LAW ENFORCEMENT MANAGEMENT INSTITUTE

A STUDY OF THE AUTOMATED FINGERPRINT IDENTIFICATION SYSTEM'S IMPACT ON LAW ENFORCEMENT

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I. Background: Fingerprint Classification

The automation of fingerprint identification is a major advance in the investigation of crime. Fingerprints are the most frequently encountered type of physical evidence at a crime scene and criminals have been fingerprinted after each arrest for decades. The ability to link these two abundant sources of information has had a tremendous impact on law enforcement. This impact, and the use of fingerprints in law enforcement (past, present and future), will be discussed in this paper.

According to ancient writings, fingerprints were used to seal contracts in Babylonia approximately 2000 years before Christ. Centuries later, the Chinese used bits of clay indented with fingerprints on bills of sale for identification. These were the first prints found preserved. It is thought that the use of the hand was considered sacred and binding in business dealings. Later, the prints would be used to settle disputes between the parties involved.

Sir Frances Galton wrote the first book on fingerprinting in 1892. Galton, an English scientist known as the founder of the science of eugenics, became interested in fingerprints after mediating a dispute between two men already studying the use of fingerprints for identification. Galton asserted that no two fingerprints are alike and an individual's never change. To prove the latter, he followed one person's prints for fifty years.

Sir Edward Richard Henry, who was a commissioner of

the London Metropolitan Police, is credited with improving and implementing, in 1897, the fingerprint identification system currently used worldwide. Henry's system spread in the early 1900's and in 1911, the Illinois Supreme Court "upheld both the legality of fingerprinting and the right of technicians to testify as expert witness."[1] The era of fingerprint application to police science had begun.

In 1896, the International Association of Chiefs of Police started national fingerprint files in the United States. These were later moved to Washington, D.C. and became the core of the Federal Bureau of Investigation's files which are so extensive today.

Police departments generally have standard procedures for fingerprinting arrestees. Each fingertip is coated in special ink, then rolled onto a card with sections marked for each of the ten fingers. Several sets of the appropriately called "tenprint" cards may be taken, one or two sets for the local police department files and others to be sent to state and federal agencies. The number of sets taken may depend on the seriousness of the prisoner's charges.

The fingerprints on the cards are then classified by a trained identification technician (I.D. tech). Classification involves close examination of the fingerprint to determine the appropriate category. Basically, there are eight print groups. These are radial loop, ulnar loop, double loop, central pocket loop whorl, plain whorl, plain arch, tented arch, and accidental (does not fit in any other

category). Fingerprints are identified as belonging to one of the basic categories. Then, if necessary, further classification is either by the Henry or National Crime Information Center (NCIC) methods.

The Henry method is much more detailed and can be used to positively identify a person. Henry created five additional categories to further break down fingerprint identification. The primary classification is the first and largest. Each finger is assigned a value depending on the presence or absence of a whorl configuration. Then, the total value of the even, then odd fingers is tallied and placed in a ratio, e.g., seventeen over one. The secondary classification is next and the two index fingers are examined for their pattern type and assigned a letter. Following the secondary is the sub-secondary classification and the three middle fingers of each hand are used for this categorization. Each finger may be assigned the letter I, M or O, depending upon both the number of ridges in the fingerprint and whether the ridges are loops or whorls.

The penultimate category is called the major division. The thumbs are designed as S, M or L, again depending on the number of ridges in the thumbprint. The last, or final category, considers the number of ridges in the small fingers and either S, M or L, is assigned to them.

Most agencies have files only as far as the secondary category. A department may also separate black from white and male from female to facilitate identification. The F.B.I. uses other identifiers and sub-categories to further

separate their files due to their large inventory of fingerprint cards.

The N.C.I.C. method relies mainly on the eight basic fingerprint configurations with minor additions. For example, when describing a loop, its direction may be specified as ulnar (toward the ulna) or radial (toward the radius). Because the information included in the N.C.I.C. classification is so limited, positive identification of a subject is not possible. The N.C.I.C. fingerprint code on a criminal history may indicate the subject in question can be included as one of many with that particular classification. This would confirm to the I.D. technician that further investigation of the subject's background is warranted and necessary for a positive identification.

II. Latent Fingerprints: Location and Processing

Latent fingerprints are those left on an object by a person at a crime scene. The concept of obtaining fingerprints when a crime has been committed is simple enough, but there are an overwhelming number of variables that affect the quality and quantity of fingerprints available to collect.

First, perfectly clean hands do not contain the oils and dirt necessary to leave a print. But, most criminals do not wash their hands just prior to committing a crime. Second, the surface of the object touched must be suitable for retaining prints. As an example, the new refrigerators advertised for their ability to hide fingerprints will do just that. No I.D. technician would be able to lift latents

from that particular type of surface. An ideal surface is clean, dry, level and non-porous.

Stolen vehicles that have been abandoned in a parking lot would seem to have great potential for recovering fingerprints since they are self contained crime scenes. However, the vehicle may be wet from rain or coated with dust, especially if it has remained in one place for a long time. Fingerprints cannot be raised from wet or dirty surfaces.

Car and truck interiors present different challenges. A steering wheel may be smooth, but curved and the seat covering, if not cloth, is usually textured. The main hope of an I.D. technician is that the suspect touched the windows or the rearview mirror. The I.D. technician usually has better luck at a burglary, if the thief was not wearing gloves. Fingerprints can be found on the glass from windows broken out of a home to gain entry. Another source could be a jewelry box picked up to empty the contents or the dresser top the jewelry box was on. Often, the primary task is to determine whether an observed print was left by the burglar, family member, or guests in the home.

Murder or rape crime scenes may not yield any fingerprints. If a weapon was used, it may have vanished with the suspect. Many murders are committed by someone the victim knows, so there may be no forced entry to provide fingerprint surfaces. During rapes, many times the only items touched are made of cloth. While fingerprints can be raised from cloth, usually other types of evidence are more

plentiful and easily collected.

It is evident that locating latent prints is difficult and challenging for an I.D. technician. He or she must re-create the criminal's path and decide which surfaces may have been touched, then print them. Locating the latent, however, does not guarantee it will be a viable print. Fingerprints must be of a certain quality before they can be compared to others.

One problem encountered with a latent is smudging. As the suspect releases an object he has handled, there is a tendency for his fingers to slide sideways, thereby partially obliterating the fingerprint. This is true of heavy objects and those handled in haste. The result is one portion of the print is rather clear and the other a dark smudge. With most latents, a partial print is all that may be obtained in the best of circumstances. The I.D. technician can only hope that enough identifying characteristics are included.

A similar problem confronted by I.D. technicians occurs when one latent is found on top of another. This is called superimposition. The concern in this case is determining which ridges belong to which finger. With luck, there may be a portion of one fingerprint with enough identifiable characteristics that has not been covered. The print would then be treated in the same manner as a partial print.

The quality of a fingerprint may also depend on the suspect's age or occupation. People who work with cement or other substances that dry and adhere to the fingertips leave

very poor quality prints. The matter on the fingers may coat and smooth over the ridges creating solid dots in the fingerprint. As a person ages, his or her ridge pores close, causing the fingerprint ridges to become faint.

As fingerprint technology became more and more important to law enforcement, it is not unusual that criminals tried to find ways to "beat the system." Some attempted to file the ridges on their fingertips smooth, while others used acid to achieve the same results. More industrious subjects turned to surgery and either had the outer layers of skin removed in hopes of a smooth print or had circles of skin cut in the center of their print then rotated to throw off the overall look of the print. The most famous case of all is that of Robert James Pitts, a career criminal.

Pitts was picked up by the Texas State Highway Patrol in 1941, for vagrancy and taken in for fingerprinting. It was discovered that the last joint of his fingers had no friction ridges. Pitts admitted that he had surgery several months earlier in an attempt to alter his fingerprints. During the surgery, the doctor cut out five flaps of skin along both sides of Pitts' ribcage. Most of the skin was removed from Pitts' fingers which were then grafted to the flaps along his ribcage. His arms were folded across his chest and his fingers were attached to his sides until they had grown together. They were then cut apart and the end joints of his fingers were covered with skin free of any ridges.[2]

Do these attempts to alter fingerprints work? No, because normally there is enough ridge left around the altered section to identify the person anyway. Once the criminal discovers that law enforcement personnel can not be easily fooled, he usually divulges his true identity. With that established, the abnormalities are noted and the person can be more easily identified in the future.

The I.D. technician employs many methods to lift latent prints from a crime scene. The most common is fingerprint powder, normally used at the crime scene, but, evidence may be taken back to the laboratory for print analysis.

Three chemical methods of developing apparently invisible prints are iodine, ninhydrin and silver nitrate. The iodine fuming method develops grease and oil prints on porous or absorbent items. If all three processes are to be used on an object, iodine should be used first. The specimens are normally placed in a plexiglass fuming cabinet in which iodine crystals are heated until they vaporize. The fumes are absorbed by fatty or oily material and the fingerprint ridges turn yellowish brown. The fumes do not alter the specimen being printed. Because the prints begin to fade almost immediately, they must be photographed for a permanent record.

Ninhydrin (triketohydrindene hydrate) reacts to amino acids found in perspiration and can be used to develop latent prints on paper or cardboard. The ninhydrin is mixed with acetone and then applied to the specimen by spraying, dipping or brushing. The vapors are very toxic and the

process should take place under a fuming hood for proper ventilation. Latents appear within minutes, but can also appear after twenty four hours. Heat will accelerate the process and, once developed, the fingerprint should be photographed.

Silver nitrate is the last chemical process applied to specimens because the solution will wash away fat, oil and amino acids. This reagent is used to develop prints on paper, cardboard, plastics and unfinished wood. A solution is mixed using silver nitrate crystals and distilled water or denatured alcohol. The alcohol evaporates more quickly than water so the ink on documents is less likely to run, but there may be some loss of the fingerprint with the evaporation.

The alcohol/silver nitrate solution is favored for paper items soaked in oily substances such as kerosene, which arsonists use to start fires. After the specimen is soaked in the silver nitrate solution, the appearance of latents is dependent upon exposure to light. Sunlight causes rapid development, but artificial light sources are preferable for more control. A latent exposed to light too long will gradually fade and, again, it is best to take a photograph of the print image immediately.

Within the last decade, another highly technical manner of developing fingerprints had emerged, the laser. High powered lasers are directed at fingerprint molecules to excite them. The molecules are composed of compounds that fingers leave behind, for example, the riboflavin derived

from the food we eat. The result of the excitation of molecules is fluorescence. The fingerprints glow and can be photographed. Lasers are extremely useful on surfaces that cannot be dusted with fingerprint powder or treated with chemicals such as the sticky side of tape. Of course, lasers are very expensive and considering the limited resources of smaller police agencies, are usually only purchased by large metropolitan agencies. Laser technology and its applications to law enforcement is in an early stage of development.

Over the years, police departments have easily collected millions of latent prints from crime scenes. Unfortunately, these prints have been of little use to detectives investigating a crime unless he or she has a suspect in mind. Clearance rates using latents have traditionally averaged about five percent of all cases investigated. The suspect's tenprint card can be pulled and the latent compared against the rolled prints. If the correct suspect has been detained, one will match. If not, the detective can only hope the criminal is eventually identified through other acts or evidence. It has been estimated that, for an average sized police department to check a latent print against all their tenprint files, a technician would have to work only on the assignment for fifty to one hundred years.[3] That is for one latent print and in the end, there is no guarantee the suspect's prints are in their files.

III. Modern Improvements: Automated Fingerprint Identification System

The Automated Fingerprint Identification System (AFIS) has been hailed as the greatest technological advance since radios were installed in police cars. Thanks to AFIS, thousands of serious crimes that were once considered unsolvable have been reopened and suspects arrested and convicted. One of the most sensational cases involves Richard Ramirez, California's "Night Stalker." " Three minutes after California's new automated fingerprint identification system received its first assignment, the crime stopping computer scored a direct hit."[4] A print had been lifted from a car at the scene of one of the murders attributed to the "Night Stalker." The print, when run through AFIS, was matched with those of Richard Ramirez who had prior arrests for drugs and auto theft. Ramirez was arrested and later convicted of murder. Had AFIS not intervened, Ramirez may have taken an untold number of lives.

Police in Edmonton, Alberta, Canada had closed the file years ago on a 1971 strangulation death of a woman found by railway tracks. A latent print was lifted from a wine bottle found at the scene. The area was a local hangout for derelicts and transients, so there was little hope of finding a suspect. The latent was eventually run through the AFIS computer and it hit on a man only convicted of petty crimes and last arrested in 1972. He was arrested and convicted for manslaughter and received a three year

sentence. Once a heavy drinker, he confessed he remembered little of the crime, but could remember his hands around the victim's neck.[5]

Almost five years after the kidnaping and rape of a four year old Michigan girl, a suspect was identified, tried and found guilty of the crimes. In September 1985, the child was coerced into the suspect's car, taken to a remote wooded area, then left to find her way back. She had wandered almost three miles before finding a house. The suspect's fingerprints were lifted from a diaper used to cover the little girl's face and from her school papers. His prints were on file from his arrest on a property charge in 1978.[6]

When Dallas Police Department's new AFIS computer was given its first assignment in 1989, to show a group of officers how it would work, the result was a match on a latent from a capital murder. The computer took only thirty two minutes to identify a nineteen year old who had fatally shot a man and critically wounded the man's wife. They had come home from a party and had surprised the teenager who was burglarizing their home. The suspect lived just down the street and was on parole for a drug charge.[7]

The Milwaukee Police Department has had some very quick solutions to crimes because of AFIS. A citizen reported a burglary at 10:00 p.m. and the technicians found a quality latent print at the scene. The latent was run through AFIS and had positively identified a suspect by five in the morning. Three hours later, the suspect was arrested and

the citizen's property was recovered. From start to finish, the time elapsed was ten hours. An even better time of two hours was accomplished on a stolen vehicle. The vehicle was recovered at 2:05 p.m. and was processed for prints. One latent print was found and run through AFIS. At 3:15 p.m., a suspect was identified and arrested forty five minutes later. Milwaukee Police Department had a remarkable hit ratio of thirty six percent, approximately ten percent higher than found in other agencies, during their first six months on-line.

The first automated fingerprint systems went on-line in the late seventies. These original systems were developed by Rockwell International, which later became known as Printrak. The four agencies involved include the police departments of St. Paul, Minnesota, San Jose, California, Houston, Texas and the sheriff's office in Montgomery County, Maryland. During the middle to late nineteen eighties, new and better systems were created, greater interest was generated in law enforcement agencies, and state and local governments realized the potential for the AFIS concept.

Without modern-day computer capability, AFIS would still be a dream. How the computer looks and stores the information a fingerprint provides is both fascinating and highly accurate. The computer uses minutiae and the relation between them, then encodes that information for storage. Minutiae are the points at which ridge lines end or split in two. The ridge lines on a fingerprint can be

short, less than a quarter inch in total length, or they can wrap around a fingertip converging with and diverging from other ridge lines. While the position and direction of the minutiae can change because of the pliability of fingertips, the ridge count between minutiae never changes. It is because of this reliability that AFIS is so accurate.

AFIS stores both the information from tenprint cards and latent prints. There are specific steps that are followed before each type of fingerprint is entered into the computer. The quality of the entered print is of utmost importance and great care must be taken to ensure the integrity of the system.

Before entering the fingerprints from tenprint cards, each fingerprint is checked for clarity, classification and position on the card. The fingerprint must be exactly centered in its appropriate block. If it is not, the print is copied, cut out and pasted on the print card in the correct position. This is called "blocking" the card. The card can then be placed in the data entry reader to check the image. If the print is not clear or there are mistakes, corrections must be made. The finished fingerprint is entered into the computer to determine if the prints are already stored. If so, information on the card can be checked for accuracy. The prints could be the same on both cards, but the subject might have given two different names. In this case, the correct name would be determined and properly entered.

A latent print that is submitted for a search against

the files of tenprint cards is first examined to determine if it is "AFIS quality." The print must have an adequate number of minutiae for it to be verified against another print. Smudging and overlapping may make it difficult for a technician to be able to sufficiently clean the print up.

If the latent is of adequate quality, it is first photographed and the picture enlarged to five times the original size. The print is placed over translucent glass with a light underneath. Each ridge is traced onto paper covering the print and if an area is smudged or obliterated, the technician relies on his knowledge of fingerprints to decide how to finish tracing a missing ridge line. After he or she completes the tracing, the fingerprint is reduced and entered into the computer.

Information about the suspect, if known, is entered with the fingerprint. The fields include sex, approximate age, and which finger the latent is from. Just knowing the sex of the suspect will eliminate quite a few tenprint cards from comparison. The search can take as little time as ten seconds or as long as a few hours. The computer eventually lists the top number (usually ten) of suspects from the best possibility on down. Each suspect is given a score from 1 to 9999, depending on how close his fingerprint is to the latent. The higher the score, the better chance the latent will match the suspect's tenprint card.

The I.D. technician can call up, one by one, each of the top suspects' tenprint cards and place the appropriate fingerprint next to the latent for comparison. If it

appears that the two prints match, the technician can point out the similar minutiae with computer created arrows on each print. When finished, a printout is made with a picture of the latent, the fingerprint it matches from the tenprint card and some of the suspect information. The printout does not give the name of the suspect, but includes his or her assigned number.

A fingerprint identification system that receives prints from several agencies identifies, by separate number, the submitting agency. When one police department submits a latent that hits on a tenprint from another department, arrangements are made to view the tenprint card at the other department. All AFIS hits must be verified by a trained technician visually checking the latent print against the rolled fingerprint. The computer alone cannot verify a suspect.

Although there is a better chance that the first suspect on the list often will match the latent, it is not unusual for the real suspect to be in a lower position. Occasionally, the fingerprint of a suspect later found to have committed the crime may receive a low score, for example; 689 out of 9999. As long as the fingerprints are compared and verified, the score means very little. AFIS is only as good as the information entered into the computer and not all fingerprints are of the highest quality.

Identifying suspects through latent fingerprints is not the only use for AFIS. As mentioned before, people who have been arrested occasionally lie about their true identity.

They have found that many police agencies have few available means to determine their correct name. So, each time they are arrested, they change their name a little or create an entirely new name and change their date of birth. When the arresting agency does not find any information under the name and birthdate given, a new person is created with his own criminal history. This keeps an extensive criminal history from being credited to one person and parole officers are less likely to find out about parole violations.

Larger metropolitan areas may have an abundant supply of fingerprints on file against which an arrested person's prints can be checked. Usually, the local sheriff's office, or a large police department, can look through their files manually under the correct classification to find out if the person has an arrest record. Sometimes one is found, sometimes not. AFIS eliminates this problem. The suspects tenprint card is entered and minutes later his correct name and birthdate appears along with all his aliases. Prisoners who have "beaten the system" in the past are very surprised to discover they can no longer deceive the authorities.

AFIS is also useful in finding criminals who have committed a series of crimes. Since latent prints are entered into the computer, new latents can be checked against old latents. Even if the computer has no suspect to match with the latents, the prints remain together until perhaps a tenprint card is entered and the suspect can be identified. A serial killer or rapist might clear up crimes

from five or ten years ago, once his identity is finally established.

Forgery and check-related crimes have always presented unique investigative problems to law enforcement. The City of Santa Ana, California began experiencing, in 1987, an increase in the number of stolen and counterfeit checks being passed. A large ring of counterfeiters had settled in the area, mainly preying on small stores and check cashing businesses. The criminals would use false identification to cash the forged checks, and once the area was saturated, they would move on. Since no one had their correct names, they were virtually undetectable, until Cal I.D.[8]

Cal I.D. is California's AFIS. The Santa Ana Police Department suggested taking the fingerprint of the person cashing the check. Concerns were raised about the messy fingerprinting ink and the possibility of driving away customers. The first dilemma was solved with inkless fingerprint pads and several businesses decided the advantages would far outweigh the disadvantages. The interested owners were given the fingerprinting equipment at no cost to themselves. They were also issued window decals and placards which explained the Check Print program.

In April of 1988, the program officially began. On every check was the thumbprint of the person cashing it. Checks that were later found to be stolen were run through AFIS and the culprits identified and arrested. When the forgers discovered they were to be fingerprinted, they sometimes left the bogus checks and identification as they

departed. As news of the program's success spread, more businesses became members. There has been a forty eight percent decrease in reported forgeries and the businesses' losses have decreased about sixty eight percent.[9]

The myriad of uses for and the successes of AFIS are evident. It is, however, an expensive endeavor and much thought and preparation is necessary for its implementation. Because of its cost, the cities within a large metropolitan area may choose to share project financing. The agencies must also decide who is to have control over the integrity of the system and the training of the operators. Several agencies across the nation would normally be contacted for information on their particular arrangements and for statistical information. Each agency's statistics are kept differently, but success overall points to the value of AFIS.

IV. AFIS Networks

One of the most helpful police departments contacted for AFIS information was Milwaukee, Wisconsin. Identification supervisor Wayne Peterson said that the police department has had AFIS since August, 1987 and Milwaukee has provided all the financial backing. However, any other police agency in the area can and does use the system free of charge. The Milwaukee Police identification technicians even provide the preliminary preparation of fingerprints necessary before they are evaluated. Peterson has heard that some police departments charge as much as one hundred fifty dollars per print for the privilege of using

an AFIS. He acknowledges that while he enjoys being able to help the agencies in his areas, there may come a time in the future when he will have to put a price on a fingerprint. Peterson said his manpower is already growing increasingly encumbered by the amount of fingerprints sent through AFIS.

The Milwaukee Police Department has approximately 225,000 tenprints and 1,500 latents on file with their AFIS. The average monthly additions are 14,000 tenprints and 1,600 latent prints. During 1990, 4,616 crime scenes were processed and 1,470 prints of value were lifted. Out of those, approximately 300 will lead to positive suspect identification through AFIS. Peterson did not have the exact number for 1990; for 1989 it was 325.[10]

Chicago Police Department's fingerprint system is for agency use only. Jesse McMullen and Tom Krupowicz are both supervisors over the department's AFIS and they stated it went on line in November, 1986. As of December, 1990, there were 900,000 tenprint cards entered and 17,000 latents. Out of the latents, some 1,500 suspects had been identified and 1,450 cases filed, mostly burglaries. Chicago not only has suspects entered on AFIS, but also all their officers and civilian personnel. Needless to say, from time to time, employees' fingerprints will appear at a crime scene if they are there processing the scene.[11]

Lieutenant John Denk of the Dallas Police Department is the head of their AFIS and coordinated its implementation. Dallas currently has almost 300,000 tenprints in their system and over 4,000 latent prints. They have annual

additions of 22,800 tenprints and 6,700 latent prints. Out of the latents, approximately 90 percent are identified as belonging to suspects.

Dallas' fingerprint system has only been in service since July of 1989. Lieutenant Denk noted that his department's entry into the world of AFIS may have been smoother than most because it was four years in the making. He said it was planned from the beginning to allow other area police departments to use the system for a fee and the arrangement works quite well. The other agencies submit tenprint cards, as well as latents, which benefits everyone involved. The Dallas Police Department's I.D. technicians are the only personnel who have direct access to AFIS.[12]

Lieutenant Steve Hall of Fairfax County Police Department reported on the status of NOVARIS - Northern Virginia Regional Identification System - of which his police department is a member. The other police agencies include those from Arlington and Prince William Counties and the cities of Alexandria, Fairfax and Falls Church. Their system went on line in April, 1984 and a year later was linked to the District of Columbia AFIS of the Metropolitan Police Department in Washington D.C. and the AFIS of Montgomery and Prince George's Counties in Maryland. This was the first statewide AFIS in the country.

Through 1990, NOVARIS has a total of 135,000 tenprints on file and almost 12,000 latent prints. Lieutenant Hall said they do not keep statistics on total tenprint checks, but 3,200 latent prints were entered into the system. Out

of the 139 hits, 104 were identified as criminals. Besides criminal checks, NOVARIS is used for background inquiries on solicitors, taxi drivers and gun and gold dealers. There were 2,375 of these checks during 1990. Although there are no statistics available, the Secret Service also has remote access to NOVARIS.[13]

The most far reaching AFIS is the Western Identification Network (WIN). There are eleven states involved in varying degrees - Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming. The central computer system was installed in Sacramento, California in 1989 and 900,000 fingerprint records were loaded. The WIN AFIS is capable of processing 18,000 tenprint cards and 3,400 latent prints per month and currently has a data base of 1.4 million criminal fingerprint records.

WIN is a unique arrangement between the participating states. Alaska, California and Washington already had their own systems and had only to interface with five other states. These states, Idaho, Nevada, Oregon, Utah and Wyoming were given AFIS capabilities equivalent to stand alone systems when WIN was funded. Arizona and Montana were still in the process of installing the necessary equipment for interfacing with WIN at the time this information was provided in December, 1990. Montana was still seeking the funding needed to buy additional computer equipment.

Many of the states have subsystems and booking terminals in different cities, as opposed to one central

location. Each agency involved determines the purpose of its AFIS. Nevada, for example, is interested in controlling the gambling and enters fingerprints of all personnel connected to gambling activities. They also check all the applicants wanting to care for children. Potential child abusers might not be detected, but those already possessing such records would be identified.

Oregon checks on all people who purchase guns. Each state must decide for itself the best uses of the system. There are no regulations now, but should these miscellaneous non-criminal uses glut the system, they may be restricted in the future.

Ms. Wentz stated "there were no significant problems encountered during implementation other than a few minor delays getting remote booking terminals and interfacing with existing AFIS systems."[14] She also said there have been other states that expressed an interest in joining WIN including New Mexico and Texas.

V. AFIS Costs and Effects

A lot of thought and consideration goes into the decision to purchase a fingerprint identification system. How will the system be financed and what other expenses will arise? Current and planned use of personnel should also be examined. How will AFIS affect them and how would a high quality system be maintained?

The actual cost of an AFIS is the largest hurdle to overcome. With more and more systems in use and delivering such amazing results, finding the funds should have become

easier for police agencies. The costs speak for themselves. Dallas Police Department's AFIS was 4.5 million dollars, the Michigan State Police spent 18 million, the Illinois State Police system cost 20 million. Are these tremendous costs justified?

As Joseph F. Slawinski points out, "Money, or lack of it, is the main reason why most agencies have not proposed a system. As a society, we can find millions of dollars to pay for dribbling a basketball, hitting a baseball or throwing a football, but not to possibly identify a murderer or a rapist."[15] What family with a member who has been brutally murdered or raped would object to spending the money needed for AFIS if there were a chance the criminal could be identified? What are some of the benefits of having AFIS, especially for the public?

The greatest benefit is ridding society of some of the most hardened and least likely caught criminals. Drug addicts may commit hundreds of burglaries before being caught and, in their frenzied state of mind, it is unlikely they will remember every house or building burglarized, carelessly leaving behind valuable fingerprints. With AFIS, the burglar may be caught immediately, eliminating the grief of others possibly destined to return home from work only to find their houses ransacked and valuables missing. There is also the possibility that with a more rapid criminal identification system, stolen items could be recovered.

Millions of dollars in warrants could be served, once the subjects who use aliases have their criminal histories

consolidated under one name. The benefits for check cashing businesses and retail trade have already been discussed. The great cost for an AFIS could result in savings even greater for the public, not only in money, but in lives as well.

Once knowledge that money is available for AFIS, choosing and preparing for the system should be a careful procedure. There are several fingerprint identification systems on the market today. A project coordinator can choose a system he or she thinks would best meet the police agencies' needs. If unsure, coordinators can visit police departments similar in size to determine the most suitable system.

The plan to implement a new fingerprint system may cause an agency to detect possible shortcomings. While AFIS does the work of countless employees, it also creates new tasks and paperwork. The police agency is forced to analyze employee uses to determine if additional personnel are needed. "It has been our experience that the workload does not decrease - but increases dramatically."[16] This results from the amount of fingerprint cards that must be analyzed and cleaned up before processing and new forms used to track the fingerprint system.

Increased identification of criminals leads to additional calls assigned to detectives, more interviews with criminals, larger numbers of cases filed and many more hours in the courtroom testifying. Viewed in this manner, AFIS may seem to create much more work than it alleviates.

The burdens may temporarily overwhelm an unsuspecting police agency. If well planned, however, the introduction of AFIS will proceed smoothly.

After the AFIS is chosen and installed, the personnel using it must be trained. Even before the installation, "because reorganization and training of a crime scene investigation unit can take months or even years to complete, efforts in the area are best started well in advance of the anticipated delivery of AFIS."[17] A well trained crime scene investigator is every bit as important as the expensive fingerprint identification system because, as the old computer adage says, "garbage in, garbage out."

There may be a tendency to train fingerprint experts on AFIS, but not the technician who collects the fingerprints at the scene. The technician should be sent to schools to learn how to classify, search for and identify fingerprints. Also important is knowledge of comparing latent with rolled prints and the various techniques for raising fingerprints from difficult surfaces. Without this training, the money spent on AFIS will not be used effectively.

The ideal arrangement may be to have crime scene investigators trained in crime scene collection and on AFIS operations. The investigator would have total responsibility for processing scenes, entering the latents in the computer, marking all latent print comparisons and testifying in court when needed. The advantages are numerous. The technician would be able to see first hand if the fingerprints he or she had been lifting were not of the

highest quality. There is a sense of continuity and completion when the technician follows a case from start to finish which may result in higher job satisfaction. There is daily variety. Instead of sitting at a computer eight hours a day pulling up latent comparisons, the technician could be out following up on a case that has a particularly good chance of being solved.

The disadvantages include high training costs for all the technicians. Some may be better at lifting fingerprints and some may excel at latent print comparisons. Not using the same person from beginning to end opens up the possibility of using civilians for some of the jobs. There are two trains of thought in police agencies as to whether the identification technician or criminalistics specialist should be an officer or a civilian. Some believe the officer, having police training in his or her background would be better at evidence collection and analyses. Others feel that regardless of the employee's background, the training received determines that technician's competence and qualifications. "At the very least, both the technician and the examiner should be under one command to facilitate training, quality control and goal sharing."[18]

Conclusion

The value of fingerprints was discovered a century ago. Since then police agencies have collected millions of fingerprints and found an efficient way to classify them. Fingerprints were accepted by courts as admissible evidence because of the fact that no two individual's prints are

identical. Criminals have been identified as having committed a crime using fingerprints and their criminal histories have been compiled based on those prints. Different means of collecting prints from wood, cloth, paper and many other difficult surfaces have been discovered and used successfully.

The same dependable techniques served police agencies for years. Files were maintained on criminals, sometimes under several names, and they served their purpose. Occasionally, a detective would be able to place a suspect at a crime scene because he had a fingerprint from the scene and a fairly good idea who the suspect was. These were infrequent successes.

Then, a decade ago, the automated fingerprint identification system arrived, much to every police officer's delight. Here was a crime fighting tool that was effective. Cases closed years, even decades before, were reopened, prosecuted and criminals went to jail. Crimes, like fraud, could be prevented and those crimes committed had a better chance of being solved. Computerization has highly benefited the police. In light of AFIS, what else does the future hold?

Perhaps the Western Identification Network provides a view into the future. At one time such an extensive fingerprint identification system might have seemed improbable. If it works with eleven states, why not the possibility of connecting all fifty? Of course there would be a great deal of bureaucracy and red tape to eliminate,

but consider the possibilities. One AFIS containing the fingerprints of every person arrested and printed in the United States. There would be no escaping the "long arm of the law" if a criminal left a fingerprint of AFIS quality at a crime scene. The effects of a United States AFIS would be far reaching and who could imagine the effect it would have on crime in America.

A concept a little less probable is an intra-continental AFIS. There is little doubt that criminals cross both the Mexican and Canadian borders to escape detection. Today it takes a lot of time and effort to go through Interpol to determine whether a person is wanted. Even license plate registrations take days. There is little cooperation between the countries. With a joint AFIS, fingerprint records would be even more extensive.

Interfacing with Canada would not be as great a problem as with Mexico. Canada is very similar to the United States in the areas of wealth, language and political philosophies. Mexico would be more difficult. There is a language barrier and it is a very poor country, one unlikely to want to spend even four million dollars for an AFIS. Perhaps at this time an interstate AFIS is the only feasible possibility.

There are currently other technologies that have meshed well with AFIS. One is the facsimile machine. There are some faxes that can print very high quality fingerprints. One agency wishing to instantaneously view the tenprint card from a distant city may have it faxed. The fingerprint examiner can then determine with accuracy if the prints on

the faxed page match those that he holds for comparison. The fax machine can also transmit back-up dates about a suspect that only the sending police agency has.

Approximately twenty five percent of rolled ink fingerprint cards do not meet AFIS standards. "That means one in four inked cards currently being prepared is of such poor quality that it may be rejected as unreadable by most AFIS systems."[19] The solution - an inkless fingerprint using a laser. The resulting fingerprint can be viewed and, if flawed, retaken. The laser also allows poor quality latent prints and tenprints to be scanned and computer enhanced. The new laser-printed cards will greatly enhance the capabilities of AFIS.

Even more exciting is "the use of live-read electronic fingerprints captured electronically and transmitted over telephone lines."[20] This technology would be immensely helpful in leading the way to a central AFIS for all fifty states and it is available at this moment. California is attempting to implement the electronic fingerprint system in two of their counties. Eventually, it is hoped the system will go state-wide and, via satellite access, world wide.

AFIS has indeed opened up new horizons for law enforcement. At a time when it seemed hopeless, between such limited jail space and so many new drugs and new abusers, the automated fingerprint identification system has been a welcome gift. It has given new hope to officers who might have given up prematurely, overwhelmed by the odds against them. The future is bright for law enforcement and

used wisely, AFIS will surely be only the beginning of a host of new technologies dedicated to fighting crime. With proper management and cooperation, the entire world could be linked together on one fingerprint system. The sharing of information between the world's police departments will only increase their effectiveness. Perhaps it may even have the power to combat crime at unthinkable levels.

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