

WHAT IMPACT WILL GENETIC TECHNOLOGY HAVE ON
THE SELECTION OF CALIFORNIA PEACE OFFICER
CANDIDATES BY THE YEAR 2009?

A Project presented to
California Commission on
Peace Officer Standards and Training

by

Karen T. Axall, Lieutenant
San Diego Sheriff's Department

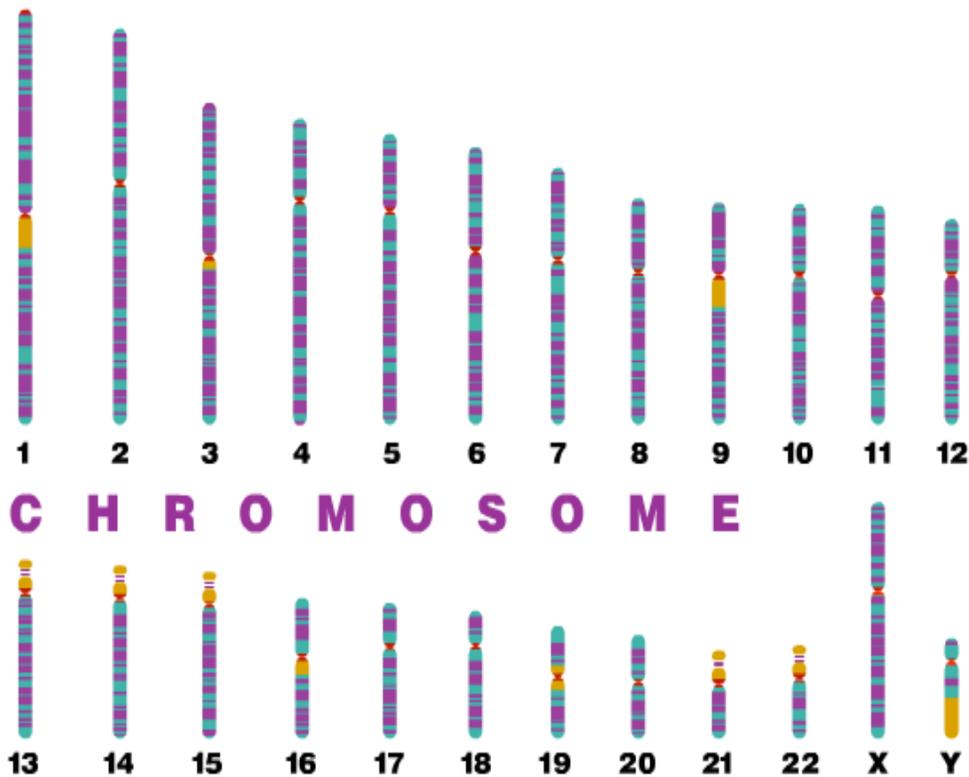
Command College Class XXVIII

Sacramento, California

April 2000

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to Chief Maudie Bobbitt for recommending me for Command College and for telling me it would be a lot of work. (She was right!) I would like to thank POST Consultant Ed Pecinovsky for supporting my decision to enter the program. I am indebted to my classmates in Class 28 especially Tim Shelby for his assistance with many technical aspects of the project, Clete Hyman for his expertise and knowledge of the NGT process and Cathy Sulinski for her support and encouragement during the process. I wish to give a special thanks to my family for their understanding and support during this arduous journey. I also greatly appreciate the patience and input that POST Consultant Alicia Powers provided during the final (and lengthy) rewriting process.



This Command College Project is a Futures study of a particular emerging issue in law enforcement. Its purpose is NOT to predict the future but rather to project a number of possible scenarios for strategic planning consideration.

Defining the future differs from analyzing the past because the future has not yet happened. In this project, useful alternatives have been formulated systematically so that the planner can respond to a range of possible future environments.

Managing the future means influencing the future--creating it, constraining it, adapting to it. A futures study points the way.

The views and conclusions expressed in the Command College project are those of the author and are not necessarily those of the Commission on Peace Officer Standards and Training (POST).

Preface..... v

Chapter

1. THE HUMAN GENOME PROJECT1

 Introduction

 Social Issues Concerning Genetic Research

 Post Minimum Standards of Selection

 Predicting Violence

2. FUTURES STUDY OF GENETIC TECHNOLOGY.....11

 Forecasting of Trends and Events

 Optimistic, Most Likely and Negative Scenarios

3. STRATEGIC PLANNING AND TRANSITION MANAGEMENT..... 28

 Strategic Planning Process

 Transition Management

4. IMPLICATIONS ON LEADERSHIP.42

 Findings

 Recommendations and Implications

 Budgetary and Funding

 Conclusion

The Appendices

A. LIST OF TRENDS57

B. LIST OF EVENTS.....58

C. TREND TABLE.....59

D. EVENTS TABLE.....	60
E. CROSS IMPACT MATRIX TABLE.....	61
F. LETTER FROM SCIENTISTS.....	62
Endnotes.....	64
Bibliography.....	67

PREFACE

What difference does it make to know that our DNA is telling our RNA to tell our ribosomes to make protein that will influence our behavior? It should foster a hard-nosed skepticism about our choices and judgements and make us alert for our atavistic, perhaps gene-propelled impulses like racism and sexism that we don't want and make no sense in today's world.
--William Wright, *Born that Way*, (1998)

During the next decade the very foundations of many cherished institutions will be irrevocably challenged and ultimately demolished. Previously held assumptions about nature versus nurture and the effect of heredity over environment will be impacted as scientists unravel the complex genetic codes contained in human DNA. When the information gained from the Human Genome Project is complete, theories about the etiology of crime in relation to poverty and lack of education will be altered. Efforts aimed at eradication of drugs will also change if a biological basis for drug addiction is proven. Biological interventions will supercede the current focus on interdiction and education as a means of prevention.

As society begins to understand the complex biological information it will have to change the way it responds to criminal behavior. Likewise, societal institutions that are tasked with dealing with criminals will also change, as organizational responses adapt to the developing information. Detention centers may become almost entirely medically oriented, as genetic therapy becomes the judicially imposed treatment for certain types of criminal conduct. Within one decade the changes arising from the impact of computer technology and the biological revolution will be profound. The next decade is full of great promise and equally great challenge. The challenge for law enforcement leadership is to begin preparing for the future today.

CHAPTER 1

THE HUMAN GENOME PROJECT

Introduction

The world is truly standing at the threshold of a golden age of biology analogous to the computer revolution that occurred during the last decade. Within the next few years the biochemical secrets of DNA (deoxyribonucleic acid), the chemical foundation for an individual's entire genetic composition, will be revealed to scientists who are working to discover the etiology of human disease. This massive undertaking that scientists are working on is called the Human Genome Project (HGP). The goal is to create a very detailed map of all human chromosomes, showing the location and description of each gene in great detail. The scope of the Human Genome Project has been likened to that of writing a set of encyclopedias describing all human genetic material. The volumes were defined in the year 2000. The next stage of research will consist of refining the information contained in each volume. This research is progressing ahead of schedule and is estimated to be complete by the year 2003 if not sooner.¹

The successful completion of this project could provide the ability for employers to benefit from the scientific knowledge developed by researchers. Within several years of its completion, the technology will exist to provide employers with the means to accurately screen applicants for job related personality attributes required or more desirable traits specific to certain work environments. It is not an uncommon business practice to hire individuals for certain professions based on genetic attributes and this evolving genetic technology will cause this type of selection refinement to increase. This type of knowledge would also be beneficial to public agencies that hire peace officers.

Candidates who possess positive traits such as: empathy, communication ability, intelligence, and cooperation would be selected. Those with violent, hostile, aggressive, cruel, paranoid, ethnocentric and anti-social personalities would not be selected. This command college project is presented on the emerging issue of using DNA technology to screen peace officer candidates based on their psychological genetic profile.

Impacting the speed of the discoveries involved in the Human Genome Project are the parallel technologies being developed in computing, particularly the speed at which computers process information. During the first week in August 1999, Hewlett Packard and the University of California at Los Angeles jointly announced the discovery of a new chemical process that could lead to computer circuits as thin as molecules. The results of this discovery could increase the speed of computation a billion times faster than today's computers. The speed of a computer is measured by how fast it can perform operations or computations. The world's fastest computers now work in teraflop range- a trillion flops or floating point operations per second. Increasing the speed of supercomputing, (which works by breaking down a large complex group of information into small known variables), will also speed the completion of the HGP. The United States government will be working on a supercomputer that will compute at the 30-teraflop speed in 2001 and a 100-teraflop computer by 2004. Based on these and related technological breakthroughs, the computational complexities involved in deciphering the genetic code known as gene mapping should be greatly accelerated.²

Due to computer advances such as these, an explosion in genetic research is expected as biomedical researchers are provided with a complete blueprint to understand human biology. Over the next few decades, biochemical codes for human DNA will be revealed

that will unlock the cause of most disease and other biological processes. This genome research may ultimately lead to the medical treatment and cure of most gene-linked diseases such as Alzheimer's, Lou Gehrig's, alcoholism and obesity. This research could also result in medical procedures such as performing genetic surgery/ therapy inutero. Researchers estimate that these scientific discoveries alone will prevent 13 million deaths from heart disease and another 2 million deaths from lung cancer, leukemia and colorectal cancer.³

Social Issues Concerning Genetic Research

Accompanying these exciting medical advances and investment opportunities will be concomitant complex social issues to resolve that will involve many different competing groups. The potential for immense profits as biotech companies compete for patents to these discoveries is great. Likewise, the potential for abuse of the genetic information also exists. Questions concerning the ethics of identifying the presence of incurable genetic diseases that may not manifest for decades or whether all children should be genetically screened at birth will become more prevalent as the completion of the gene project nears.⁴

In the public sector, issues regarding suitability for hiring, insuring, advancement, promotion and assignment will need to be addressed by public agencies, legislative bodies and human resource specialists. Lawmakers; religious leaders; special interest groups like law enforcement unions and the American Civil Liberties Union (ACLU); community leaders; scientists and educators will have to redefine how society views disease and disability. Decisions by parents who are interested in genetically engineering their children will be possible, if not in this country, then certainly available in a less

regulated country or in an area where there is no jurisdiction such as the open sea.

Genetic property will be the subject of litigation: issues concerning property rights of ownership of fertilized eggs will transform into ownership of cloned tissue, organs, etc. Certain occupations designated as high security, such as those of secret service agents or pilots of Air Force One, could be genetically screened for optimum selection parameters. Selection standards based on national security would be necessary to insure the safety of the President and probably would appear reasonable to most citizens.

In addition to the implications of the medical discoveries on society in general, the vast knowledge gained from the Human Genome Project has the potential to seriously impact the entire law enforcement profession in other areas as well. The importance of DNA evidence is already well established and has come under intense scrutiny in high profile murder cases and is routinely used to resolve paternity issues. As technological refinements are made and DNA processing costs decrease, DNA evidence could conceivably replace fingerprint analysis in future criminal investigations. The implications of DNA technology on the law enforcement profession are already becoming evident, as every State in the country begins implementing a criminal DNA index for individuals convicted of certain crimes: rape, murder, and child abuse. This electronic database is called the Combined DNA Index System or CODIS.⁵ The costs associated with obtaining, processing, storing and retrieval of criminal DNA continues to rise and will probably continue to increase as crime grows during the next decade with the anticipated population increase in California. The increased costs will impact all levels of law enforcement service by draining revenue from other areas such as

training and infrastructure replacement to pay for the costs associated with DNA evidence.

POST Minimum Standards of Selection

The Commission on Peace Officer Standards and Training (POST) role plays a seminal role in the selection process which includes the responsibility for instituting minimum standards for selection of peace officers in California. The standards range from reading and writing ability to psychological suitability. POST's involvement includes conducting research into the reliability of tests and procedures. Recently, because of highly publicized incidents involving peace officers who use unreasonable force against people, the efficacy of the tests including the battery of psychological tests used to select these officers has come under scrutiny.

The public continues to express concern over the use of unreasonable force by law enforcement personnel who kill or injure citizens when other options are available. In the age of the Internet, where real time video provides worldwide, instantaneous communication, the intense scrutiny of all actions by law enforcement is ubiquitous. The amount of public outcry will continue with the increasing availability of less lethal means of force. This in turn should result in continuing pressure exerted on POST to improve the means by which peace officer candidates are selected, so that those who are predisposed to use excessive or deadly force inappropriately are weeded out.

The public has a legitimate concern that peace officers selected, hired and trained by public agencies will not abuse the authority of their position. Agency administrators, city managers and risk managers recognize and support the absolute necessity for optimizing the selection of peace officers. In an era where excessive litigation can bankrupt a smaller

municipality, the assurance that POST will continue to provide guidance in these areas becomes increasingly important. The threat of lawsuits for reckless behavior whether it involves pursuits, arrests, custody environments or any other law enforcement activity, will continue to cause grave concern at all levels of society and within the criminal justice system. Clearly all law enforcement would benefit from the ability to make a more accurate determination as to the psychological suitability of a candidate during the selection process. Currently psychological tests, a thorough background check and voice stress analysis and/or polygraphs are used to screen law enforcement applicants.

Predicting Violence

In 1992, a Use of Force Report written for POST recommended that pre-employment psychological screenings needed to describe any risk factors believed to be associated with the potential to use unreasonable force. Predicting future violence was considered a key factor in screening for this type of violence. Such predictions are difficult because of the complexity of the variables involved and because that specific trait is hard to isolate, due to its low base rate of occurrence in the general population. The report cited that most literature researched indicated mental health professionals cannot accurately predict with a high degree of certainty future violence and clerical personnel have been more accurate in predicting violence than professionals.⁶

According to the report, there is evidence to suggest that trait based behavior defined as a propensity for violent behavior does exist and can be identified. The background investigation is designed to check into the applicant's past behavior, as the most significant factor in predicting future behavior. Individuals identified with hyperaggressive, hostile or assaultive personalities are generally deselected in the

screening process either through a records check or during the reference check interviewing process. These traits can be expressed in a variety of ways from a history of arrest to a history of moving vehicle code violations. The author listed 29 items that research has indicated correlate with adult violent behavior. The report indicated that although the correlation(s) is not absolutely linked to violent or antisocial adult behavior, it might be indicative of a predisposition to engage in inappropriate or unnecessary force. The stipulation for using these warning traits was: a positive finding on an undetermined, predefined threshold number of variables should cause concern. This subjective and unstructured method of determination is one of the major problems with psychological testing. In the hands of a skilled practitioner, an informed decision is possible. In the hands of a less-skilled practitioner, who may have received the contract because he/she is the lowest bidder, the hiring decision may be less accurate. The information developed should then be used in conjunction with the background investigator findings to make a determination as to whether this individual is prone to violence.⁷

Although this is only one study, a more reliable means of prediction is needed to provide the public with assurance that law enforcement personnel have been appropriately screened. Many of the traits listed in the report correlate with adult violent behavior such as Attention Deficit Disorder; family histories of anti-social conduct and crimes of violence; and major mental disorders. These traits are also thought by scientists to be gene linked. Although obvious examples such as these are probably screened out, given the time constraints that many agencies are under to hire personnel, some relevant information might not be known during the selection process. Critical information that if known, would preclude the candidate from being hired could result in complaints,

lawsuits, and poor community relations for the hiring agency. Clearly a number of the traits listed as described above are gene based in that they appear to occur in biological families. The trait listed as number 20. - A history of authoritarianism and number 29. - A history of bias, poor verbal and interpersonal skills and pronounced ethnocentricity also may be a gene-based trait according to preliminary research.⁸

Improving the Selection Process

It is time to consider the possibility of using genetic profiling to improve the candidate selection process for the following reasons. The process being used is not entirely sound from a scientific perspective. In particular, the psychological evaluation has many subjective components. There are many opportunities for someone who has a predisposition toward violence to be overlooked, because of insufficient time to conduct in-depth interviews with appropriate persons who have knowledge about the candidate's behavior and character. In addition, lack of records, distance in the case of candidates who have lived in other areas, etc. can all contribute to these costly selection errors.

Another reason for using genetic screening in the selection process is the cost of hiring. The entire process is time consuming and expensive in terms of the amount of money invested in the screening process, versus the amount returned during the employee's career (depending on the length of service and other variables). This represents a sizeable investment to any agency. The final portion of the process, the medical screening, includes psychological testing, and the result after the large and lengthy investment in the background investigation, can easily be a disqualified candidate. Because of the requirement that conditional offers of employment have to be made prior to the final medical testing, there is a high percentage of failure and a

significant monetary loss to the agency that spent many hours on an applicant(s) who was subsequently not hired. When this failure to hire scenario is repeated many times over, there is a substantial monetary loss to the agency. Genetic screening would be more cost effective because it would eliminate unsuitable candidates early in the process, prior to a large expenditure of money and time.

A final factor to be considered when examining the efficacy of using genetic screening, is the increasing competition from the private sector. Although it is not a direct factor in the above reasons for improving the process, it would be a by-product of an improved process. With a healthy economy and low employment, the private sector is in direct competition for qualified applicants. As private security companies continue to grow, they too will compete for potential employees from the same candidate pool as public sector employers. If agencies improve the efficiency of their applicant screening by speeding up the process to eliminate unsuitable candidates (earlier in the process), they will be more competitive, even in a tight labor market.

Public agencies are increasingly competing with each other for the shrinking pool of qualified candidates and this trend will continue. Agencies need to examine the complete cost of hiring applicants. This cost should include the number of candidates who successfully pass probation and remain in their careers, as opposed to only counting the number of candidates who are hired initially. This false reading does not accurately reflect either employees who are hired but may soon resign due to academy failure or lateral (transfer) to other departments. Employers that continuously turn over new hires to other higher paying jobs as soon as they are trained or have the candidates fail probation

after their academy graduation, need improved safeguards to better predict overall long-term success and future stability in the profession.

Genetic screening has the potential to be more reliable, more accurate and more cost effective than the methods now being used. This would include predicting successful completion of training and passing probation. Genetic screening has the future potential to eliminate the need for the exhaustive background checks currently in use. Eventually, many areas of the background selection process could be civilianized or even outsourced, by using DNA lab personnel to conduct some of the screening. Such improvements would streamline and enhance the speed of the process considerably.

The approaching availability of genetic technology, POST's required minimum standards for selection, the public's legitimate concern about unreasonable force being used by law enforcement, and the lack of accurate testing/selection devices to absolutely predict violence in applicants, are all related to the issue being studied. Ultimately, instead of being a negative elimination of undesirable traits, the process could also be fine-tuned to screen in those traits deemed desirable by society. This project examines the question: what impact will genetic technology have on the selection of California peace officer candidates by the year 2009?

CHAPTER 2

FUTURES STUDY OF GENETIC TECHNOLOGY

Forecasting of Trends and Events

Future forecasting is research based anticipatory planning. It provides the forecaster the capability to examine alternative futures, to formulate strategic plans based on a reasonably foreseeable future and the ability to systematically prepare to influence or provide direction for the organization. This planning process enables those using it to better anticipate potential changes and their impact on the organization. Both strategic planning and transition management require the use of systematic techniques to provide essential information necessary for the planning process. One such method is called the Nominal Group Technique (NGT). The NGT is a structured process, which identifies and ranks the major issues relative to a topic; in this case the impact of genetic technology. Prior to the meeting, the participants are provided with information relating to the topic being discussed. The group then votes on the most relevant trends and events that will impact the issue under discussion.

For forecasting purposes, an event is generally defined as an occurrence or incident that should it occur, will have the potential for significant impact on the issue. Known events are not used because the impact has already occurred. Events are discrete, one-time occurrences generally traceable to a cause. Trends are defined as a series of similar and related incidents occurring over a period of time. Trends have movement that could include the past, present, or future and have prevailing movement that has a particular character. Trends may increase, decrease or remain the same and trends may be influenced by events. Unlike fads, which are generally short-lived and fast-moving;

trends are slower and have longer lasting effects. Both influence society and alter the future. Future forecasting using an NGT group creates a series of possible events and trends that may ultimately have some influence or impact on the future. Predictions are generally avoided because of unknown variables that may change the outcome. In this case, the future focused upon is: “What impact will genetic technology have on the selection of California peace officer candidates by the year 2009?”

The NGT group was comprised of nine participants representing a variety of career backgrounds, education and training from seven separate agencies and one civilian. Utilizing a diverse panel helps to lessen such influences as cultural or personal bias, parochial interests and error. Diversity also brings a variety of views to bear on the issue being discussed. The NGT group consisted of: two line level deputies; a sheriff’s sergeant; three lieutenants; two captains; and one deputy chief. The participants had experience in religious studies, biology, labor, psychology, personnel and business. Two consider themselves to hold strong religious beliefs, one of whom is a lay minister. One third of the NGT was female. One third of the NGT had AA degrees, one third had AB degrees, and of the remaining third, two had MA degrees and one had a Ph.D. Although the NGT was composed primarily of individuals with law enforcement backgrounds, two participants have extensive experience in the private sector.

The NGT was primarily conducted on line via computer, with portions being conducted in person and follow up questions via telephone. Prior to conducting the NGT the group was given information concerning the progress of genetic research regarding genetically inherited traits. The NGT participants were also provided with definitions of trends and events to improve their understanding of the process. They were instructed to

individually identify the top trends and events during the period 1999 through 2009. After the initial list was developed, the top five trends and events were identified and voted on.

The top five trends and events generated by the Nominal Group were:

TRENDS:

1. Concern for privacy in society. This trend was defined as the overall societal concern with government involvement into areas of privacy. Should the concern increase, the result could cause a delay in uses of genetic information. This represented a significant concern to the group because they thought genetic privacy was highly regarded. The general feeling was that privacy is and will continue to be a very contentious issue due to the ability to misuse the information in nonmedical exclusionary ways. There was general concurrence reached that the private sector, such as insurance companies might employ this type of information to deny or remove insurance coverage, as well as using this information for making adverse (to employee) employment decisions.
2. Concern for costs to government agencies due to liability from excessive force, pursuits, etc. by law enforcement personnel. The group thought this trend would continue to exert influence as expressed by public and media attention. It was generally felt that concern by various stakeholders regarding the high costs of litigation based on law enforcement actions would continue during the next decade. Because litigation results in excessive settlements paid by law enforcement agencies and ultimately taxpayers to victim of egregious police conduct, this trend was a major concern of the majority of the group. The group recognized that highly publicized incidents would cause this trend to increase to the detriment of the agency's budget.

3. Organized religious opposition to genetic research. This trend concerned the impact of religious opposition to genetic research because of the potential abuse by scientists playing God. Various sources located on the INTERNET mentioned that DNA samples are being gathered from three major sources: newborn babies, military recruits and convicted felons. Private research laboratories, biotechnology companies, fertilization clinics, etc. are collecting human DNA. Information of this type could be used to convince religious fundamentalists that godless scientists are planning to create life using human DNA. The group foresaw a trend of increased resistance by the religious right to genetic research. As recently as March 9, 2000, the House opened hearings on fetal tissue research, spurred by charges by anti-abortion activists that the federal law is being broken by suppliers of fetal cells to researchers.⁹
4. Competition from private enterprise for qualified applicants. This trend concerned the shrinking pool of qualified applicants and the increased competition from the private sector. The majority of the group thought with increased privatization there would be increased competition. The net effect of the competition would be that agencies would need to increase the efficiency of the applicant screening process and reliability of predicting success of those who are hired in an effort to be more efficient and competitive.
5. The legislation of genetic protection. The group suggested this trend would occur nationally, similar to the protection provided by the Americans with Disabilities Act. i.e. employers would be legally prevented from discrimination against an individual based on his/ her genetic make up. This so-called genetic ADA would be aimed at preventing discriminatory practices in health issues, hiring decisions, etc. This trend

was identified almost unanimously and is already occurring in 16 States that have enacted legislation designed to protect individuals from discrimination based on genetic information to prevent the denial of health coverage or raising insurance rates (based on genetic information).¹⁰

EVENTS:

1. The ACLU (American Civil Liberties Union) files suit against a public agency to prohibit genetic discrimination. The panel defined this event as ACLU opposition to any use of genetic information for any employment decision. The group felt the ACLU would oppose any use with the exception of medical use of genetic information and the opposition would be based on the right of privacy, the right to keep certain information from disclosure to others and confidentiality, the right of an individual to prevent redisclosure of sensitive information that was disclosed in the confines of a confidential relationship.¹¹
2. The positive identification of a recessive gene that controls lethal behavior. This gene is evenly distributed across the population both by gender and ethnic groups. This event, as defined by the panel, was proposed as a scientific discovery of a gene that regulates lethal behavior. Gene behavior(s) are complex and can be chemically triggered. High stress events could conceivably represent situations that could trigger chemical reactions such as rage. It was felt that because this gene was not restricted to any gender or ethnic group, there would be more support for using this technology to deselect applicants with the lethal gene. If such a gene exists and is more prevalent in one race or gender, then using it for deselection would be arguably, more problematic. This technology would have to be perfected to a high degree and have

to be irrefutably proven scientifically. Should some trigger event similar to a highly publicized incident like the Rodney King beating occur where those involved tested positive for this lethal gene, it would probably increase the clamor for its use in law enforcement selection decisions.

3. The recording and storage of genetic bar codes from birth by the National Institute of Health. This event was predicted as a logical progression of existing trends and viewed as a nationwide effort to provide medical information that would contain all the pertinent genetic and other relevant medical information to assist medical practitioners when dealing with the patient. This event was viewed as a somewhat benign one, largely arising out of the need to provide prenatal and postnatal treatment, gene therapy to improve the health outlook of children and to prevent adult-onset diseases where possible.
4. Violence against genetic researchers. This event was predicted based on the violence against abortion clinic physicians and was related to trend number three. The majority of the NGT participants felt that it would occur, although they did not know if it would be a random act or the result of organized protests by opposing groups. As the furor over fetal tissue research increases, the probability of such violence against an institution, organization or business connected to DNA research is expected to increase.
5. Instantaneous availability of computerized fingerprint information via AFIS. The panel predicted this would be a precursor event to event number three. They acknowledged that as more digital information becomes computerized and is readily available to law enforcement personnel, it would become accepted. As it becomes

more routine, databanks of information previously considered restricted will be accepted by the general public, leading eventually to the assignment of DNA bar codes from birth. AFIS went on-line in January 2000. This was the first event that occurred of the five events forecast.

After the final trend and event identification votes were completed, a smaller panel consisting of six of the original group then provided values concerning the probabilities of the trends and events at various time intervals. The instrument required the participants to provide estimates at points five years prior, five years in the future and ten years in the future. The present value was held constant. The event and trend data obtained from the NGT process was summarized in table form. The tables reflect the panel's average figures and are contained in the appendix section of this report.

Following the NGT exercise, the author and two of the original NGT members provided values for the cross-impact matrix. The cross-impact group assessed the issues as primarily concerning a clash of competing values. This opposition between the research and how it is conducted (fetal tissue), versus the potential positive use of the results of the research was discussed at length. There was also concern expressed for scientists discovering cures for diseases versus identification of genetic diseases that would prevent the individual from being insured or hired because they carried defective genes. Because of the potential for profit associated with discovering genes that regulate obesity versus looking for a cure for cancer, money could be channeled into social genetics over medical genetics. Ethical issues will continue to influence this field in the next decade, unless there is legislation affecting how such scientific discoveries are

patented. The majority of these events fit into either a social, political or technological category.

The concerns for privacy and protection from discrimination were in opposition to the technological advances underway in the development of the Human Genome Project and Automated Fingerprint Information System of AFIS. The trend involving competition with the private sector was felt to have no influence on the other events, but it was still deemed an important trend that would have an impact on the use of genetic profiling in candidate screening in the future. The identification of the lethal gene and DNA bar coding was thought to have a strong positive correlation with ongoing genetic research. The lethal gene also correlated positively with liability concerns.

The information developed by the NGT panel serves as a foundation for the following scenarios. Scenarios are alternative descriptions or stories of how the future might unfold given the trends as proposed in the NGT. Scenarios are especially important when rapid change is likely to occur and where there is high uncertainty about the future. The author feels we are in such a time of uncertainty. Scenario development allows us to foster creative thinking, raise fundamental questions about deeply held values (like privacy) and to challenge current assumptions about the future. The scenarios that follow describe three different possible future outcomes utilizing genetic information as part of an applicant screening process.

The research the author conducted during this project has indicated that a tremendous number of genetic discoveries will occur during the next five years. The timeline on the Human Genome Project has forecast that the project completion date is two years ahead and it has been given a tentative target date of 2003. This date would also mark the 50th

anniversary of Watson and Crick's description of DNA's fundamental structure. It is predicted that the 21st century will be the biology century. By using the analytical power arising from the reference DNA sequences of several entire genomes and other genomic resources, it is anticipated that this knowledge will jump start the new millennium.¹² Based on these predictions, the following optimistic scenario was developed to describe the future.

Optimistic Scenario

The year is 2009, the head of personnel, Captain Jon Holmer, takes a list of potential applicants for public safety officer to Dr. Axall, the Director of Sandiego County's Human Resource/ Special Project Management office for final approval. Captain Holmer tells Dr. Axall that he is pleased to report he has ten excellent candidates to consider for hiring as Public Safety Officers (PSO). He wants to discuss one in particular because she is what he considers an ideal candidate. He is aware that the County is able to provide bonus incentives to candidates possessing special skills deemed desirable and this candidate has such skills. The County in an effort to remain competitive began providing recruiting bonuses to attract high quality candidates from competing firms and organizations about three years earlier. This has been very successful in stemming recruiting losses to private security firms.

According to Captain Holmer, "Candidate X possesses a complete constellation of social-oriented skills: including empathy, mentoring ability, civic conscience, flexibility, team playing, compassion, honesty and an optimistic personality.¹³ What is even more impressive is she is bi-lingual in Spanish, has a Master's Degree in computer science with a minor in urban planning and does not even have a parking ticket!"

After reviewing the background and interview files the Director noted that this candidate had no trace of the “lethal gene.” [This gene had been positively identified in the early part of the decade by researchers working on the Human Genome Project, who studied the brain cells of students involved in school violence and serial killers. Once the gene had been isolated, the media dubbed it the lethal gene when the research was published. The L gene research began in the late 90’s after a series of shootings in high schools. Although there is a slightly higher percentage of males with the gene than females, otherwise the gene is evenly distributed across the population by ethnic group. It was decided by a Congressional Task Force to protect society from overzealous officers, that individuals who possess this L gene should be prevented from entering into law enforcement. Likewise, because of the interest in providing safe environments for children, individuals who were identified as possessing this lethal gene were schooled by private tutor and medicated. Because the violent potential could erupt without the medication, these individuals were considered unsuitable for public schooling.]

[In the interest of public safety, with the passage of extreme limitations on firearms, a rider attached to an Assembly bill was enacted that restricted L gene carriers from high stress occupations or those involving access to firearms and other lethal equipment. There had been little or no public reaction to this kind of genetic occupational restriction because of the public’s interest in gun control, safe schools and rogue cops. Genetic restrictions were generally viewed as occupational necessities and were considered an acceptable and necessary intrusion for a safer and more secure community. The societal shift had occurred during the early part of 2000, where safety needs on school campuses

outweighed the individual privacy concerns, because of the fear of violence associated with firearm usage.]

[When law enforcement began using genetics to screen applicants, it was viewed as a logical extension of the same argument; it would result in society being protected from errant law enforcement personnel. This was viewed as a more important consideration than individual restrictions from certain occupations based on their genetic profile. By the year 2009, all law enforcement agencies in California who had since merged with other public safety organizations such as paramedics, dispatch centers and firefighters, were routinely using established DNA markers. The DNA was stored in the POST database, where POST had been collecting peace officer data for years on California peace officers.]

[By using the new technology, the entire process was streamlined and applications that had previously taken six months to process were now completed in six days. In the year 2000, AFIS had improved the process, but with the increased competition from the private sector for qualified applicants, everything that would streamline the process was needed to be able to offer a job to qualified candidates as quickly as possible. The DNA screening allowed personnel managers to optimize hiring by replacing the antiquated standard psychological profiles developed decades earlier. Although preliminary results were not complete, the last two years of use of genetic profiling had resulted in a marked improvement in successful completion of the academy, a 95% decrease in complaints against the probationary employees and a 50% reduction in lawsuits after two years of service. Genetic screening became the answer to the personnel manager's prayers.]

Captain Holmer concluded the review by telling Dr. Axall, “This one maxed all the DNA profile markers. If I didn’t know better, I’d think she was some kind of cloning experiment.” Dr. Axall just nodded absent-mindedly and went back to her DNA charts.

This scenario probably represents an overly optimistic vision of the future based on the glowing reports that have been promoted by enthusiastic researchers and companies that specialize in genetic products. The value lies in having a vision of a better way to select candidates in an effort to improve the profession. It can be useful to assess where law enforcement is today in order to develop a strategic and transitional management plan to manage the imminent technological developments. With sufficient thoughtful planning the use of such genetic information to enhance the selection process could be properly managed and the potential to eliminate undesirable characteristics that generally prove harmful to an organization could occur.

The remaining two scenarios represent a most likely future and a negative future.

The nominal or surprise free future follows:

Most Likely Scenario

The year is 2009, the President of Cyber Background Investigations, Inc. (CBI), Jon Holmer, takes a list of completed background packages to the Director of Sandiego County’s Human Resource/ Risk Management Office. Mr. Holmer reports he has completed the background packages on the applicants under the allocated time and is eligible for the 5% merit bonus. He also tells the Director, that all 10 are excellent candidates eligible for consideration as Public Safety Officer cadets.

[Up until five years ago, Holmer had worked for the Sheriff’s Department. In the mid-2000’s the millennium taxpayer revolt succeeded in passing legislation to relieve the

over- taxed working class from supporting the huge group of retiring baby boomers by shrinking the size of government. Holmer recognized the government downsizing trend fast approaching and took an early retirement to start a computer aided background investigations company, he called CBI. His experience and training made him a natural liaison to the other areas of the Department that were out-sourced. The ability to provide almost instantaneous information via the huge computerized repository of data available, made his company not only efficient, but also affordable.]

[Sandyego County had almost gone bankrupt in the mid-2000's from the sheer weight of providing health care to its thousands of workers, retirements to healthy workers, who would live another twenty years and other expenses that had not been factored in during the 1990's, especially the extreme tax cuts and the energy crisis. Facing the crush of not being able to balance the County's budget, the CAO drastically cut the payroll- by reducing government functions to essential core functions. Payroll was centralized and largely computerized, management functions were merged between public safety areas that provided similar services. Top echelon employees were completely eliminated by providing early retirements. The remaining departments were scaled down, leaving a no frills structure of core components that operated strictly on a merit pay system. The CAO was recognized as a management genius and went on to write a book and was hired by an energy company. The remaining departments followed suit and eliminated all but critical services. Common nuisance type calls were not handled by law enforcement, but were referred to volunteers. Private security firms quickly recognized the opportunity to fill the service void for requested, but non-essential needs as increasingly fearful groups of retirees joined together in private gate-guarded

enclaves. The fearful retirees then hired private companies to provide the service levels of protection desired, that had fallen victim to government cost-cutting. Private security firms were now competitively hiring individuals away from public employees, as they became more powerful and profitable.]

Holmer remarked he could have brought the files in sooner if he could access DNA files directly, unfortunately with the ACLU lawsuit still being litigated, all but the highest risk conditions were legislatively protected. He told the Director, "It's a shame we can't access the complete DNA data banks. The government does it for key positions like secret service agents who guard the President. I think public safety is important enough to warrant DNA screens!"

The Director remarked, "although the process is tedious, the battery of tests including computerized hand writing analysis, voice stress analysis and the virtual MMPI are reliable enough for our needs. I do agree they are not as accurate as the genetic testing is. Once the Supreme Court makes its decision on the constitutionality of such testing, assuming it is deemed legal, we can get results much faster and my life will be much easier."

Holmer shrugged, "you know that hackers have cracked the security on some of the most common data bases and that private enterprise routinely buys the information on special category employees on the black market.... not that I am suggesting we use such illegitimate sources. It's just that's the information is already out there."

The Director looked kind of dismayed at this, but said, "sooner or later, DNA will be allowed to be used in hiring decisions in most employment categories. Meanwhile, CBI will continue to have plenty of opportunities to expand. Look on the bright side at

the growth in the private sector, especially in the biotechs. Protection of patented technology is worth billions. And I am sure they will pay to ensure that their employees have company loyalty and the highest security clearance that money can buy."

The final scenario presented is the least desirable presented in the "what if" hypothetical format based on a series of negative events unfolding. It is the half-empty scenario based on a bleak economic outlook and other factors adversely influencing the law enforcement community.

Negative Scenario

It is the year 2009, Lieutenant Holmer of the Sandiego Sheriff's Department, takes a list of job applicants to Captain Smith for his review. Lieutenant Holmer appears discouraged by the prospects as he remarks to the Captain, "these are the best we can do with the limited time spent searching for qualified applicants." [With the increasing competition from private enterprise in general and national security firms in particular, recruiting is very difficult indeed.] "The large, multi-national security companies now pay top dollar," he remarks to the Captain. "It's really hard to compete in this labor market, especially with the shrinking labor pool of eligible people."

As the Captain scans the files Holmer continues, "We just can't keep up with the attrition from retiring, resigning, etc. We just lost 20 people out of the last academy to that huge security conglomerate, All Safety Services, Inc. (ASSI). They're gobbling up our probationary deputies faster than they can be backgrounded. I wish it was the 90's when the only competition we had to contend with was the PD." He continued his soliloquy.... "You know who is responsible for this situation.... It's the ACLU and their meddling." [After the Human Genome Project was completed in the first part of the

decade, the ACLU had successfully filed suit to prevent any use of the DNA data bank for any hiring decisions, other than screening for criminal activity. Since 2001, all criminal records were DNA coded. DNA clearances were permitted only for the highest echelon of government but not for the majority of State government hiring decisions. Because of the lengthy process, the Department could not keep up with its attrition to the better paying private sector.]

The Captain looked up from his review and said, “you know Jon, it wasn’t just the ACLU that got us into this situation, you can blame the Association and the local Employee’s Union for starting the ball rolling by getting the injunction to prevent us from using DNA. Their self-serving decisions and fear that we would use the information against them by retroactively forcing early retirements and other hysterical pronouncements are all part of the picture. Don’t you remember early in the 00’s when we had that spate of workplace violence and we wanted to hire employees using profiles for all job categories? That’s when it all began. The Union hacks labeled it the ‘genetic ADA.’ ” The Captain then got a far away look in his eyes as he remembered back a decade ago, when it was easy to hire employees, that was until...

[The final blow to hiring was the result of demographics, when approximately 25% of the U.S. population was over 55; the political power wielded by this group grew steadily and eroded the County government’s precarious tax base. This powerful group created special tax districts and hired private security firms that would provide the level of safety desired by these crime fearing young seniors. The result was predictable: large security firms begin to merge like Rancho del Oro and ASSI, forming mega security conglomerates. These corporations were able to lure many of the department’s personnel

to them by offering higher pay, better benefits, on-site childcare, signing bonuses, 4 at 50 and a corporate profit sharing plan. The Sheriff's Department, like most of the other public agencies, could not successfully compete and was constantly trying to hire employees to stem the tide of continuous attrition.]

Returning to the present, the Captain sighed wistfully, readjusted his glasses and said, "Let's get on with it. We still have to fill this academy, one way or another. It's just too bad we can't clone the good ones. You know they are making clones in other countries. It would sure take care of the shortage of skilled workers...."

CHAPTER 3

STRATEGIC PLANNING AND TRANSITION MANAGEMENT

Strategic Planning

Of the preceding three scenarios, the optimistic scenario illustrates the most hopeful outcome of the use of genetics screening information in the selection process. It is also the one that the writer would like to see unfold. To implement this proposal, it will be necessary to work through issues identified in the trends and events. These sensitive issues must be dealt with fairly and appropriately to all relevant parties, both stakeholders and those who may wish to either completely oppose or just restrict the proposed use of DNA technology. Those oppositional groups are dubbed snaildarters in honor of an environmentally protected species of bird. Situational analysis of the issue using the WOTS model, to describe an organization's Weaknesses, Opportunities, Threats and Strengths, was beneficial in developing a strategic plan.

Weaknesses:

Law enforcement is not accustomed to dealing with issues in the scientific realm and does not have a large cadre of experts from which to gather relevant information. Experts knowledgeable in advanced genetics fields such as cybergenic research are almost non-existent in the law enforcement arena. While most law enforcement agencies have been aware of DNA technology through its use to identify or eliminate suspects, few have analyzed the future impact on policing because of court decisions based on societal expectations of privacy, confidentiality, etc. Although law enforcement has been using genetic identification for years, through blood and other body fluid analysis, as well as fingerprint analysis, these forms apparently have been accepted by society as an

acceptable level of intrusion in the interest of solving crimes. As the use of DNA data bank knowledge increases, the likelihood of experts needed in this field to interpret the data, will also increase. Their availability to provide expert testimony on many issues will impact law enforcement in its prosecution of cases. Likewise, as DNA information increases, the storage of samples and records represents a huge potential weakness. This operational defect will affect the use of DNA technology in other all areas because of the expense involved in DNA related activities. Legislation such as Megan's Law is already causing a negative impact because of the lack of sufficient DNA labs to examine, process, and store the samples that have been taken and the attendant costs associated with these activities.

Opportunities:

Law enforcement agencies utilizing genetic technology have the opportunity to optimize the selection process by incorporating science into the process. The POST commission is in the unique position of initiating an amendment to the minimum standards relating to peace officer selection standards, to raise the level of competence of peace officers. Past research conducted by POST has focused on identification of those psychological factors that impair the performance of law enforcement personnel. By utilizing scientific knowledge developed from the Human Genome Project, POST would be able to develop guidelines for recommending the addition of certain characteristics that research has demonstrated enhance performance of law enforcement officers.

Agencies participating in the research would have the opportunity to shape the next generation of law enforcement by working with POST to ensure the dimensions being measured were relevant to bonafide occupational qualifications. This research and other

appropriate measures of occupational fitness would provide POST with information necessary to make recommendations about improved guidelines for entry-level requirements. Psychological characteristics such as flexibility, sensitivity, maturity, anxiety, etc., if found to be genetically based could be readily identified and quantified. Government grants could provide monetary incentives to participate in research projects. DNA technology has already been used to free wrongfully convicted prisoners and is viewed favorably by many people. This favorable rating could be used advantageously by law enforcement to improve the hiring process.

Threats:

The most serious threats to utilizing DNA technology would most likely come from those segments of society and special interest groups that view this type of selection as discriminatory. Traditional groups opposing infringement on individual liberties such as the American Civil Liberties Union, the American Trial Lawyers Association and other special interest groups, would probably consider this type of genetic selection to be elitist, unnecessary and unconstitutional. Possibly joining or aligning with these groups would be organizations and individuals who oppose genetic knowledge on the grounds of religion or those who feel that it is foolhardy to genetically alter anything. Incidents involving environmentalists who vehemently oppose the use of genetically altered food have occurred in Europe. As more information about scientific research becomes available, oppositional groups should also increase. Some of the violence displayed at the World Trade Organization meeting in Seattle can be considered a precursor event for similar organized protests. These groups are usually dubbed environmentalist or

naturalists because of their desire to maintain the status quo or even to return to a more natural state.

President Clinton established the National Bioethics Advisory Commission (NBAC), to focus on issues before they reach the point of confrontation. NBAC has focused on cloning and the use of human materials or stem cells in research. “The Department of Energy and the National Institutes of Health have devoted 3% to 5% of their annual Human Genome Program budgets toward studying the ethical, legal and social issues (ELSI) surrounding availability of genetic information. This represents the world’s largest Bioethics program and it has become a model for ELSI programs around the world. Included within the ELSI issues are conceptual and philosophical implications regarding human responsibility, free will versus genetic determinism and concepts of disease and health. Fairness, privacy, confidentiality and the psychological impact of genetic testing are also issues raised by ELSI.”¹⁴

Groups like NBAC would certainly become involved should there be legitimate concern about the propriety of eliminating candidates based on genetic characteristics, whether they were manifest or not.¹⁵ DNA would fall into the same category as other protected data and be stored in a safe repository with access limited by legislative decree. POST already maintains a database on California law enforcement employment, POST certificates and POST-certified training records. These are confidential records and may be obtained only by the subject individual or the individual’s California law enforcement employer. Similar protocols should be established for DNA data to ensure that adequate safeguards are in place to maintain the security of the stored information.¹⁶

Strengths:

Computer technology and concepts of Community Oriented Policing have strengthened the relationships between agencies within the criminal justice community. Information is being shared and collaboration among agencies is widespread. This unprecedented level of cooperation and collaboration is the necessary foundation for providing the impetus to promote the re-examination of the selection process. The overall objective should be to improve the process and thereby improve the level of professionalism, by encouraging POST to investigate the necessity to amend the standards. Moral fitness has been measured in terms of subjective categories that are measured by the combination of the polygraph, background investigation and a psychological examination. It was concluded by the subcommittee examining the Los Angeles Police Department's Rampart Division scandal, that POST should convene a statewide task force to examine psychological testing of peace officer candidates. It was felt by this panel that the pursuits, injuries resulting from excessive force and other complaints were a pattern of behavior that should have been detected during the selection process.¹⁷ As discussed previously, low frequency behavior is difficult to predict because of its rarity. It should also be noted that the scandal surrounding LAPD does revolve around a very small group of people. However, the long-term damage to the organization in terms of court cases overturned, lowered morale, and costly litigation, estimated at over 100 million dollars at this writing, will be incalculable.¹⁸

The next generation of recruiting demands that objective, measurable criteria will be developed to not only eliminate candidates lacking the appropriate moral fitness, but also to identify those who have the optimum levels of desirable characteristics. The use and

availability of this technology and the access to DNA data banks that are already maintained by the Federal government for tracking felons and registered sex offenders is the logical progression in the transition. The availability of genetic information to attempt to accurately predict the future success of candidates in law enforcement would seem to be an appropriate evolution from the current generation of screening devices in use with their high percentage of errors and subjectivity, due to human frailty.

The last area of analysis is an examination of stakeholders and snaildarters; those groups who would be most impacted by the actions in this issue and the impact of their influence on the issue. Stakeholders by definition are interested, influential individuals; groups or collectives who are affected or perceive they will be affected by the issue and are concerned about the effect of the issue on them. Snaildarters are various special interest groups who often go unidentified during the initial planning analysis and whose input is not included. Because they are often overlooked or ignored, the impact of the snaildarters on transition management when they become involved in the process can be detrimental, if not fatal. It is necessary to conduct accurate identification and analysis of all parties, whether stakeholders or snaildarters. The stakeholders and snaildarters identified for this issue are:

- POST – the agency who will be tasked with the responsibility of researching, recommending, instituting and amending the minimum selection guidelines,
- Communities – who would have an interest in the selection of the highest quality individuals for the law enforcement profession,
- Law enforcement agencies – who will benefit from individuals who are sued less than those who are genetically at risk,

- ❑ Law enforcement labor associations and unions – who will benefit from the increasing prestige of competent and respected employees,
- ❑ Personnel managers – who want to ensure the testing process conforms to appropriate legal standard of hiring, screening and selecting,
- ❑ Government attorneys – who want the testing process to be validated and a bonafide, job related requirement,
- ❑ Law enforcement psychologists – who will be responsible for administration, evaluation and monitoring the new hiring guidelines recommended by POST,
- ❑ Bio-medical researchers – who do not want the scientific information misused to discriminate against individuals based on genetic characteristics,
- ❑ Media – who are interested in any newsworthy item concerning law enforcement personnel,
- ❑ Legislators – who will attempt to prevent the abuse of DNA information that will cause damage to identified groups of constituents,
- ❑ ACLU, et al – who using legal means, will attempt to prevent perceived discrimination against their clients,
- ❑ Insurance companies – who will support methods to improve their exposure to risk by hiring individuals less likely to engage in behaviors that are more likely to incur liability.

One of the most likely snaildarters could include law enforcement unions or associations. These organizations may fear genetic engineering because it has the potential to change the police culture by creating a homogenized and standardized recruit. Such a prototype recruit would eliminate the variety and could possibly change the

culture. In addition, unions may fear that the existing, tenured personnel will ultimately be weeded out because they no longer fit the new organization. There would also be concern that the unions might become passe and unnecessary. With so much union energy and resources designed to represent errant police conduct, this new breed of law enforcement, hired for exemplary characteristics, pose a direct threat to the unions and their attorneys, who could become obsolete.

The ACLU would probably be one of the chief flag bearers for the cause against genetic selection based on issues related to discrimination under the rubric of the Americans with Disabilities Act (ADA). Although this offers protection from discrimination to individuals currently affected by a genetic condition or disease, it does not protect those who are carriers who have not manifested the disease.¹⁹

Another likely snaildarter would probably be the Equal Employment Opportunities Commission (EEOC). This agency oversees enforcement of nondiscrimination in employment. The EEOC has ruled that the ADA applies specifically to individuals who are subjected to discrimination on the basis of genetic information relating to illness, disease, condition or other disorders. This interpretation extends coverage to people who have genes making them predisposed to a disease-causing disability or who have genes for a late-onset disorder.²⁰

With those stakeholders in mind, the following strategies have been identified to develop and implement the use of genetics testing into the applicant screening process:

Strategy 1 – The active research and development by POST of guidelines to be used to supplant the existing standards with new ones to incorporate DNA information relating to behavioral suitability for the law enforcement profession. This strategy would involve the

most effort and commitment of the stakeholders who would need to work collaboratively with POST to develop these guidelines.

Strategy 2 – Adoption and support of the amended POST guidelines developed in strategy 1. In this strategy, law enforcement agencies would voluntarily conform to the guidelines developed and recommended by POST.

Strategy 3 – Maintain the existing guidelines. Although this would appear to be the least involved from the standpoint of expenditure of effort by individual agencies, it could also create the perception to the community that law enforcement is not interested in changing or improving professionally. The recent furor over the Rampart Division resulted in some recommendations to POST in the Board of Inquiry Report to examine psychological testing. In view of these recommendations, it would be far better for POST to take the initiative in this area, than to be forced to implement socially mandated changes without having sufficient law enforcement participation in establishing and validating the new guidelines, at a later time.

Transition Management:

The first strategy requires the support and collaborative cooperation of POST, law enforcement agencies and law enforcement organizations like the California Peace Officers' Association (CPOA) and Peace Officers' Research Association of California (PORAC). This combined effort will create the opportunity for the development of guidelines that will reflect a consensus of opinion. The second strategy requires adherence to the guidelines developed. The third strategy maintains the status quo.

The first two strategies will require traditional organizations to embrace and incorporate high technology applications into their existing organizational framework.

Change of this magnitude will be fraught with difficulty as a low technology culture is forced to deal with the scientific breakthroughs occurring in genetic research, information technology and related parallel developments. One of the biggest obstacles to overcome will be the low level of scientific skill generally available within the law enforcement agency. This deficit could be compensated for by out-sourcing with research institutions and by networking with local institutions that have expertise in these areas.

Public advocacy and support demonstrated by the stakeholders is crucial to the success of the transition. All stakeholders must be included in focus groups to identify and deal with identified issues. Presentations and forums discussing relevant scientific discoveries, potential applications and ethical and philosophical issues should be convened at regular intervals. Within these community presentations, committees need to be formed to deal with the various issues that arise. The committees may need to recommend certain issues for the work of a task force. These task forces should include people with diverse backgrounds, not only within the law enforcement community, but also from external sources including academia, consumer advocacy groups, State health agencies, clerics, etc.

These designated task forces would be composed of key stakeholders including opponents of genetic technology. The purpose of the task forces would be to provide a forum for discussion of issues before they become barriers to implementation of the technology. Their focus would be the development of model policies concerning the use of DNA in the public sector. Ideally the members of these state-wide task forces would meet regularly to debate the implications of the multi-faceted issues, hold retreats to discuss their progress, conduct surveys to identify genetics related activities and future

efforts. Experts from the private sector could be brought in to consult with the group during the course of their work.

Four essential components of the work of the task force would be: assessment of the technology, recommendations for evaluation, development and implementation of the genetic screening into the law enforcement sector for applicant screening. The results of their work would be sent to a central point to finalize the information using a panel of experts. This oversight group should consist of representatives from groups like the National Bioethics Advisory Commission (NBAC), the National Institutes of Health (NIH) or the Ethical Legal and Social Implications (ELSI). The focus would be to define the necessary priorities in response to the wide scale changes.

The oversight group would then select a final advisory task force to develop a vision and mission for the use of this genetic knowledge in the law enforcement profession. A sample vision statement would be: *"To use genetic knowledge responsibly to improve the efficiency and effectiveness of the law enforcement profession."* A sample mission statement would be: *"To integrate the knowledge and technology of the human genome project into effective and ethical law enforcement selection procedures to promote and improve the law enforcement profession."* Relying on the work of the task forces convened and the oversight committee, POST would be tasked with developing the final product in the form of recommended guidelines. Once developed the guidelines could be distributed Statewide using the normal POST procedures.

Vital to the success of the first two strategies is the ability to identify the change environment's critical mass. Critical mass represents the smallest number of groups whose support is necessary for this change to occur. Without this group's support, the

change will likely not occur. The following individuals and groups represent those who should be considered in planning a transition, to provide relevant information regarding the impact of using genetic profiling, on the applicant screening process in California law enforcement candidates:

- ❑ POST
- ❑ California Police Chief's and Sheriff's Association
- ❑ CPOA/ PORAC
- ❑ California Personnel Managers' Association
- ❑ American Psychological Association
- ❑ Attorney General's Office
- ❑ ACLU
- ❑ Director of California DOJ Division of Law Enforcement
- ❑ The media

It is strongly recommended that the Executive Director of POST assume the leadership role in this transition and be designated the Transition Manager for the program. The Director is in the best position to implement this strategy by bringing together a team to translate this future vision into reality. POST's successful telecourse network would be an ideal means of communications with the diverse groups who need to communicate. Video conferencing is already a reality and would appear to be the ideal venue to bring together the diverse group being sought to cause critical mass to be reached.

Effective communications will be the key to the success of using this genetics research in this manner. It will also be necessary to secure legislative support for the

proposal to ensure there are sufficient funds to carry out adequate research to support the hypothesis. In addition, the legislative support will be critical to prevent special interest groups from attempting to pass legislation that would prevent or forestall the use of this technology. Additional resources and support might be obtained from corporate donors or federal grants for research on the related topics.

The role of the media in securing support for this effort is crucial and should not be underestimated. Periodic informational briefings need to be held regularly by the Transition Manager's designated public information spokesperson. Information must be provided that is accurate, has the appropriate level of technical detail and is conveyed in a culturally appropriate manner using a mixture of electronic and print media for the dissemination. A quarterly newsletter available on-line to keep the various constituents informed of the progress is highly recommended.

During the development of the new guidelines it is recommended that the following actions occur within one of the designated task forces or committees that are selected by the Transition Manager:

1. Establish a mechanism for external input for the snaildarters as part of the Ethical, Legal and Social Issues task force or subcommittee;
2. Develop an introductory course or a POST telecourse in genetic technology, which would include the ethical, legal and social issues information;
3. Communication via the Internet, media and professional publications to invite commentary from interested persons; and
4. Incorporate seed money from OCJP grants, etc. to solicit genetics behavioral research.

Law enforcement executives who will assist POST in this vital transition will have a seminal role in assessing the impact of this technology, in ensuring the appropriateness of the standards adopted, in evaluating the effectiveness of the procedures developed and in addressing the complex ethical issues that will most certainly arise during the life of this project. In particular, the clinical validity of the genetics tests used to make the selections must be collected under investigative protocols that are sensitive, specific and have predictive value. The study sample must be representative and drawn from a group of subjects representative of the population for whom the test is intended and formal validation for each behavioral dimension is needed.

Continual advances in human genetics will offer new opportunities for improved personnel selection and could lead to a new paradigm of law enforcement selection parameters. The ideas presented in this strategic plan and transition management section provide a long-term vision for the role of law enforcement in translating advances in human genetics into improving the existing selection process for the good of the agency and ultimately the good of the community.

CHAPTER 4

IMPLICATIONS ON LEADERSHIP

Findings:

The research for this project revealed a dynamic trend of increasing scientific breakthroughs in the human genetics technology field. These discoveries when combined with the continuing evolution in computer technology will result in the increased availability of DNA based information to law enforcement. In addition, the use of DNA applications in personnel selection will become an option in the near future (assuming legislation permits this practice). Personnel selection would be enhanced by utilizing DNA information to determine both physiological and psychology fitness for the law enforcement profession. The selection process is governed by POST guidelines and would have to be modified through their approval process.

Implications on Leadership

Law enforcement is on the verge of facing the two most important changes in its history: the computer revolution, which will impact all areas of law enforcement service and the bio-medical advances developed by decoding the human genome project. The computer implications are obvious; the importance of the emergent medical-biological is less obvious.

For over 100 years criminologists and sociologists have been focusing exclusively on environmental explanations for criminal behavior and ignoring other less popular explanations for criminality. Hundreds of millions of dollars have been poured into efforts to reduce drug usage, improve literacy, eradicate slums, provide enhanced

education, etc., without bringing about any appreciable decline in criminal behavior that cannot be explained by demographic changes, including the current declining crime rate. Diana Fishbein, a Department of Justice criminologist, argues the point convincingly that despite compelling data in recent years, biology continues to be overlooked by criminologists. Ms. Fishbein thinks pharmaceutical interventions are appropriate for some types of criminality. She believes for selected high-risk cases, like repeated perpetrators of violence, drug therapy is appropriate and should be mandatory. Ms. Fishbein is speaking about mild stabilizers such as Lithium and Prozac for use in these situations.²¹

On the opposite side of the crime gene issue, one of the founding fathers of behavior genetics, Irving Gottesman disagrees strongly with the theory of a crime gene and considers it to be nonsense. According to Mr. Gottesman, such genetic differences are intricate interactions with environmental factors and involve many genes. “A crime gene might be a nucleotide predisposition to behavioral tendencies such as impulsiveness. Such a predisposition could, under certain conditions, make the probability of criminality higher than it is in most people.”²²

Consider also the following information that genetic research has revealed:

A 1975 Australian study of 3, 810 pairs of twins discovered a genetic component to a broad range of attitudes, everything from a liking for modern art to respect for divine law. Perhaps the most significant findings had to do with racial attitudes. Of three questions relating to his subject—belief in white superiority, acceptance of mixed marriages, and feelings about nonwhite immigration—all had a significant degree of heritability.²³

The identification of behavioral characteristics using DNA will be available within the next decade. This information would allow law enforcement agencies to objectively and scientifically assess a candidate’s suitability for the profession. Phenotype is the

scientific word for each genetic manifestation. Genotype refers to an organism's entire complement of genes, which is the overall blueprint for each species. Although the research is still in the preliminary stages at this writing, should a phenotype (the organism's physical properties produced by the interaction of the genotype and the environment), linked to racial hatred be positively identified, such individuals carrying this phenotype would be unsuitable for employment in law enforcement in any capacity. If the ability to nullify this gene surgically or chemically existed so that it would not be expressed ever, then an exception might be possible.

If the Human Genome Project reveals that addictive behavior, certain violent, impulsive behavior and other areas of human conduct, such as racial attitudes that impact the law enforcement profession, are inherited and not able to be environmentally mitigated, then the entire system aimed at environmentally changing (whether through incarceration or treatment programs), will have to be reevaluated and revamped. Efforts and programs aimed at reducing crime and criminals will have to be changed radically, as will the type of law enforcement and the type of practitioners including law enforcement personnel, used in the next decade.

Law enforcement candidates represent a major investment by the agency and the community. The community is entitled to optimize the candidate selection process to use technology for improving on the current methods. The unique qualities required in this occupation often call for individuals to show no emotion yet have sensitivity, to have physical strength yet not express force inappropriately, and other characteristics that call for a group of traits that appear almost oppositional to each other. Identification of these unique qualities will require the most sophisticated scientific techniques available. With

the advent of advanced DNA technology the opportunity to provide relevant information regarding certain positive traits and the elimination of negative ones (relative to the law enforcement profession) will revolutionize personnel selection in the future.

Law enforcement is without a doubt one of the most stressful occupations and one that requires a multitude of abilities to perform. The public demands the highest possible standards for selection, yet existing screening techniques only eliminate extreme behavior and have not been developed to the level of sophistication to screen for candidates who possess desirable attributes. The ability to identify necessary character traits related to moral, value systems (if they in fact exist) will become increasingly important during the next decade.

Obviously, debates over genetic components of behavior, particularly eliminating or rejecting employees in both the public and private sector with certain undesirable traits like extreme violence; anti-social behavior or even racism; sexism or pedophilia, will continue to foment much debate. The focus of this project is not to examine all the issues affected by the completion of the Human Genome project, but to examine one such area, “What impact will genetic technology have on the selection of California peace officer candidates?”

The challenge to the law enforcement community and the other stakeholders listed is to recognize these scientific discoveries as a portal to the future. The opportunity offered poses an exciting challenge to those who want to continue to professionalize the law enforcement community. The changes will take strategic planning, active participation and dedicated leadership. Most of all it will take commitment toward the identified collective goals. It will call for those in law enforcement to cross into areas where they

are less comfortable, to join with those in academic communities where the research is occurring and to work together toward common goals. By working with researchers in the academic community and becoming connected to their expert networks, alliances will be built that will permit the organizations to better adapt to the rapidly changing world. This level of participation will ensure the pending technological changes are fully expected and anticipated with planned responses, rather than unforeseen events.

Recommendations:

The following recommendations can make the issue of using genetic profiling on the applicant selection process a reality by the year 2009:

- ❑ POST, CPOA and PORAC should initiate a discussion relevant to DNA technology and its use as a minimum selection standard.
- ❑ POST, CPOA and PORAC should conduct NGT panels to develop a list of trends and events regarding DNA issues, then identify Critical Mass members whose support is crucial to the success of the topic by surveying California law enforcement agencies.
- ❑ POST, CPOA and PORAC should conduct research and field-test the information developed on an experimental group to properly validate the data.
- ❑ POST, CPOA and PORAC should conduct regular meetings with stakeholders and snaildarters to discuss developing issues and resources for managing the timeline of the topic.

- POST should hold public informational meetings to discuss the results of the testing and solicit input from interested parties prior to drafting the new guidelines.
- POST should establish the guidelines based on the research and public input after hearings are held.

Budgetary and Funding:

Costs associated with this proposal will be difficult to determine. Technological developments in DNA research are continuously occurring. DNA costs initially were expensive and time consuming because of lack of accredited laboratories able to perform the protocols. Recently portable DNA units have been developed that can be used in the field. By the time law enforcement agencies are using this technology to screen applicants, there should be numerous options available to competitively bid for law enforcement applicant screening contracts.

The most significant costs affecting law enforcement would probably be those incurred in the litigation over the use of such testing in the public employment sector. POST would undoubtedly incur costs due to researching and development of the guidelines for such testing, absent the availability of private funding sources for this research. The potential for reimbursement from grants from various public and private sources could substantially offset some of the research expense. Many of the genetic discoveries have the potential to be valuable in the private sector. Knowing what genes cause aging, obesity, cancer, etc. will prove extremely valuable to patent and market. The lucrative potential for research in this and related areas is limitless. It is unknown if genetic knowledge regarding positive or negative personality traits (depending on the

culture), assuming these traits can be isolated, would be profitable. Should this scenario occur, trait marketability would likely be profitable and the cost(s) could be prohibitive. Governmental agencies might be provided with the information at a lower cost in the interest of security or public safety.

It is highly likely there will be significant interest by parents, who desire children with certain characteristics such as high intelligence, patience and gentility, as opposed to children with Attention Deficit Syndrome. Because of this, it is extremely likely that such personality trait research will continue for its profitability. This will result in many identified genetic personality characteristics. Parents will potentially have the ability, assuming they could afford the technology, to decide and buy, not only how their child will look, but how he/she will act as well. Likewise, there would be employers who will also want to be able to optimally select their employees for loyalty, dedication and honesty. In this way, genetic selection will take much of the guesswork out of the hiring process.

When and if the genetic knowledge evolves to the point where it is available to consumers, will it be affordable? If such screening occurs what will the impact be on the crime rate? How will it affect law enforcement and how will law enforcement evolve to deal with the changes in society? Will the public furor over law enforcement agencies that have employees who use lethal force continue to rise to the level where it will become mandatory for the elimination of certain genes, such as the lethal gene from the agency? What other genetic pre-dispositions or characteristics will be eliminated? If this is this specific scenario unfolds, then most certainly the types of tests necessary to screen for specific genes will be made available to public agencies. Topics such as these and

related areas of interest are promising areas for continuing futures research in the Command College.

The real cost savings will ultimately be realized when candidates who are genetically pre-selected for specific qualities are hired, successfully pass probation and perform at a higher level than their predecessors. Improved performance should result in a higher retention rate, less civil litigation resulting from negligent acts or omissions, fewer investigations and civil service actions and ultimately greater public confidence in law enforcement. Long-term benefits such as those far outweigh the costs associated with developing and implementing such proactive testing. The entire matter hinges on precisely what DNA scientists will and will not be able to identify in human behavior as the microcomponents are revealed. If and when genetic screening of candidates is used, it will be relatively easy to compare data of those groups who were not DNA screened against those who were, to determine the effect of this technology. This before and after comparison should be matched for age, gender, education, etc. to accurately assess the success or failure of this type of screening.

Conclusions:

Futurists are not psychics, nor do they have the ability to predict the future. Instead they must look for trends and events that will influence the future based on existing information. One of the most interesting speculative aspects of this process is, will the issue discussed in the project occur during the next five, ten, or twenty years or at all? One of the major driving forces affecting the completion of the Human Genome Project and the speed of its progress is the parallel evolution occurring in computer technology and the speed at which computers calculate. The discovery over ten years ago of massive

parallel processing (MPP), which allows computers to use hundreds or thousands of microprocessors, each working on a separate part of the problem will greatly accelerate the progress of the project.

Using a method called chromosome jumping, which is a research technique developed to move swiftly up or down a chromosome in search of a particular gene, researchers can make large jumps over uninformative regions of DNA. Supercomputers using MPP will speed up this process substantially. With the ability to process complex data more efficiently, the DNA mysteries will be unraveled even more rapidly than during the last five years. With the Human Genome Project completed almost two years ahead of schedule, cloning experiments and biomedical discoveries are increasingly becoming commonplace news items as science fiction becomes science fact. Examples of the following discoveries will serve to illustrate this point.

In what is being referred to as Jurassic genetics, an article dated October 1, 1999, contained a discussion of the possibility of cloning a woolly mammoth based on the discovery of an adult male mammoth. A group of Texas A & M scientists had successfully cloned a steer from the hide of a steer that had died a year earlier. This demonstrated that live cells are not needed for cloning. This provided the potential to perform the same procedure using the woolly mammoth or other extinct species and the potential to clone extinct humans. Cloning of non-humans is controversial; cloning of extinct humans from ancient mummified remains will contribute to a furious ethical debate.²⁴

In another historic genetic breakthrough, scientists reported the successful transferring of a frozen embryo at the Audubon Institute's Center for Research of

Endangered Species. The result of the transfer was the birth of an endangered African wildcat to a domestic cat. This procedure will assist scientists with the conservation of rare and potentially extinct species.²⁵

In the March-April 2000 issue of the *Futurist*, it was reported that a Princeton University neurobiologist in the gene therapy area, discovered the addition of a single gene, NR2B, to mice significantly increased the animals' ability to solve maze problems. The genetically altered mice then retained the ability to learn into adulthood, as opposed to decreasing memory retention in adult mice, which is the norm. This neurobiological breakthrough provides an optimistic forecast into the approaching future with the possibility of being able to reverse the effects of aging on human memory. Discoveries such as these give us a glimpse into the impending future with the promise of scientific discoveries that will improve human existence.²⁶

On June 26, 2000 an important milestone was reached when scientists announced they cracked the human genetic code—the biological equivalent of the moon landing.²⁷ The volumes were defined in 2000. The final stage will be to refine the genetic information contained in each volume. The research is progressing ahead of schedule and is estimated to be complete by the year 2004.²⁸

It is a difficult concept for the majority of nonscientists to comprehend, that chemicals contain the instructions for growing parts of the body. It is harder still for nonscientists to conceive that chemical components that are barely microscopic particles can also determine personality. Whether the individual is happy or morose, passive or aggressive, bright or dim, liberal or conservative, religious or atheistic is genetically

determined. A leg is a phenotype, and so is a wing, but according to geneticists, behavior or behavioral propensities are also another example of phenotype.²⁹

To further illustrate the minute differences between these genes consider the description of a mood gene from the book, *Living with Our Genes*:

Maybe the mood gene makes a receptor protein that responds to the hormones released under stress. Maybe the only difference between two people is that one has a gene with a T at positions 4,356, whereas the other person has a C at the same spot. That might be enough to affect the strength of the electrical current flowing through the cells, so that the same amount of hormone produces a gentle buzz in one person and a walloping jolt in another. That single detail—1 letter out of 3 billion—could mean the difference between a mostly cheerful person and one who is easily depressed. Both people have the same gene, but the fine print makes all the difference. Imagine a room filled with 30,000 books. Here the difference would be the equivalent of a single letter in a single book.³⁰

Society is beginning to undergo significant and fundamental cultural changes about how crime and criminals are viewed. These topics will continue to be hotly debated and become policy within the next generation. Should distinct phenotypes related to behavior considered desirable in the law enforcement community be identified using DNA, it will more than likely eventually be used in some fashion to select candidates. Current testing for law enforcement already eliminates those who have criminal backgrounds. Logically these same criminal behaviors that are screened out by background testing would also be eliminated genetically, if that phenotype were positively identified. These and many other issues relevant to genetic profiling will be examined during future decades.

At the present rate of progress, the year 2009 might easily achieve the ability to identify specific characteristics desirable in different professions. This presents the specter of a genetic caste system reminiscent of society in *Brave New World*. This knowledge has a dual purpose; it will allow the elimination of birth defects, the

eradication of cancer and Alzheimer's disease, and it has the dystopian potential for predetermined, lifetime professions based on chemical coding determined in utero.

Seeking more informed community involvement into discussion about genetics technology, expert Glenn McGee writes the following about this crucial and vital need:

It is time for town hall meetings about genetics, reproduction and the future of the family. It is time to train clergy to think about these issues. More importantly, it is time to start telling our children stories about the future, to help them imagine a world that will be exciting, but challenging, too.³¹

It is imperative that law enforcement leaders become involved in planning and discussion meetings related to this topic. Likewise, they should increase the training and knowledge in their respective agencies relevant to this issue. It is apparent that there are many issues concerning human DNA that will arise from using this level of technology. Today may not be soon enough to start learning and tomorrow may be too late.

Science has successfully been using genetics with animals and plants for years without having to face the ethics debate until recently (over genetically altered food). The twenty-first century will offer the promise of removing some of the most dread diseases facing mankind, but it will also open a Pandora's box of problems dealing with the ethics of genetically engineering humans. The ELSI and NBAC are the main watchdog groups over this interest, but they are funded from the same source. It is time for informed private groups to also provide oversight into the use of genetics technology on humans to ensure that sufficient safeguards exist to oversee this emerging branch of science.

Genetics gone awry could have the same result as Dr. Frankenstein's creation did on the unprepared village. Glenn McGehee thinks that the realm of genetics is an unpoliceable realm, a realm where human cloning will occur. He adds, "considering the current trajectory of genetic research, so will a host of other exotic and frightening

developments.” Should the research occur in another country, it will be unpoliceable.³²

Is it entirely beyond the realm of possibility that if crops can be genetically engineered to withstand bacteria and pests, that humans could also be engineered to withstand certain chemicals, to live longer and to be stress resistant? What does that present to law enforcement executives who are faced with making hiring decisions in the future? It is certain that the most important aspect of any discussion concerning the use of scientific technology is that it should occur in public forums. By holding such discussions in the open, diversity and debate will cause the inclusion of many divergent opinions. If these discussions occur in private with only a few key stakeholders involved, the opposite may result.

The law enforcement profession is more complex than ever. The complexity requires practitioners to have a greater degree of intelligence and sophistication and a wider range of social skills in combination with high ethical standards and common sense, than at any time in history. According to the findings of the Christopher Commission: “Police work modifies behavior. Officers may enter the force well suited psychologically for the job, but may suffer from burnout, alcohol related problems, cynicism, or disenchantment, due to on the job stress.”³³ It is necessary to find out what characteristics are more stress resistant to this kind of psychological damage. In addition to stress resistant phenotype, it is apparent there are essential characteristics required to optimally function in the law enforcement profession. Some of these characteristics include: technological intelligence and adaptability to deal with the ever-changing technological environment; versatility to change gears rapidly as one moves from one environment to another and excellent critical thinking ability to evaluate and make decisions. Law enforcement needs to join with

futurists to decide what sustainable law enforcement qualifications are required to successfully accomplish both agency and community goals in the twenty-first century.

As we enter the new millennium, the critical decision for the law enforcement profession is how to respond to the technological changes facing the profession, as the traditional role of law enforcer evolves into the role of peacekeeper and problem solver. The course that is charted during the next decade will have profound effects on the structure of the organization as well as the image the public has of the profession. Will law enforcement administrators accept the challenge and investigate emergent technology or will they ignore the scientific knowledge and wait for someone else to decide for them?

On a final cautionary note, William Wright, the author of *Born that Way*, warns:

As we approach the capability to edit genes in the womb, the result might be to strip the world of future Handels, Dostoyevskys, and van Goghs in a drive to that prevent the birth of flawed humans. Another point in the debates to come would be that having a van Gogh on the planet was great for the rest of us but wasn't so great for van Gogh.³⁴

Science, despite all its advances and accomplishments, has not yet been able to unravel the secret of mutations as to when, why and how they occur. Perhaps they represent the ultimate mark of the Creator, who planned these mutations for a greater, but as yet unknown purpose. The author fervently hopes that genetic advances will not come at the expense of genetic diversity that provides not only genius, but also survivability to the collective gene pool. By attempting to make everyone genetically perfect and in essence homogeneous, the result could be human extinction in the face of some heretofore-unforeseen environmental crisis. The same analogy applies to law enforcement; improvement of the profession is sought using DNA as a selector, but

not at the expense of diversity. It remains to be proven if the two are mutually exclusive. If all of this appears like futuristic science fiction it is important to remember this:

America entered the atomic age through the work of a single research institution, at Los Alamos. It entered the computer age through the efforts of about a dozen companies. But biotechnology research is now carried out in more than two thousand laboratories in America alone. Five hundred corporations spend five billion dollars a year on this technology.³⁵

The sheer volume of these efforts will greatly magnify the speed of the discoveries and their availability to consumers. The strategic value of the discoveries will also greatly impact the application of the technology and its use. Law enforcement leaders need to leverage the technology to their advantage while there is still time to explore, develop and plan for the new information.

APPENDIX A

List of Trends

1. Concern for privacy in society, defined as the overall societal concern with government involvement into areas of privacy.
2. Concern for costs to government agencies due to liability from excessive force, pursuits, etc. by law enforcement personnel.
3. Organized religious opposition to genetic research.
4. Competition from private enterprise for qualified applicants.
5. The legislation of genetic protection.

APPENDIX B.

List of Events

1. The American Civil Liberties Union (ACLU) files suit against a public agency to prohibit genetic discrimination.
2. The positive identification of a recessive gene that controls lethal behavior.
3. The recording and storage of genetic bar codes from birth by the National Institutes of Health.
4. Violence against genetic researchers.
5. Instantaneous availability of computerized fingerprint information via the Automated Fingerprint Identification System (AFIS).

APPENDIX C

Trend Summary Table

	<5 Years	1999	>5 Years	>10 Years	Concern
Privacy Concerns	82	100	140	171	-7.43
Lawsuit Concerns	75	100	117	123	+6.29
Religious Opposition	74	100	102	119	-3.14
Competition for Applicants	61	100	113	126	+3.43
Genetic Protection Legislation	57	100	129	129	- 5.14

LEGEND

Column 1 - Trend identification

Column 2 - Trend value 5 years ago, compared to today

Column 3 - Trend baseline standard value today (100)

Column 4 - Trend value 5 years from now, compared to today

Column 5 - Trend value 10 years from now, compared to today

Column 6 - Trend concern, if trend direction continues (concern for impact on the issue)

APPENDIX D

Event Summary Table

	Year > 0	>5 Years	>10 Years	Impact	+10 - 0 -10 - 0
ACLU Lawsuit	5.7	42	81	7.71	-
Lethal Gene		31	57	8.57	+
DNA Bar Codes		44	73	5	+
Violence Against Research	3.43	61	89	3.43	-
AFIS On-Line	3.14	74	100	5.57	+

LEGEND

Column 1 - Event Identification

Column 2 - First year probability of occurrence exceeds zero (that event would occur)

Column 3 - Probability that event will occur within 5 years (100 = certainty)

Column 4 - Probability that event will occur within 10 years (100 = certainty)

Column 5 - Event impact from -10 to + 10 (if event occurs)

Column 6 - Event direction positive or negative relative to the issue concern

APPENDIX E

Cross Impact Analysis Table

SCALE: +10 - 0 -10 - 0	Trend #1 Privacy Concern	Trend #2 Liability Concern	Trend #3 Religious Opposition	Trend #4 Competition from Private Sector	Trend #5 Gene Protection Legislation
ACLU Lawsuit	+10	0	+2	0	+10
Lethal Gene	+9	+10	+3	0	+10
DNA Bar Codes	+8.33	0	0	0	+8.33
Violence Against Research	- 1.67	0	+6.67	0	0
AFIS On-Line	+3.67	0	0	0	+2.33

LEGEND

Forecasts based on the question: “If the identified event occurs, what if any impact, will the event have on the identified trend, expressed in a positive or negative number on a scale of –10 to +10.” The five actor events are depicted on the vertical axis and the five reactor trends are depicted on the horizontal axis. The zero numbers indicate the event had no appreciable influence on the trend.

APPENDIX F

in support of scientific research

The following letter appeared in the July 1972 issue of American Psychologist.

BEHAVIOR AND HEREDITY

The posthumous Thorndike award article by Burt (1972) draws psychological attention again to the great influence played by heredity in important human behaviors. Recently, to emphasize such influence has required considerable courage, for it has brought psychologists and other scientists under extreme personal and professional abuse at Harvard, Berkeley, Stanford, Connecticut, Illinois, and elsewhere. Yet such influences are well documented. To assert their importance or validity, and to call for free and unencumbered research the 50 scientists listed below have signed the following document, and submit it to the APA:

BACKGROUND: The history of civilizations shows many periods when scientific research or teaching was censured, punished, or suppressed for nonscientific reasons, usually for seeming to contradict some religious or political belief. Well-known scientist victims include: Galileo, in orthodox Italy; Darwin, in Victorian England; Einstein, in Hitler's Germany; and Medelian biologists, in Stalin's Russia.

Today, a similar suppression, censure, punishment, and defamation are being applied against scientists who emphasize the role of heredity in human behavior. Published positions are often misquoted and misrepresented; emotional appeals replace scientific reasoning; arguments are directed against the man rather than against the evidence (e.g., a scientist is called "fascist," and his arguments are ignored).

A large number of attacks come from nonscientists, or even antiscientists, among the political militants on campus. Other attackers include academics committed to environmentalism in their explanations of almost all human differences. And a large number of scientists, who have studied the evidence and are persuaded of the great role played by heredity in human behavior, are silent, neither expressing their beliefs clearly in public, nor rallying strongly to the defense of their more outspoken colleagues.

The results are seen in the present academy: It is virtually heresy to express a hereditarian view, or to recommend further study of biological bases of behavior. A kind of orthodox environmentalism dominates the liberal academy, and strongly inhibits teachers, researchers, and scholars from turning to biological explanations or efforts.

RESOLUTION: Now, therefore, we the undersigned scientists from a variety of fields, declare the following beliefs and principles:

1. We have investigated much evidence concerning the possible role of inheritance in human abilities and behaviors, and we believe such hereditary influences are very strong.
2. We wish strongly to encourage research into the biological hereditary bases of behavior, as a major complement to the environmental efforts at explanation.

3. We strongly defend the right, and emphasize the scholarly duty, of the teacher to discuss hereditary influences on behavior, in appropriate settings and with responsible scholarship.
4. We deplore the evasion of heredity reasoning in current textbooks, and the failure to give responsible weight to heredity in disciplines such as sociology, social psychology, social anthropology, educational psychology, psychological measurement, and many others.
5. We call upon liberal academies—upon faculty senates, upon professional and learned societies, upon the American Association of University Professors, upon the American Civil Liberties Union, upon the University Centers for Rational alternatives, upon presidents and boards of trustees, upon departments of science, and upon the editors of scholarly journals to insist upon the openness of social science to the well-grounded claims of biobehavioral reasoning, and to protect vigilantly any qualified faculty members who responsibly teach, research or publish concerning such reasoning.

We so urge because as scientists we believe that human problems may best be remedied by increased human knowledge, and that such increases in knowledge lead much more probably to the enhancement of human happiness than to the opposite.

Endnotes

¹Elizabeth L. Marshall, *The Human Genome Project Cracking the Code Within Us* (New York: Franklin Watts, 1996), 9.

²Leslie J. Nicholson, "Race is on for Fastest Computer," *San Diego Union Tribune*, 14 August 1999, C1,3.

³Douglas E. Olesen, "The Top 10 Technologies for the Next 10 Years," in *Exploring Your Future Living, Learning, and Working in the Information Age* (Bethesda: World Future Society, 1996), 71.

⁴Ibid.

⁵What Every Law Enforcement Officer Should Know About DNA Evidence, report prepared by the National Commission on the Future of DNA Evidence, #BC000614.

⁶Philip S. Trompetter, "Pre-employment Psychological Screening of Violence-Prone Peace Officer Applicants," *The Journal of California Law Enforcement* 27(January 1993): 16.

⁷Ibid.

⁸Ibid, 18-19.

⁹Alissa J. Rubin, "House to Open Hearing on Fetal Tissue Research Sales," in *latimes.com*: available from <http://www.latimes.com/cgi-bin/peinr.cgi>; INTERNET accessed 9 March 2000.

¹⁰Mark A. Rothstein, "Protecting Genetic Privacy: Why it is so Hard to Do," in (Human Genome News vol. 10, no. 1-2), prepared by the U.S. Department of Energy Human Genome Program, February 1999; available from <http://www.ornl.gov/hgmis/publicat/hgn/v10n1/14roth.html>; INTERNET accessed 8 September 1999.

¹¹Ibid.

¹²"U.S. HGP on Fast Track for Early Completion," in (Human Genome News vol. 10, no. 1-2), prepared by the U.S. Department of Energy Human Genome Program, February 1999; available from <http://www.ornl.gov/hgmis/publicat/hgn/v10n1/01goals.html>; INTERNET accessed 8 September 1999.

¹³ David C. Dohn, "Oral boards critical when hiring," California Peace Officers' Newsletter (February 2000): 12-13.

¹⁴ "Ethical, Legal, and Social Issues (ELSI) of the Human Genome Project," in (Human Genome News vol. 10, no. 1-2), prepared by the U.S. Department of Energy Human Genome Program, February 1999; available from <http://www.ornl.gov/hgmis/resource/elsi.html>; INTERNET accessed 7 September 1999.

¹⁵ s.v., "Facts about Genetic Discrimination." Produced by the Arc's Human genome Education Project, available from <http://thearc.org/faqs/discq&a.html>: INTERNET accessed 7 September 1999.

¹⁶ "Obtaining a Peace Officer Profile," California POST Commission, available from <http://www.post.ca.gov/faqs/Profile.htm>: INTERNET accessed 20 February 2000.

¹⁷ "Board of Inquiry Report into the Rampart Area Corruption Incident, Public Report, March 1, 2000, p. 303; available from lapdonline.org/pdf_files/pc/boi_pub.pdf INTERNET accessed 10 March 2000.

¹⁸ Henry Weinstein, "RICO Suits in Rampart Okd," in LA Times; available from <http://www.latimes.com/news/state/reports/rampart/>; INTERNET accessed 20 April 2001.

¹⁹ "Facts about Genetic Discrimination," 2

²⁰ Ibid.

²¹ William Wright, *Born that Way Genes Behavior Personality* (New York: Alfred A. Knopf, 1998), 239.

²² Ibid, 240.

²³ Ibid, 6.

²⁴ Jolyn Okimoto, "Northern Arizona University Professor Hopes to Excavate, Clone Woolly Mammoth," in Signon San Diego Science News; available from <http://www.uniontribune.com/news/science/991001-98124/-wst-mammothc.html>; INTERNET accessed 5 October 1999

²⁵ Alan Sayre, "House cat gives birth to rare wildcat," in MSNBC NEWS; available from <http://www.msnbc.com/news/34067.asp?cp1>; INTERNET accessed 14 December 1999.

²⁶ Princeton University Office of Communications, "Gene therapy for Improving Memory?" Futurist- Forecasts, Trends and Ideas about the Future, (March-April 2000): 65.

²⁷Charlene Laino, "Scientists complete genetic milestone- 'human alphabet' complete, next step is to make sentences," in MSNBC NEWS; available from <http://www.msnbc.com/news/424682.asp?cp1>; INTERNET accessed 28 June 2000.

²⁸Elizabeth L. Marshall, *The Human Genome Project Cracking the Code Within Us* (New York: Franklin Watts, 1996), 9.

²⁹Wright, 6.

³⁰Dean Hamer and Peter Copeland, *Living with Our Genes*, (New York: Doubleday, 1998) 84.

³¹Glenn McGee, "Tomorrow's Child," in MSNBC NEWS; available from <http://www.med.upenn.edu/bioethics/breaking/7Jun99.html>; INTERNET accessed 19 July 1999.

³²Ibid.

³³Independent Commission on the Los Angeles Police Department, Report of the Independent Commission on the Los Angeles Police Department. Summary. (Los Angeles, Calif.): The Commission, 1991.

³⁴Wright, 258.

³⁵Michael Crichton, *Jurassic Park*, (New York: Ballantine Publishing Group, 1991)ix.

Bibliography

- “Board of Inquiry Report into the Rampart Area Corruption Incident, Public Report, March 1, 2000, p. 303; available from lapdonline.org/pdf_files/pc/boi_pub.pdf INTERNET.
- Michael Crichton, *Jurassic Park*, (New York: Ballantine Pub. Group, 1991) ix.
- David C. Dohn, “Oral boards critical when hiring,” California Peace Officers’ Newsletter (February 2000): 12-13.
- “Ethical, Legal, and Social Issues (ELSI) of the Human Genome Project,” in Human Genome News vol. 10, no. 1-2), prepared by the U.S. Department of Energy Human Genome Program, February 1999; available from <http://www.ornl.gov/hgmis/resource/elsi.html>; INTERNET.
- “Facts about Genetic Discrimination.” Produced by the Arc’s Human Genome Education Project, available from <http://thearc.org/faqs/discq&a.html>; INTERNET.
- Dean Hamer and Peter Copeland, *Living with Our Genes*, New York, New York: Doubleday, 1998.
- Independent Commission on the Los Angeles Police Department, Report of the Independent Commission on the Los Angeles Police Department. Summary. (Los Angeles, Calif.): The Commission, 1991.
- Elizabeth L. Marshall, *The Human Genome Project Cracking the Code within Us* (New York: Franklin Watts, 1996), 9.
- Glenn McGee, “Tomorrow’s Child,” in MSNBC NEWS; available from <http://www.msnbc.com/news/271976.asp>; INTERNET.
- Leslie J. Nicholson, “Race is on for Fastest Computer,” *San Diego Union Tribune*, 14 August 1999, C1, 3.
- “Obtaining a Peace Officer Profile,” California POST Commission, available from <http://www.post.ca.gov/faqs/Profile.htm>: INTERNET accessed 20 February 2000.
- Jolyn Okimoto, “Northern Arizona University Professor Hopes to Excavate, Clone Woolly Mammoth,” in Signon San Diego Science News; available from <http://www.uniontribune.com/news/science/991001-98124/-wst-mammothc.html>; INTERNET.
- Douglas E. Olesen, “The Top 10 Technologies for the Next 10 Years,” in *Exploring Your Future Living, Learning, and Working in the Information Age* (Bethesda: World Future Society, 1996), 71.

Princeton University Office of Communications, “Gene therapy for Improving Memory?”
Futurist- Forecasts, Trends and Ideas about the Future, (March-April 2000): 65.

Mark A. Rothstein, “Protecting Genetic Privacy: Why it is so Hard to Do,” in (Human
Genome News vol. 10, no. 1-2), prepared by the U.S. Department of Energy
Human Genome Program, February 1999; available from
<http://www.ornl.gov/hgmis/publicat/hgn/v10n1/14roth.html>; INTERNET.

Alissa J. Rubin, “House to Open Hearing on Fetal Tissue Research Sales,” in
latimes.com: available from <http://www.latimes.com/cgi-bin/peinr.cgi>;
INTERNET.

Alan Sayre, “House cat gives birth to rare wildcat,” in MSNBC NEWS; available from
<http://www.msnbc.com/news/34067.asp?cp1>; INTERNET.

Philip S. Trompetter, “Pre-employment Psychological Screening of Violence-Prone
Peace Officer Applicants,” *The Journal of California Law Enforcement*
27(January1993): 16.

“U.S. HGP on Fast Track for Early Completion,” in (Human Genome News vol. 10,
no.1-2), prepared by the U.S. Department of Energy Human Genome Program,
February1999; available from
<http://www.ornl.gov/hgmis/publicat/hgn/v10n1/01goals.html>; INTERNET.

Henry Weinstein, “RICO Suits in Rampart Okd,” in LA Times; available from
<http://www.latimes.com/news/state/reports/rampart/>; INTERNET.

What Every Law Enforcement Officer Should Know About DNA Evidence, report
prepared by the National Commission on the Future of DNA Evidence,
#BC000614.

William Wright, *Born that Way Genes Behavior Personality* (New York: Alfred A.
Knopf, 1998), 263.