

Law Enforcement Management Institute

A Report On The Historical Perspective Of  
Radio Communications In Law Enforcement

A Research Paper Submitted In Partial Fulfillment  
Of The Requirements For Completion Of The  
Law Enforcement Management Institute



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## INTRODUCTION

As long as humans have lived together in communal groups, they have realized the need to select some from the group to be responsible for protecting the whole community. This individual or group became the prototype for the police force or the law enforcement agency. As communities grew larger, the need for more police officers also grew. As the number of police officers grew, police departments were formed, and with the growth of police forces came the need for the force to communicate with one another. Communications has always been a part of law enforcement, the need for a system by which a man could communicate with and warn his fellows of existing or pending danger and to send messages. The means of communicating between police officers has changed dramatically over the years. Radio communication has played and continues to play a vital role in police operations and as further technological advances are made in the field of electronic radio communications, the future of radio communications in law enforcement would appear to have only just begun to take off.

The purpose of this paper is to explain to the reader how radio communications in law enforcement evolved from being non-existent, to its present day availability and usages. This will be accomplished by showing how law enforcement operated prior to the existence of radio communications and how law enforcement operates

in today's society with the advanced electronic technology available to us. Finally, thoughts and views will be given on how law enforcement may operate in the future with electronic technology which is just beginning to be discovered.

## DEVELOPMENT OF HUMAN COMMUNICATION AND LAW ENFORCEMENT

The history of police communications has slowly evolved from being non-existent to its present day state of being a vital necessity in effective law enforcement. Primitive man pounded on hollow logs or beat animal skin drums to convey messages. Later, man discovered that when he cut the tip from the horn of an animal and blew through it, the sound carried for quite a distance. The use of horns for long-distance communication is found throughout the bible, and it was certainly a system for warning that crime had been committed or that a felon had escaped. When the alarm sounded, listeners raised a cry and sounded their horns, then they would lay their work aside and join in the pursuit. In the Orient, the brass gong and finally the bell, became the warning instrument.

In 1663, England's King Charles II passed an act which provided for the employment of night watchmen or bellmen to be on duty from sunset to sunrise. It was required that each able-bodied man serve a turn as one of these night watchmen. They were required to call out the time and weather each hour.

In 1829, the system of police protection in England was haphazard and generally inefficient when Sir Robert Peel, England's Home Secretary, introduced into Parliament an act for improving the police in and near the metropolis. This came to be known as the 1829 Metropolitan Police Act. This act created the Metropolitan

Police, more commonly referred to as the "New Police" . The result was that in September 1829, England had its first real uniformed, municipal police department. These police carried a wooden rattle which was used to communicate with other officers and to call for help if the need arose.

In many Western countries, until very recently, the church bell called the people to church services and also warned the town or village of imminent dangers. Since the church was usually located near the edge of town, the church bell would be rung to notify the residents when they should gather or respond to danger. American Indians used smoke signals to communicate with other indians and, at times, with calvary soldiers. Indians also used bird calls and drums to communicate or send out messages and warnings.

In the Western american towns of the 1800's, when people needed to report a crime, they would either have to walk or ride a horse to the nearest town to report to the sheriff or the town marshall, assuming he was in town. If not, the message would either have to wait until the lawman returned or be left with a reliable person in the town to be passed on to the sheriff upon his return. Once the sheriff was apprised of the incident, he relied on several different means of communication to work his case. He might send a flyer or wanted poster to other law officers in the territory through the United States mail system so that they could be looking for the wanted person. The United States Mail was generally

conveyed by stagecoach and sometimes by horse and rider, the pony express system, which was actually short lived. After the invention of the telegraph, the sheriff could send a message using morse code over a wire to another telegraph office in the next town to be decoded and passed on to the sheriff of that town. This system was sometimes unreliable, since criminals often cut the telegraph wire. If these means were not available, the lawman might have to ride his horse to the next town to communicate with the sheriff there.

#### Historic Developments

Historically, then, the horn was replaced by the handbell and rattle, and, finally, the metal whistle. Officers could set up several distinct signals with their whistles. Short blasts on their whistle could be heard for several blocks by the officer on foot patrol which was less noticeable to the criminal than an officer's voice shouting a command out or calling for assistance. The officers on the beat would carry a night stick, and when the night stick was rapped on the pavement, it gave off a distinct sound. Once the officers had their signals set up between the beat officers, they could communicate with one another simply by making sounds with their hand-bell, rattles, whistles, or night sticks. This was particularly effective when officers attempted to surround a building in an effort to apprehend a suspect hiding inside.

## Early Communications in Law Enforcement

Some police departments set up systems of signal lights for the foot patrol officer. Signal lights were installed atop a building in the center of town, usually on the dome of the courthouse, and beat officers were required to look at this building periodically to check and see if the light signal was on. If it was, the officer would have to return to headquarters to receive his message or assignment. In some places, these signal lights were affixed to utility poles connected directly to the station house. Officers would receive messages by means of coded combinations of light flashes.

On November 13, 1990, legendary Texas lawman, Clint Peoples, retired senior Texas Ranger Captain and senior United States Marshall, was a guest speaker at the Fidelis Masonic Lodge in Waco, Texas<sup>1</sup>. Peoples noted how with the advent of the telephone, the local telephone operator became the central link in dispatching officers. A large, loud electric bell was attached to a telephone pole just outside her office, and when someone called in and reported a crime, the operator would step outside her office, trigger the bell, and wait for the officers to converge. Captain Peoples stated that as long as the electrical equipment and the telephone operator were reliable, the system worked very effectively. When Captain Peoples was asked how long this type of communication system remained in effect, he stated that when the



oil boom came to the Conroe area, and there were more people and more criminals to deal with, a different scheme was devised. A red light was installed on top of the courthouse with the switch located inside the telephone operator's office beside the switchboard. The telephone operator could trigger the switch when she received a call. All the law enforcement officers in the area knew to report in when the red light came on. Captain Peoples noted that later on, when a large water tower was built, the red light system was moved to the new structure so its beams could be seen at greater distances.

Captain Peoples recalled the Texas Department of Public Safety establishing its radio communication system in 1939 and the start of transmitting radio calls to units in the field. Many of the patrolmen had one-way radios in their cars that were capable of receiving incoming transmissions but that could not transmit either to headquarters or to other officers. When dispatch operators transmitted calls they could not know for some time if the call actually had been received. The operator had no idea if the officer was even in his patrol car when the transmission was made. According to Captain Peoples, operators would sometimes dispatch the call several times in an effort to make sure that the officer heard the call. "In the Fall of 1945 Captain Peoples was assigned to a new patrol car, the first to have both receiving and transmitting radios"<sup>2</sup>.

It is obvious that communications are the backbone of police

tactics and that without proper communications, modern police departments could not function.

#### SPECIFIC COMMUNICATIONS DEVELOPMENTS IN LAW ENFORCEMENT

As we have already seen, the first radios installed in police vehicles were usually just receivers and did not have transmitters for answering calls. The radio operator would broadcast the calls, and hope that it was received by the officer in the field. If the officer was out of his patrol car when the call was first dispatched, he would not receive the call unless it was repeated. Operators sometimes gave the calls out several times to ensure that the officers received them.

The police have always been aware of the importance of communications and because of this they, along with the military, have been leaders in the development and adoptions of new methods of communications. In the early days of electronic communications, individual departments had to develop their own communications equipment, because little or no commercial equipment was available. Because of technology developed through military and space programs, police are able to readily adapt now existing commercial equipment to their needs thus eliminating the many years of costly, time consuming experiments and failures that early police departments had to suffer in their development of communications equipment.

Briefly the development of electronic police communications can be traced beginning in 1877 when the Albany, New York Police Department installed five telephones in the mayor's office connected to precinct stations. This was only two years after Alexander Graham Bell invented the telephone which indicates how quickly the police saw the value of the telephone and how promptly it was utilized as a communications tool in law enforcement.<sup>3</sup>

In 1880, the Chicago, Illinois Police Department installed the first "Police Call Box", a locked box containing a telephone for use by the officer on patrol. Officers could call headquarters periodically to check for calls or messages. Only police officers and "reputable citizens" were given keys to the box. Before this time, police had relied on signals without voice capability, such as signal lights. The city of Detroit, Michigan installed these call boxes in 1884 and Indianapolis, Indiana did so in 1895.<sup>4</sup>

In 1883, the Detroit, Michigan Police Department installed one police telephone. This was significant since there were only seven telephones in the entire city at that time. In 1889, the department established a new division to handle communications called the Police Signal Bureau. A code wheel was installed in the call box so that when the beatman called in for his timecheck, it would register at headquarters with the proper signal for that particular call box. This insured that the beat officer was in fact, at the proper location, from which he claimed he was calling in from<sup>5</sup>.

In 1916, the New York City Harbor Police installed spark transmitters for communication with police boats patrolling the harbor. This also enabled the police to communicate with other boats and ships in the harbor<sup>6</sup>.

In 1917, the Detroit, Michigan Police Department began using automobiles with two men assigned to a car, but they did not perform patrol duties as we know them today. These men were stationed in "police booths" along the streets. These booths were furnished with a desk, a pot bellied stove, a coal bin and a telephone. The officers would wait in the booth until they received a telephone call requesting their assistance. While in 1923, the Pennsylvania State Police installed point-to-point radio telegraph between their headquarters and various posts throughout the state<sup>7</sup>.

#### One-way Radio Communication

On April 7, 1928, the world's first workable police radio system went on the air. The Detroit, Michigan Police Department went on the air as station W8FS. The transmitter was installed on Belle Island in the Detroit River, and the receiver was installed in police cruiser number 5. This was the climax of seven years of work and development under the direction of Police Commissioner William P. Rutledge<sup>8</sup>. The major problems in making a radio receiver work reliably in a police car were receiver instability and lack of sensitivity. Added to this were problems involving red tape with

the Federal Radio Commission, predecessor to the Federal Communications Commission.

By 1927 the prohibition era had seen the development of underworld crime with the gangsters making wide use of automobiles as "get away cars" . The police were under great pressure to control the situation, but often arrived at the scene too late to apprehend the criminal. Commissioner Rutledge persuaded Robert L. Bates, a young radio technician and student at Purdue University, to come to Detroit to develop a radio receiver that would operate in a police car<sup>9</sup>. Tests of the new radio receiver Bates created were more than successful, and police patrol cruiser number 10, of the Detroit, Michigan Police Department, was equipped with the second new receiver.

The results in terms of criminal apprehension were exciting. Police cruisers were catching holdup men, car thieves, and burglars often seconds after the crime was reported. Police communications ushered in a phase of police work glorified in early gangster movies as "hot pursuit" chases depicting the interception of gangster-loaded sedans leaving the crime scene to the accompaniment of screeching tires and the staccato sound of sub-machine guns, and vehicles racing through city streets at high speeds<sup>10</sup>. While addressing the International Association of Chiefs of Police at its 1929 convention, Police Commissioner Rutledge stated that "Snaring criminals in a radio network, woven by broadcasting to radio equipped cars, has become a matter of seconds...with the use of

radio communication between headquarters and the patrol cars, we are catching criminals red handed...instead of trailing behind in the dust of the criminal, we are as nearly abreast of him as it is humanly possible to be."<sup>11</sup>

The new Detroit Police radio system was so successful that it drew worldwide publicity, and visitors came from police departments throughout the nation and the world to observe this new, effective tactical police weapon. Unfortunately, other police departments desiring to install police radio systems had to develop their own equipment because there were no commercial police radio receivers then available. In September, 1929, the Cleveland, Ohio Police Department went on the air to a few cars with radios installed in them, and in December of the same year, the Indianapolis, Indiana Police Department became the third police department in the world to set up a workable police radio communication system<sup>12</sup>.

In October of 1930, the Michigan State Police<sup>13</sup> became the first state police organization to go on the air. It proved very effective in apprehending bank robbers and other gangsters. By this time, twenty-three police stations were on the air, including the police departments of San Francisco, Berkeley, and Pasadena, California, and in September 1931, the first police motorcycle was equipped with a radio by the Indianapolis, Indiana Police Department<sup>14</sup>.

## Two-way Radio Communication

In March 1933, the Bayonne, New Jersey Police Department went on the air with the first two-way, mobile police radio system<sup>15</sup>. By 1934<sup>16</sup>, so many police departments had two-way police radio systems that they were being used as inter-city communications for all types of general police messages and the Federal Communications Commission had to intervene and establish strict control on police radio communications, restricting non-emergency messages to wire communications.

By 1935<sup>17</sup>, because the police departments did not understand the government restrictions, they at first refused to obey them and police radio personnel from all over the country banded together to form the Association of Police Communications Officers, or A.P.C.O. Since that time it has been changed to the Association of Public Safety Communications Officers. The need was great for such an organization so that police radio personnel could exchange ideas and information and thus develop better equipment, techniques and performance.

In 1939, Daniel E. Noble, of Connecticut State College, developed the first FM (Frequency Modulation) mobile, two-way transmitters and receivers for the Connecticut State Police<sup>18</sup>. This development brought about a change in the entire mobile radio picture. In 1940, Motorola Radio Corporation President Paul Galvin saw the value of FM over AM radio frequencies for mobile police

communications and hired Daniel E. Noble to develop two-way FM for Motorola police radio sales<sup>19</sup>. One of Nobles' first developments was the remarkable differential squelch circuit which demonstrated greatly-increased range in fringe areas. This was to signal the changeover to FM for police communications even though the Federal Communications Commission would only accept applications for FM on an experimental basis.

In 1945, the Federal Communications Commission began allocating frequencies for FM<sup>20</sup>, and it became the established system for police radio communications. Today, police departments utilize three-way radio systems where the patrol car in the field may not only carry on a two way conversation with the base radio at headquarters, but may also carry on the same type of conversation with other police vehicles in the field.

Today, law enforcement has a variety of high tech electronic communications equipment at its disposal. Because many different electronic companies compete with one another, and since we now live in a world which is ever more dependent upon the technology, communication equipment is forever changing for the better. It would be virtually impossible to list and describe every device which is used by law enforcement agencies throughout the world, but a few of the more frequently-used communications devices can be discussed.

It is difficult to imagine a modern, efficient law enforcement agency without the use of a two-way radio system. The



two-way radio system has been in use in law enforcement for the past fifty eight years and during this time many changes have taken place such as the development of the many different frequencies and bands for radio transmissions. These frequencies are allocated by the Federal Communications Commission which is charged with the responsibility for the legal and efficient use of radio frequencies. This allows a single law enforcement agency the opportunity to have at its disposal a number of frequencies or channels. For example, the uniformed patrol division may use one or more frequencies, depending upon the size of the department; the uniform traffic division may use another; the criminal investigation division may use several in their routine and undercover operations, while the administrative division may use another.

There are different types of two-way radio systems in use. First is the base station radio, primarily used by dispatch/communications. There are also mobile radios in automobiles and the portable radio, better known as the walkie-talkie, for street officers. These small, hand-held radios normally have fewer channels than the mobile or base radios, but are capable of transmitting for great distances with the aid of repeater stations and micro wave relays. All of these radios allow officers to keep in touch with headquarters and with each other.

Some states have implemented an interdepartmental communications system, modeled after Pennsylvania's State Police system<sup>21</sup>. In these systems, state police receive authorization to use the radio frequencies of the local police agencies within their jurisdiction. If a call goes out to a local agency, the state police are able to monitor the call at the time of its dispatch, rather than having to wait until the local agency's communications center notifies the state agency. This saves much valuable time in attempting to locate or apprehend criminals and provides more available manpower to cooperate in pursuits. Communications is the lifeblood of law enforcement agencies binding together individual entities within departments so that all their activities can be directed toward common departmental goals. As a result of this team effort, many barriers that existed between state and local law enforcement agencies are coming down.

#### Non-Cellular Systems

Another important piece of communication equipment is the telephone. When Alexander Graham Bell invented the telephone in 1876<sup>22</sup>, he probably had no idea of the contribution he was making to the field of law enforcement. The telephone has adapted quite naturally to the needs of the police as well as the people they serve. The first contact--and sometimes the only one that a citizen has with the police--consists of the telephone call requesting

advice or assistance. The most common means of communication between police departments and the people they serve is by personal contact, but no type of police operation is transacted without frequent use of the telephone. In some departments, many members actually spend their entire duty time on the telephone, answering questions for information or advice or questioning people. In these instances, the telephone is intimately involved with the role of law enforcement because it is a convenient, economical, and rapid means of communications.

#### Cellular Systems

Thanks to modern technology, police can now have mobile, cellular phones in their patrol cars that allow them to be in constant contact virtually with the world<sup>23</sup>. These cellular telephones will probably never replace radio systems, but the mobile phone allows the officers to make and receive phone calls from just about any location. In areas where two-way radio communication is impossible, the cellular phone allows communication to take place through micro wave and satellite relays. There are even mobile, transportable phones that officers can carry with them when they are out of their patrol cars. The days of having the dispatcher make a phone call or having to find a public telephone are practically gone.

Another version of the telephone communications system,

called photophone<sup>24</sup> gives police departments instant audio-video contact with other law enforcement agencies worldwide. While some police departments do not have a use for this system, others have found this new dimension in communications most useful. This system can transmit and receive high resolution color images of all types of forensic evidence. It operates anywhere there is a telephone and a power source. The operator focuses the camera on the subject matter, dials the desired telephone number and presses the "send" button. Unlike facsimile transmitters, photophones can transmit images of three-dimensional objects. This type of system is currently being used by some of the larger metropolitan police agencies, federal agencies, the United States military services, and some foreign police agencies.

#### Visiophone Systems

A telephone device called the visiophone<sup>25</sup> is currently being tested in France by the Biarritz Police Department. This high-tech security device may become commonplace in the next century. This experimental device allows callers to see each other while they talk. The device allows personnel in the police station the opportunity to visually access the interiors of offices, stores, nursing homes and some residences in that city. A number of banks and business throughout the city have alarm systems that are connected to the police department. When these alarms are activated

it is possible for the police to conduct an initial investigation of the interior of the building using the visiophone. An officer calls the business and requests that a visual scan of the premises be made using the detachable camera. If there is no answer to the visiophone, poor vision through the camera, or suspicious activity observed in the premises, a patrol unit is dispatched immediately. This type of communication technology is increasing the efficiency of the traditional police functions. It is expected that this type of service will increase in the future.

Members of some police departments are actually on call twenty-four hours a day, seven days a week. For example, members of a S.W.A.T. team must stay in constant contact wherever they are, on and off duty. One way that this is done is by having the officers carry pagers. With the invention of alphanumeric pagers, capable of delivering complete written messages that can be stored for later reference, it is no longer necessary to page officers through the communications center. Officers can communicate directly with each other with far less chance of interception by citizen's band radio operators, with radio scanners.

It is hard to imagine modern day police agencies operating without the assistance of computers. The past decade witnessed an unprecedented growth in micro-computers, while the size and cost of this technology decreased steadily enabling even small law enforcement agencies to implement sophisticated micro-computer systems, ranging from laptop models to the in-house expert systems.

Computers assist police departments in everything from records management to crime fighting by collecting, storing and analyzing data. Some police officers are issued laptop computers so they can write investigation reports while at the scene of a crime. At police headquarters, the laptop computer is linked to the main departmental computer system so the information can be transferred to the appropriate data banks. In this type of situation, virtually all of the department's record keeping is processed by computer and stored in data bases, thus eliminating paper handling and making the resulting information easily accessible to all members of the department.

Many different computer services available to law enforcement agencies assist them in their communications efforts. One of these is the electronic bulletin board<sup>26</sup>, which serves as a central "meeting place" for information exchange and resource sharing. Agencies with computer systems can communicate with other agencies via their computers to exchange information, post notices, send and receive electronic mail, share software, and query on line databases,

#### Mobile Data Terminal Systems

Police cars in some departments are equipped with Mobile Data Terminals<sup>27</sup> which are scaled-down blends of the old teletypes and the newer law enforcement computer systems. An officer is able

to check a drivers license or a name through the wanted files, or send a message to another department or patrol car through micro wave and repeater relay stations connected to the main terminal back at headquarters. If an officer needs to communicate with another officer but chooses not to speak over the two-way radio system, a message can be sent by way of the mobile data terminal (assuming the other officer also has a terminal).

#### Rescue 9-1-1 Communication Systems

Rescue 9-1-1 and other prime time television programs have brought awareness of police emergency response systems into the living rooms of America. They have also elevated public awareness of the vital role of communications and computer technology in assuring that citizens receive a rapid and accurate police response in an emergency situation. For instance, dispatchers often use a computer aided dispatch system, an integrated network of computer and telecommunications technology designed to help police personnel respond accurately and with appropriate speed to citizens calls for assistance. Such systems assist in the real-time management of scarce police patrol resources, provide personnel with tactical information supporting the public safety mission and assures the safety of responding emergency services personnel. There are a number of secondary purposes of a computer aided dispatch system, such as assisting police managers in strategic problem-solving,

such as determining what locations and what times generate the most demands for police services and how these demands can be met.

Emergency 9-1-1 systems are often integrated with computer aided dispatch systems. This allows a callers name, address, telephone number and other pertinent information to be displayed on a monitor as the call is received by the 9-1-1 operator. Some 9-1-1 systems are equipped with a T.D.D., a telecommunications device for the deaf. This allows deaf persons to connect their telephones up to a device which then allows them to transmit a typewritten message to the 9-1-1 operator. The 9-1-1 operator can ask the questions through the T.D.D. keyboard.

Televisions are often used by the police in communications in various ways. Some police departments have video cameras installed at strategic locations throughout the city transmitting pictures back to the communications center where they are viewed on monitors. For example, a camera could be relaying pictures of a heavily-traveled intersection; when the traffic gets so congested that the assistance of a traffic officer is required, the dispatch operator can dispatch an officer to the area. This allows officers to remain on patrol duty until they are needed.

Television allows police officers across the country to receive and view the same training programs by means of the Law Enforcement Television Network. Valuable training information is conveyed to police officers in this manner. The Law Enforcement Satellite Training Network<sup>28</sup> broadcasts live teleconferences on



various police subjects. Police officers from across the United States are able to participate in these seminars by calling in and asking a panel of experts questions on the program topic. Officers can communicate with other law enforcement officers and receive information which they can use in their day-to-day duties.

#### COMMUNICATIONS IN THE FUTURE

A consideration of what radio communications will be in the future might begin by a reflective look at how far communications have progressed and lead to consideration of recent television series and major motion picture portrayals of electronic communications of the future. Are these portrayals purely fiction? Certainly they are. Nevertheless, many fictional concepts have materialized in time. Perhaps some electronics corporation or imaginative individual is presently working on one of the advances that will be the next big step in police communications. In this section, then, the author will review some concepts from popular media--film, music, television--and offer, as well, some personal projections about the future course of communication in law enforcement fields."

Two-way radios will become more effective in the future with their broadcast range increasing and their size becoming more compact. There will probably be more radio frequencies available and all radio equipment will continue to improve as the electronic

corporations compete for the law enforcement dollar.

#### Projections from Imaginative Sources

As the song In The Year 2525<sup>29</sup> says, "In the year 9595, I'm kind of wondering if man is gonna be alive," and not only will he be alive, but he will be living as he is presently portrayed in futuristic movies such as Star Trek<sup>30</sup> and others. Crime will continue to exist, but unique crimes with unusual types of people committing them. When people of the future become the victims of a crime, they will continue to turn to their local police, but they will be able to contact the police by means such as the Visiophone. Officers will take reports and conduct investigations while the victim scans the area with the camera portion of the visiophone. This will reduce the number of officers employed and save on response time. When the call is first received at the communications center, the operator will immediately connect that person with an enforcement officer. Response time will be reduced to increase the chance of solving the offense and apprehending the violator.

#### Personal Projections

It is entirely reasonable to believe that someday a citizen will contact a law enforcement agency by a communications device

which will enable the persons thought process to transmit all of the information to the operator. This information, the callers' name, address, telephone number, type of crime committed, name or description of the offender, and any other information that the caller may be thinking about. This information will be automatically routed to the officer that is assigned to the area where the offense occurred. This will be performed by some super electronic transmitter. The officer will be equipped with a device, probably a small instrument which would be implanted in his ears or inside his brain. Man will probably have many various types of electronic devices implanted inside his body. Once the officer receives information of the offense, he is again informed by a super mini-micro-computer, again implanted in his body, of the person who committed the offense. He will also be advised of the quickest manner to clear the offense and have the individual placed in detention. This could all be performed by the officers' mental thought process.

Once the violator has been identified and his whereabouts are revealed, the officer will be equipped with a device which will electronically place the individual under arrest. He will be transformed into some type of matter that can be transported through time and space by micro-beams. He will then be "beamed" by the officers' portable telecommunicator to the detention facility. This entire process will probably be only a minute or two in duration. The violator will then be tried in an electronically

controlled courtroom, where the victim and the officers' mental thought processes will be displayed on a large vision screen for the jury to see and hear. If and when the individual is found guilty, he will be transported by micro-beams to the final place of detention. Here he will serve his sentence out in real time, not electronically. He will serve out his entire sentence. This entire process could take only minutes. From the time the offense is committed to the time the individual is in the final place of detention<sup>31</sup>.

#### CONCLUSION

One may think that these last few ideas are far from reality, but can anyone honestly say that this will not occur in this manner. We cannot foretell the future. We can only speculate on the occurrences which we may encounter.

In conclusion, I have attempted to show how law enforcement operated during the time prior to the existence of what was initially known as one-way radio communication. I have shown how law enforcement operates in today's society with two-way radio communication and other electronic equipment that is associated with communications systems. I have given my somewhat unheard of thoughts and views on how I perceive law enforcement of the future to operate with communications systems of the future.

## ENDNOTES

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