than one message is sent in the same broadcast. In this case "Two messages. two messages. message message" would be sent. Apart from the 1 and 2 suffixes, other, more elaborate headings have been sent. The purpose of these is unknown.

Part Three ODDS AND ENDS

This section contains items and loggings not covered earlier. It includes "One-Off" transmissions as well as mistakes and other oddities. It is by noting errors that one can gain a tiny clue to the operation of these stations.

2707 - "Papa November" sending both synthesised and real voiced messages at the same time (0030), making them impossible to copy.

4370 - Woman in Russian with "187/27" at 2305, then into five figure groups. At 2308 Scheviningen Radio from The Netherlands was on the same frequency sending a shipping traffic list in English.

4740 - An orchestral rendition of part of Verdi's Aida heard repeating from 2000-2005, then off the air.

5091 - Woman with "ULX 2" on the wrong frequency. At 2030 the woman said "JSR 2", which was correct.

5091 - Woman with VLB 2" on the wrong frequency at 1847. WLB 2" switched to the correct frequency of 4665 and "JSR" started on 5091.

5284- A woman sending "Kilo Whisky" from 2130 to 2133. This then changed to "Sierra Tango" until 2135 when a woman in German sent five figure groups. The "Kilo Whisky" identification was a mistake.

5420 - A woman in German repeating "528, 528, 528, 528, 1" from 2000-2015. Then she sent "85,45, 85, 45" and then went into five figure groups. The numbers were terribly clipped, which meant that the "funf" was sent as "unf". Transmission ended with "00000 " in CW.

5725 - Longest five figure transmission I've heard. Woman in English with "248" from 1900-1905, then "967, 967, 301, 301" at six groups per minute. The broadcast ended with "00000" at 1951 - over 45 minutes in length!

6570 - Woman in German repeating "40905" from 1345-1350 UTC, then the same woman with "30209" from 1350 to 1354, after which five CW "didahs" (the letter "A") were sent. The station then left the air.

6808 - 2000 UTC - A woman in English was repeating "288 and 71" until 2010. Then she said "attention" and went into five figure groups. The "5s" and "9s" were pronounced as "fiver" and "niner".

7375//9465 - Woman in German with a 1 to 0 count and "192" at 2000. The 7375 frequency was also being used by Radio Beijing transmission to the USSR.

7404 - An autovoice test transmission during changeover from a real woman's voice to synthesised voice had "Papa November" sending dummy messages to addressees 524, 602, 307 and 669 - broadcasting at the non scheduled time of 1300.

7445 - Mixing error had "KPA 2" and "MIW 2" interfering with each other at 2115.

7740 - Woman in English with a 1 to 0 count and "260" at 2000. On the same frequency a woman repeating "Foxtrot Sierra" before going into five figure groups at 2005. The counting station went into five figure groups at 2010.

8170 - Man in Romanian repeating "trei patru sase zero zero zero" (356,000) from 2030 to 2035, then off the air. This is no relation to the Romanian "Skylark" station. Apparently, stations that end with "000" or "00000" are operated directly by the Soviet KGB.

9450 - Woman repeating "Foxtrot Bravo" at 1700, interfering with French language broadcast of Radio Moscow. The woman began five figure groups in German at 1705.

9450 - At 1030 a German 2-letter station, "Romeo Kilo", started its transmission on top of the world service of Radio Moscow. The numbers broadcast could be heard distinctly on top of Moscow's English language program. I managed to re-

cord this on a cassette which was then sent to Radio Moscow. I asked if they could identify it. Their reply was included in one of their DX programs. Here it is, as read over the air by their DX presenter:

"I've consulted experts on interference but they were unable to identify it. You know, sometimes over 20 different radio stations operate on the same frequency due to a lack of frequencies. It is permitted by international rules, however, that transmitters are directed in such a way so that interference does not occur. But, you know, conditions or developments in the ionosphere influence propagation. Radio waves travelling around the globe may thus create this type of interference. And the station that you heard that was imposed on the Radio Moscow world service broadcast could either be a utility station or a meteo station. I don't know exactly."

10655/11685 - Woman in German with 1 to 0 count and "373" at 1800. Similar situation to the last logging. The 11685 broadcast again interfered with Radio Beijing.

11108- Woman repeating "Yankee Sierra" at 1800 on this "Papa November" frequency. The other "PN" frequencies of 2702, 5015 and 7404 were carrying "PN" as usual. A mixing error at the transmitter site.

11108- A mixing error similar to the above had DFD21 transmitting on this "PN" frequency. DFD 21's frequency of 4010 was carrying "PN" at 1800 UTC. The repeat at 1830 was without error.

13390 - 1910UTC - a sine-wave signal was being transmitted. It was obviously warming up" the transmitter prior to some sort of broadcast. This lasted until 1922 when just the strong carrier signal was left on the air. At 1930 a woman in English started repeating "619" until 1934 when "485, 485, 32, 32" was sent. The woman then sent the five figure groups, ending with "00000".

13775- A woman repeating "Golf Charlie" with electronic tones from 1000-1005, then text for addressee "082". Had "24 und 124 gruppen". Two messages were separate for the same recipient.

Part Four TERMINAT

Unfortunately, the complete story behind the numbers stations is a mystery. As of the fall of 1991 the KGB was apparently being wound up and a new organisation was being formed to look after the interests of whatever remains of the Soviet Union. The new organisation's purpose is supposedly to protect Soviet interests abroad and, we're told, it will have little to do with phone tapping, spying and all of the other traditional activities of the old KGB. Indeed, the amount of Russian language traffic being sent has markedly decreased.

However, German language transmissions continue undiminished. Why this should be is unclear. Are the old East German agents still spying in the West? If so who is the agency benefiting from their information? Where are the transmitter sites located now, after the sites in the former East Germany were shut down? Are some actually operated by western governments? Trying to find the answers to these and many other questions is practically impossible. A recent example: 6840 is listed as a BBC "feeder" frequency in various utility station guides. The BBC uses the frequency to send programming from their transmitter site at Daventry, UK, to various receiving sites for rebroadcast. These programs are usually sent using independent sideband (ISB). Indeed, on many occasions in 1991 BBC programs have been heard on this frequency, especially during the Gulf War early in the year. As stated earlier, 6840 is also home to various number stations and on a few occasions I have heard BBC programs mixing with number stations on this frequency. Puzzled as to how the programming could be of any use to the BBC when it was tangled with "EZI 2", Gypsy violin tunes, counting stations and the others that haunt the frequency, I wrote to BBC asking if the number stations caused them any interference. As usual, the reply only deepens the mystery:

"Thank you for your letter regarding our World Service transmissions. 6840 kHz was an ISB feeder used to provide programs for relays prior to inauguration of satellite feeds. We have not used it for many years so have not logged any complaints."

If the BBC hasn't used 6840 for many years then who has been broadcasting BBC programming on that frequency? I doubt that the BBC is involved in the numbers mystery but sometimes strange things have happened regarding international broadcasters and spy stations. On various occasions monitors in the United States have reported Spanish language number transmissions mixing with Radio Havana Cuba programming.

Recently I was convinced that I heard a similar broadcast on 5340 kHz. The German language station which signs on using the Swedish Rhapsody tune was sending its five figure groups as usual one Saturday at 2010. when the station finished sending its traffic at 2023 the carrier was left on for a few minutes. In the background I could faintly hear Russian speech from male and female presenters in the "Mayak" programming style. Mayak is the Russian word for "lighthouse" or "beacon". The programming is usually music and speech, broadcast over practically all of the USSR. When the carrier left the air so did the program.

It cannot be assumed that this number station was sent over Soviet transmitters. Number stations very rarely give up their secrets so easily. That is what makes what to many is a pointless and boring pursuit so fascinating. Yes, there are dull periods but they contrast greatly with the excitement of uncovering a new clue, a new insight as a result of one's monitor-

ing efforts. In its own way, tracking and puzzling out the number stations mystery can be as interesting and rewarding as any other part of the radio hobby.

Much work remains to be done. In Europe, the transmitter sites are unknown and individuals with direction-finding equipment can perhaps shed some light on these. This book has been concerned solely with the European number stations but, around the world, many other broadcasts take place, apart from the numerous transmissions in Spanish. Far Eastern languages such as various Chinese dialects and Korean can be heard. One thing is certain: even after the ending of the cold war, the break up of the Warsaw Pact, the demise of the Stasi and the KGB and all of the other monumental changes in recent years, unknown agencies still find it necessary to transmit random figures over the airwaves. The numbers continue.

THE COLD WAR MAY BE OVER
BUT THE NUMBERS STATIONS ARE STILL ON THE MR!

Here's a fascinating look at numbers stations in Europe
from a man who has studied them for years -
monitoring thousands of numbers broadcasts in the process!
They're all here Bulgarian Betty, Papa November,
The Lincolnshire Poacher, Swedish Rhapsody,
the Czech Drum and Trumpet, The Russian Man
and many more mystery stations!

Many of these stations can be monitored in North America.
And this book is the key you need to track them yourself!