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Technical devices and plan of operations for eavesdropping on the adversary.

AUDIOSURVEILLANCE

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The relatively modern art of technical audiosurveillance is the counterpart of audiocommunications, following like a shadow close on the heels of every development in the latter's techniques. Shortly after the first telegraph for commercial purposes was installed between Washington and Baltimore in 1844, private individuals began intercepting its messages in order to grab profits in east-west marketing manipulations, to steal exclusive news stories, and to further other unlawful purposes. By 1862 public concern over the interception of telegraph messages was shown in California's enactment of legislation prohibiting the practice. Extensive military use of wire-tapping during the Civil War established it as a recognized tool of the intelligence services of both armies.

Similarly, telephone tapping had its beginning soon after the first commercial telephones were installed in 1878 in New Haven, Connecticut. During the early 1890's it was practiced to some extent throughout the entire country by private individuals, and police services had adopted it for active use. In 1892 New York State made telephone tapping a felony.

The clandestine installation of concealed microphones—"bugging"—was not long in following. Newspaper files and court records have for years been full of scandals and exposures featuring not only the tapping of telephones and wires but also the bugging of rooms, both by the police and by private citizens. The records of intelligence services are less readily available, but there is abundant evidence that even in World War I intelligence made extensive use of microphones along with other forms of clandestine eavesdropping. During this period the monitoring of all kinds of communications media, including radio, came into its own with the establishment of large organized systems of illegal listening-in and

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cryptanalysis as necessary arms of the military and political intelligence services.¹

During the past 10 years there has been a great new surge in the use of audiosurveillance by intelligence services. This phenomenon can be attributed in large part to the development of improved listening, transmitting, and recording devices, new installation tools and techniques, a systematized operational approach to making audio installations, and advances in rapid processing and full exploitation of the take:

Technical Developments

All the many methods of audiosurveillance are variations of three basic forms. First, both in frequency of use and in volume of take obtained, is the telephone tap; second comes the concealed microphone connected by wires with a recorder; and third, the microphonic pick-up of a concealed wireless transmitter in circuit with a monitoring receiver. There is no mystery about any of these methods; the principles involved are common knowledge among communications and electronic engineers, and they are employed in practice to a greater or less extent by all intelligence and policing agencies and by private investigators. There is considerable variation, however, in the technical sophistication of these devices and in techniques of using them for audio operations. Many inventions for the development of hearing aids, radio communications, broadcasting, and recording have been adopted or adapted for use in organized eavesdropping. The mention of only a few of these that have had an especially great impact on audiosurveillance will serve to convey an idea of the technical advances recently achieved.

It is now virtually impossible to detect when a telephone is tapped by the most sophisticated methods without visually inspecting every inch of the wires and every element servicing it, down to the last screw connection. Only crudely placed taps cause give-away noises such as clicks or crackling or produce easily detectable changes in line voltage. Electronic search has been frustrated by the use of new devices. And the tap can be made more productive by any of several effec-

¹ See Wilhelm F. Flicke, "The Early Development of Communication Intelligence," *Studies* III 1, p. 99.

tive techniques for "hot miking" which convert the telephone into a microphone for general eavesdropping when it is not being used to make a call.

For telephone calls an instrument known as the Dial Recorder automatically starts a recording on magnetic tape as soon as the earpiece of the tapped phone is picked up. It records the number of the outgoing call being dialed. It transfers the conversation from the tap to the recorder at a constant output level, so that a play-back of the tape will show no volume variations with the distance of the answering telephone. When the earpiece is returned to its cradle the recording is stopped. The electrical characteristics of the Recorder's input section can be made such that an electronic check of the line will not reveal the presence of a tap.

Developments in the hearing-aid field, together with the invention of the transistor, have opened new horizons in the design of miniature microphones, amplifiers, and recorders. Highly efficient microphones only half an inch square and a quarter-inch thick, small enough to hide behind a dime, are now commercially available. Wires and shielding for them have also been vastly improved, made stronger, more resistant to weather and bruising, and at the same time thinner: some of them are no thicker than a human hair. Miniature pre-amplifiers combine with the high-quality microphones and new mike wire to make possible runs to greater distances without loss of signal, deterioration from moisture, or rupture under stress. Telephone lines have also been turned to use as clandestine carriers.

Transmitters have undergone a similarly tremendous change with the advent of transistors. The small size of these elements and the fact that they generate no heat have opened the way to miniaturization, and their low current requirements have made it possible to design smaller and better batteries for use with them. We now have self-powered transmitters only slightly larger than a package of cigarettes. Both these and current-powered transmitters can be equipped with remote-control switches to turn them off during inspections by countermeasures technicians or simply to prolong their service life. They are made in a variety of different shapes to facilitate concealment.

There has also been considerable improvement in the tools and materials for making audio installations—quiet drills, pipe-pushers, collapsible ladders, acoustic plasters that need no audio opening, better paints and paint-matching methods, and an array of new techniques for installing microphones without actually entering the target area. The countermeasures technician can only hope to find traces by examining all wall surfaces for merest pinpricks and exploring behind every crack in the walls and floors, as well as every fixture and electrical outlet.

Important corollary advances have been made in the development of recorders. The first magnetic recorders, patented in 1898, used wire as the storage medium. They were inefficient, however, and further development was slow. It was not until 1935 that tape coated to retain magnetic impressions was successfully, if still clumsily, used for audio recording, and not until 1948 that it was developed to the point that it revolutionized broadcasting practices.

Up to that time the effectiveness of audiosurveillance in intelligence operations had been limited by its dependence on bulky and inefficient equipment and, more importantly, by the requirement that a monitor familiar with the language, dialect, and terminology actually listen to the live conversation and with the help of notes retain the desired information from this single hearing. The advent of an efficient tape recorder brought a completely new concept of audio operations. Recordings could now be taken to a processing point for full transcription and thorough analysis. The fact that three or four hours are now devoted to processing each hour of tape, and considerably more if there are several different languages on it, gives some measure of the limitations from which audio operations have been freed by the availability of a compact, dependable recorder of high fidelity.

Effective systems of processing the recorded material have been evolved in order to extract quickly items of immediate intelligence or operational value. These systems feature both technical advances and other processing devices. Fundamental factors are the improved fidelity of the take and the training of personnel in translating and evaluating it. The accumulation of voice libraries and aids like lists of dou-

ble meanings have also helped to get more out of the raw material. IBM machines and other electronic classification devices are being used increasingly to speed up analysis and tabulation of the product.

Organizing an Audio Operation

Viewed from an operational standpoint, the setting up of an audio installation must be the execution of a "perfect crime." It must be perfect not only in that you don't get caught, but also in that you give no inkling, from the inception of an operation until its termination sometimes five years later, that such an operation was even contemplated: any show of interest in your target would alert the opposition to lay on countermeasures. This secrecy and smooth dispatch require much foreknowledge, a well-laid plan, and the synchronized coordination of a many-talented team.

Today's audio operations are a far cry from those of the very recent past, when the responsibility for making an installation would simply be turned over to a technician. The audio installation team now includes operational officers who are experts on the area, skilled in the tradecraft necessary for the particular operation, and professionally committed to the success of the job. They work in unison with technicians who take pride in demanding of themselves that each job show the flawless perfection of a masterpiece and who have the versatility to become at different times master carpenters, plumbers, masons, plasterers, painters, gardeners, laborers, and artists.

Since most audio operations are directed against targets of opportunity, they must be got under way on short notice. It is therefore necessary, in any given locality, to have accumulated data in advance regarding local building practices, radio frequencies in use for civilian and military purposes, telegraph, telephone, power, and water plants, equipment, methods, and service practices, traffic patterns and regulations, local policing capabilities, and other pertinent conditions. A capability for covert casing and surveillance must also have been established in advance. Then when an opportunity for making an audio installation presents itself, the local operational officers, having this background information on hand, can concentrate on casing the target and collecting the spe-

cific information necessary to plan the operation while they are awaiting the arrival of technicians.

When all the required information, together with photos, sketches, and floor plans of the target in its orientation to the listening post, has been assembled and screened, the operational officers and technicians together formulate a plan that covers in detail all the facets of the coming operation, however complex it may be. In every case the plan will contain the following elements:

Cover and method for approaching and entering the target to be bugged or the place where a line is to be tapped.

Preparation of the required tools and equipment and method of packaging and delivering.

Protective surveillance prior to and during the operation, with a primary and an alternate means of communication between the surveillance team and those inside the target.

Membership of the team assigned to the job, its chain of command and distribution of responsibility.

The specific assignment for each man, and how it is to be executed. For example: planting the mike or transmitter and the exact method to be used; digging a channel in the garden; manning the communications link with the surveillance team; checking for any tell-tale traces of the work done—scuff marks, scratches, bits of wire, etc. No detail is left unassigned.

Manner and timing of departure from the target on completion of the job, and alternatively in the event of emergency.

The operational plan is set forth on a master sketch of the area, so that each move is marked out much as in the diagram of a football play. When the action begins every man will know exactly what he is to do and when.

Equal care is exercised in renting and establishing a listening post to monitor the target: a never so perfect installation would be useless if compromised before activation by attracting attention to the listening post or the monitors being quartered there. These arrangements must usually be so handled as to assure secure operation over a long period of time, sometimes years. And finally, with the greatest circumspec-

tion of all, communications are established from the listening post to the intelligence center receiving the take; the exposure of this link would not only spoil a particular operation but set off a compromising chain reaction that might have far-reaching effects on the intelligence service itself. The whole operation is undertaken in full awareness that it will be only as successful as its weakest point, and no foreseeable circumstance is left to an on-the-spot decision.

Countermeasures

Our Sino-Soviet bloc adversaries are aware of the danger of audiosurveillance—more so, unfortunately, than we—and accordingly take elaborate precautions to thwart our efforts. In selecting new quarters for diplomatic or trade mission offices, they regularly make it a point to show equal interest in as many as eight or ten different buildings at the same time, and at the last minute close a deal for one on terms of immediate occupancy. They then post a guard and closely supervise any alterations or improvements to be made, in most cases selecting their own contractors. They are likely to import their own equipment and technicians to set up the internal telephone switchboards. In some cases they have dug a trench six feet deep around the entire building, and have severed and inspected every pipe and wire servicing the installation. Their technicians “sweep” the premises immediately upon occupation and periodically thereafter. They take similarly great pains to protect the residences of their officials abroad.

Despite these extreme preventive countermeasures, we have continued to operate successfully against them. Our operations, profitable during normal periods, sometimes become even more productive during crises when security is sacrificed for speed and clarity.

Our success in the face of such vigilance makes dubious the security of our own overseas offices against hostile audio operations. Although it is not proposed to treat here the countermeasures we should take, it should be noted that we are mere sitting ducks by comparison. Since March 1949, when the first hostile audio device was found in the Prague residence of our military attaché, several hundred have turned up in

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many locations, mostly behind the iron curtain; and their advanced technical sophistication is illustrated in the Great Seal installation recently publicized by Ambassador Lodge. Yet, even after more than 100 devices were discovered in the first few months of 1956 and the National Security Council alerted the intelligence community to take countermeasures, U.S. installations overseas have tended to be complacent about being targets of hostile audio operations. A thorough exposition of the dangers and of the possibilities for countermeasures should be the subject of an article in a future issue of this journal.