COPS, CONSULTANTS, AND TECHNOLOGY:

AN EXAMINATION OF INNOVATION

IN THE BOSTON POLICE DEPARTMENT

1962 - 1974

by

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ABSTRACT

Cops, Consultants, and Technology: An Examination of Innovation in the Boston Police Department (1962-1974)

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While a number of national commissions in this country have recommended greater exploitation of advanced technology as an important approach to improving police performance, little is known about why police departments actually select a piece of technology and how they intend to use it. Similarly, there is very little information available regarding what variables play critical roles in determining whether such technology is successfully implemented, and what the technology's impact on departments' organization and operations has actually been.

As an initial step toward discovering answers to these questions and developing an understanding of the process of technological innovation in police departments, this study examines the introduction of a computer-aided command and control system (CCS), similar to the type recommended by the 1967 President's Crime Commission, into one police agency, the Boston Police Department. Information for the case study was obtained from the Boston Police Department's files on its technological development program, from reports of the Department's consultants, and from a series of semi-structured interviews with direct participants in the CCS project and other affected parties. In the course of the research, the possible role which the Department's limited technical expertise and its reliance on consulting assistance might have had on the process of adopting the technology was explored. Other "variables" which were given particular attention include the existance of external funding, the local political environment, the technology's endorsement by professional bodies, and the Department's prior experience with innovation.

One of the most important findings from the Boston case study was that the process of the technology's adoption was stochastic. Over the course of the introduction and development of the CCS, there were significant shifts in the functions which the Department wanted the technology to perform, and the equipment was modified accordingly.

A second critical contribution of the case study is that it demonstrates the inaccuracy of the Crime Commission's assumption that police departments would follow a rational decision-making process in selecting the technology. In the Boston case, the two most important considerations in the initial decision to adopt the CCS appear to have been the status associated with possessing a piece of "high technology", and the availability of federal subsidization to pay for it. In these deliberations the Department exhibited little concern about what the technology could actually do.

Finally, the study suggests that in the case of departments which have a more substantive commitment to the technology's application than the Boston Police Department initially exhibited, the police administration may well be more interested in the capacity of such advanced systems to increase managerial control than in their direct application to the problems of crime.

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CHAPTER ONE

INTRODUCTION: TECHNOLOGY AND THE POLICE

During the last fifty years, a number of national commissions have been formed to study the problems of law enforcement agencies and to determine ways to improve their performance. These commissions, which were composed of the elite of the law enforcement community, have consistantly advocated "professionalism" as the solution to the inadequacies of police service. As part of their goal of police professionalization, the commissions have repeatedly recommended greater exploitation of technology. To understand the arguments used to urge departments to adopt technological approaches to their problems, it would be useful to review the history of the police professionalism movement and its most notable commissions. The commissions and their recommendations will be summarized in the first part of this chapter.

Examining the commission reports provides us with the law enforcement "elite's" perception of the value of technology, but it leaves some important questions unanswered. Most important, it is unclear whether local departments have come to share the commissions' position regarding the purpose of such technology. The last section of this chapter will be devoted to introducing such questions in greater detail.

Police Reform at the Turn of the Century

The history of police reform in the United States is closely linked to the nineteenth century émigré population's desire

for upward mobility, and their subsequent development of the uniquely American political institution, the "political machine." By the end of the century, many municipal police departments had come under the domination of the machine. As with the other public service agencies under their control, the machines used the police department for building the social and economic mobility of the ethnic groups, which were the foundations of the organization's political strength.[1] Understandably, many of the middle and upper-middle class native-born Americans found this situation intolerable.[2] Beginning in the late 1800's, these native-born Americans began to form groups which called for the reform of municipal government.

Reform of the police was an especially vital issue to these groups because of what they considered to be striking increases in lawlessness and immorality, which they attributed to police mismanagement and corruption. More important, however, the general lawlessness and corruption were seen as manifestations of competing theories of social and economic mobility. To the reformers, "social mobility in America was essentially economic, private and individual..., and that as a result, success was ultimately a function of industry, frugality, integrity, respectability, and occasional good luck."[3] The machines, on the other hand, held that social mobility was political, public, and collective. If such values were institutionalized by the machines, the native-born Americans' positions of economic, political, and moral supremacy in society would be threatened. To prevent this situation from happening, the reformers had to destroy the power of the machine. And to

do that, they had to break the machines' grip on the police.

From 1890 until the 1930's, then, the main impetus for police reform came from the native-born Americans and the civic associations and municipal research bureaus which they formed.[4] These groups relied heavily on a military analogy as a source of proposals for the reorganization of the police.[5] According to this model, the police were a military body engaged daily in a war on crime. Carrying this analogy further, the reformers argued that police officers were "home guard soldiers"[6] who owed the force and their superiors the undivided loyalty which the soldier owed the army.

However, after over thirty years of effort on the part of the reformers to develop centralized, apolitical, crime control-oriented police departments, few of their recommendations had been widely implemented.[7] Many citizens, because of the traditional civilian character of the American police, still disagreed with the idea that the military model was the appropriate basis for restructuring police departments.[8] As a result of this resistance, the police administrators, who from 1900 through the first World War had accepted the military analogy in increasing numbers, began to have second thoughts about its value as a reform strategy. Without the support of these individuals, the reform movement lost much of its momentum.[9]

The Wickersham Commission: The Beginnings of Police Professionalism

It was not long, however, before the police once again

became the focus of considerable public criticism and demands for reform. Following World War I, the country began experiencing alarming increases in crime rates. Finally, in 1931, when the crime rates were reaching new highs and public confidence in the police had all but disappeared, the National Commission on Law Observance and Enforcement was formed.[10]

The report of the "Wickersham Commission," as it was more popularly known, was significant in three ways. First, the report demonstrated that the police administrators themselves were attempting to assume the leadership role in the movement for police reform, which to that point had been dominated by the civilian reform groups. It is significant that the Commission's volume on the police was largely the product of August Volmer, a reknowned police chief, and his assistants.[11]

Second, in the discussions and recommendations of the Commission report, the military analogy had been replaced with a corporate/professional model. Instead of looking to the army for ideas on how to improve the performance of the police, the reformers now suggested that departments evaluate their organization and practice against the operations and principles of large-scale, "professionally run" businesses.[12]

Finally, and most important from the standpoint of this study, the Commission argued that if the police were to successfully cope with the increasingly sophisticated crime which the cities were experiencing, local departments would have to make full use of the latest technological breakthroughs.

The Inefficiency of Police Administration

Many of the criticisms and recommendations contained in the police volume of the Commission report were very similar to those that had been advanced by the civic groups for years. For instance, the Wickersham Commission argued that the police's inability to prevent crime was largely attributable to police mismanagement. This "inefficiency of police administration," as the report viewed it, was seen as being the result of a variety of factors. Foremost among these in the Commission's opinion was the poor quality of leadership and the influence of politicians.[13] Consequently, as previous investigations of the police had done, the Commission recommended that more of an effort be made to find competent chiefs, and that the position of chiefs should be made more secure by extending their tenure. The Commission also concluded that the patrolman was burdened with too many duties and, as a result, the police function should be narrowed to the more manageable law enforcement tasks.

While their comments regarding police leadership and the focus of police work were essentially identical with the proposals of the progressive civic associations, the Commission's evaluation of the quality of patrol personnel differed significantly from the view held by the majority of civilian reformers.[14] The latter groups had felt most police officers had the basic abilities and honesty required to function effectively once the influence of the machine was curtailed. Instead of this view of the patrolman as the victim of the political organizations,

the Commission held that most officers were willing and even eager participants in the machine's illegal operations, and concluded that, except for rare exceptions, the beat officer was essentially incompetent, inefficient, and dishonest. As a result, the Commission placed a great deal of emphasis on upgrading the quality of recruits and supervisory (command and control) staff. Not surprisingly, technology became one obvious vehicle for this reform.

The Need to Exploit Technology

A major way in which the Wickersham Report differed from earlier investigations was in regard to the attention paid to technology. Consistant with its view of the inadequacies of command and patrol personnel, the Commission's report criticized the police's underutilization of existing technology as one of the "great defects of our police administration."[15] The report drew a graphic picture of the emergence of the "professional" criminal, and the police's lack of the proper tools and training to meet the challenge which these individuals represented:

> The police have now most often to deal with highly organized groups of criminals, often astutely led by unseen leaders, who place at their disposal the most recent inventions and resources in the arts and sciences which can be effectively misapplied to criminal ends....By imitating modern business in its adoption of every mechanical contrivance which will save labor and secure profitable results with the least expenditure of time and money, the criminals have by association and combination amongst themselves become in their commission of crime superior to the police in detecting, arresting, and prosecuting them. (emphasis added) 16

The report concluded that to "serve the community effectively, the policeman should be fully equipped with the tools of his profession"(emphasis added), and that the tools of the law enforcement community "for the detection, pursuit, and arrest of the criminal should be better than the equipment of the criminal."[17] Among the technical aids which the report specifically mentioned as essential for the operations of the modern patrol force were patrol cars, wireless radio, and telephone communication systems. In its report, the Commission also noted that as police operations became more complex, they would necessarily become much more dependent on records. Accordingly, the Commission urged that departments make a greater effort to develop and maintain a comprehensive records system.[18]

The 1967 President's Crime Commission

Since the release of its report, the Wickersham Commission's concept of reform has dominated much of the professionalists' thinking about the police. From the 1930's to the present, the model of the ideal municipal police agency presented in the professional literature has been characterized by a strong command and control structure, the insulation of beat officers from political influence, an emphasis or aggressive law enforcement, efficiency, and impartiality, and the use of the latest technology.

The 1967 President's Crime Commission report, The Challenge of Crime in a Free Society, was no exception to this pattern.

Like the Wickersham Commission, the President's Crime Commission was established in a period when public confidence in law enforcement agencies and other governmental institutions was low.[19] Crime rates had climbed steadily since the beginning of the decade. Social unrest was also on the rise. Most important, the actions taken by the police to deal with these problems were perceived by many quarters to be ineffective, inefficient, or inequitable.

The President's Crime Commission responded to the criticisms which were then focused on the law enforcement community by once again appealing to the departments to "professionalize." In their report, professionalization became much more closely linked with achieving centralized control of patrol units.[20] The Crime Commission denounced the "diffusion of authority, confused responsibility, and lack of strong lines of direction and control" which characterized many of the departments which the Commission's staff had surveyed.[21] Proper organization and management, the Commission argued, was prerequisite for implementation of most of the other recommendations contained in their report.[22] In explaining this position, the Commission described the importance of strong centralized control in preventing improper political interference, corruption, and particularistic enforcement:

> For police organization, as for large scale organization of any kind, the heart of the matter in central control... Administratively it implies policymaking and planmaking, and the kind of supervision that guarantees that policies and plans are understood and carried out by every member of the

> department....Overall, it implies the maintenance of departmental integrity by providing that governmental control over the department is exercised only by top-level political executives through top level enforcement officials, and not by neighborhood politicians through precinct officials.... The removal of political pressures from subordinate police officials would make discriminatory law enforcement more difficult. 23

While it is not obvious from this excerpt, the Crime Commission was especially concerned with the issue of control over the discretion of patrolmen because of the charges of police misconduct which had been raised by increasingly powerful and militant minority groups. In fact, the entire Commission report demonstrated a concern for police-community relations which was atypical of the professionalism literature to that point.[24]

Although it devoted considerable attention to the issue of community relations, the real focus of the Commission's remarks was on the methods whereby local police departments could deal more effectively and efficiently with crime.[25] Both the Wickersham Commission and the earlier progressive reformers had expressed the belief that the police could eradicate most crime, and that the only reason why they had not been effective in this function previously was because of police mismanagement. The President's Commission, on the other hand, was much more open in discussing the possible social and environmental causes of crime, which it admitted were beyond the ability of the police to control. Nevertheless, the Crime Commission maintained that though the police could not prevent all crime, they could con-

trol a significant enough amount to warrant the law enforcement function remaining the police's primary function.

The Crime Commission's View of Technology

According to the literature advocating professionalization of the police, the police primarily prevent crime through deterrence. A deterrant effect is achieved, the argument goes, when the probability of apprehension is high enough to create too great a risk for a would-be offender to be willing to commit a crime. This view assumes a great deal, including the supposition that the criminal operates in a rational enough fashion that he will calculate realistic arrest probabilities before undertaking any action. Nonetheless, although until quite recently, there has been little empirical evidence regarding deterrence, for decades law enforcement tactics have been based on the assumption that this phenomena actually exists.

Once one accepts the deterrence argument, the problem of crime control becomes a technical one. That is, how does the department best deploy and utilize its resources so as to create the maximum possible apprehension probability? Given this reformulation of the crime control problem, it is not at all surprising that the professionalists in the police community, including the President's Crime Commission, have repeatedly advocated technology.

As the Wickersham Commission had, the 1967 Crime Commission Report focused on the gross underutilization of technology by the

criminal justice system.[26] However, whereas the earlier study had limited its recommendations to the acquisition of existing devices and the provision of some technical training for career officers, the 1967 President's Crime Commission additionally encouraged the larger departments to establish operations research groups which would be made up of professionally trained scientists, mathematicians, and engineers. Once such a group was formed, it would develop on-going studies of the organization of the department, provide technical guidance to the department management, analyze operations, and assess the effects of all experimentation within the department.[27] The Commission pointed to the "marvelous results" which such groups had achieved in the military, federal government, and industrial sectors, and expressed confidence that they could prove to be a significant force for experimentation and innovation in the criminal justice system.[28]

As an introduction to the utility of the skills which the scientists and engineers would bring to a department, the staff of the Commission's Task Force on Science and Technology prepared an example of the use of systems analysis (an operations research technique) in finding how the patrol force could better deter crime.[29] Their analysis started with the assumption that the principal objective of the criminal justice system was to reduce crime. The police attempt to reduce crime, the staff reasoned, by using the patrol force to pose a threat of apprehension. A preliminary study was then carried out in Los Angeles, which suggested that apprehension probability was

correlated with response time and that a rough cost-effectiveness analysis of a number of options for reducing response time could be computed. The results of this analysis led to the conclusion that the best allocation of resources would be in automating the communications center by such means as using computers to perform some of the dispatching functions, automatic car locators to find the nearest car, and other technological possibilities.

Consistent with this analysis, in their presentation of promising advanced "hardware," the Task Force on Science and Technology concentrated on electronic data processing and "command and control" equipment.[30] In discussing the advantage of computer-based information systems, reference was again made to the success which government and industry had realized from such equipment. The Crime Commission also made mention of the criminal justice computerized information systems already in existance (such as the statewide systems of California and New York). Such computer systems, the Commission noted, could aid the police in many capacities. For instance, they could be used to provide real-time responses to inquiries from the patrol force regarding outstanding warrants or stolen vehicles. They would also permit the development of a dynamic resource allocation capability, allowing a department to alter deployment in response to changing patterns of crimes on an hourly or daily basis. Additionally, computer equipment could be used to collect uniform statistics on agency operations and workloads, which would provide a basis for estimating personnel needs and

for optimal allocation of men and dollars.

In its "hardware" discussion, the Commission also presented the general outlines of a possible computer-assisted command and control system. According to the report, a properly applied computer in such a system could reduce communications center response time delay significantly -- from 90 seconds to about 30 seconds. Moreover, the Commission argued that with such a computer-assisted system, many new possibilities are presented for the deployment of patrol personnel. For instance, under a riot or other emergency situation, contingency plans could be programmed so that the appropriate units are sent to the emergency, and adequate backup maintained.

The Commission recognized that much of the equipment which they had recommended was relatively expensive. In fact, the report cited the costs of such hardware as the principal reason why police agencies had been so slow in introducing technology into their operations.[31] To help alleviate this problem, and to promote experimentation within the criminal justice system, the Commission asked the federal government to sponsor a national program of research.

The United States Congress had already taken a step in this direction when it established the Office of Law Enforcement Assistance in the summer of 1965. Subsequent to the release of the Crime Commission's report, the Congress passed the 1968 Omnibus Crime Control Bill, which abolished the OLEA and created the Law Enforcement Assistance Administration in its

stead. Under the LEAA, the OLEA's program of grants to local law enforcement agencies was greatly expanded. However, the LEAA retained its predecessor's interest in seeking the exploitation of technology by the police, and its grant programs were structured to provide substantial advantages to those departments who sought federal assistance for the acquisition of advanced hardware.[32]

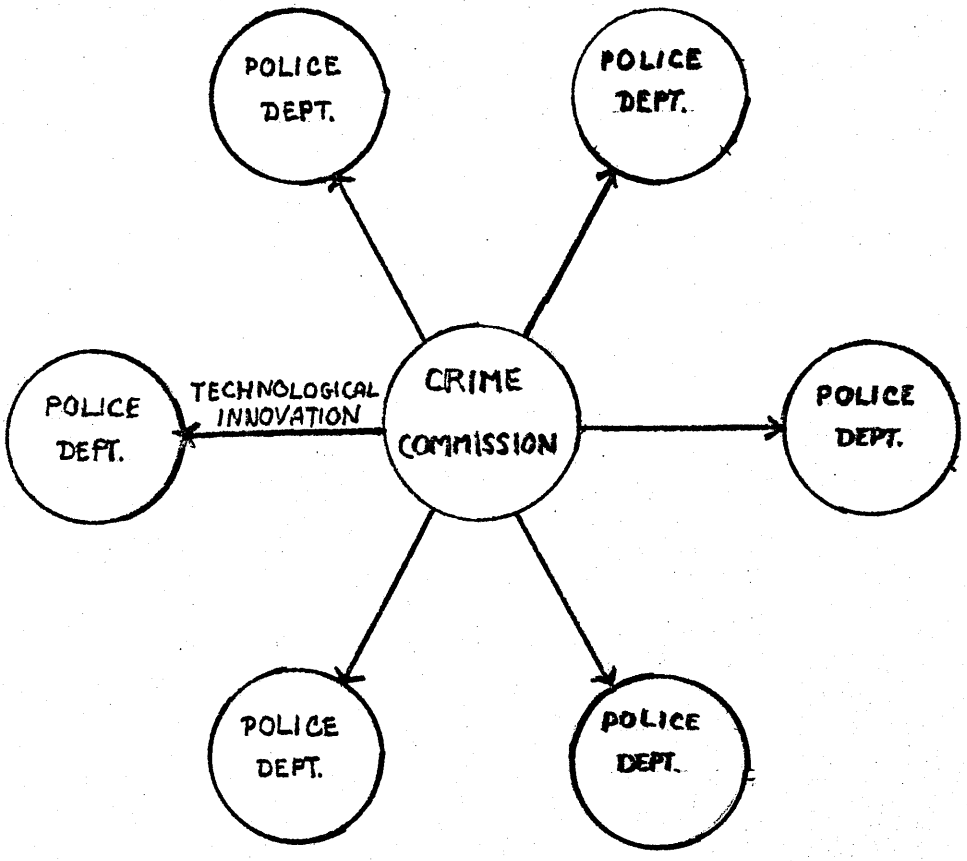
The Diffusion of Innovation

As the preceding discussion has suggested, a considerable amount of space in the police professionalism literature has been devoted to advocating technology. However, surprisingly little information is available regarding the actual process whereby such technology gets introduced into a department's operations.[33] Specifically, there is little data in the literature about why departments decide to select a particular piece of technology, how they use it (or plan to use it), and how various groups in the department react to the adoption of such technology. These questions focus on the diffusion of innovation.

The dearth of information regarding such questions appears to be a result of some of the assumptions which professionalists like the President's Crime Commission made regarding police organization and the process of diffusion. As we have noted previously, most of the recommendations of the Crime Commission were predicated on the assumption that a department had first reorganized itself into a system of strong,

centralized control (similar to Weber's "monocratic" bureaucracy).[34] According to this model of organization, an order issued by the top police executive is faithfully enforced down through the departmental hierarchy.

In large part because it looked upon departmental organization in this fashion, the Crime Commission subscribed to a variation of the center-periphery theory of innovation (see figure 1), which treats diffusion as an act of communication.[35] In the Commission's opinion, police administrators shared the professional elite's deep concern for improving their department's crime control performance. Therefore, essentially all that would be required to get departments to introduce technology into their operations would be for prestigious professional bodies such as the Commission to articulate the value of technology in law enforcement, which the President's Commission infact took great pains to do. The one factor which the Commission saw as a possible obstacle to the technology's diffusion was the expense of the equipment. Consequently, the Commission sought the creation of a federally-subsidized program of research which would defray some of the costs.[36] Most important, however, since the Commission assumed that such professionally-minded departments would have already established a system of centralized control, once the decision was made to adopt the technology, implementation was not perceived as presenting much of a problem, and was given little attention in the report.



(Figure 1)

By viewing the technology's diffusion in this way, however, the Commission overlooked the fact that, as in all organizations, the staff of police agencies are attempting to achieve a variety of personal and administrative goals in addition to the organizational goal of crime control. Moreover, even in the most centralized of organizations, there are often powerful coalitions over which the top police executive has limited control, and who consequently play a major role in determining the nature of changes in the department. Thus, the decision to innovate could be prompted by a number of factors besides the desire to improve crime prevention, and the role which technology is assuming in law enforcement could be quite different from what the Crime Commission envisioned.

As a first step towards empirically ascertaining whether police agencies adopt and use technology in the fashion visualized by the law enforcement elite, this study will examine a case of technological innovation in the Boston Police Department. The section which follows will detail the specific questions which the case addresses, and will discuss the methodology which was used in the search for answers to those questions.

FOOTNOTES FOR CHAPTER ONE

1. Robert Fogelson, The Rise of Police Professionalization: 1890-1970, (Cambridge: Unpublished Manuscript, 1973), Introduction, p. 22; Chapter I, pp. 7-8

2. Ibid, Chapter II, pp. 13-14.

3. Ibid, Chapter II, pp. 12-14

4. Ibid, Introduction, p. 20.

5. Ibid, Chapter II, pp. 24-25

6. Ibid, Chapter III, p. 26

7. Ibid, Chapter III, pp. 6, 16-18, 21, 23, 30, 35, 43

8. Ibid, Chapter I, pp. 1-7

9. Ibid, Chapter II, p. 46

10. The United States National Commission on Law Observance and Enforcement Report on the Police (Patterson-Smith republication series on Criminality, Law Enforcement, and Social Problems, New Jersey, 1968) pp. 1-9, 137-140.

11. See also, Gene Edward Carte , "August Vollmer and the Origins of Police Professionalism, Journal of Police Science and Administration, Vol. 1, No. 3 (1973) pp. 272-281

12. Fogelson, Introduction, p. 20; The National Commission on Law Enforcement and Observance, p. 2

13. The National Commission on Law Enforcement and Observance, pp. 1-3, 6

14. Ibid, pp. 3-4; Fogelson, Chapter II, pp. 19-20

15. The National Commission on Law Enforcement and Observance, p. 4

16. Ibid, pp. 4-5

17. Ibid, p. 4

18. Ibid, p. 139

19. Ibid, p. 1; The United States President's Commission on Law Enforcement and the Administration of Justice, Task Force Report on the Police (Washington, D.C., 1967),p.1.

20. Task Force Report on the Police, pp. 28-38, 44-51.

21. Ibid., p. 45.

22. The United States President's Commission on Law Enforcement and the Administration of Justice, The Challenge of Crime in a Free Society, (Washington, 1967) p. 113.

23. Ibid., pp. 113-114.

24. See Task Force Report on the Police, pp. 144-204

25. Ibid, pp. 1-3.

26. The United States President's Commission on Law Enforcement and the Administration of Justice, Task Force Report on Science and Technology, (Washington, 1967) p. 1.

27. Task Force Report on the Police, p. 57.

28. Task Force Report on Science and Technology, pp. 2-3.

29. Ibid., pp. 2, 7-12.

30. Ibid., pp. 1-2, 21, 36; Task Force Report on the Police, pp. 57-61.

31. Task Force Report on Science and Technology, p. 1.

32. For a critique on the federal government's emphasis on equipment and advanced systems in its law enforcement subsidy programs, see Lawyers Committee for Civil Rights Under Law, Law and Disorder III: State and Federal Performance Under Title I of the Omnibus Crime Control and Safe Streets Act of 1968 (Washington, D.C.: Lawyers Committee for Civil Rights Under Law, 1972), particularly pp. 41-57.

33. One of the few publications which deals with the actual implemantation of police technology is the Law Enforcement Assistance Administration's, Innovation in Law Enforcement (Washington, June 1973) 163 p.

34. Victor A. Thompson, Bureaucracy and Innovation (Alabama: University of Alabama Press, 1969), p. 15.

35. Donald A. Schon, Beyond the Stable State, (New York: Random House, 1971), pp. 80-116.

36. Task Force Report on Science and Technology, p. 2.

CHAPTER TWO

METHODOLOGY

QUESTIONS FOR RESEARCH

The fundamental goal of this study is to begin to develop an understanding of the nature of the process whereby technology is introduced into the operations of police departments. As a case in technological innovation, an empirical investigation of the Boston Police Department's experience in adopting a computer-aided Command and Control System was carried out. This investigation was guided by four major questions:

1) Why does a department select a particular piece of technology?
2) How do the selectors intend to use the technology, and what is the expected impact?
3) Once a decision is made by a department to adopt the technology, what variables play critical roles in determining whether the technology is implemented or not?
4) What is the actual impact of the technology on the department's organization, function, and personnel, and on the quality of the service it provides?

Why select a particular piece of technology?

One issue which the study sought to address is how police departments initially become aware of the existence of a piece of technology. In the course of the research, an

attempt was made to identify those groups whose advocacy of sophisticated technology came to the attention of the department, and to analyze how these groups differed in their presentation of the technology and of its potential utility to police operations. Special consideration in this effort was given to the motivation of these groups, how these motivations seemed to affect the character of their advocacy, and how the department responded to the different appeals.

Another task of the research was to determine which members of the department took part in the deliberations over the technology's introduction, and why the decision to adopt a technological innovation was reached. The President's Crime Commission seemed to assume that departments would follow a rational decision-making process, and by doing so would discover that the advanced systems which it recommended represented a superior approach to improving police patrol performance.[1] The study of Boston's experience was seen as a way to test the validity of the Commission's assumptions, not only about the nature of the decision-making process, but also in regard to whether the primary motivation of departments for deciding to introduce such equipment is in fact the desire to improve patrol performance. The case also provides an opportunity to evaluate the importance of federal funding as an incentive for police departments to adopt technological solutions and as an influence on their perceptions of high technology.

Intended use?

Closely related to the questions of the department's motivations for selecting technology is the issue of how the police intend to use the technology and what the department expects its impacts will be. The Crime Commission had anticipated that the police would be employing advanced systems to improve their crime control operations. However, the equipment which it advocated (command and control systems, automated vehicle monitoring systems, high-speed computers) have a number of potential functions, many of which relate to crime control only indirectly. By examining the Boston experience, we should be able to begin to assess how the equipment is actually perceived, what (perhaps) latent goals are seen as rationales for selecting it, and finally how perceptions of its purposes differ among groups within the department.

What are the critical factors affecting implementation?

The Crime Commission treated the actual development and integration of the technology into the department's operations as relatively routine once the decision was made to adopt the innovation. However, depending on the characteristics of the organization and of the technology being introduced, one can expect that departments will experience varying degrees of success in implementing technical innovations. Some "characteristics" of the technology which could prove to be important determinants of success include whether the system is in a

production state or not, or , if it requires further development, the extent of outside subsidization which will be available. The level of complexity and sophistication of the technology could be another important factor, especially in regard to how it compares with the technical ability of the department to understand and maintain the equipment.

In addition to the technical competence of the department, one could expect that a number of other organizational characteristics could have an impact on the effort to implement innovation. For instance, what is the environment for change in the department like? Have there been attempts in the past to implement similar reforms, and how have they turned out? Have these past experiences shown the force to be receptive to change or generally threatened by it? Does the force perceive the technology as being relevant to its problems and consistent with its theories of police organization and function?

Another consideration might be the internal political environment of the department. Is there a power struggle taking place within the command staff, or between members of the command staff and the administration? What is the tenure and status of those in the department who are advocating the technology? Who are the opinion leaders in the force (who must accept the innovation if it is to succeed), and what is their accountability to those trying to implement the technology?

Actual impact of the technology?

Probably the most important issue regarding the technology advocated by the police professionalists is the nature of its

actual impact on the operations of police departments. If we find that a department has adopted high technology for the reasons recommended by the 1967 President's Crime Commission, we must ask how the impact on patrol performance compares to that anticipated by the Commission. If, on the other hand, we discover that the technology has been used by the police in ways unanticipated by the Commission, it is still very important to ask what its impact has been and how it compares to the initial expectations of the department. In either case, it is necessary to identify the causes of the discrepancies between the expected and actual impact, whether they be organizational factors or limitations of the technology itself.

There is also a normative dimension to evaluating the impact of high technology. For example, how does the cost-effectiveness of the technological approach compare to alternative approaches to realizing the specific objectives of the police? What are the potential implications of using technology to improve the overall quality of police service?

DEVELOPMENT OF THE CASE STUDY

To date, there have been few empirical investigations of the process of innovation (technological or otherwise) in police departments. Moreover, there seems to have been almost no attempt to develop theories of police innovation on the basis of what scant information is available. While

the Crime Commission apparently subscribed to the center-periphery theory of the diffusion of innovation, its selection of this theory seemed to have been determined more by the assumptions the Commission made about the nature and goals of police organizations than by empirical evidence. Most important, the theory to which the Commission subscribed primarily focuses on the communication of innovation between organizations, and largely overlooks the introduction of the innovation within the organization.

The police field is not unique in the state of the existing theory regarding organizational innovation, however. Although considerable empirical work has been carried out examining innovation in business organizations, little substantive theory has emerged from these investigations.[2] Consequently, it is not clear to what extent "borrowed" models which have been developed for other types of organizations can explain the process of innovation in police departments.

Since there is no well developed theory regarding the process of organizational innovation, it was necessary that this study be essentially exploratory.[3] As a result of this fact, and because innovation appears to be not a single variable but a complex process within which a number of critical variables are likely operating,[4] the study utilized a holistic approach.[5] That is, rather than testing pre-specified hypotheses, the objective of the study has been to identify the more general characteristics of the process of technological innovation

in police departments and to identify some of the critical variables which guide that process.[6]

Because of its proximity and its history of technological development, the Boston Police Department (BPD) served as the focus of the research. During the period 1962-1974, the BPD had more than a dozen federally subsidized technological projects. However, due to time and space constraints, only one of these-- the development of a computerized command and control system-- was examined in great detail (although the case study summarizes the development of many of the other projects). In the next section, the process of researching the case will be outlined.

Organization of the research

My research design for the case study involved three major tasks: (1) compilation of available written material on the BPD's technological programs, (2) interviews with participants in the program, and (3) analysis of the combined data. Initially, I expected to be able to perform each of these tasks independently, and in the order presented above. However, the actual research process ended up being more of a cyclical pattern in which I jumped back and forth between tasks. Basically I would obtain a few reports or carry out some interviews, and do some analysis, and then (after modifying the focus of my inquiry on the basis of my analysis) repeat the process over again.

One of the first concerns which I had in planning the research on the Boston Police Department was how I might

overcome the problem of the "blue curtain"--the legendary unwillingness of the police to speak openly with outside researchers. My initial assumption was that if I obtained some "official" backing for my research from the Department administration, than the individuals whom I was planning to interview would be more responsive to my questions. Accordingly, with the aid of some MIT faculty, I approached Mark Furstenberg, the present director of the BPD's Research and Planning division, with the proposal to study the Department's technological development program. As with most of the BPD personnel with whom I spoke, Furstenberg indicated that he was not particularly interested in "history" (meaning anything focusing on the work of previous administrations) but that he would like to see the results of the study. He did, however, assign a patrolman to assist me in obtaining records and arranging interviews with Department personnel. With the patrolman's aid I was able to schedule interviews with the following sworn personnel (for a description of the responsibilities of the organizational subunits to which these officers were assigned, see Appendix A). These individuals were selected because they represented a variety of ranks, subunits, and orientations in the BPD:

--the Deputy Superintendent in charge ofthe Communications Division (who had participated in the development of many of the technological projects)

--two of the Department's five Area Commanders (both of

whom had served as District Captains under McNamara)

--a Captain from the Bureau of Field Services (who was responsible for developing patrol unit sectors and equalizing workloads)

--the District Captain of District 4

--a former member of McNamara's Planning Staff

--a dozen patrolmen from Districts Four and Eleven

Working under the Department's auspices during the interviews turned out to have mixed results. Many of the individuals with whom I spoke took great pains to be cooperative, and undoubtably would have done so even if I had not been working through the Planning and Research Division. During several of the conversations, however, I got the distinct impression that I was granted an interview only because the interviewee wasn't sure of the exact nature of my relationship with the Department and was afraid that if I were offended, word would reach his superiors. In such cases the answers to my questions were unually extremely evasive.

One factor which undoutably contributed to the hesitancy some BPD members felt about speaking with me was the fact that I was primarily asking about events which had occured during the previous administration of Edmund L. McNamara. Because they did not want to lose favor with the present DiGrazia administration (which viewed McNamara and his staff as unprofessional and considered most of the pre-1973 technological projects to be failures), members of the Department were

hesitant to speak about the previous administration, much less praise it. As a result, when questioned about the efforts of the McNamara staff, the interviewees were extremely negative or claimed ignorance, whereas when talking about the latest reforms, the officers' comments were generally more positive than would seem to be warranted.

In addition to my conversations with BPD personnel, I also had access to the transcripts of interviews which Kent Colton of MIT had in 1971 with members of the command staff under Commissioner McNamara. These transcripts included several interviews with Steven Rosenberg, the former Director of Planning and Research, as well as discussions with the Deputy Superintendent who was then in charge of Records and Data Processing (John Bonner), and the Deputy Superintendent then in charge of Communications Control (John West). Because Colton had been investigating the BPD's experience in utilizing electronic data processing equipment (such as that which formed the basis of the Command and Control System) the transcripts of these discussions were very relevant to my own study, and provided much useful information. As part of his research, Professor Colton had also interviewed members of the staff of Arthur D. Little and Concord Research--the consulting firms then developing the Department's Command and Control System and geographic base file, respectively, and these protocols were similarly available to me.

Colton's transcripts were supplemented by interviews which I personally conducted with a number of the civilian participants in the federally-funded projects. For instance, since Rosenberg was such a central figure in the Department's program of technological development and had served as a special assistant to Commissioner McNamara during the latter's second term, I felt an additional interview of the former Planning Director was critical. When I initially approached him, Rosenberg asserted that since his departure from the Department, it was normally his policy not to publically discuss the BPD. However, because of the negative (and in his mind unfair) evaluation which his efforts had received in a LEAA planning agency-sponsored review of the technological projects, he eventually consented to present his interpretation of the projects' history for my benefit. Additional prespectives were gained from conversations with Dr. Richard Larson and JamesWilliamson (both of whom had functioned as consultants to the Department during Rosenberg's association with the BPD), and with the members of the LEAA State Planning Agency for Massachusetts.

The interviews provided valuable insights regarding the opinions and relationships of the principal actors in the technological projects. However, because of the subjective character of the interviewees' comments and the confusion which the interviewees exhibited over the exact timing of events, for a more objective and comprehensive picture of the history of the technological projects, I relied heavily on

the BPD Planning and Research Division 's files (to which, thanks to Mark Furstenberg's gracious approval, I had free access). During the initial stages of the research, I had been concerned about the level of documentation which might exist on the projects, but within a short time realized my worries had been unwarranted. In addition to the grant applications and final reports for the technological projects, the BPD's files also contained numerous progress reports detailing the work accomplished during each stage of the technology's development, and considerable correspondence between the funding sources, the BPD, and its consultant. This correspondence was a particularly revealing source of information regarding shifts in the nature of the relationships between actors or in project orientation.

As the introduction to this section suggests, the basic approach used in synthesizing an holistic assessment from the data available to me was what Glaser and Strauss term a "constant comparative" method of analysis.[7] Essentially, my approach involved reading the assembled case study materials over and over again, each time noting in the margin those places where I felt a critical decision or shift in orientation had occurred, and hypothesizing what the causes of these "events" had been. By repeatedly going through the data in this way, and constantly evaluating and modifying the tentative hypotheses in light of the different sources of data, I gradually developed an understanding of both the nature of the process by which the technology was introduced, and the critical variables therein.

THE SETTING OF THE STUDY: THE BOSTON POLICE DEPARTMENT

This section will briefly describe the environment into which the McNamara administration sought to introduce high technology. In this description, particular attention is paid to those characteristics of the BPD's history, structure, values, and workload which tend to distinguish it from other urban police forces.

The Boston Police Department, the oldest in the country, was founded in 1838, only nine years after Sir Robert Peel established the Metropolitan Police of London as the world's first organized police force. For its first two decades, the Boston police was actually two separate forces, a day force operated by a city marshal and a night force supervised by a chief constable. In 1854, however, the BPD was reorganized, with the night and day forces being merged into a single body.[8]

According to Reppetto,[9] the basic structure of the BPD has changed little since the mid-nineteenth century reform (see Appendix A), and the Department retains a strong traditional orientation. The BPD is formally organized in the classic mold of steep hierarchy (with six rank levels between patrolman and commissioner) and functional compartmentalism. Moreover, the Department is very decentralized (as in the days before mobile patrol), with the bulk of the force assigned to uniformed duty in the eleven districts. Although during the last decade (and

particularly the last few years) the power of the district commanders has diminished considerably, they still possess a great deal of control over field operations. The tradition of decentralized control is not limited to the districts, however. A considerable number of the command staff in headquarters itself views their subunits as largely autonomous baronies.[10]

The BPD has 2500 sworn officers, making it one of the nation's largest departments. Most of the members of the Department have been recruited from among local residents, and the force contains few blacks, Puerto Ricans, women, or college-educated personnel. Eighty-five percent of the sworn personnel are patrolmen, although only about 40% actually perform field work. This situation is partially accounted for by the fact that the BPD has the oldest personnel of any major force in the country, with an average age of 44 years in 1970.[11] The emphasis on tradition and high average age also helps account for the force's conservative orientation and dislike of change. The force's wariness towards suggestions for reform was undoubtably heightened by a number of investigations of the Department carried out during the 1960's which hinted at the existance of widespread police misconduct.[12]

Like most departments, the BPD experienced alarming increases in crime rates over the decade of the sixties. For instance, from 1962 to 1969, the number of Part I Crimes jumped from 20,515 to 43,347.[13] However, unlike most other departments,

the BPD additionally performs a variety of nonenforcement functions (such as ambulance service, voter registration, and license investigation), the demand for which also increased during the last ten years. Nonetheless, though 85% of the calls which the BPD receives are unrelated to criminal activity,[14] most of the force (and especially the younger officers) have tended to reject a social worker orientation, preferring instead to view themselves as law enforcement experts.[15]

METHODOLOGICAL ISSUES

Since this study involves only a single case, there is the problem which Weiss discusses of generalizing from "an N of one."[16] In the holistic approach, generalization is based on two assumptions. First, there is a presupposition that "the study of the situation will reveal inter-relations among elements, that the organization of these interrelations will have the properties of a system, and that the system will be the unifying force underlying the observed phenomena." Second, the holistic approach assumes "that whenever the system is repeated . . . the same interrelations must exist and phenomena which are essentially the same . . . will be observed."[17]

Although the ability to generalize rests with these two assumptions, the accuracy and usefulness of the generalizations depend on the validity of the holistic assessment and the frequency with which systems essentially identical to the

idealized system exist elsewhere. The problem of demonstrating the validity of a holistic assessment is a difficult one. As Weiss points out:[18]

> . . . If one sets up falsifiability as a test for whether a statement is a useful assertion about reality, then holistic assessments often are unsatisfactory. For though their assertions taken one by one can be matched against reality, the more important assertion that the observations are systematically interrelated often eludes test. How, one might ask, can one tell the difference between the careful identification of systematic interrelation which is the product of good sociological work and the almost equally convincing assertion of systematic interrelations which is the product of paranoid delusion? The answer would seem to involve some process of evaluating the weight of the evidence, a much less clear process than the significance testing which is available to analytic investigation.

One of the benefits of the holistic approach is the density of empirical detail, or evidence, which is available to the researcher, and subsequently, to the reader. However, even the most conscientious holistic analyst can never entirely eliminate the possibility of bias in his or her assessment. For instance, I have been able only to present a fraction of the data which I have encountered in the course of the research. Additionally, the data which I have selected for inclusion in the presentation is that which provides the strongest support for my particular theory of the system.

Furthermore, much of the theory of holistic analysts is often grounded on interpretations of events, rather than on the mere details of the events, but the distinction between fact and interpretation is not always obvious to the reader. In the text which follows, I have tried to address this problem,

and have striven to make my occasional interpretation of events distinguishable from the bulk of the case, in which I am simply outlining the facts of the situation. As I have probably not been completely successful in this regard, the reader is urged to study the case with a critical eye.

Finally, even if the theoretical assessment of the Boston experience is wholly accurate, unless essentially similar systems exist elsewhere, the transferability of the findings will be severely limited. The issue thus becomes, how representative of police departments in general is the BPD's organization, political environment, values, and resources (human, material, and financial)? For example, the BPD was undoubtably more decentralized than most police agencies, but its hierarchical structure and compartmentalism is characteristic of a great number of departments. Moreover, the criticisms of the BPD and pressures on it to demonstrate reform are probably not unlike those experienced by many law enforcement bodies. On the other hand, the Boston force did have much less of a professional ethos than is evident in some departments around the country, but is it not immediately obvious which "style" of policing is more representative of the average police department. Further, although the BPD is a particularly large agency (in terms of both budget and manpower), most departments presumably had similar access to the federal grant program, which should tend to equalize the resources which could be brought to bear by a department. In short, it is

difficult at this point to accurately appraise the "representativeness" of the Boston Police Department. At the very least, however, the Boston experience should provide a set of hypotheses which will be useful to guide future investigations of police innovation.

FOOTNOTES FOR CHAPTER TWO

1. See U.S. Commission on Law Enforcement and the Administration of Justice, Task Force Report on Science and Technology, pp. 1-6.

2. For a description of the status of organizational innovation theory, see Selwyn W. Becker and Thomas L. Whisler, "The Innovative Organization: A Selective View of Current Theory and Research," Journal of Business, XL, No. 4 (October, 1967), pp. 462-469.

3. Herbert J. Gans, The Urban Villagers, (Illinois: Glencloe, 1962), p.349.

4. Becker and Whisler, p. 469.

5. Robert S. Weiss, "Alternative Approaches in the study of Complex Situations," Human Organization, Vol. 25, No.3(Fall 1966), pp. 198-206.

6. Leonard G. Buckle and Suzann Thomas Buckle, Bargaining for Justice: Plea Bargaining as Reform in the Criminal Courts (M.I.T.: Unpublished doctoral dissertation, Jan. 1974) p. 169.

7. Barney Glaser and Anselm Strauss, The Discovery of Grounded Theory ,(Chicago: 1967) pp. 101-115.

8. Draft of Boston Police Department's "1975 Description of the Department," pp. 1-2.

9. Thomas A. Reppetto, Public Safety Service Needs of The Future City of Boston, p. 30.

10. International Association of Chiefs of Police, A Survey of the Police Department of Boston, Massachusetts (Washington, D.C.: IACP, 1962), p.22

11. Reppetto, pp. 30-31, 41.

12. Ibid., pp. 18-35.

13. Ibid., p. 27.

14. Edmund L. McNamara, "Discussion of Implementation of IACP Survey Recommendations," The Police Yearbook (Washington: IACP, 1964) p. 18.

15. Boston Magazine, Vol. 65, No. 10 (October 1973) pp. 59-60.

16. Weiss, p. 203.

17. Ibid., p. 199.

18. Ibid., p. 201.

CHAPTER THREE

ORGANIZATION OF THE CASE STUDY

The case study replicates the basic sequence of events in the BPD's technological development program between 1962 and 1974. This "longitudinal" format was chosen for a number of reasons. From my observations, it became clear that an awareness of the temporal relationship between the emergence of external pressures for reform and key actors was critical if one was to appreciate the Department's decision to adopt the technology. Similarly, I felt that presenting the case study in a chronological fashion would more effectively convey the confluence of factors which brought about shifts in the Department's orientation toward the technological projects, and determined the potential for successful implementation. Organizing the material in this way seems to give the reader a better "feel" for the situation, and for the reasonableness of the author's suppositions about causal relationships.

BOSTON POLICE DEPARTMENT: THE ROOTS OF REFORM

The Boston Police Department: 1900-1962

At the turn of the century, the Boston Police Force was considered one of the best, most scandal-free departments in the country. While the Department did receive some criticism for being proportionately the largest and most expensive department in the country, the force generally received praise from the municipal reformers active during this period.[1]

In 1919, however, the Patrolman's Association (which had heretofore been primarily a social and benevolent organization of Boston's police officers) sought to affiliate with the American Federation of Labor. This activity led to the dismissal of the Association's leadership from the force. The dismissal was followed by a sympathy strike by over two-thirds of the patrol force beginning on September 9th. Although the strike only lasted a few days, the rioting which occurred in the city in the absence of the full complement of the police force brought sharp criticism from the public and the summary firing of all the strikers by Governor Calvin Coolidge.

In the years following the strike the Department's administration concentrated on recruiting a new police force. However, this new force did not attain the praise and respect which its predecessor had enjoyed. In fact, from the late 1920's through 1943, the Department was rocked by a series of scandals involving alleged corruption of police officials.[2]

Although the Department had had five different commissioners between 1922 and 1943, all of whom had left office under pressure, the Commissioner appointed in 1943 remained in office

an unprecedented 14 years until 1957, and did a great deal to restore the Department's image of integrity. Nevertheless, according to Reppetto, during the decade of the fifties, "the changes in police organization and methods which were taking place in other cities at that time left no trace in Boston."[3] For instance, the Night Watch organizational pattern, which dated from the mid-nineteenth century and divided the city into a large number of districts, was retained despite the fact that the district boundaries no longer reflected equal workloads or populations.

Additionally, in 1960, the cost for providing police service for Boston was again revealed to be proportionally the highest in the country. As it had done nearly fifty years earlier, in the weeks that followed this revelation the Department tried to justify the high cost in terms of superior protection and police services. The Department was especially vocal in citing how it had cracked down on book-making and other forms of gambling in the preceding months.[4] A year and a half after this claim, however, the credibility of the Department's policy on gambling was seriously impaired when NBC broadcast on national television a film showing several men alleged to be Boston police officers frequenting a commercial establishment which had been raided by state and federal officers as a bookmaking center, but which had escaped similar attention from the municipal force.[5]

In the wake of this scandal, three major events occurred. First, in 1962 and after seventy-seven years of state control, jurisdiction over the city's police was returned to municipal

government. Shortly thereafter, Boston Mayor Collins appointed Edmund L. McNamara, a sixteen-year veteran of the FBI, as the new Commissioner. Also in that year, the International Association of Chiefs of Police completed a survey on the BPD and recommended that a wide variety of reforms be implemented.

The 1962 IACP Report

The findings of the IACP report, which were largely assimilated by the city administration in its blueprint for police reform over the ensuing decade, can be summarized by four statements:

1) The BPD was too large and expensive;
2) the BPD was poorly organized and managed;
3) the BPD was poorly deployed and engaged in too many non-police activities;
4) BPD personnel were not qualified for their duties.

1) Size and Cost: The IACP report disclosed a number of interesting statistics comparing the BPD with other departments. For instance, in 1962 the Department had 4.26 men for every 1,000 population, which turned out to be the highest ratio for any American city with a population of 250,000 or more. Additionally, per capita cost for police services in Boston was $26.36, whereas the median for cities of 500,000 or more was only $17.26.

To reduce the size and expense of the Department (since 94% of the police budget went to salaries), the IACP recommended that the force be reduced by 600 through attrition.

2) Organization and Management: The "Quinn Tamm" report, as the IACP study was locally known, described the BPD as "probably the most decentralized organization in the country" and claimed that the department was characterized by "divided authority, excessive spans of control, and inadequate record-keeping." In order to make it possible for the force to "operate as one department, not decentralized baronies,"[6] the IACP recommended that the Department reduce its number of districts from seventeen to five, to reassign the station detectives to headquarters, and to organize the force according to function. Further, the IACP urged that the Department eliminate the position of a single superintendent as number two man in the Department; this act would serve to centralize control in the commissioner by giving him authority over both administration and operations. The report also directed the Department to increase the number of supervisors, to fix responsibility for each man's performance, and to centralize the record-keeping systems.

3) Functions and Allocation of Resources: The report was highly critical of the use of patrolmen in Boston to perform such non-police tasks as clerical work, census taking, licensing of taxis, and the provision of ambulance services. Accordingly, the IACP recommended that the police function should be narrowed considerably, and that citizens should be hired to perform the department's clerical work, thereby freeing patrolmen for street assignment. They also felt the Department had too many foot beats, and argued that such officers could be much more effective in dealing with crime if assigned to motorized patrol.

4) Personnel: The report indicated that almost all aspects of the Department's selection, training, and method of promotion of officers was inadequate. Among its recommendations in this area the report urged that the Department recruit on a nationwide basis, seek better educated men, utilize psychological and intelligence tests in screening recruits, and upgrade the academy's curriculum. It also recommended that the Department make promotions on the basis of supervisory capabilities, rather than on the basis of seniority and the memorization of the Blue Book.

The set of recommendations which the IACP offered to the Department were by no means unique or surprising. In fact, they represented the fundamental prescription for reform which police professionalists had been advocating since the turn of the century. As Reppetto has pointed out:[7] "...the IACP sought to emphasize the law enforcement, crime control mission of the police, and to create a tightly controlled, highly centralized department with a well trained staff operating under the classic merit personnel system."

The BPD's Initial Response to the IACP Survey

In 1964, Commissioner McNamara made a presentation to the IACP conference in which he reviewed the progress of the BPD in implementing the recommendations of the 1962 survey. The Commissioner's presentation focused not only on the Department's achievements in the last two years, but also on the local obstacles which could hinder further implementation of the suggested reforms.

McNamara prefaced his comments to the conference by noting that as in all studies of this type, the Boston Survey had concentrated only on the weaknesses of the BPD, and therefore to the layman, its final report appeared to be "unduly critical." McNamara continued, however, (and thus softened what appeared to be a thinly veiled criticism of the study) by recognizing the validity of the IACP's suggestions for reform:

> A more detailed study of the report, however, demonstrates that their recommendations conform to those generally recognized and accepted as standard practices and procedures by every modern progressive police agency.... 8

His next few sentences, nevertheless, expressed serious reservations about the ability, at least in the short term, to implement many of the survey's recommendations in the BPD:

> ....If it were my responsibility to organize a new police department in a new city, not affected by legislative restrictions and deep-rooted customs, I would readily accept practically all of the general recommendations made in the report. This is not an easy task, however, in an old city like Boston which is steeped in the traditions and customs of more than three centuries. 9

Despite this disclaimer, it appeared that in the previous two years a number of significant actions had been taken along the lines suggested by the survey. One of the first things which McNamara did upon becoming Commissioner was to form a Planning Board (made up of career department officers), and to assign the Board's members "to study, evaluate and report on every phase of the completed survey."

Two decisions resulted from these deliberations:

1) a decision was made to create a new organizational

structure for the BPD; and,

2) a decision was made to select those survey recommendations which McNamara, his administrative assistants, and the Planning Board considered to be of primary importance and within the departmental administration's ability to implement.

The reorganization,[10] which became effective on January 3, 1963, was principally concerned with the consolidation of the departmental agencies into four bureaus, each headed by a superintendent who reported directly to the Commissioner. (See Appendix A).

There are several aspects of the reorganization which deserve special note, however. For one thing, under the new organization plan, the inspectional function was expanded considerably to full bureau (line) status. This move represented the elimination of several layers of management between the Commissioner and those personnel who were charged with monitoring departmental activities to assure compliance with formal policies.

Another feature of the reorganization was the addition of the Planning Division to the Department's organizational structure. Among the duties vested with this division was responsibility for the development of plans and procedures for all phases of departmental operations, operation of the new Data Processing section , and the preparation of the Department budget. These responsibilities, along with this unit's prominent position in the Office of the Commissioner and McNamara's emphasis on planning in his IACP presentation, seemed to suggest

that this division would be a relatively powerful one in the new bureaucracy.

The reorganization was not wholly successful at streamlining and rationalizing the Department's structure, however. In the new Department organization, the dispatchers, who have responsibility for a large amount of the deployment of cars (in response to calls for service), were placed under the jurisdiction of the Records and Communication division within the Bureau of General Services. Since it was the Bureau of Field Operations, rather than the Bureau of General Services, which was charged with maintaining and coordinating the patrol force, the placement of the dispatchers under the latter bureau served to complicate the lines of authority regarding control of the field force.

Another subject which McNamara discussed in his 1964 presentation was the consolidation of the Boston Police Department's stationhouses. This area was one in which the Commissioner was able to report some progress. McNamara revealed that even before the submission of the Boston Survey Report to the Department, one of the station houses had already been vacated, which had resulted in an estimated annual savings of over $200,000.00. In addition, plans were being formulated, with the assistance of the Boston Redevelopment Agency (the local urban renewal agency), for the consolidation and/or replacement of the remaining stations.

In his address, McNamara also observed that a large portion of the Boston Survey had concentrated on the weaknesses and deficiencies of the BPD's record management system. In

response to this criticism, McNamara reported that the Department was making progress in the records area, and, with the assistance of two private business organizations that volunteered their technical assistance, was in the process of planning "the development of a model police central records system which will represent the best available in the law enforcement field."[11]

The Commissioner's remarks were much less optimistic, however, in regard to the possibilities for reducing the size of the force and narrowing the functions performed by the Boston police. From his comments on the importance of guarding against the dilution of the patrol force, it appears that McNamara had not agreed with the recommendation of the Boston Survey to reduce the force by 640 officers. Moreover, he noted that this reduction had been predicated on the "drastic consolidation of the station houses" as well as "the dropping of the licensing functions, ambulance service, and other non-police activities."[12] Although McNamara himself argued that the primary mission of the police was <u>crime repression</u>, he indicated that community resistance to many of the IACP's recommendations had become evident, and in some instances has been converted into a "ready-made political issue."[13] He continued:

> A study of our day-to-day operation reveals that our police department is essentially a service organization...Over the years the citizens of Boston have come to expect assistance from the police in areas far removed from what are considered normal police responsibilities...
>
> Out-of-town experts in the field of police administration may rightfully stress their professional concept that the police image is best served when their functions are strictly confined within the framework of actual law enforcement, and we quite agree with this premise. In practice, however, it

> is very difficult to abruptly reverse the policies of police service which have become a traditional way of life with the local inhabitants.... (Consequently, McNamara warned that) progress in this area will be slow due to the necessity for legislative action and also the desire to be responsive to the will of the people. [14]

The Commissioner's remarks to the conference seem to be significant in a number of ways. Although he did not agree with all of the Survey's recommendations (such as the recommendation to increase specialization in the Department and to reduce the size of the force), it appears that McNamara felt considerable pressure to demonstrate at least a token attempt to accomplish reforms in all the areas outlined in the 1962 report. The status of the Department (and its leadership) within the police community was at stake. Accordingly, McNamara went out of his way to repeatedly emphasize that progress on many of the Department's projects was achieved even before the IACP survey was completed.[15] In addition, McNamara predicted that with the completion of a number of the projects underway, the BPD would become the leader in the law enforcement field in these aspects of police operations.

By 1964, however, McNamara had already encountered some serious local opposition to the implementation of several of the IACP's major recommendations. Citizens and businesses who feared that the closing down of the local station house would mean a decline in the quality of police service, protested the consolidation of districts. Similarly the proposal to reduce the patrol force drew sharp criticism from local groups. Moreover, because the low pay scale of the

policemen made them the cheapest available source of labor for performing municipal duties such as census taking and licensing, the city administration indicated it would oppose any attempts to eliminate BPD responsibility for such functions.[16]

Although some of this opposition might have coincided with McNamara's personal biases, it also threatened to frustrate his efforts in many of those areas where he had agreed with the survey's recommendations, such as removing responsibility for non-police functions. If McNamara wanted to produce some concrete reforms to demonstrate to the IACP that the BPD was moving forward on its recommendations he would have to concentrate his efforts on a less controversial area.

ARTHUR D. LITTLE, INC. AND THE BOSTON POLICE DEPARTMENT: PLANNING FOR AN INTEGRATED INFORMATION SYSTEM

The BPD's Records and Reporting System

One facet of the BPD's operations which needed substantial improvement, but, unlike consolidation,had not resulted in wide-spread opposition, was the area of records and reports. The existing BPD records system had evolved slowly over time without very much attention to its overall design.[17] Each time somebody had wanted to collect a new piece of information, the response of the records section had been to design an additional form. As a result, the Department had literally hundreds of different forms, many of which contained largely redundant information. Filling out all the proper forms for an incident was an arduous and time-consuming task for the patrolmen. Moreover, the data from these reports was all compiled by hand by clerks at the stations and headquarters, which increased the chance of error.

This system of record-keeping was so inadequate, in fact, that in 1958 the F.B.I. had refused to accept the accuracy of the Department's crime statistics.[18] In response to this criticism, the Department switched from compiling statistics by hand to the use of unit record equipment. The purchase of more sophisticated data processing equipment was suggested to the Department at that time by several computer vendors, but the Commissioner, who we've already indicated had done much to restore the integrity of the Department, felt that such equipment was not necessary.[19]

In 1962, with the advent of the McNamara administration and the IACP Report, the Department was again approached by vendors. This time, however, the vendors' efforts were rewarded. By 1964, McNamara had signed a letter of intent with IBM (for the lease of a 360 Model 30 computer with 32k bytes of core memory) which the Department's Data Processing Advisory Committee subsequently approved.

While McNamara may have privately viewed this action largely as an easy way to obtain a visible symbol of reform, in the report which the Planning Division prepared (with the help of the consultant firm, J. R. Reilly & Co.) as justification for leasing the computer, the money-saving aspects of electronic data processing equipment were stressed. In particular, the Department indicated that it envisioned using the computer in connection with payroll preparation, inventory and budget control, and fleet maintenance control. The report also indicated that the computer, by providing the potential for timely analysis of crime trends, and fuller, easier access to information, would likely result in more effective performance by the Department. The report must have been fairly persuasive, for although there was some doubt on the part of the City Council regarding what this action meant in terms of helping to solve crime, in 1965 the Department received city approval for the leasing of the computer.[20]

The Boston Police Department's efforts to implement a new record and reporting system were facilitated by the establishment of the Office of Law Enforcement Assistance in the summer of 1965. As the federal government's response to the rising

crime rates in the first half of the decade, the OLEA was empowered to distribute grants to encourage comprehensive planning by the states, and experimentation in innovative approaches to crime control by local law enforcement agencies. One avenue which the federal government was particularly interested in exploring was the use of technology in combatting crime.

By the fall of 1966, the OLEA had set up a regional office for Boston. At that time, the Boston Police Department was expecting delivery of their IBM 360/30 within the year. In October, representatives of the Department met with Dr. Robert Emrich of the OLEA to discuss whether and how the agency could help the BPD in developing its records and reporting system. As a result of this meeting, an agreement was reached that the Boston Police Department would request a grant to study the Boston reporting system and to devise a design for an integrated information system. A key objective of this study would be "to determine the most efficient method and means for acquiring, storing, retrieving, and disseminating information"[21] of use to the Department.

For technical assistance in this study. Dr. Emrich suggested that the Department get in touch with Professor Alvin Drake at MIT. Representatives from the Department's administration subsequently met with Professor Drake, an expert in Operations Research, who volunteered the services of two of his students, Steven Rosenberg and Richard Larson, both candidates for Master's Degree in Operations Research. Larson and

Rosenberg were to provide the Department with some preliminary assistance in its study, but as the students could not be much assistance in determining the economic feasibility of various information system options, Drake suggested the Department contact the Cambridge, Massachusetts consulting firm of Arthur D. Little, Inc. (ADL).

ADL: The San Francisco Experience

When the BPD first approached the local office, Arthur D. Little, Inc. had branches located in a number of cities throughout the United States, including one in San Francisco. Until the early sixties the San Francisco office, like its Cambridge counterpart, had been primarily concerned with the physical sciences. In 1961, however, the San Francisco office was reorganized in an attempt to expand ADL's operations into the social sciences.[22] Shortly thereafter the consultant secured a contract to use systems analysis in developing a community renewal plan for the City of San Francisco, and ADL ventured into the field of urban problems for the first time. We shall briefly examine ADL's experience in this effort. There are two reasons for this: first, ADL became engaged by the BPD almost immediately after the termination of the San Francisco contract, so one could expect their West Coast experience would have a significant effect on their manner of operation in Boston; and second, a number of the problems which ADL encountered in San Francisco were also evident in their work in Boston.

About a year before the West Coast branch realligned, the local urban renewal coordinator initiated informal discussions with a friend on ADL staff about ways to launch San Francisco's Community Renewal Program (CRP).[23] These discussions principally focused on the feasibility of using sophisticated systems analysis and data processing to develop the general renewal plan. As ADL's representative soon discovered, the City Planning department, the body actually charged with developing the community renewal plan, was particularly receptive to the idea of utilizing a systems approach to the CRP. A few years earlier, while trying to select computer equipment, many members of the City Planning Staff had been extremely impressed by a management information system report that had been prepared for Los Angeles. One of the agency research planners had been so impressed that he began "advancing a systems-oriented CRP... a decision-making system based upon a management information system."[24]

Eventually ADL submitted a proposal to do the Community Renewal Plan for the city. A key element of the firm's proposed approach was the development of a large scale computer simulation. The operational simulation would be used in the following way:

> Based on the model, urban development trends and future renewal requirements will be forecast. The model will be used to run a series of special tests designed to determine and measure the effects of introducing changes in the model by altering one or more elements in the existing system. The factors in the model will be changed to test different assumptions, conditions, policies, and their consequences. The consequences of different renewal programs, priorities and time schedules

> will be analyzed and tested against the financial, relocation, administration, and other resources...[25]

This analysis would then be used to draw up the actual renewal plan.

The city approved the firm's proposal, and in February, 1963, a third party contract was entered for $520,000 between the Department of City Planning and ADL. The final report from the project was expected in April of 1965. In the months which followed the agreement, ADL experienced a number of difficulties which impaired its ability to meet the terms of the contract. These difficulties resulted from the lack of staff expertise in the particular areas of investigation, the lack of sufficient data, and the lack of prior comparable efforts to use as guidelines for the model's development. As we shall see, similar deficiencies were to hinder the consultant's operations in Boston.

The firm's initial problems in San Francisco came when the ADL planner most responsible for the early negotiations and the proposal withdrew from the project to accept a faculty appointment, only three months after the contract was signed.[26] The planner which ADL hired as his replacement, as well as the majority of the ADL project staff, had little familiarity with computer modeling, and nothing near the technical skills required to develop the simulation.[27] Even if they had had the technical abilities, the staffs' efforts would have been hindered by the lack of accessibility to the client. Since the city contributed so little money to the project (the majority of funds coming from the federal Housing and Home Finance Agency), they felt little incentive to commit city manpower to closely

monitor and participate in the design of the model. It was considered the experts' job.[28] What the city didn't seem to realize however, was unless it was careful to outline its requirements, the final design of the model would probably not respond to its needs. ADL ran into additional problems. Despite a survey of city information sources the consultants were unable to discover any reliable and consistant data sets which would be suitable for model construction and testing. The information which did exist in the Assessor's Office and Board of Education was denied the firm on the basis of what was termed "political reasons."[29] As a result of this development, the industrial and commercial sections of the model were dropped. From the ambitious plans at the start of the project to develop an analytical tool which could examine all aspects of the economic, physical, and political environment, the scope of the proposed simulation was redefined as being limited to the residential housing sector.

ADL was able to finally come up with an initial version of the model in December 1964, and a second, more complicated version in the summer of 1965, but its effort never really overcame the initial personnel and information problems. Moreover, as a result of the lack of similar modelling efforts, and the scarcity of reliable theory on housing market behavior, the simulation ended up containing a number of highly questionable simplifications and assumptions.[30] There was also strong reason to believe that the demographic estimates upon which the model was based were probably erroneous. To compound this, the results of the model were expressed in a geographic unit

(a "fract") which had no counterpart in reality and was useless to the city planning authorities.[31]

In the agreement with the city, the simulation had been seen as a means to an end, the community renewal plan. Nonetheless, throughout most of the contract, ADL, which was professionally committed to exploring the utility of systems analysis to public sector problems, had operated as if the simulation were their principal objective. In fact, the model functioned as an unintended retardant to the development of the renewal plan. According to Brewer, "the model's novelty--its sex appeal -- took a disproportionate amount" of time and attention of the project staff (as opposed to that expended on the larger goal of the plan itself) "because it was of great intellectual interest to the people on board the staff."[32] It also had a similar "sedative" effect on the city planning people:

> Everybody talked about things in terms of the model... the model was the catchword. If you talked about changing the administration of the city... about changing zoning regulations....a great many decisions that had to be made in the course of time were deferred because of the possible development of the model. 33

ADL's fixation with the simulation could not last forever, since their contract called for submission of the Community Renewal Plan in mid-1965. Below is one project participant's description on how the CRP was eventually put together:

> ADL management had agreed to present its recomendations as a public service on local television in June 1965. The problem was that "there had to be a report so that there would be something to talk about." Recollections vary, but sometime around four to six months before the project was over, panic set in:

> "There (had to) be something to talk about," according to the project leader (planner), who assembled a separate team, but "no OR guys as such. We went into a room, and I said, 'We are not going to leave this room until we walk this thing through'...The recommended CRP was produced in this fashion." This fashion meant "sitting down with the census books (and)...plotting enumeration district information...(because) we really at that stage didn't even know where the housing conditions were pretty bad." It meant occasionally leaving the room (the process took about two months)" to go out to do the quickest and dirtiest windshield surveys to confirm the '60 Census data." It meant that ADL at the last moment "flew some writers out from Cambridge...to polish (the report) up. It was kind of a round-the-clock operation such that one of the guys who flew out... died of a heart attack about a week later. It was really that bad." And it meant finding out "that it (the CRP) could have been done...without going through the agency of the model..." 34

ADL's first effort in applying sophisticated analysis and technology to urban problems was by most assessments a failure. Partly this result had been due to the restrictions of the contract timetable, but even with more time it is not clear whether the firm could have done very much better given the relatively limited resources and expertise it was devoting to the project, and the dearth of similar efforts which could provide some guidance.

ADL and BPD: OLEA Grant #153 Application

At the conclusion of the San Francisco Project, Dr. Martin Ernst, one of the three members of the project staff with OR training,[35] relocated to the Cambrdige office of ADL. A short time after Ernst's transfer, ADL was approached by the Boston Police Department regarding the possibility that the firm could assist the Department in its effort to revise the reporting

and records system. On December 16, 1966, Dr. Ernst, along with Dr. Steven Waldron, another member of the ADL staff, met with representatives of the BPD. In the BPD contingent was Superintendent William A. Taylor, then in charge of the Bureau of General Services. Taylor was joined by Supt. John T. Howland, who had served as Administrative Assistant to the Commissioner during the 1962 reorganization, and was, at the time of the meeting, head of the Bureau of Inspectional Services and Chairman of the BPD's Advisory Board. The remainder of the BPD group was made up of two patrolmen from the Department's Planning Division,[36] and Richard Larson, one of the graduate students suggested to the BPD by Professor Drake of M.I.T.

The composition of the BPD contingent is noteworthy in several respects. For one thing, although the Department was negotiating a significant development project, and in one of the areas singled out by the International Association of Chiefs of Police as needing reform, for the most part McNamara did not involve himself directly in the process. According to a number of sources, by the end of his first term McNamara had become disillusioned with the possibility of reforming the Department, and had begun to delegate more and more authority for such efforts to his subordinates,[37] and especially to Howland.

The BPD group was also very unrepresentative of the Department as a whole. For instance, there were no representative from either the Bureau of Field Operations or the districts. Further, of the two senior command staff officers present, Howland, who seemed to have an atypical commitment to

the Department's reform, apparently dominated the negotiations. The Department's delegation also included a civilian academician/ practitioner, Richard Larson, who had the same professional interests as ADL had in advocating the application of sophisticated Operations Research techniques and technology. Finally, as we shall see, the group which gathered for the December 16th meeting was also significant because over the duration of the Department's relationship with ADL, very few additional BPD personnel would become directly involved in the projects on which the consultant worked.

At the December meeting, possibly as a result of the availability of OLEA funds, it was agreed that developing an integrated information and communications system for the Department would involve at least two stages. First, ADL would develop a plan for establishing the system. For this task, Ernst suggested the department should apply for a federal grant of $30,000. For doing the actual implementation, Ernst indicated that a second grant would be required, on the order of $90,000. This arrangement seemed acceptable to the BPD representatives, who stressed, however, that the end result "should show some benefit to other police departments in the country."[38] The BPD seemed concerned not only with getting an improved information system, but one which would be innovative enough to increase the Department's status in the police community.

It is noteworthy that little further discussion between ADL and the BPD preceded the submission of the OLEA grant application the following month. Aside from a vist to Police Headquarters by Waldron (who was to serve as the project leader of the ADL staff) in late December 1966, primarily for the purpose of picking up the OLEA applications forms and names of the BPD personnel participating in the project, the Department and consultants did not meet again formally until January 9th.[39] The ADL and BPD representatives were joined in this meeting by Dr. Emrich, the Regional Director of the OLEA. The proposal was found to be acceptable to all the parties present, and, after a few days delay to get the necessary signatures, the application was officially submitted.

What was of concern to ADL and the BPD at this time is reflected in this initial grant application. In the application, in a fashion very similar to that which ADL had employed in its San Francisco proposal,[40] the consultant outlined its perceptions of the BPD's problems, developed a set of study objectives which it felt followed from these problems, and presented the research methodology by which these objectives would be achieved. Since the Department gave its approval to this application, one can conclude that it also gave a reasonable impression of the BPD administration's perceptions of the current status of the Department (or at least the image of the Department which the administration wanted to project).

The ADL application stressed several points:

1) it claimed that the Department had performed much better than the BPD's critics would concede;
2) the application admitted, nonetheless, that the Department's operations could be improved in a number of areas;
3) however, to be in a position to determine what changes were really necessary, and to measure the effect of such changes once they were made, ADL argued that it was first necessary to acquire an efficient and effective integrated information system, which exploited the latest technological developments.

The grant application began with what seems to be a reply defending the Department against the critics of the BPD over the past years. After defining the objectives of police departments principally in terms of their crime control function, the discussion turned to the difficulty involved in trying to measure the success with which these measures are obtained. For example, ADL made the assertion that "at present (there is) no way of comparing cost of increased protection with benefits in terms of reduced crime."[41] Further, until direct causal relationships between crime and demographic characteristics could be discovered, the proposal argued, it would be improper to use the UCR's to compare the relative performance of police departments.

After preparing the reader with this discourse on the invalidity of comparisons between cities, ADL then introduced some of the comparative, and highly uncomplimentary, statistics on Boston to which its critics had frequently pointed. Moreover, in connection with each of these statistics, ADL either suggested a second statistic which presented a more auspicious aspect of the Department's activities or showed a less derogatory way in which one could interpret the Department's unfavorable record.

Although the proposal claimed that the comparative statistics were irrelevant, it subsequently conceded that various groups had considered them significant enough so as to want to discover their cause. The consultant noted that as a result, there had been numerous studies of the BPD, the most recent of which had been the 1962 IACP (Quinn Tamm) Survey. Furthermore, the application identified the Tamm Report, along with the anticipated installation of the IBM 390/30 computer and the need to make some decisions about the Department's communications equipment (which was soon to become obsolete because of the need to rearrange district boundaries following urban renewal activities) as the primary pressures forcing the Department to undergo some reform.

Perhaps more interesting, after arguing that the information which one can collect on police operations doesn't accurately measure the extent to which the Department's fundamental crime control objectives are achieved, the application stated that the proposed research would primarily be concerned with

developing a plan for an integrated information and communications system. The proposal dealt with this apparent contradiction by reasoning that since one can't measure how well police objectives are achieved or the appropriate level of police effort for a city, one should do the next best thing, and maximize police effectiveness per dollar. That is done, the application continued, by changes in operating procedures and resource allocations. The proposed information system, ADL argued, would make it possible to measure the effect of these changes.[42] However, one thing which the proposal didn't make clear was what performance indicators one should use in evaluating police effectiveness given the inability to directly measure the achievement of basic crime control objectives. For instance, does one look at the number of police cars on the street per dollar? Does that information alone tell us enough? In fact, does it tell us anything about the quality of police service?

The 1967 proposal also presents the reader with information about ADL's probable conduct of its research. For one thing, it became clear that ADL intended from the start to carry out its research independently of the BPD.[43] ADL may have structured its research in this way because it assumed the lack of access to the client which had characterized the San Francisco study. Alternatively, this approach may have been agreed to by the parties in the interest of maintaining an impression of impartial research. Regardless of the reasons for this approach, as we shall see, ADL's tendency to work in isolation from

police personnel very soon brought it into conflict with the BPD.

ADL's comments in the application regarding "Continuation" are also interesting to note considering both the firm's implicit prior agreement with the Department concerning a follow-up grant, and the amount of time that was ultimately required for implementation:

> It is expected that implementation of the recommendations with respect to information and communication systems will have started before the end of the proposed research project, and that completion will be effected by personnel of the department. Preliminary work relating to the exploitation of EDP can be implemented by a consulting firm, J.R. Reilly, already engaged to instruct the department personnel in procedures and programming. It is not known at this time what arrangements may be made to exploit further suggestions for the use of modern data processing methods in police operations or administration. (emphasis added) 44

Summarizing some of the issues discussed above, although ADL presented a proposal which superficailly appears to represent a rational, impartial, "scientific" research design, upon closer inspection a number of biases in their argument became evident. The defense of the Department which ADL included served no purpose but to present an undeserved positive picture of the BPD, and to ingratiate the consultant with its client. Nor did the consultant adequately appraise whether there was reliable evidence which showed that the information which ADL would give the Department the capacity to collect had any quantifiable relationship to the quality of police service. Finally, the application portended the difficulties which the BPD was to experience as a result of the consultant's independence.

ADL and BPD: OLEA Grant #153 Final Report

The OLEA approved the Boston grant application in February 1967.[45] In September 1967, ADL submitted the final report, which outlined a general plan for implementing an integrated information system.[46] The report began largely as the earlier proposal had, with an appraisal of the problem facing the Department. In the opening section of the final report, however, ADL admitted that there was a strong feeling on the part of the public that the degree of protection did not appear to correspond to costs. They also noted that there was a widespread belief that the Department was overloaded with paperwork and that it needed to get officers currently performing clerical skills back in the street.[47]

The biggest difference between the January 1967 application and the final report came in connection with the consultant's discussion of the benefits which would be realized from the proposed integrated information system. Like the application, the final report advocated improving the Department's cost-effectiveness and administrative efficiency. However, the consultant argued that the strongest justification of the proposed system came from its value in the control of personnel:

> The elements of police work are manpower, mobility, and information...The manpower must be recruited, trained, deployed, and supervised. The men must be able to move about, on foot, horse, cycle, auto, or other vehicle. But these elements cannot be effective without information. Up-to-the-minute information is needed so the men can be at the right place when needed, and so that management can know that the work is being performed. [48]

The report claimed that by implementing the recommendations for the integrated information system which was about to be presented, the Department would achieve much greater control of its field forces. This, it was implied, would allow the Department to use its resources in a more efficient and effective way in attaining its primary crime control objectives.

By defining the value of the proposed integrated information system largely in terms of managerial control of field units, ADL had drastically shifted from its earlier position (in the application) in which it had emphasized the use of such a system to measure differences in the quality of police service achieved by changes in operating procedures.[49] Moreover, the report conceded that the command staff had significantly less control of its field units then it should properly have: "It is our judgement that the inability to control the field operations is the single greatest defect in the (Boston) police function."[50]

The shift towards managerial control was also apparent in the recommendations which followed the opening sections of the final report. Initially, developing a plan for a new reports and records system had been the primary focus of the study, at least from the Department's standpoint. Accordingly, the final report suggested a number of changes in the existing records and reports area to cut down on duplication and to free men for patrol duty. The most potentially promising of these was the recommendation to eliminate the District Journal:

> The greatest inefficiency in the records system is the District Journal. An equivalent of 75 men in the Department are employed in keeping up these Journals, mostly with information which appears in other places, possibly at other times. The Journals are more than a record of history, however; they are the means by which the District Station can know what is happening in its district from hour to hour. Except for piecing together a picture from listening to the police radio net, a very difficult task, there seems to be no other way for the District to know what is happening. Therefore, although we recommend that the Journals should be dropped eventually, we also recommend that this act be coupled to a promise to provide something of equal or greater value to the District. 51

Nevertheless, the single most significant suggestion made by the consultant was the recommendation to develop a Command and Control System (CCS) as the focus of the integrated information system. In fact, even the execution of the recommendation to eliminate the District Journals was directly dependent on implementing the Command and Control System:

> The Districts would not have to generate the synthetic reality represented by the Journals if they had the information available in the turret plus a little more. That "little"is very likely to be exactly what the turret needs to perform its function more effectively: a status board describing the recent past.
>
> At present the dispatcher (in the turret) knows which cars are on assignment, but can tell only at considerable inconvenience the relative importance of various car assignments. It is so difficult, in fact, that few attempts are made to search out cars on unimportant assignments when an emergency arises and cars are scarce. Further, no attempt is made to monitor cars to see whether they are off the air so long as to suggest danger or dereliction (emphasis added). The latter information can be pieced together after the fact, but is not, in spite of its utility for the supervisory sargeants at the district level. (emphasis ADL)

> ...It is now technically feasible to make a command and control system which will: allow the dispatcher to see at a glance the status of car operations in any District; allow District supervisory personnel to know what its cars are doing; provide data on daily operations in a machine-usable form for the preparation of daily operational statistics; provide the basis for a District control log to be prepared at Headquarters for transmission to the Districts; and provide the machine-usable data base for a name and location index. [52]

Although ADL gave significant attention to the way in which the CCS would be of utility to the districts, the report explicitly indicated that the real motivation was not to assist individual district commanders but rather to benefit the command staff at headquarters:

> The heart of the justification (of the command and control system) is that Headquarters, by increasing its capability from simply assigning to command plus control..., will have information which will both improve field operations and allow many men to be released from paper work and returned to police work. 53

Something which ADL hadn't mentioned in their final report was the fact that authority for controlling the patrol force had traditionally been in the hands of the districts, not the dispatchers, and that the proposed CCS threatened to dramatically modify the existing power structure in the Department. ADL was not unaware of this fact; indeed, during the same month in which they submitted the final report, one of the ADL personnel had circulated a memo outlining the evolution of the command and control function in the BPD.

ADL's History of the BPD Command and Control Function

According to the memo, in the 1930's the Boston Police Department had installed a police call box system throughout the city, the first such system in the country. The call boxes in each district were wired by underground cable to the stationhouses. The call box system served three, perhaps conflicting, functions. First, it was an important supervisory tool for the districts, who could communicate with the patrol force via the duty pull or recall light, or through the direct telephone line from the box to the station house. The system also gave the patrolman the ability to summon help (via the wagon pull and telephone). Although citizens did not have access to the telephone, the call box also had a citizen alarm turnkey by which they could summon police assistance.

One of the reasons why the stationhouses had served as the command and control center for the patrol units in the early 1900's was the fact that calls for service were directly routed to the district stations rather than to headquarters:

> As foot patrol was replaced by car patrol, and as more of the police cars came equipped with mobile radios, the focus of police communications shifted to headquarters, where the base radio transmitting station was located. Since fewer and fewer men were on foot patrol each year, the clerk in the stationhouse found it necessary to answer requests for police service....by calling headquarters and having a car dispatched to the incident. Command of the mobile patrol was still in the hands of the districts, since they told the dispatcher to send a car; control of the mobile patrol was also in the hands of the district, since the patrolmen reported in (via the call box telephone) after every assignment.

> Gradually, however, more and more of the requests for police service were handled by headquarters; a Central Complaint Room was set up in order to answer the telephone calls from citizens and pass the complaints on to a dispatcher. The district was completely bypassed. The citizen alarms for the district still terminated in the district stationhouses but the district clerks just relayed the number and location of the actuated citizen alarm to the Central Complaint Room, which supplanted the district as the command center. Although the command function was assumed by the dispatchers, they had no authority to command; although the control function was in the hands of the district personnel, they had no knowledge of where their mobile patrolmen were at any given time. 54

This memo appears to have been an attempt by ADL to present the proposed system in a way that highlighted its benefits to the districts, who presumably would have been concerned about the centralizing effect such a system could have. For instance, considerable attention was devoted in this memo to describing how the districts would get instant information on car location and status via coaxial cable. "In this way," the memo argued, "the district supervisory personnel are put back in the loop, with immediate supervisory information."[55] From subsequent work schedules produced by the consulting firm, however, in which expansion of the CCS to the districts is listed as one of the last tasks to be undertaken,[56] its clear that ADL considered HQ to be its primary client group. Additionally, while ADL was trying to sell the system to the districts on the basis of the information the system would provide them, there is no obvious evidence that the districts considered the current lack of such information a problem. Recall that in the 1967 final report, for instance, the districts had the

capacity (after the fact) to compile data on service times and other activities on district cars but did not.

The BPD's Reaction to the 1967 Final Report

Although ADL hoped the final report would appeal to the districts, their principal concern was how those BPD personnel charged with monitoring the project would react to it. As things turned out, ADL had little to worry about, for the response of the BPD administration was quite favorable.

There seems to be several reasons for this positive reaction. One of these stems from the publication of the President's Crime Commission report the preceding summer. The influence of the recommendations of the Crime Commission on the Department's thinking is evidenced by the fact that Howland had Steve Rosenberg (who upon graduating from MIT's Operations Research program was hired by the Department as a civilian planner in the Planning Division) prepare a comparison of the recommendations of the President's Commission with those of ADL. The memo which Rosenberg prepared cited the analysis in the Science and Technology Task Force Report of ways of reducing response time in order to increase apprehension. Of the options described -- public callbox, complaint clerks, computer and related hardware for a command and control center, automatic car locator system, and 1-man patrol car -- the command and control system was "found" to be most cost-effective in terms of seconds of delay saved per dollar allocated. As it turns out, Richard Larson, who had participated in the

development of the BPD-ADL application for OLEA Grant #153, was the author of this analysis, and, according to Rosenberg's memo, the parameters of the "hypothetical city" were strongly based on the city of Boston. Thus, the prestigious Crime Commission had given an extremely favorable endorsement of a system similar to that proposed by ADL, and had indicated that such a system would only cost in the neighborhood of $200,000. Moreover, as Rosenberg noted in his letter to Howland, "Boston is (because of the ADL study) probably as far advanced in implementing these particular recommendations of the Crime Commission as any city."[57] This meant that Boston could potentially acquire a great deal of status if it went ahead and developed the systems recommended by ADL.

An additional reason for the BPD's favorable reaction to the ADL report was the fact that the CCS promised to provide improved supervision of the patrol force. This point was probably not lost on Project Director (Supt.) Howland, who had served as liason with the IACP survey team (which of course had strongly criticized Boston's existing supervisory system), and who was serving as Chief of the Bureau of Inspectional Services (the office charged with monitoring the patrol force for irregularities in behavior).

These considerations, as well as the fact that the federal government would be bearing the brunt of the costs, explain the administration's receptiveness to ADL's recommendations. Nevertheless, despite ADL's attempts in their final report to

anticipate the criticisms which might be raised in the Department as a whole (and to a great extent had succeeded), individual actors in the BPD had objections even at this stage. For one thing, Rosenberg (who was emerging as Howland's protegé) had disagreed with some of the consultant's recommendations, and was undoubtedly disturbed that many of his comments on the draft of the final report (which ADL presented to the Department during the previous summer) had not been responded to in the final version of the study. In particular, Rosenberg had opposed the firm's recommendation to postpone the computer installation contemplated by the Department. ADL argued that if the Department was going to develop a CCS, the planned computer would have to be designed specifically to facilitate the control of operations. ADL envisioned that this design process would be a complicated task, and in the meantime, it would be senseless for the department to install and teach its personnel to operate equipment which would probably be found inadequate to the new purposes.[58]

Rosenberg, on the other hand, apparently was more sensitive to the pragmatic issues facing the Department. First, because the computer contract which the Department had executed was "cancellable at the end ofthe term, or at ninety days notice," he argued that "no flexibility in planning future systems /would/ be lost by proceeding as planned with the system 360." In addition, Rosenberg commented that the "political ramifications of cancellation at this time would probably be disastrous."[59] It seems that Kevin White, who was a mayoral candidate at the time, was very outspoken about the

Department's gross inefficiency,[60] one problem which the new computer was supposed to help alleviate. Also, during 1967-68 Commissioner McNamara was chairman of the IACP Committee on Uniform Crime Records which was very "hot" on utilization of computers by police.[61] If McNamara and the Department hierarchy were as sensitive to attitudes of the police community as they appeared to be, they would probably want to avoid the loss of face the Commissioner might suffer in the IACP if the computer installation was cancelled. Eventually, Rosenberg's arguments prevailed over ADL's recommendations on this point, and the computer installation continued as planned.

DEVELOPMENT OF THE COMMAND AND CONTROL SYSTEM

ADL and BPD: Application for OLEA Grant #346

Despite the Department's disagreement with ADL over the way in which the Department's data processing capability would be developed, Howland indicated on October 26, 1967 in a letter to the OLEA, transmitting a copy of the final report from Grant #153, "that the continuance of our association with ADL, as originally planned, will result in the final solution of a great many of the problems pointed out in this (ADL's) preliminary study. This (association) will result in the acquisition by the BPD of records and communications operations that will serve as a model for other urban, municipal police departments." Three days earlier the BPD and ADL had submitted an application to continue the work started during grant #153. In this proposal, the Department requested a grant of $160,000, $147,640 of which was to go to ADL. The Department was to contribute $20,000, 95% of which to be in the form of the salaries of Superintendents Howland and Taylor, and of two sergeants assigned to the project on a part-time basis from Records and Communications. It is interesting to find that not only did the Department plan on fulfilling its contribution thru the salaries of these officers, but also requested that OLEA pay the salaries of a number of other officers who would be working with the project in various capacities.

The application's summary statement gives a concise picture of the intended focus of this new work:

> The aim of this project is to assist the Boston Police Department to refine and implement a number of recommended changes in its reporting, records, and communications system, and subsequently to assess the impact of these changes. A major portion of the technical work performed will be to refocus a planned computer facility from an information retrieval system to a switching system as well, for the real time control of field operations. In this mode, the integrated computer and communications systems will also generate many of the departmental records directly, and most of the statistical data required by the FBI of potential use to the department. 62

An important feature of this application (and, in fact, most of the subsequent proposals from ADL) was the consultant's failure to specify exactly how far along the Department would be in implementing the final report's recommendation at the end of the proposed grant period. A close examination of the proposal discloses that although ADL intended to undertake various activities in each of the areas identified in their 1967 final report (reports, records, communications, command and control, and the computer facility), it appears that many of the "major" tasks would be largely unfinished at project's end. For instance, although several interim changes would be made in the records and reporting system, design and implementation of a completely revised system was to await the completion of the CCS. In fact, the application gave attention to each of the components of what was to be the integrated information system, but the real emphasis of the proposed work lay with the development of the Command and Control System (CCS). Yet, although the proposal indicates that the consultants would be determining the computer storage, buffering, and switching

capacity of the proposed system, and would specify the physical arrangement of the final Command and Control System, the application was extremely vague about when this new system would actually get implemented.

White's Election as Mayor

The success or failure of the ADL effort to introduce new technology into the BPD was determined to a great extent by the salesmanship reflected in its proposals and by its methods of working with the Department. In addition, however, external actors played a significant role. One such actor was Kevin White, who became Mayor of Boston in January 1968. White saw the BPD "...in terms of high absenteeism, long lists of officers injured on and off duty, an overall lack of efficiency, and /despite McNamara's attempts at reform/ a department totally set in its ways, resisting change at all costs and interested primarily in protecting its own."[63] Reforming the police department, therefore, became one of the goals of his administration. In White's view, however, McNamara was not the man to carry out this job.[64]

McNamara had originally been appointed Commissioner in the spring of 1962 for a term of five years. In 1967, then Mayor John Collins appointed him to a second five-year term. According to Boston Magazine, at the time of White's election, McNamara was considering retirement -- that is, "until he found out that White had already located a replacement for him" At that point, "/e/nraged by White's jumping the gun," Mc-

Namara decided to stick out his five-year term. This was the beginning of a "cold war" between the BPD and the Mayor that lasted until the spring of 1972. While he served his second term as Commissioner, McNamara (who apparently had given up most of his hopes of reforming the Department by this time) continued to relinquish much of his authority to his subordinates.[65] The remainder of his tenure was characterized by "grudging cooperation between the Department and the mayor, and little or no rapport between the Department and the community."[66]

ADL and BPD: OLEA Grant #346

Despite these tensions, when in June of 1968 the BPD received word that the OLEA had confirmed their application, White gave his immediate approval for expenditure of the grant award. The total award was for $134,450, or roughly $27,000 less than the initial request. Of this amount, $133,090 was to go to ADL.

It was after the approval of this second grant request that greater interaction -- and conflict -- between the BPD and ADL began. On August 6, 1968, Steve Waldron of the ADL staff submitted a progress report to Howland which outlined the BPD-related activities undertaken by his firm since submission of the application to OLEA. On several occasions during the spring, despite the lack of a contract, ADL had prepared quick paper studies and evaluations of various pieces of communication equipment which the Department had been interested in purchasing, and had helped in the selection of vendors. However,

it was not until the grant award was announced that ADL attempted an evaluation of the new computer system which had been recently installed.

ADL's appraisal of the system was rather harsh and conveyed a much more negative image of the Department's administration than had earlier reports:

> Our initial examination of the computer hardware installed in the police headquarters indicated that the configuration is likely to be inadequate for all but the very short run needs of the department.....(After talking with IBM and J.R. Reilly representatives, who had supposedly advised the department on hardware to buy)...The conclusions we draw from these meetings, from consultations with computer experts at ADL and elsewhere, and from study of relevant documents are as follows:
>
> a. No substantive and systematic examination of the department's total medium and long range requirements preceded the specifications of computer hardware.
> b. The new computer will do little more than duplicate the functions already satisfied by the IBM 407 accounting machine currently in use, but the cost to perform these functions will be increased substantially.....
> c. On-line access to stolen car information cannot be furnished 24 hours per day without substantially impairing flexibility.....
> d. In its present configuration the machine will support only one of the police application programs which IBM reports to be available, namely a UCR package..... 67

Upon discovering the inadequacy of the installed equipment, ADL tried to piece together how the choice was made. Its findings were also quite embarassing for a number of the involved parties:

> The real reason for the selection of the particular hardware now installed will probably never be known, but it is evident that no one is eager to assume responsibility. J.R. Reilly reports that his firm had no responsibility for machine selection or for systems work on which the selection was based. The IBM representatives involved in the sale of the machine are no longer in evidence, and little record of their activities appears to remain.
>
> However, the limited info that is available suggests how the decision could have been reached. IBM and J.R. Reilly and Co. are convinced that the department is barely capable of working with the present computer system, and that anything more would be too complex to be understood and maintained by the present police-programmers. IBM reports that if it had specified a machine with more capabilities, the department would not have agreed to lease it. IBM contends that it sold the department as much as it could support at the time the sale was made and that the department would not have been able to obtain funds to lease additional hardware. IBM expects to supply more hardware in the future, including at least another 32k of memory, and is fully aware that the present hardware is inadequate for future requirements. In the meantime, the department can learn about computers on the machine it now has, eliminate its 407 accounting machines, and enjoy the advantages (whatever they may be) of a computerized stolen car file.
>
> We question whether these benefits are worth about one hundred thousand dollars per year... 68

Given the administration's fixation with the "political ramifications" of the computer, its very possible that in selecting the equipment the Department really hadn't been concerned with what the computer could do, just so long as they could say they had one. It is also probably true that the Department personnel working on the system's specifications had little formal computer training. This suggests that the De-

partment was very susceptible to any suggestions which the consultants might have made.

In the August memo, the ADL staff also announced that its time horizon, along with its conception of the project task, had shifted. After a brief review of the benefits which would accrue to the Department from the completed CCS, ADL revealed that it "...may not be possible to accomplish it /installation of the CCS/ within the time of the present project. Consequently, we will develop a more limited system, in parallel, for early implementation. The details of this system will be reported in a memorandum already in progress."[69]

Thus, in their first formal report to the BPD on the project, three months into the twelve-month term of Grant #346, ADL had begun to hedge on the time horizon for completion of the system, and indicated that they had made what appears to be a unilaterial decision to develop, for the time being, only a limited CCS. What they didn't make absolutely clear at this point, however, was that this limited CCS was not to be a limited "production" (operational) system, but instead its use would primarily be confined to serving as a training tool to familiarize the dispatchers with the approximate design and operation of the CCS. Moreover, ADL's underlying justification for this incremental approach was that before the final CCS could be developed, the "bugs" in the basic design and the idiosyncracies of the users would have to be discovered and modifications made. It could be argued, however, that it did not make much sense for ADL to wait until after the basic (prototype) system was designed and implemented, before soliciting the opinions

of the future users.

Most important, ADL ended the progress report with an announcement of the magnitude of Omnibus Crime Control funds which were potentially available to the BPD, and volunteered the firm's help to try to get some of it for the Department. To this point, ALD's reestimation of the time and effort necessary to make the CCS operational seemed innocent enough (although one wonders why the consultant did not realize the difficulties of the task earlier, and why it could not be more specific about work schedules). However, the disclosure of ADL's interest in future funding possibilities apparently raised some concern among the McNamara administration about the expectations of the consultant.

DEVELOPMENT OF THE PROTOTYPE SYSTEM

The Prototype's Functional Specifications and the Emphasis on Control

The consultant's draft of the functional specifications for the limited CCS were submitted to the Department's administration in two parts, on December 29, 1968, and January 4, 1969. This document was significant for several reasons.[70]

First, Working Memorandum EDG-3 (as the draft was titled) outlined a revised schedule for the CCS project. The proposed schedule included six phases. Phase One was concerned with development of the simplified CCS, with the other phases focusing on expanding the capabilities of the system and the districts' access to the system. Although no specific dates were included, this was another indication of the view which ADL held (or was trying to market to the BPD) that development of the CCS was to be a long-term project.

Perhaps more important, from reading the Working Memorandum, one can get the impression that the CCS configuration was not being developed very systematically, and that decisions on equipment and other aspects of the design were being made in a seriously uncoordinated fashion. For example, the principal staff author of the memo assumed a layout for the proposed command and control center which failed to correspond with either the Department's existing dispatching system or the layout suggested by another member of the ADL staff.[71] This prior layout had not only already been approved, but it had been used in the previous months in planning the redesign of the Department's

telephone network with NET&T. Moreover, as a result of using this latest layout proposal in making design calculations, the number of computer terminal displays which the memo said would be required was less than half of the figure which had been given to the Department in earlier discussions.

While ADL's priorities and decision-making process became more discernible during late 1968 and early 1969, its emphasis on improving management's control of the field force began to be much more obvious in all aspects of its work for the BPD. In January of 1969, the consultant released a memo proposing a radio communications system for each patrol car which, like the CCS, would probably increase headquarters' ability to monitor and supervise the performance of the individual patrol cars.[72] The communications system package for each patrol unit which ADL proposed included mobile and portable radios (so that the patrolman would have few good reasons to be

out of touch with the dispatcher), a car locator, a selective calling system, and a car identification system (to identify the source of radio transmission).

The selective calling device was a particularly interesting suggestion. This piece of equipment had two functions: to switch on a light in the patrol car, signifying that the dispatcher acknowledged the car's desire to communicate and would call back as soon as radio traffic permitted; and to turn on the siren and/or overhead light to attract the patrolman's attention in an emergency if he is out of his car.

What the memo didn't detail was why this second function would be necessary if the patrolman was supposedly carrying a portable radio with him at all times. According to several sources[73] who were working in the department around this time, however, the dispatchers had considerable trouble contacting units. After completing a series of assignments, many of the patrol units would remain off-the-air, feeling that they deserved a break, and would not acknowledge the dispatcher's request that they identify their status. In fact, at times the only way for the dispatcher to obtain a car to service an incident was to actually describe the nature of the call over the air, which tied up valuable transmission time. At such times, if the incident was an emergency or promised excitement, many of the missing cars would suddenly "come to life." In suggesting the selective calling device, the consultant was apparently hoping that the threat of activating their siren (which is annoyingly loud for the occupants of a patrol car)

would be an incentive for the patrolmen to stay in closer communication with the dispatcher.

Control-oriented suggestions like the selective calling device made ADL's objectives evident enough that members of the Department were again moved to directly comment on the consultant's work. Not surprisingly, the first reaction came from a lieutenant from the Central Complaint Section. On March 21,1969, Lt. David Silverman submitted a memo to Superintendent Howland outlining his general impressions regarding the deficiencies of the current system of command of the patrol force and the potential of technological solutions. Silverman began by describing the problem of the overlap of command authority which ADL had noted in earlier memoranda. However, Silverman's description of the existing command and control system differed somewhat from the consultant's, most significantly in regard to the number of parties which exercised authority over the patrol force:

> The operational function as it exists today is divided up threeways with varying degrees of control exerted over the patrol force. The primary command of the Boston Police Department patrol units rests with the Bureau of Field Services from which car assignments and changes in the status of vehicles and deployment is made to cover various contingencies that arise from time to time. Secondary controls or straight transmissions of assignment in response to calls from the general public for police service are supplied by the turret at the present time. The third level of command and control exerted over the normal operations of the department are at the district level and are occasionally correlated with the turret operations. 74

Thus, Silverman saw the overlap of authority as actually involving three parties (Bureau of Field Services, dispatchers, districts) rather than just the two (dispatchers and districts) identified in ADL documents.[75] To partially alleviate the problem of conflicting authority, Silverman suggested that the Department remove responsibility for turret operations from the Bureau of General Services, and locate it instead under the Bureau of Field Services (previously the Bureau of Field Operations). However, as the rest of Silverman's memo indicates, this action would probably not go very far in correcting the problems of control:

> The proposed survey (ADL's Working Memorandum) endeavors to automate a system that...is splintered and fragmented among three main competing units (by that I mean that each one can call cars and give them specific duties and assignments without the knowledge of the other and often working at cross purposes or both working on the same type of assignment without the knowledge of the other)....At the present time the dispatcher in the turret has no conceivable knowledge as to the location of cars, who is on the air, where these cars are, or even who is in them...(T)he status of the cars keep changing from minute to minute without informing the turret. Cars go into and out of service for any number of valid reasons, and when the turret inquiries of the district as to where a certain car is, the response is often -- oh, I had to combine two cars, or he had to cover the wagon, or he went homesick and we forgot to let you know -- and a whole host of other explanations.
>
> The dispatcher assumes that the cars are clear and on the air when the officer informs him of this but often the car is at the other end of the district....(a) car may well be around the corner from a serious emergency or crime taking place and the dispatcher has no knowledge of this. Devices of an electronic nature would eliminate this fault of the present system. 76

Silverman's perceptions of the basic problems of the existing command system were fundamentally the same as those held by ADL: that authority for command was fragmented and overlapping, and that those sharing this authority were unlikely to know what a particular car was doing at any instant. Both ADL and Silverman avoided coming out with an explicit recommendation to centralize control of command authority (although ADL's proposed CCS, as well as putting the turret personnel under the Bureau of Field Services, would began to do just that). In regard to the problem of a lack of knowledge of what the cars were doing, both ADL and Silverman suggested technological solutions. What is most interesting, however, is that Silverman felt the solution lay not in a CCS, contrary ADL's claim, but in some of the less sophisticated devices the consultant had suggested in its memo on a proposed future patrol car communications system. Specifically, Silverman stated that "the failure of the past has been that the turret does not have locations devices and cannot tell which car is transmitting at a given time" (emphasis added). Moreover, rather than implementing an expensive automated car locator system, Silverman offered that "a master control chart and a simplified numbering system for each vehicle could go a long way in improving the efficiency and control capability exerted by the turret as well as eliminating many false or superfluous transmissions that violate the communications network integrity."[77]

Whether Silverman's sentiments reflected the feelings of a considerable number of the command staff or not is uncertain. What is known is that when Rosenberg (who was expanding his role in the federal projects in anticipation of Superintendent Howland's forthcoming retirement in the fall) had a series of meetings with ADL in April 1969 to discuss the Working Memorandum, he largely stuck to narrow technical comments on the proposed functional specifications.[78] These discussions also distinctly reflected Rosenberg's interest in the control aspects of the CCS. For example, Rosenberg repeatedly mentioned that the Department wanted a way (via the CCS) to flag vehicles that were off the air for more than twenty minutes. In these meetings it was evident that the administration was committed to proceed with the CCS (although perhaps only because the federal government was paying for most of it), and was excited about whatever additional margin of control over the performance and use of the patrol force which the system would give headquarters.

ADL and BPD: Application for LEAA Grant NI-69-007

The influence of Silverman and Rosenberg's comments on the consultant is apparent in the application for another grant which was submitted to the OLEA a month before the termination of project #346. Unlike the previous ones which had suggested research and work on a number of the information system components besides the CCS, this application was almost entirely

devoted to discussion of the prototype system. Moreover, whereas in the earlier proposals the consultant had taken pains not to threaten or insult the districts, in the May 1969 application, the consultant insinuated that many of the ways in which the district commanders employed patrol units were illegitimate:

> Another reason for creating a command and control system...(is the fact that) there are many periods when not a single patrol car is available to be assigned to a new incident...Good records are kept on service incidents which involve crimes, public disturbances and so forth. Very sketching records are kept on such housekeeping activities as taking cars to be repaired, transporting prisoners and so forth....
>
> The number of housekeeping events exceeds the number of law and order type incidents. More importantly, the time spent on the average housekeeping event is longer than that spent on the average service incident. Therefore, the fraction of cars that is unavailable for assignment due to internal business is often double that which is unavailable due to public-related business. Unfortunately, this condition is very difficult to observe both because of the sketchy records kept and because events are so numerous that it has been hard to justify the cost of examining them. A close examination shows that a combination of discipline of the patrol operations and the substitution of other means to carry out some of the housekeeping functions would greatly increase the number of patrol cars available at any time. 79

The ADL proposal apparently incorpoated Silverman's concern that the districts' reassignment of patrol units to various tasks often impaired the Department's ability to respond to citizen calls for service. But unlike Silverman, (who took the position that, though such assignments should be better

coordinated with the dispatcher, they represented valid uses of the patrol units) ADL inferred that many of their activities were unnecessary, presented opportunities for derelection of duty by patrol officers, and represented an unwarranted usurpation of the dispatcher's control of the patrol force. This new attitude toward the districts seems to follow from the emergence of Rosenberg as Howland's successor. According to a number of sources, Rosenberg was extremely critical of the districts' autonomy, and of headquarter's inability to effectively supervise the patrol force.

In the May 1969 application, ADL also introduced a new project schedule. ADL submitted that the development of the CCS could be viewed as three phases. Phase I was considered to be the first "brief" study of the department. According to the consultant, the Department was currently engaged in Phase II, during which the recommended changes which the consultant had felt needed more support had been "buttressed by more work." In addition, during this "phase" ADL claimed that they had also "created and examined a large number of systems for information management and the control of field operations." Work in this area had supposedly gone so well that ADL professed, "we have finally come down to the specifications of a particular system which we believe can be installed in the very near future. Implementation is well under way...."[80]

According to the proposal, the objective of Phase III of the project, which the Department would shortly be entering upon approval of this new grant request, was to create what

was termed a "preliminary" command and control system for use in the command center ("the turret") of the BPD. The development of the prototype CCS was just the first of a series of tasks which would be involved in the eventual installation of the "preliminary" system. Although the time table was left vague, the indications were that this process would take considerable time. Moreover, ADL's utilization of the term "preliminary" suggests that theconsultant was also hoping for additional work with the BPD following the CCS' installation.

In addition, the application disclosed that ADL had made the decision to base the full CCS on an IBM 360/40 with 128K bytes. Because of the bad experience which the department had had in choosing their existing computer system, ADL probably felt obligated to justify this unilateral decision to the BPD. In the proposal, ADL iterated the benefits which would accrue to the Department by remaining with IBM:

> First, the men who operate the present machine are familiar with the type. More importantly, a softward package which comes close to performing the desired operations has already been put together and operated by IBM on similar machines in San Francisco. In other words, we are staying with an IBM computer in order to take advantage of their experience with particular software and to take advantage of their support in implementation of the system.[81]

ADL apparently expected similar support from Sanders, manufacturers of the computer terminals the consultant had decided to use for the CCS:

> The software package in operation in San Francisco...uses Sanders Associate Displays. Sanders has a strong interest in expanding the market for their displays in non-military areas, and as a consequence has guaranteed strong support for our programming relative to the displays. One of the primary architects of the Sanders/IBM system in San Francisco is now employed by them in Nashua, New Hampshire, and is available to us, together with other experts in displays technology.[82]

As we've mentioned, the McNamara administration, or at least those individuals in it who were charged with monitoring the federal projects, were very excited about the possibilities offered by the CCS. By the time of this new application, however, they had become increasingly concerned with ADL's slow pace. Although the consultant had managed to develop the functional specifications for the prototype during the previous grant's term, many of the other tasks which ADL was supposed to perform under the contract for grant #346 were incomplete. The consultant's progress was especially slow in those tasks not directly related to the CCS. As in San Francisco, because the consultant had considered the high technology item its primary focus, it may have been devoting inadequate resources to the other facets of the BPD project.

Nevertheless, since the Department did not have the in-house technical ability, if it wanted the CCS, it would have to go along with the consultant. Another incentive for the BPD to continue with ADL, in spite of the consultant's less than exemplary record, was the fact that the federal government would be paying the lion's share of the costs. While the Department was not footing the bill itself, those members of the McNamara Administra-

tion charged with monitoring the projects were interested enough in the system to take steps to hasten its development. For instance, in their contract with ADL for the new grant, #NI-69-007, the BPD stipulated that the prototype was to be installed and evaluated during the upcoming grant period. Moreover the Department specified that all work not completed by ADL on grant #346 was to be completed during #NI-69-007.[83]

White Versus the BPD

We've previously mentioned that the Department's adoption of technological systems was in large part a reaction to criticisms of the Department by external actors. For instance, the 1962 IACP report had put strong pressures on the newly formed McNamara administration to attempt sweeping reforms in the BPD. The administration's efforts at reform during the early and mid-sixties had been hindered by the lack of support from city hall, and by the Commissioner's apparent unwillingness to replace officers who resisted change. As time went on and the political pressures eased, McNamara began to delegate more and more responsibility for "carrying the ball" on reform to subordinates[84] like Howland. (Howland, of course, was the individual who initiated discussions with the OLEA regarding the development of an integrated information system.) However, in the first two years of his administration, Mayor Kevin White launched several investigations into the BPD's operations which brought renewed pressure on McNamara's administration to demonstrate progress in reforming the Department's basic deficiencies.

Kevin White attributed his 1967 mayoral victory in large part to the black vote, and developed the Model Cities Program as a way to repay the black community and to respond to the disorders of the previous summer. As part of the proposed program, the city administration devised a police-community relations plan for the model cities area which concentrated on increasing minority involvement in the operations of the BPD: Some of the main points of this plan were:[85]

1. The Model Cities Staff would have the right to set standards for police operations in the area.
2. The legislature would be urged to pass emergency legislation giving the mayor authority to appoint to permanent status specific number of qualified patrolmen, officers, and administrators.
3. A Police Advisory Committee composed of area residents would be set up. It would specifically include some persons who disagreed with the police.
4. A community institute for police officers would be established. Courses would be taught by area residents and attendence would be mandatory.
5. Psychological testing of all policemen for the purposes of identifying authoritarian personalities (defined as those exhibiting suspecious or sadistic tendencies) would be required.
6. Volunteer citizens' security patrols would be publically funded and integrated into regular police work.

7. Criminal records would be waived as disqualifying factors in some instances in order to permit selected men to become police officers.

Since many of these proposals represented an usurpation of the power of the Commissioner and the Command Staff, opposition from the BPD administration was expected. As things turned out, however, the most potent opposition was from the rank and file. When White submitted the model cities proposal to the city council for approval, the council passed the ordinance on to the Boston Police Patrolman's Association (the police union)[86] for their approval of provisions relating to police. The redrafted version which the BPPA returned, and which was subsequently approved, eliminated those sections which proposed hiring men with criminal records, waiving civil service requirements, using psychological tests, hiring neighborhood security patrolmen, and authorizing the Model Cities Agency to oversee police operations.[87]

Mayor White's attempts to expand the BPD Cadet Program met a similar fate as that experienced by the Model Cities ordinance. White felt that using police cadets for particular chores would free patrolmen for actual police duties. Furthermore, as a result of the contract which the recently established police union had wrested from the city administration in March 1968, police salaries had dramatically increased across the board, making the performance of clerical functions by sworn officers prohibitively expensive. The cadet program could also be used as a vehicle to increase the recruitment of blacks for the Boston police force.

At first, BPPA did not oppose the proposed expansion. However, when in July 1968, White proposed to hire 100 additional police cadets to direct traffic (particularly in downtown Boston), the union came out in full force against the Mayor's proposal. One observer of this struggle saw several reasons for this opposition:

> First, there was undoubtably an anti-black animus among significant components of the Boston police force, and the resistance to the police cadet program reflected resentment at the recruitment of more blacks. Second, the traffic assignments in downtown Boston generally were desirable because the policeman became familiar with influential citizens and businessmen. Also, traffic assignment was viewed as preferable to walking a beat. 88

Whatever the reasons for their actions, the BPPA was able to muster enough influence to block the passage of the cadet program ordinance when it came before the city council.

Despite such setbacks, White continued to work for the reform of the police department. In 1969, concerned with the Department's high cost, citizen dissatisfaction, and indications of corruption, he formed a Task Force on the Police and instructed them to evaluate the Department's operations and come up with a list of recommendations for improvements. The Task Force's report paid particular attention to suggestions for narrowing the police function, upgrading personnel, and improving the allocation of department resources:[89]

1. Relieve policemen from serving as downtown traffic officers or as station clerks and replace them with civilians so that additional manpower can be used in

the field.

2. Assign personnel according to need, as determined by crime trends and service calls. This would mean transferring a number of men from day to night shifts and from quiet to more active districts.
3. Rotate personnel between shifts and among the various communities so that no one remains too long in any one assignment.
4. Increase supervision at all levels by promoting more sargeants and putting them in marked cars and by placing a deputy superintendent in charge of groups of districts.
5. Recruit younger, better educated officers and see that promotions go to the same type of men rather than to those with seniority.
6. Increase sensitivity training for all officers so that a greater understanding of minority problems is developed.

Though the Commissioner might have ignored (and let the rank and file oppose) White's earlier suggestions, this report was a direct attack on his administration. In effect, the Report reissued the criticisms which the IACP had focused on the BPD seven years earlier.[90] It was the same as saying that McNamara's administration had been unable to do a single thing to significantly improve the Department in McNamara's one and one-half terms as commissioner. The police were still poorly trained and deployed. Officers were still engaged in non-

police tasks which (with the rise in salaries paid to the Department's sworn personnel) cost the taxpayer unnecessary dollars. The Department was decentralized and poorly co-ordinated, and exercised inadequate supervision of the patrol force. Moreover, the Department was not responsive to the needs of a significant segment of the population of Boston.

The Annual Report from the Commissioner for 1969 (which was issued in January 1970) demonstrated that the McNamara administration had indeed taken the Mayor's Task Force Report very seriously. For almost every aspect of its operations which the Task Force had criticized the Department reported that some type of reform had taken place.[91] To bring greater supervisory capability to the patrol operation, twelve additional marked cars had been purchased and assigned to patrol sargeants at the district level. The number of active patrol supervisors had been increased through additional promotion of patrolmen to sargeants. The thirteen districts were grouped into six divisions, and a deputy superintendent was appointed for each one.

Most important, in the BPD's summary of its reform achievements, its technological projects figured prominantly.[92] For instance, the report pointed to the Command and Control System being developed as one of the ways that the BPD was trying to improve supervision, as well as reduce response time to emergency calls. (In fact, the Task Force Report had probably been a strong factor in the BPD's decision to continue with the prototype's development). Moreover, the report mentioned that the

Department was continuing to seek out innovative programs which would help the Department exploit technology to better allocate its resources.

A number of the "reforms" instituted by the McNamara administration since 1962 had very little substance to them, and undoubtably were only carried out because the Department was under pressure to produce an image of innovation. The administration did pursue more substantial changes in many aspects of the BPD's operations, but its efforts were rarely forceful. If any resistance by the Department's career officers or city hall emerged, the proposed reform was usually aborted. The opposition of city hall to the IACP recommendations, in fact, had been a prime reason why McNamara had been able to accomplish so little during his first term. However, the 1969 Task Force Report indicated that White was going to actively seek out many of the reforms which city hall had heretofor opposed. Consequently, the environment for change seemed much more promising.

White and McNamara were both in agreement on the need to civilianize the traffic function,[93] so it is not surprising that this was picked to be the first of the Task Force's recommendations that the two would try to implement. Basically, they proposed to hire fifty civilians to act as traffic directors in the central business district. White also sought to hire 50 civilians to handle administrative and clerical tasks at headquarters, a proposal about which McNamara had some reservations.

The BPPA's opinion of the proposed changes was very negative:

> Inside clerical jobs and downtown traffic jobs are cream puff jobs and they (the patrolmen) don't want to give them up. Their answer to the call for more cops fighting crime is to hire more men, not reassign some men and replace them with civilian scum.[94]

As a result of the opposition of the BPPA and a number of businessmen, the ordinance to civilize the job of traffic direction was defeated by the city council. White was able, nevertheless, to persuade the city council to fund his civilian clerk program. Thus, the BPD annual report was able to state that fifty civilian clerks had been hired to release uniformed police officers for duties in the field. However, as had been New York City's experience when that department tried to civilianize its clerical work, the end result was that headquarters had "50 clerks, plus 50 cops (which) they were supposed to replace still inside doing clerical jobs."[95]

Once again, though McNamara believed in the reform being undertaken (in this case, civilianization of the Department's clerical function), he seemed to be unwilling to take the forceful actions necessary to insure its successful implementation.

If any meaningful changes were to be accomplished, it appeared that the BPD would need an individual in a position of power who was more forceful than McNamara. A prime candidate for such a leadership role was Steven Rosenberg.

Rosenberg Begins to Press ADL

By February 1970, Steve Rosenberg has been appointed as an administrative assistant to McNamara and as Director of the Department's Planning and Research Division. Moreover, he had also been selected to serve as Howland's successor in the role of Project Director of the federal grants (currently, grant #NI-69-007). Almost immediately, Rosenberg made it clear that he was less than fully satisfied with the job that ADL had been doing. For instance, in a letter to the National Institute of Law Enforcement which Rosenberg sent on February 4th, he indicated that most of the project areas in which significant progress had been realized were those which Department personnel had largely taken the responsibility for developing. According to the letter, when it became obvious that ADL was persisting in concentrating its efforts on the prototype's development, Rosenberg, Howland, and a handful of BPD personnel had taken over and done the bulk of the work accomplished to this point on the callbox system, the coaxial cable system, and the field reporting system.

Moreover, despite the supposed concentration of effort, ADL did not have too much more to show in regard to the CCS than they had the previous summer. One reason for this was some difficulties which

ADL had encountered with the programming language selected for the CCS. Although developed by IBM and IBM users, the FASTER programming package which the consultant had chosen was not fully documented or widely available. As a result, considerable time was required to collect the basic data necessary to design and program the system. However, Rosenberg's letter to the National Institute conceded that even when one took into account such unexpected delays, progress on the CCS seemed to be extraordinarily slow.

The new critical reaction of the Department to ADL's work required a strong response from the consultant. Thus, in the final version of "Functional Specifications of a Prototype Command and Control System for the BPD," which the consultant sent to the National Institute on February 18th, ADL sought to justify its slow progress by describing the great complexity of the system under development, and the subsequent need to exercise great care and to "provide for orderly and evolutionary progress from one well defined phase to another."[96] In their presentation, the consultants were also careful to reiterate why developing an initial prototype system was such a crucial and unavoidable step in this process.

> The prime reason for developing a prototype system first is the very complexity arising from an imprecise knowledge of realistic man-machine interactions; lack of previous experience gained from operation of a similar system in a similar environment; incomplete software packages requiring extensive analysis to determine where, how, or whether to patch to provide needed features; and the need to combine the hardware of different vendors. Another factor to be considered is the level

> of skill required to operate the system and the caliber of personnel required to maintain it. 97

In what appears to be a further attempt to calm the BPD's growing concerns with the CCS project, in the report to the National Institute, ADL presented a summary of the features and benefits which the Department could look forward to upon installation of the full system. The list of benefits which ADL developed at first appears quite impressive. However, scrutiny reveals that about half of the items are either duplications of benefits previously mentioned, or are features which will not be realized unless substantial work over the above implementing the CCS is undertaken.[98]

In hindsight, it appears that ADL probably could have done a much better job of allaying the doubts of the BPD if they had simply indicated a tentative date for installation of the prototype. In its May 1969 application for OLGA Gran NI-69-007, the consultant had indicated that "implementation was well underway." Yet, nine months later, the "Functional Specifications..." presented no evidence which would convince an otherwise skeptical Department that, in fact, significant progress had been made since Rosenberg's meetings with the ADL staff the previous spring.

As a result of ADL's failure to present what Rosenberg would consider a satisfactory response to his expressions of displeasure with the CCS' progress, during the Spring of 1970 the Director of Planning took a number of steps to determine details of the CCS' status and to minimize any delay in imple-

menting other projects which might be caused by ADL's slow pace. For example, Rosenberg phased out ADL's involvement in all of the Department's projects which were not inseparately tied to the CCS. He also began to seek out other consultants to perform a number of tasks ancillary to the CCS (such as developing a geographic base file and monitoring the reconstruction of the communications command center) which had originally been considered part of ADL's purview.

Despite the fact that the consultant had failed to achieve a number of contract obligations associated with grant NI-69-007 (which had included completion of both the prototype CCS and the new records and reporting system), the Department decided to go along with ADL in submitting the May 1970 grant application. However, Rosenberg's patience with the consultant had grown exceedingly thin. LEAA approval of the latest grant request, which was for an additional $100,000, was received by the Department in September, 1970. At that point, however, Rosenberg informed ADL that, despite the official October 1st startup date on grant 70-107e, before he would finalize the contract on this latest phase of the CCS development he wanted to see a much more detailed work statement from the consultant than had appeared in the application itself.[99]

Additionally, during the spring of 1970, Rosenberg pressed ADL to specify the technical progress which had been achieved during the latest grant period, as well as the work which remained and an expected date of implementation. In the Project Plan which ADL developed as part of its May 1970 application for further fed-

eral support of the CCS project, the consultant had responded to such pressure by providing a list of the various technical functions which would be accomplished during the upcoming grant period. However, although this list was one of the most detailed work schedules which ADL had provided for the Department to date, it was still extremely vague about the exact nature and relative timing of the tasks. ADL still claimed that "because of the inherent complexity of the work to be done and because it is not possible to arbitrarily separate each activity from the others, accurate forecasting of the work to be completed within a specific time period is not possible."[100]

Moreover, the Project Plan gave little insight into the amount of technical work that had already gone on prior to this date. The limited information which the Project Plan did contain on the work accomplished by ADL in the previous months was hardly something which inspired kudos:

> In terms of work accomplished to date a major achievement has been the completion of the 'Functional Specifications of a Prototype Command and Control System for the BPD'.....
>
> (This document, it should be remembered, essentially had been completed in January 1969, almost a year and a half earlier).
>
> ....The past few weeks have seen a concentrated effort to translate the functional specifications into a viable software oriented toward specific central processing hardware an display terminals. (emphasis added)[101]

EXPANSION OF THE BPD'S PROGRAM FOR EXPLOITING TECHNOLOGY

While Rosenberg was demanding more accountability and productivity from ADL, Mayor White became embroiled in another struggle with the BPPA. A major result of this latest dispute was even greater pressures on the McNamara administration to use its resources more efficiently. According to Rory Albert:

> This issue started with the Hemenway Street disturbances during the Cambodian turmoil, when the police interceded and, according to the New York Times report of May 15, 1970, "indiscriminately beat people, broke into apartments, and threw rocks and bottles at people from the tops of buildings." White charged the officers with overreacting. Two months later, at a second disturbance in the same area, a bank was firebombed and an apartment was set on fire. The police refrained from even entering the area and White charged them with underreacting. The BPPA, by now unsure of how the cops were supposed to act, lashed out at White. They accused him of handcuffing the police and of ordering them to stay out of the area. White was furious at the BPPA; and their relationship, which conceivably could not get any worse, hit a new low. 102

This "falling out" did not last very long, however. Within a few weeks, a meeting had been held between the leaders of the BPPA and White. As a result of this meeting, the BPPA decided to endorse White's primary campaign for the Democratic gubernatorial nomination. In return, White indicated that he would change the officers' work schedule from five days on, two days off to four days on, two days off. He also indicated that he would see that a "Minimum Manning" Program would

be instituted by the Department. Under this program 50% plus one of the cars in each district would man the streets at all times. Finally, White gave his guarantee to the union that the Department would continue to use two-man cars exclusively.

The new working schedule, together with the holiday and sick leave benefits secured by the BPPA, meant a decline in the total man-hours worked by the force. At the same time, police costs were rising dramatically, which was also largely due to salary concessions made to the union. These developments only added to the problems the Department was experiencing in trying to cope with the increasing rates of crime and calls-for-service. Given his operations research background, it is not surprising that Rosenberg's response to these pressures in part was to expand the BPD's program for exploiting technology.

In 1970,[103] some members of the Raytheon Company, like ADL, had become interested in the idea of attempting to apply advanced technology to the problems of the public sector, and they approached the BPD with an offer to develop a car locator system for the Department. Under the agreement which was reached, the Department would not be charged for the development costs for the car locator system as long as it allowed the Raytheon technicians to use BPD facilities whenever necessary for the design and test of the prototype, and promised to purchase the completed system.

However, long before the project was near completion, an administrative shake-up occurred in the firm, and the executive in charge of the car locator project, Ken Kaye, left the company. In September of 1970, Kaye met with Rosenberg to

explain his situation, and suggested that if the Department was still interested, he could put together a consulting group to explore the feasibility of an automated vehicle monitoring system (car locator) for the Department. Rosenberg quickly consented to the proposition. He undoubtedly realized that the CCS would not be a particularly effective supervisory tool unless it was tied in with a car locator system. Additionally, based on his experience thus far, Rosenberg was probably hesitant about giving the job of developing an AVM system to ADL. Despite the fact that the Raytheon team under Kaye had not actually produced anything for the Department, Rosenberg apparently felt that Kaye's group had acted in a more responsive and accountable fashion than the Department's other consultants had to this point.

At Rosenberg's urging, Kaye pulled together a small group of systems people and founded Urban Sciences, Incorporated. Rosenberg meanwhile had contacted the Governor's Committee, the LEAA State Planning Agency, and was able to obtain $25,142 for the AVM requirements study, which began in October 1970 and was scheduled to last six months.

In the middle of this project, however, Rosenberg brought Kaye to a demonstration of the patrol force simulation model which Richard Larson had developed for the NYPD.[104] Rosenberg was extremely enthusiastic about the simulation and suggested that Larson and Kaye join together to develop a BPD-specific version of the model. Within a very short time, Larson had become a consultant to Urban Sciences, and Rosenberg had secured an LEAA grant of $32,888 for the initial work on developing the BPD simulation.

While Rosenberg was expanding the BPD's technological program into these other areas, he continued to take steps to guarantee the earliest possible completion of the CCS. For instance, when Rosenberg approached the Governor's Committee for the AVM study funding, he also procured a grant of approximately $25,000 to be used to develop a computerized geographic base file (GBF) for automatic address verification. As we've mentioned, the GBF (which was an essential component of the CCS, as well as the AVM) was originally to be developed by ADL. However, because of ADL's slow progress in developing the CCS prototype, Rosenberg decided to award the contract to another consultant, Concord Research.

The Planning Director even explored the possibility of achieving some of the benefits of the CCS through the use of some less sophisticated equipment. Utilizing the idea suggested by ADL in their memo on patrol car communications, Rosenberg and the BPD's Communications division head developed a siren activator device which was placed in all the Department's marked patrol units. The device gave the dispatcher in headquarters the ability to activate either the overhead lights and/or the siren of patrol cars which had been off-the-air for a suspiciously long period of time.

This effort did not fare very well, to say the least. Within a month almost all of the devices, which were fastened under the dashboard of the police cruisers, had been broken. Although officially the BPD administration claimed that this situation was due to faulty equipment, the head of the Depart-

ment's communications division privately admitted that the men hadn't liked the devices and had "whacked them with their nightsticks until they broke."[105] Some of the officers explained their dislike in terms which suggested that the siren activatiors had impaired their ability to function effectively; others, however, indicated that they resented the activators because of the implications of "big brother," or because it kept them from taking breaks which they felt they deserved.[106]

The BPD Demands More Accountability: LEAA 70-107e

As we have seen, Rosenberg's difficulties with ADL led him to seek other consultants for work originally intended for ADL, and to explore alternative technological approaches to achieving better supervision. Despite such evidence of the Planning and Research Director's displeasure, ADL's performance had not seemed to appreciably improve. With the reception of Waldron's work statement in January 1971, Rosenberg felt it was necessary to directly confront ADL's management with his complaints. The following excerpt is from Rosenberg's letter to ADL's Contracting Officer:

> Enclosed is the "Work Statement" for the Integrated Information System which was sent to me on January 15, 1971. I am disappointed in the lack of detail and lack of definite information content in the proposal, especially in view of the fact that it has taken from early in September until now to prepare the two pages. (emphasis added)[107]

The memo went on to state that to meet the Governor's Committee's funding requirements, the BPD needed a variety of information on the history of the project up to the current date, the de-

tails of the work to be carried out, a detailed schedule of work (including listings and descriptions of expected accomplishments and timing), a list of the ADL staff members assigned to the project, and a discussion of the methods to be used to evaluate progress and results. Although the name of the Governor's Committee was invoked, it was clear that the information requested was the same data which Rosenberg himself was interested in and had been trying to obtain for over a year.

Moreover, unlike the Department's lax attitude during grant 346 and NI-69-007 toward the completion of the specified work, the Director of Planning and Research indicated that the BPD would tolerate no more delays in the accomplishment of project objectives.

> Please be advised that we consider the contract to be a fixed price technical services contract with fixed performance requirements as outlined in Article I of the Contract. We expect that the above noted performance items will be completed during the contract period and before processing of final contract payment.
>
> ....I have halted the processing of the contract pending receipt of a suitable work plan.[108]

Waldron, ADL's project leader, was very disturbed by the letter which Rosenberg had sent to his firm's Contracting Officer, one of Waldron's superiors. He contacted Rosenberg on January 25th, and set up a meeting for the following day to discuss revisions in the work plan. The next day Waldron called to indicate that he had to go out of town and rescheduled the meeting for 9:30 on the 28th. A half hour before this meeting was to begin, Rosenberg received a call

from Waldron's secretary saying that he was sick and would have to reschedule the meeting for sometime the following week.

This information is significant in two respects. First, that it is available at all suggests that Rosenberg's records were unusually comprehensive. In fact, immediately following the letter announcing his dissatisfaction with the ADL work statement, Rosenberg seemed to begin to exercise much greater care in recording details of his conversations with ADL staff members. Apparently he felt that at some future date he would want to have documentation of the consultant's response to the BPD's demand for more information and more substantive results. The notes which Rosenberg had kept for January were also significant in that it turnedout that the difficulties which Rosenberg had in contacting and arranging a meeting with ADL'reps' at this time were characteristic of the entire grant period.[109]

On February 1, 1971, the BPD's Research and Planning Division released its Computer andData Processing Plan.[110] The Plan reflected Rosenberg's impatience with the Department's dependence on its consultants, and especially on ADL:

> Because the Department has not had any experienced systems people available and because the Department has had to train its own programmers, it has used IBM expertise in setting up the stolen vehicle application. It has also used the consulting firm of ADL to develop a Command and Control system. It has taken a little longer to develop an on-line system with people who havenot worked as officers in the field. The use of outside consultants is expensive (3-10 times the cost of hiring competent Department personnel) and the knowledge gained in the development of these applications with the use of consultants is not accumulated to build a continuously in-

> creasing body of police system knowledge within the Department to be applied to future applications. The Department needs to hire at least one senior data processing systems analyst and one principal data processing systems analyst.
>
> ....As the development of the Department's computer operations takes place and more and more dependence is placed on the various computer-related systems in the daily management and control of police operations, it becomes essential that the Department have its own high level systems staff....
>
> ....Such systems, once developed, cannot be considered in a permanent state of completion, but must be constantly improved, modified, and updated. Without a high level systems staff "living with" the problems of these systems on a day to day basis, it will be impossible to keep the systems responsive to the changing needs of the Department. 111

Rosenberg's negative feelings toward ADL had undoubtedly been heightened by the fact that even in those instances where he had directly informed ADL's project staff of his displeasure, he had gotten very little satisfaction from the consultant. However, in the revised work statement for LEAA Grant 70-1076 which Waldron submitted in mid-February, 1971, ADL seems to have made some significant conciliatory gestures.[112] For example, despite the BPD's wishes otherwise, since grant #346, ADL had persisted on viewing the complete redesign of the record and reporting system as work which would be undertaken <u>following</u> the development of the CCS (and which would probably require an <u>additional</u> grant.) In the February 1971 version of the 70-107E work statement, however, this task was presented as work which would be completed during the current grant term, regardless of the status of the CCS.

Another way in which the Work Statement differed from ADL's previous presentations was that it contained a detailed description of the remaining steps in the prototype CCS' development, as well as a specific schedule for their accomplishment over the next six months. This was an important part of the information which Rosenberg had been seeking so long from ADL. This development, along with the change in ADL's position on the records and reporting system, indicates that Rosenberg's tactic of going directly to the consulting team's superiors had been effective.

According to ADL's latest estimates in the February Work Statement, the prototype CCS would be functional by August, 1971. Just what the prototype CCS would and would not do was carefully addressed.

> The scope of the prototype command and control system as it will be implemented for the BPD is as follows. The system will handle up to three Sanders on-line display terminals. The terminal operators will be able to enter transaction codes and receive the appropriate replies independently of one another. The transactions included in the system will store information about on-going incidents, and up-date that information. It will also be possible to retrieve any of the up-dated incidents. In addition, it will be able to store and retrieve information regarding the status of vehicles in the field, and to change that status. The transactions implemented also include a set of status displays to be used as a visual dispatching aid for assigning vehicles in the field. Each status display contains, in condensed form, a list of incident and/or vehicle data, as it is currently contained in the system.
>
> The prototype command and control system is not intended to be a production system; rather it is a tool for learning how to implement an on-line production system.....The prototype system has not completely addressed the back-up and re-

> start problems, although the decision has been reached that sophisticated backup is not essential. Also, the prototype does not yet log out the data which it contains into a format which is directly usable for analysis.[113]

Along with the Prototype CCS, as output of this task, the consultant promised to produce a manual consisting of (1) detailed flowcharts of the system, (2) listing of each module used, (3) a description of the process by which one could assemble, link edit, and execute the program, (4) a description of the commands, and (5) a description of the control load and up-date of all files.[114]

Demonstration of the Prototype

The revised work statement which Waldron and his staff had prepared was apparently not enough to satisfy Rosenberg. On March 18th, Waldron contacted Rosenberg to inquire when the contract would be processed. Rosenberg commented that he was not at all happy with the consultant's performance and was considering holding up the contract until he saw some evidence that the Department was "getting its money's worth." At this point Waldron asserted that much progress had been made and they were ready to run a demonstration, but Rosenberg replied that since he had no idea of what was going on, he could not schedule a demonstration.[115]

Once again, Rosenberg's "hard line" appears to have been effective. Within two weeks, he had received a complete progress report on the CCS from Waldron, who was coming under increased scrutiny and pressure from the ADL management to get the contract with the BPD finalized. According to this report, the prototype system was in a "demonstration state" with one terminal on-line and with vehicle and incident files available to the programs. The memo further reported that the project team was also in the process of completing final drafts of the system's documentation and operations manual. Finally, it disclosed that much of the core storage which the BPD, upon ADL's advice, had been leasing in anticipation of the prototype's installation would not be necessary, at least for the near future:

> It has turned out that the prototype system requires only about 50k of core instead of the 120k or so originally envisioned. With a little more ingenuity this can be reduced even further. Consequently, we expect to be able to operate the system for test without the necessity to stop batch (processing) work on the machine.116

The cover sheet of the progress report from Waldron mentioned that ADL wanted to put on a demonstration for the Department on April 9, 1971, and that he (Waldron) wanted to meet with Rosenberg the day before the test to discuss the project team's results on other tasks, and to work out a schedule for the next few months. Waldron closed the letter by saying that he would call Rosenberg within a few days to check on the latter's availability for these dates.

The emphasis which ADL's management gave to demonstrating the system suggests that they felt that once Rosenberg saw the prototype in an operational state, he would be much more agreeable to finalizing the contract. However, despite his superiors' obvious concern over the BPD project's status, Waldron apparently never got back in touch with Rosenberg before the suggested demonstration date.[117]

Finally, on May 25, 1971, ADL demonstrated the prototype system for Rosenberg and two other representatives of the BPD (Dep. John R. West and Dep. John J. Bonner). During the demonstration, several of the ADL programmers which were present stated that, because there was no contract, they had done no work on the system for months. Waldron later informed Rosenberg that ADL's management had indeed ordered all work stopped until the contract was signed.[118] However, even though Rosenberg subsequently learned that some of the project staff had continued to work despite the lack of a contract, the incident undoubtedly helped to reinforce the view that ADL could have had the prototype completed much sooner than it did.

Growth in the Influence of Urban Sciences

While ADL's relationship with the BPD was rapidly deteriorating, the Department was getting results from its other consultants which Rosenberg found much more acceptable. In July of 1971, Urban Sciences issued its findings for the AVM study.

The report examined improvements in the defined CCS which would be afforded by the incorporation of an AVM system, and concluded that such a system "would be very beneficial to the operations of the BPD from the officer safety, public protection, and financial aspects."[119] Accordingly, the study recommended that the Department actively pursue the analysis, specification, and selection of an AVM system as quickly as possible.

Because of the care the consultants had taken to keep the BPD informed of all project developments, and to provide the Department with full documentation of its analysis, Rosenberg was quite pleased with Urban Sciences' performance on the AVM study. The Planning Director was also generally satisfied with the progress Urban Sciences had achieved on the patrol force simulation model being developed for the Department (under a separate grant, 70-107B, which began in February, 1971). Consequently, he was quite receptive to Urban Sciences' suggestion to seek an additional grant to undertake future work in these two areas.[120] In fact, Rosenberg suggested two additional tasks which he was interested in having Kaye's firm perform.

As a result, the formal application for "consulting and systems engineering services" submitted by Urban Sciences in September 1971 listed four major project areas.[121] The first of the proposed projects concentrated on programming changes which would improve the operation and use of the patrol force simulation model. The second task area was essentially concerned with a study on the "most promising candidate" AVM systems.

The final two projects, which had been suggested by Rosenberg, involved an evaluation of the computer applications planned by the Department (including an assessment of the present system's ability to accommodate them), and the provision of project management and technical services for the redesign of the Dispatch and Communications Center. The last task, of course, was originally ADL's responsibility.

As had been the case with the earlier BPD grant applications which the LEAA State Planning Agency for Massachusetts had to process, Rosenberg was able to get the Governor's Committee to give almost immediate approval of the proposal, and for the requested amounts.

Rosenberg and ADL's Final Confrontation

While developing this new round of project grants, Rosenberg continued pressing ADL, and got some support in this effort from theDepartment's other consultants. On the 24th of September, the Planning and Research Director sent off an angry letter to Martin Ernst, one of Waldron's superiors and the individual from ADL with whom the Department had first dealt:

> Enclosed is a copy of a letter to Dr. Stephen Waldron of ADL which poses certain questions, the answers to which are necessary in order to put our Command and Control, records and information system project back into full swing.
>
> The letter was sent on August 23, 1971. In view of the fact that I have had no reply to this letter, I am refering it to your attention....

During the period in which Rosenberg had been expecting a reply from ADL, both Waldron and his secretary had been hospitalized. Waldron's secretary had contacted the Department to inform Rosenberg of the situation, but her message wasn't passed on to the Planning Director until after he received a call from an upset Waldron in mid-October who explained his absence and the fact that he was back at work.[122]

Though in this particular instance the Planning and Research Director's criticism of ADL's performance had been unfounded, the incident understandably improved Rosenberg's position vis-a-vis the consultant. A second factor which added fuel to Rosenberg's arguments was criticisms of ADL's method of operation offered by Urban Sciences. These tended to echo Rosenberg's feelings that....

> Considerable amount of software is being developed by ADL for the proposed Command and Control system at the Boston Police Department. Because of the impact of decisions reached during the life of this study contract upon the work that the vendor is supplying, it is imperative that the BPD obtain from ADL further definition of their proposed system.....The estimates made a few years ago which required the department to upgrade to a 360/40 computer, add three additional magnetic tape units, and increase the memory storage requirements by a factor of four (from 32k bytes to 128k bytes) all were estimates somewhat predicted on a terminal software system (FASTER) which is no longer being used. <u>The Department must obtain new estimates and justifications for the present hardware configuration as well as any future hardware which may now be recommended by that vendor</u>. An accurate estimate of the date of installation of the software system would also be helpful. (emphasis added) 123

It should be noted at this point that Rosenberg's criticisms were not critiques of the Command and Control System itself, but of ADL's record in implementing the system. Despite all the difficulties which the Department had experienced thus far, Rosenberg was still firmly committed to getting the system up and running. Although the ADL project staff probably suspected this fact, the emergence of other consultants to whom the BPD could turn if relations with ADL became intolerable gave Rosenberg's position additional strength. In fact, about this time, Rosenberg hinted to the Urban Sciences staff that he was interested in them taking over the CCS development once the system's documentation was received from ADL.

Over the next few months, Rosenberg attempted to exploit this position of strength to insure that the consultant completed the project objectives of grant 70-107E. Between November 1971 and March 1972, he sent several memos to ADL reviewing what work would be required from the consultant before the Department would consider that ADL had fulfilled its contract obligation. The memo's directed that the Reporting System was to be completely documented, structured and analyzed, and a detailed implementation plan for installation was to be prepared, including the organization of interim filing procedures pending establishment of a new central records system. In connection with the Central Records System component of the contract, the consultant was to come up with a set of functional specifications, including flow charting of the records operation and procedures, a description of the basic files that would be

maintained, and estimates of file size and access requirements. For documentation of the CCS phase of the current project, Rosenberg demanded a series of materials, including a system description explaining all programs and flow charting, and a number of copies of users' manuals. In these memos, Rosenberg also mentioned the trouble which Department personnel were experiencing with "bomb-outs" of the CCS. The implicit inference of the memo was that this difficulty was to be corrected before approval of the final contract payment would be given.[124]

In reaction to Rosenberg's latest demands, ADL assumed the offensive. On March 14, 1972, the BPD received a letter from the ADL Contracting Officer. The overt purpose of the letter was to propose a series of additional tasks which ADL could perform on the Prototype Command and Control System. In the memo, however, ADL stressed that in its own opinion, it had fulfilled its responsibility to develop the prototype. Further, the letter indicated that any further work on the CCS would be deferred until a new contract had been completed.

> ....Under a contract associated with Grant Number 70-171 (sic), the Prototype System has been implemented and operated for nearly a year. It was originally intended that modification which became evident from test of the Prototype System would be embodied in the ultimate or production Command and Control System. At this time there appears to be need for an interim stage at which the modifications can be tested in the Prototype configuration before the complete hardware configuration is implemented.... (emphasis added)
>
> ....The objective of the proposed work is to modify the Prototype Command and Control System so that it will be simpler to operate and will better meet the needs of the department for training and further evaluation....

....The modified Prototype System will include a restart capability adequate for testing and training purposes. It will not include the ultimate capability to read out data to tape....

....The total proposed program would come to $11,000. Work would commence immediately upon receipt of a fully executed contract and would be completed within four calendar months. (emphasis added)[125]

Given the history of their relationship, Rosenberg was not about to go along with ADL's latest proposal. In a strongly worded letter to Martin Ernst which Rosenberg sent on April 11, 1972, he produced a list of CCS-related problems which he indicated would have to be remedied before the BPD could begin to consider ADL's responsibility "to demonstrate an operating prototype to be completed." Among the problems which Rosenberg mentioned was the prototype's unreliability and extreme instability. According to Rosenberg, the prototype system was so unstable that one could not operate it long enough to make any meaningful tests. The BPD personnel trying to use the system were continually plagued by the extremely frustrating problem of setting up the system by assigning a number of cars to radio calls using one of the system transactions (commands), and then having the prototype "bomb-out" as soon as some other transaction was used. Moreover, whenever the system bombed out, all previously entered data was lost, making it necessary to start the time-consuming initialization procedure over again.

Another problem which was mentioned concerned the incident completion time. Although ADL had sold the system on the basis of its usefulness for supervising the patrol force, the prototype did not contain a program for recording the incident completion time, an important piece of data for determining service times, and an indicator of possible dereliction.

Finally, Rosenberg reported out that the Department had problems in operating the system with multiple terminals on-

line. The BPD staff found that intermittently the entry line was lost on one of the terminal display tubes when the other display tube was transmitting, making it impossible for each "scope" to act independently.

Rosenberg undoubtably realized that the final grant payment might not be enough of an incentive for ADL to be willing to do the specified prototype modifications. Therefore, though he did not agree to the $11,000 contract package, in his response to ADL Rosenberg included a second list of activities which he said could be undertaken in "the next phase of system development."[126]

ROSENBERG LEAVES THE BPD

ADL apparently was convinced that the BPD's promise of a contract extension was sincere, and they agreed to Rosenberg's counterproposal. However, within the month, Rosenberg, the critical actor in the Department's federally-subsidized programs, had resigned from the force. In May 1972, to nobody's surprise, but to Rosenberg's disappointment, Mayor White disclosed that he wasnot going to ask Commissioner McNamara to serve for another five-year term. With this news, Rosenberg, who had been one of McNamara's key aides and had occupied a temporary civil service position which McNamara had created, announcedhis own resignation. Rosenberg gave two weeks notice, but because of the sick leave owed to him, his departure from the force was almost immediate.

With McNamara's and Rosenberg's departure, a power struggle began in the Department among those higher ranking officers who were interested inpreserving or improving their positions in the forthcoming administration. As a result, anything inseparably associated with the former administration became tainted, and the ADL project was no exception. A deputy superintendent was appointedby the acting commissioner, Superintendent Taylor, to supervise the remainder of the federally funded projects, including the LEAA grants, but he had neither Rosenberg's technical understanding nor the intellectual commitment to utilizing such sophisticated tools. Given these personal differences and the uncertain political environment within the Department,

it is not surprising that the deputy superintendent carried out his obligations to the ADL project in a passive, caretaking fashion, rather than acting as an advocate for the project's implementation.[127]

With this change of personnel, ADL, whose contract had officially ended in June 1971, quickly terminated its relationship with the Department. With the change of administration, ADL presumably saw that a new contract would be a long time in coming, if at all. Without such a contract (or Rosenberg to push them), there was little incentive for the consultant to complete the modifications. The prototype was turned over to the BPD with many of theproblems which Rosenberg had mentioned still in evidence.[128]

Urban Sciences, on the other hand, whose grant term ended in October 1972, continued with its planned activities.[129] The staff of Urban Sciences apparently were very committed to the technology they advocated, and devoted themselves to trying to deliver the best possible product to the Department. In September, they presented their final reports on the Patrol Force simulation and the Computer Application Study projects.

The report of the Computer Application Study was significant in several respects. First, the report reflected the consultant's expectation that, with Rosenberg's departure, the Department's interest in exploiting technology would undoubtedly decline, at leasttemporarily. For example, in the report, Urban Sciences proposed three different computer configurations which the Department could decide among, depending on its plans. The firstcomputer configuration was based on

the situation that the Department, as Urban Sciences had recommended, would decide to implement the computer-aided dispatching system, an administrative information system, and a computer-based central records system. The second configuration outlined was for the possibility that the Department would decide not to make a major commitment to design and install a real-time system as recommended during the next year and a half. Finally, Urban Sciences presented a third configuration for the situation should the Department make a decision not to increase the scope of data processing for the next several years. From the presentation, it is evident that the consultant did not expect the Department to select the first system, even though that was the option Urban Sciences had recommended.

Further, the computer applications report revealed that because of its programming errors and the small number of personnel familiar with its operation, the prototype system was getting almost no use, and major components of it were already considered technologically obsolete.[130]

THE TOUCHE ROSS & CO. EVALUATION

Even before Urban Sciences submitted its final reports, however, the McNamara administration's projects were coming under review. In April 1972, representatives of the Governor's Committee had decided to attempt to evaluate the BPD's resource allocation, communications, and information system projects. Rosenberg was concerned with the possible repercussions such an evaluation might have, given the poor performance realized on a number of the projects, most notably the Command and Control System. Accordingly, it is not surprising that he sought to gain for the Department some measure of control over what this evaluation would say and who would have access to its findings. In late April, he sent a memo tothe Executive Director of the Safe Streets Act Committee, a mayoral advisory group, in which he asked that the Governor's Committee be reminded that the Department and the City "reserve(d) the full right to approval of the successful bidder" (i.e., a veto on any unacceptable bidder). Moreover, he requested that the Governor's Committee be asked to insert a sentence to the following effect in the Request for Proposals to perform the evaluation:

> No report, oral presentation, publication, or other presentation of material concerning this contract is to be made to any person, group, agency, meeting, or assembly without the express written permission of the Boston Police Department.[131]

These actions suggest that even at this late date, Rosenberg was hoping, however unrealistically, that McNamara (and there-

fore Rosenberg himself) would be retained for another term. As we have previously indicated, events turned out differently.

It is not altogether obvious why the Governor's Committee decided to do an evaluation at this point in time. In the report which resulted from the evaluation, four reasons were given.[132] First, all contracts for consulting assistance on the projects in question had been completed and the required final reports submitted. Additionally, the report mentioned that the people responsible for initiation and direction of the projects -- namely Rosenberg and to a lesser extent McNamara -- had both left the Department, breaking the continuity of the development. Moreover, a new Commissioner, Robert J. DiGrazia, had been appointed by White. Finally, the report claimed that the future development of these systems would involve the commitment of substantial additional amounts of money and Department manpower.

Although these reasons seemed logical enough in April of 1973 when the final evaluation was submitted to the Governoer's Committee, most of the events given as rationalizations for the study had not taken place, and could not be completely anticipated, in April 1972 when the actual decision to do the evaluation was made. Instead, what appears to have been a major motivation for the evaluation was a change in the personnel on the Governor's Committee staff which shifted the Committee's stance from one of advocate to one of evaluator.

Essentially, the person in charge of monitoring and assisting in the technology-oriented grants, who had been so responsive to Rosenberg's requests for funds since 1970, left the Committee staff in early 1972. His replacement found it extremely difficult to make sense out of the half-decade of BPD grants and reports and decided to enlist the aid of an outside consultant to help in this task.[133] In August 1972, Touche Ross & Co., an accounting firm which had turned to management analysis and then computer systems analysis, was hired to perform the evaluation. The great import of this decision resulted from the influence which the consultant's evaluation would have on the Governor's Committee's and the new BPD administration's opinion of the technological projects.

Touche Ross & Co. engaged in a two-stage study of each of the specified project areas (see Table I).[134] First, the firm made a calculation of the results in each project area, and compared them to what the firm determined to be the original stated goals for the area. To do this, Touche Ross & Co. carried out a review of written materials and project documentation which was made available by the Governor's Committee and the BPD.

Second, in order to develop an assessment of the operational impact of the various projects, the Touche Ross & Co. staff observed the operations of, and interviewed personnel from the Bureau of Field Operations, the Bureau of Special Operations, the Bureau of Inspectional Services, and the Bureau of Central Services. Additionally, the consultant met with representatives of the Governor's Committee and the Mayor's Office to discuss

these individuals' perceptions of the federally funded projects. However, there was no mention in Touche Ross & Co.'s final report whether the consultant had interviewed, or even tried to interview, either McNamara, Rosenberg, Howland, or the relevant staff of ADL, Urban Sciences, or Concord Research. In other words, it appears that Touche Ross & Co. never spoke to the principal participants in the projects.

Overall, the April 1973 Touche Ross & Co.'s evaluation was very critical ofthe Department's attempts at technological modernization. In fact, in the Findings Summary of the report, the consultant stated that, with the exception of the installation of the new radio dispatch consoles, mobile radios, and portable radios, the eleven projects evaluated had not achieved their stated objectives. Further, the consultant emphasized that in those areas where it felt that project goals had been modified (such as the Command and Control System), even the "less ambitious" objectives had not been fully met.[135]

Touche Ross & Co. argued that the alleged overall lack of success could be basically attributed to inadequate leadership by McNamara and Rosenberg.[136] For example, the consultant asserted that the projects undertaken by the McNamara administration had emphasized research and use of sophisticated technology rather than concentrating on opportunities to improve the street operations (patrol and investigation) of the Department. Moreover, to be successful and sustain the interest of operations personnel, Touche Ross & Co. reasoned, some "quick payoff" projects had to be included in any overall plan of improvement. In the BPD's case, however, the consultant concluded that projects

TABLE I

The projects which Touche Ross & Co. examined were:

Project No.

1. Radio Communications System Development: Redesign of the radio system and purchase of new mobile and portable transceivers.

2. Command and Control System Development -- Reconstruction, design, purchase, and installation of ten new radio dispatch consoles, thirty-two complaint operator positions, and supporting equipment.

3. Command and Control System Development -- Computer Aided Command and Control System: Development and test of a prototype computer system to assist police vehicle dispatch.

4. Command and Control System Development -- Automatic Vehicle Monitoring System: Determine the feasibility of an electronic system to locate police cars during patrol.

5. Bureau of Field Operations Administrative Command Center: Design andimplement a communications room for the control of significant field operations.

6. Records and Reporting System Development: Redesign and implement new paperwork procedures.

7. Resource Allocation System Development: Develop an automated procedure to establish patrol patterns in response to changesin the pattern of crime.

8. Statistical System Improvement (Geographic Base File): Implement an automated method to convert street address into patrol area, district, map coordinates, etc.

9. Computer System Development: Identify and implement new computer applications.

10. Headquarters to Station Communications System: Investigate and install new cable to provide data, audio and video capability.

11. Callbox System: Install free public emergency telephones at key street locations.

(continued on next page)

Table I Cont'd

This system of categorization of the Department's work was developed by Touche Ross & Co.[137] In the course of the paper, we have been primarily concerned with what Touche Ross & Co. had designated Projects No. 3 and 6, and, to a much lesser extent, Projects 4, 2, 7 and 9, which together represent the bulk of the BPD's efforts in the technological area. For each of these Projects, the Touche Ross & Co. report summarized the stated goals and objectives, examples of expected operational improvements and project results, and presented the consultant's recommendations regarding further development.

with the potential for quick payoffs had been organized in such a way as to prevent early benefits. Specifically, they pointed to the case of the records and reporting system where the elimination of repetitive paperwork had been tied to prior implementation of the computerized command and control system. The easier project failed, it was claimed, because the complex computer-aided dispatching system had failed.

Touche Ross & Co. also claimed that the Commissioner and his Director of Research had been unable to attach the "confidence and respect" of career Department personnel even to paperwork simplification, which was "well known to need improvement."[138] The consultant suggested a number of reasons for this situation:

> Career Department personnel had little or no involvement in the formulation of improvement projects.
>
> Outside consultants were prohibited from working closely with Department staff and field personnel who would use the new systems.
>
> No line commander was made responsible for successful completion of the project.
>
> Few reviews of project progress were held with command personnel. Command personnel frequently did not understand the material presented to them and, feeling that the projects were not their responsibility, did not attempt to alter project direction. A general belief existed that the projects were not relevant to Departmental problems.[139]

Touche Ross & Co. maintained that the projects had not been part of an overall program for improvement for the Department, and the relative priority of projects was neither established nor reviewed by the Department command personnel who would be

affected. Further, because the projects were oriented toward research and new technology, and because line commanders were not convinced that the projects were useful, Touche Ross & Co. argued, no sense of urgency was attached to their completion. Consequently, "projects were not closely monitored and were not completed."[140]

After reading the full text of the April 1973 report and other relevant materials,[141] however, one could conclude that many of the statements which Touche Ross & Co. made in the Findings Summary are inaccurate. For instance, although the Findings Summary states that with the exception of the installation of radio equipment (the Radio Communications System Development project and part of the Command and Control Center Reconstruction project) the eleven projects did not meet their stated objectives, on the basis of the information which the report itself presents, one might conclude that the

Automatic Vehicle Monitoring (AVM) project and the BFO Administrative Center project had also been completed according to the Department's specifications.[142] Further research into source documents suggests that several of the other projects had met their stated objectives as well.[143]

Even in the case of projects which generally everyone conceded had been unsuccessful, some of Touche Ross & Co.'s interpretations of events seem to have been mistaken. In discussing the expected operational improvements of the CCS project, for instance, the Touche Ross staff asserted that the goals of the project had changed from "implementation" in 1968 under OLEA Grant #346 to "demonstration and research" in 1970 and 1971, under LEAA Grant #70-107e.[144] In truth, however, the alleged change in ADL's project goals never actually occurred. Admittedly, the short term objectives changed from grant to grant, but throughout all their applications and work statements ADL had carefully specified that their long range goal was the implementation of an integrated information system.[145]

If Touche Ross & Co.'s evaluation of the eleven project's was inaccurate or misleading, its analysis of the critical factors in the project histories was equally so. For example, the consultant's contention that the federal projects undertaken by the McNamara Administration were strictly research efforts and

were never intended to have an effect on improving street operations is only true in themost narrow sense. The Department's biggest problems were poor deployment and utilization of resources, and poor supervision. It seems clear that the technology-oriented projects represented legitimate (though somewhat indirect) attempts to correct these problems which limited the patrol force's performance.

Touche Ross & Co. also strongly criticized Rosenberg for preventing the previous consultants from working more closely with the command staff or field officers. To a certain extent this was true, but Rosenberg felt such restraint had been justified:

> You can't let consultants in out of the blue and lay this /sales-talk/ on a deputy superintendent or district captain....After the first few words the police officer would be lost and would stop listening....And after a couple of such bad experiences with consultants it would be impossible to get him /the police officer/ to accept any kind of innovation....[146]

At least in the case of ADL, however, it was not the Department who apparently made the decision that the project team should operate independently of career officers but the consultant itself. Similarly, although Touche Ross & Co.'s presentation made it look as if the Department made the decision to have the records and reporting system revision follow the completion of the CCS, the reader will recall that the Department, and Rosenberg especially, tried repeatedly to get the consultant to perform this work while the prototype was on-going. In fact, although Touche Ross & Co. put a lot of stress on making a line commander responsible for project completion, it was not until Rosenberg became project director (replacing a line officer, Howland)

and started putting pressure on ADL, did the consultant produce more tangible results.

Despitethe numerous apparent inaccuracies, not all of Touche Ross & Co.'s criticisms of the technological projects were unwarranted. Many of the projects actually exhibited serious shortcomings. As we have previously inferred, the final prototype package which ADL had delivered to the BPD contained a number of such problems. After running the demonstration program on the Department's computer, Touche Ross & Co. discovered that the prototype still contained the errors which caused the system to stop functioning (to "bomb-out"), as well as design features which made it difficult to simulate the operation of a production system (which, of course, had been the stated purpose of the prototype). For example, the system did not have the ability to store data (such as on car availability) from run to run. Also, it was not possible to simultaneously and separately simulate the complaint operator and dispatcher functions on the prototype. Moreover, Touche Ross & Co. pointed out that theconceptual design of the system was completed almost five years previously, and that since then, developments in real-time computers and "intelligent" terminals had made ADL's configuration technically obsolete.[147]

EPILOGUE

In May 1973, DiGrazia's administrative staff presented the Commissioner with a list of eighteen projects as part of a proposal for an extended program for modernizing the Department. According to Department spokesmen, the Commissioner then chose the 'paperwork simplification' and 'resource allocation' projects as the first of the eighteen to be implemented because "they had specific boundaries, were clear and readily grasped both conceptually and technically, and were programs which offered something to the men in the field."[148]

Within the month, the DiGrazia administration selected Touche Ross & Company as the consultant to perform the resource allocation project. As consultant, Touche Ross & Co. had two main tasks to carry out. First, the consultant was to document the assignment of the sworn personnel of the Bureau of Field Services and to recommend a reorganization of those assignments in order to provide more officers for street patrol. The second function which the consultant was to perform was to help the BPD develop new sector boundaries for its districts (to equalize sector workload), and to design and implement a reallocation of personnel among the districts.

On September 5, 1973, Touche Ross & Co. presented its city-wide resource allocation implementation plan to the Commissioner, and on September 18, 1973, the plan was presented to the Department command staff. Two days after implementation of the plan began, however, the BPPA filed a grievance with the municipal

Office of Labor Relations. The union charged that:

> ....by rearranging patrol sectors, DiGrazia's plan violated the contract because the administration had changed working conditions without consulting the Labor-Management Committee of the Association. Furthur, they charged that in one particular district a number of patrol sectors had been eliminated, and the size of the remaining patrol areas had been increased. This, they claimed, endangered the health and safety of those men required to patrol the enlarged areas.[149]

Eventually, the Labor Relations Office ruled that the BPPA failed to provide sufficient facts to substantiate their accusations, and the grievance was dismissed for "lack of prosecution". In the meantime, Touche Ross & Co. continued to assist the Department in implementing the reallocation plan. The total city-wide resource allocation was accomplished in two phases which spanned a seven month period. The redistribution of personnel for the first seven districts (1,2,3,4,5,13,14) was completed by September 26, 1973, and the last four districts (6,7,11,15) by March 1974.

When DiGrazia assumed the job of Commissioner of the BPD in the fall of 1972, an average of 200 calls for help were going unanswered each eight-hour shift, largely due to the lack of an available patrol unit to dispatch to the incident.[150] In the Resource Allocation Project (Phase I) Final Report, however, Touche Ross & Co. was able to state that over the period of October 1973 - March 1974, a 26% increase in the number of patrol vehicles fielded had been achieved, and that the average city-wide 'zero car availability'[151] had decreased from 25% to 5.9%.[152] It should be noted, however, that these successes were not solely the result of implementing Touche Ross & Co.'s redistribution plan. For one thing, in late 1973 the Department began receiving new ship-

ments of marked vehicles. Another factor which helped the BPD to alleviate its vehicle shortage problem was the dramatic reduction in the number of vehicles awaiting repair which was accomplished by the Department during the same period.

Moreover, there have been some indications that since March 1974 the zero car availability rate has increased considerably. Some individuals have suggested that this development is the result of faulty workload calculations made by Touche Ross & Company. In their own defense, representatives of the consultant claim that their efforts were hindered by the unwillingness of the BPD command staff to make projections regarding probable increases in crime and service rates. Consequently, in their calculations Touche Ross & Co. was not able to consider future incident rates and distributions. Furthermore, there is considerable evidence that some district commanders have been less than fully cooperative in the effort to reduce zero car availability. The March 1974 final report notes:

> Another area of concern was the practice of certain Districts in fielding, at the beginning of the tour, its planned number of units, then, shortly after roll call, releasing certain units to court or other duties. This practice effectively reduced the level of actual vehicles fielded while indicating the higher number (planned) on the vehicle availability sheet. This practice has been partially controlled by listing those vehicles, with the times at which they were taken off the air, on the bottom of the daily zero car availability reports.153

In addition to its resource allocation and paperwork simplification projects, the DiGrazia administration, like its predecessor, decided to undertake the development of an computer - assisted dispatching system. During the fall of 1974

a request for proposals was released. Eleven firms submitted proposals to the Department. Despite the BPD's previous experience, from among the eleven firms the DiGrazia administration selected Arthur D. Little, Inc. to design and implement the proposed system. In mid-December 1974, ADL and the BPD entered into a $600,000, one-year contract for developing an operational version of the system.

FOOTNOTES FOR CHAPTER THREE

1. Thomas A. Reppetto, Public Safety Service Needs of the Future City of Boston (Boston: Unpublished manuscript, October 1971), p. 16

2. Ibid, pp. 17-18

3. Ibid, p. 18

4. "Boston Pays Top Police Tab", Christian Science Monitor, New England Edition, May 16, 1960, p. 1, Col. 1; "Curb on Crime Tied to High Police Cost," Christian Science Monitor, New England Edition, May 20, 1960, p. 2, Col. 1; "Summer's Been Hot, for Bookies," Christian Science Monitor, New England Edition, September 9, 1960, p. 1, Col. 5; "New Police Set Up Hits Bookies Hard," Christian Science Monitor, New England Edition, September 14, 1960, p. 7, Col. 7

5. Reppetto, pp. 18-19

6. International Associations of Chiefs of Police, A Survey of the Police Department of Boston, Massachusetts (Washington, D.C.: IACP, 1962), p. 22

7. Reppetto, p. 22.
Reppetto also notes that similar programs had been previously recommended to the Boston Police by such notable police reformers as Leonard Harrison (in the thirties) and Bruce Smith (in the forties). In these prior instances few of the suggestions were ever implemented; however, because of the desire of the city administration in the early sixties to revitalize the physical environment and to seek a more economical approach to providing municipal services, as well as the continuing pressure on the department to do something in response to the recent scandal, the possibilities for accomplishing such reforms seemed more favorable.

8. Edmund L. McNamara, "Discussion of Implementation of IACP Survey Recommendations," The Police Yearbook (Washington D.C.: International Association of Chiefs of Police, 1967) p. 14

9. Ibid, p. 14

10. Under the organization in effect at the time of the 1962 "key shop scandal," the Commissioner had eight different office heads who reported to him, as well as a superintendent who in turn was reported to by twenty-eight office or division (later district) heads!!

11. Edmund L. McNamara, p. 18
Although McNamara did not disclose the names of the firms, the available evidence suggests that he was talking about I.B.M. and J.R. Reilly, a computer systems consultant.

12. Ibid, pp. 17-18

13. Ibid, p. 18

14. Ibid, p. 18
Despite McNamara's pessimism, by 1964 the Department had reduced its strength by 183 (from the 1961 level of 2740). Further reductions occured over the next few years to a low of 2494 in 1967. However, the dramatic rise in crime rates and calls for service during these years prompted the city to authorize the hiring of 675 new officers over the last third of the decade, so that by 1970 the department contained more sworn officers than it had at the time of the IACP study, (Reppetto, pp. 27-28.

Furthermore, although the effort to reduce the number of station houses from seventeen to six had had an auspicious start, by 1968 the city had only succeeded in closing three stations -- Back Bay, West Roxbury, and the West End. This situation was the result of the feelings of many communities that the closing of a police station meant status degradation of the local neighborhood and would result in lowering of the quality of police service. Political opposition to consolidation was so strong in fact that both the Back Bay and West Roxbury stations were reopened during the White administration as substations (the West End community, of course, no longer existed). (Reppetto, pp. 28-29).

15. Ibid, pp. 14, 17

16. See Reppetto, pp. 22-24

17. Arthur D. Little, Inc., Reports, Records, and Communications in the Boston Police Department: A System Improvement Study (Washington, D.C.: Law Enforcement Assistance Administration, May 1968), pp. 13

18. See Boston Finance Commission Survey of Boston Police Department, Massachusetts Legislative Documents, House 2600 (1949) pp. 1-67; also, Christian Science Monitor, May 20, 1960, p. 2

19. Kent Colton interview of Deputy Superintendent John West, Spring, 1971

20. Interview with Deputy West, Spring, 1971

21. From BPD notes on the meeting.

22. Garry D. Brewer, Politicians, Bureaucrats, and the Consultant: A Critique of Urban Problem Solving, (New York: Basic Books, 1973), p. 116

23. For a brief description of the creation of the Community Renewal Program by the U.S. Congress, see Brewer, pp. 101-104.

24. Ibid, p. 105

25. Ibid, p. 107

26. Ibid, p. 116

27. Eventually, ADL decided to bring in a senior operations researcher from the Cambridge office, who, after talking with some of the city people and the ADL project leader for a few days, came up with the basic formulation of the model.

28. Brewer, pp. 159-160

29. Ibid, p. 118

30. Ibid, pp. 133-143
Faced with the job of defining the relationship between factors without the benefit of any established theory to guide them, in several instances the model builders developed analogies to the behavior of physical phenomena such as decaying isotopes and collapsing magnetic fields. The model also assumed that the system is physically closed, and presupposed that existing social rankings of housing choice would continue unchanged for the next twenty years. The model additionally ignored the relationship of place of employment to house location.

31. Ibid, p. 165

32. Ibid, p. 164

33. Ibid, p. 164

34. Ibid, pp. 167-168

35. Ibid, p. 108

36. At this time, the Planning Division, as well as the Department's data processing section, were located under the Bureau of Inspectional Services. This move seems to have coincided with Howland's assumption of command over Inspectional Services. In that Howland had been instrumental in the establishment of the Planning Division, and in developing the Department's planning priorities and timetable (as assistant to McNamara and Chairman of the Advisory Committee), this switch is understandable.

37. Rory Albert, A Time for Reform: A Case Study of the Interaction Between the Commissioner of the Boston Police Department and the Boston Police Patrolman's Association, (Cambridge: Innovative Resource Planning Project, M.I.T., 1975), p. 6

38. From the BPD's notes on the meeting.

39. This statement is based on the BPD's notes regarding the development of the initial grant application.

40. See Brewer, pp. 106-107

41. Boston Police Department, "Application for Grant", (U.S. Department of Justice, Office of Law Enforcement Assistance, form LEA-1), submitted January 12, 1967, see "Project Plans and Supporting Data", p. 2

42. Ibid, pp. 2-4

43. Ibid, particularly p. 7 of "Project Plan and Supporting Data."

44. Ibid, pp. 7-8

45. In reviewing the request, the OLEA had had some question whether the Department could do away with the regular solicitation of bids, but this problem was eventually resolved and the selection of ADL was approved by the Mayor. For its services over the course of the grant (March-August 1967) ADL was to receive the amount of $25,915. The contribution of the Department itself to the project was primarily in non-cash credits (of donated space and part-time of some BPD personnel). Superintendent Howland was named as project director for the Department. Also assigned on a part-time basis were Superintendent Taylor, Captain John West (who had worked on the original request for the computer), Sgt. Detective Daniel P. Lovett, and Sgt. David Silverman (of the Communication Section).

46. Reports, Records, and Communications in the Boston Police Department: A System Improvement Study, p. 86

47. Ibid, pp. 7-8

48. Ibid, p. 9

49. BPD "Application for Grant," January 12, 1967, pp. 2-3

50. Reports, Records, and Communications..., p. 55

51. Ibid, p. 13

52. Ibid, pp. 16-17

53. Ibid, p. 17

54. M. Maltz, memorandum on "Supervisory Police Communications," (Cambridge: Arthur D. Little), Sept. 25, 1967, pp. 1-2

55. Ibid, p. 3

56. See, for example, Arthur D. Little, Inc., Functional Specifications of a Prototype Command and Control System for the Boston Police Department, (Cambridge: Arthur D. Little, Feb. 1970), p. 14

57. Memo from S.D. Rosenberg to Supt. John T. Howland, "Comparison of the Recommendations of the Arthur D. Little Report with the Recommendations... of the President's Commission...." (Fall 1967) p. 2

58. Reports, Records, and Communications..., pp. 17-18

59. Memo from S.D. Rosenberg to Howland, "Comparisons of Recommendations....",

60. Albert, p. 7

61. Edmund L. McNamara, "Report of the Committee on Uniform Crime Records," The Police Yearbook (Washington, D.C.: IACP, 1968).

62. Boston Police Department's "Application for Grant", (U.S. Department of Justice, Office of Law Enforcement Assistance; Form LEA-1), submitted October 23, 1967, p. 5

63. Albert, p. 7

64. Albert, pp. 6-7

65. Boston Magazine, October 1973, p. 59

66. Albert, pp. 6-7

67. Stephen Waldron, "Progress Report on Arthur D. Little, Inc. Project" (Cambridge: ADL), August 6, 1968, pp. 4-5

68. Ibid, pp. 5-6

69. Ibid, p. 8

70. Part I of Working Memorandum EDG-3 dealt primarily with a discussion of two basic files which the CCS would contain, a vehicle status file and a incident status file. In addition to these two "dispatching files", the CCS could potentially incorporate a number of secondary files, including missing persons, stolen vehicles, warrants, and license registration files, among others. However, at the time of the memo, ADL noted that they were actively considering (that is, were planning to include) only the missing persons and stolen vehicles files.

    A related issue discussed in Part II of Working Memorandum EDG-3 was the hardware ADL chose for implementing their proposal, a departure from what was then being leased by the BPD.

71. See Working Memorandum EDG-3, Part I, p. 23, and memorandum from V. Reed Manning (Arthur D. Little, Inc.) to Donald Cotter (New England Telephone and Telegraph Company), October 30, 1968.

72. In the area of communication's, ADL's original mandate had been limited to help the Department in selecting a system to replace the antiquated callbox network and to develop specifications for new radio equipment for the patrol force.

73. Interview with James Williamson (Wellesley, Mass.), March, 1974.

74. Boston Police Department Memorandum, Lt. David Silverman (Bureau of General Services) to Superintendent John Howland, re: Working Memorandum EDG-3; March 21, 1969.

75. See Maltz memo, "Supervisory Police Communications."

76. Lt. David Silverman memorandum.

77. Ibid.

78. This conclusion was made on the basis of Rosenberg's and ADL's notes on these meetings. For example, see ADL memorandum from Edward Gilbert to Steven Waldron on Case 70375, April 24, 1969.

79. Boston Police Department, "Application for Grant" (U.S. Department of Justice, Law Enforcement Assistance Administration), May 8, 1969; see "Project Plan and Supporting Data", pp. 2-3.

80. Ibid., p. 8.

81. Ibid., p. 14.

82. Ibid., p. 15.

83. See contract between the City of Boston and Arthur D. Little, Inc. for LEAA Grant Number NI-69-007.

84. Interview with Richard Larson, December 1974; see also Albert, p. 6.

85. Reppetto, pp. 31-33; also see City of Boston, Proceedings of the City Council, November 25, 1968, pp. 384-90.

86. The year 1965 was notable for the BPD because it was in that year that the Boston Police Patrolman's Association was founded. According to Albert, one night fourteen Boston police officers got together at Officer Richard MacEachern's house, and, gathered around the kitchen table, decided to form an organization for patrolmen and detectives which would protect Boston Police officers against "widespread charges of police brutality and to hear civilian complaints which began about that time." (Albert, p. 6) Membership in this union was limited to the lower ranks for a number of reasons. For one thing, the BPPA was modeled on the Policeman's Benevolent Association in New York, the most prominent police union existing at that time. The founders were also afraid that if the superiors were included, they would soon dominate the activities of the organization. The union's counsel, Robert Wise, reflected this concern when he stated that "the BPD was characterized by an implicit 'establishment' -- a small group of influential and self-perpetuating superior officers -- who had long maintained a system which denied fair consideration of the interests of the patrolmen." (Albert, p. 24)

    For two years the fledgling union was engaged in an "uphill struggle" against four other employee groups already existing in Boston, as well as facing serious harassment from the Department administration. In 1967, however, as the result on a 2-to-1 vote in a bargaining unit representative election, the BPPA became the official representative of 85% of the personnel in the Department.

87. Reppetto, pp. 32-33.

88. Albert, pp. 41-42.

89. Reppetto, pp. 33-34.

90. Two of the most important criticisms made by the IACP were absent from the Mayor's Task Force Report. The reader will recall that the IACP had recommended a reduction in the size of the force. However, since 1962 there had been a dramatic rise in the crime rate. Moreover, Boston was the scene of numerous large demonstrations, which the Department was called upon to monitor while maintaining a patrol force throughout the city to respond to calls for assistance.

    The second IACP recommendation missing from the Mayor's Task Force Report was concerned with the consolidation of stationhouses. White, who had established "Little City Halls" throughout the city, was not against neighborhoods having "local" district stations. Rather, what bothered him was that the district personnel in many areas were not responsive to the community they served, and, more importantly, were not responsive to the Mayor's orders to correct this situation. Consequently, he urged for the appointment of deputy superintendents to supervise groups of districts. These command officers would serve at the pleasure of (and therefore would be accountable to) the police commissioner, who was appointed by the mayor. Although White could expect, had this organizational reform been implemented, that the McNamara administration would probably resist city hall's efforts at control, he was undoubtedly looking forward to 1972 when he would be able to select a new commissioner.

91. Boston Police Department, 64th Annual Report of the Police Commissioner for the City of Boston for the Year Ending December 31, 1969, Document No. 28, p. 9.

92. Ibid., pp. 4, 9.

93. Albert, p. 45; also see Boston Globe, November 19, 1970, p. 35.

94. From Albert, p. 45.

95. Ibid.; for additional information see Boston Globe, July 13, 1969; August 10, 1969.

96. Functional Specifications..., p. 1.

97. Ibid, p. 14

98. Ibid, pp. 19-20

99. See memorandum from Steve Rosenberg (Director of Planning and Research, BPD) to Maurice Silber (Contracting Officer, ADL), January 22, 1971.

100. Boston Police Department, "Application for Grant" (U.S. Department of Justice, Law Enforcement Assistance Administration), May 1970; see "Project Plan and Supporting Data", p. 6.

101. Ibid, p. 5

102. Albert, p. 45

103. The following three paragraphs were derived from an interview with James Williamson (Wellesley, Mass.) March, 1974.

104. Interview with Richard Larson (Cambridge, Mass.) January 17, 1974

105. Interview with Deputy Superintendent Hunter (Boston Police Department), Fall 1973.

106. Interviews with District Eleven Patrolmen, Spring 1974

107. Memo from Rosenberg to Silber, January 22, 1971, p. 1

108. Ibid, p. 2

109 Based on memos from Rosenberg's files, January 1971-May 1972

110 Another thing which the Computer and Data Processing Plan revealed was that while ADL was slowly developing the computer system's potential for controlling field operations, the Department had gone ahead on its own to develop and implement many computer applications of the sort which had been used to justify the original lease of the system in the mid-sixties. For example, at the time of the Plan, the Department had a variety of programs which provided statistics on crime and accidents. The Department was also planning to have operational within the year several online inquiry files (warrants, stolen vehicles, etc.) for use of the patrolman in the field.

What the Plan did not go into in any detail, however, is how much use the available programs were getting outside of the Research and Planning Division. According to several sources, only one of the thirteen district captains was actually using any of the statistics the computer produced.

111. Boston Police Department, Computer and Data Processing Plan, February 1971, pp. 20-21

112. Steve Waldron "Work Statement: Boston Police Department Integrated Information System Project, October 1970-June 1971", (Cambridge: Arthur D. Little, Inc.) February, 1971, p. 13

113. Ibid, pp. 7-8

114. The Work Statement also gave an interesting insight into what became of the support in developing the CCS which IBM and Sanders had "guaranteed" the department:

"It was at first thought that the computer-aided dispatch system would be built around an existing software package available from IBM, with special programs added. Unfortunately, no one at IBM knew enough about the inner workings of this program to answer some very fundamental questions concerning its architecture. After a strenuous effort to understand the intricacies of this program, it was discovered to produce too long a response time (to inquiries) to be suitable for the police application. Subsequently, a new master program has been formulated, one which can use special programs developed previously with modest changes." (p.3)

"....Display control software evaluation: This task consists of evaluation and selection and implementation of a control software package provided by Sanders. Although the design originally calls for the implementation of a control package called FASTER, it was found that the modifications made by Sanders were inadequate for our purposes. Further evaluation of modules named DUCS and other control packages are to be made and one of them implemented." (p.11)

115. Rosenberg's notes on telephone conversation with Waldron, March 18, 1971.

116. Stephen Waldron, "Progress Report" (Cambridge: Arthur D. Little, Case: 70375-I), April 2, 1971

117. Rosenberg's notes on Waldron's cover letter of April 2, 1971.

118. Rosenberg's notes for May 25, 1971; July 23, 1971.

119. Urban Sciences, A Study of the Application of an Automatic Vehicle Monitoring System to the Operation of the Boston Police Department (Wellesley, Mass.: Urban Sciences, July 1970), Abstract, p. 1.

120. Interview with James Williamson (Wellesley, Mass.), March 1974.

121. The following is a more detailed description of the four project areas:

A. The stated purpose of the Patrol Force Simulation component of the proposed project was to "improve the operation and use of the computer simulation of the BPD, and to examine the feasibility of real-time updating and use of the simulation." This component was divided up into three main stages, involving improvements in internal program efficiency, improvement in the"realism" of the model itself, and improvements in the statistics calculated by the simulation program. The consultant's estimate of the cost of this part of the project was $33,735.00.

B. The Vehicle Location System (phase II) component was to focus on the study of the "most promising candidate" AVM systems "with respect to technical compatibility with the BPD's CCS, capability to meet required specifications, availability, maintainability, and cost-effectivity." The proposed cost for this work was $37,147.00.

C. One of the tasks suggested by Rosenberg was the BPD Computer Applications Study. This study essentially involved four parts: (1) a review of the effectivity of the existingoperations and recommendations on how to improve them; (2)simplification of the simulation program operation (from the user standpoint); (3) a study of the possibility of advanced uses of the simulation program; and,(4) a study of the overall effects of existing and planned projects on the performance and requirements of the 360/40 computer, including whether the 360/40 was capable of performing all that was required, and if not, what were the alternatives, and the recommended solutions, The cost for all this work was estimated to be$42,332.00.

D. The fourth task, another which Rosenberg had suggested, focused on system engineering and project management of the new Dispatch and Communications Center which was then being installed at headquarters. The work involved in this task included providing all necessary engineering consulting and project management of the system development, installation, and testing phases of this effort, including collection and preparation of maintenance routines and records, logistics, and configuration control. The proposed price for this work, which originally was to be ADL's responsibility, was $36,699.00.

122. Rosenberg's notes for October 7, 1971, October 12, 1971; memo from Duty Officer Preston, August 24, 1971.

123. Urban Sciences "First Monthly Progress Report on the Computer Utilization Study for the Boston Police Department," (Wellesley, Mass.: Urban Sciences) October 1, 1971.

124. See, for instance, Steven Rosenberg's memos to Dr. Stephen Waldron of ADL on November 8, 1971, and February 14, 1972.

125. Memo from M.W. Silber (ADL) to Steven Rosenberg (BPD), "A Proposal for the Future Work on the Prototype Command and Control System", March 14, 1972, pp. 1, 5.

126. Memo from Steven Rosenberg (BPD) to Dr. Martin Ernst (ADL), April 11, 1972, pp. 1-3.

127. Interview with James Williamson (Wellesley, Mass.) , March 1974.

128. See Touche Ross & Co. , A Review of Information Systems Projects and Related Operations in the Boston Police Department, (Boston: Touche Ross, Inc., April 1973), pp. 3-10 to 3-13.

129. In October 1972 Urban Sciences ended its formal responsibilities to the Department with the submission of its final report on the Candidate AVM System Study. In this report, Urban Sciences offered its opinion that at that time the technical capabilities of most automatic vehicle monitoring systems were not sufficiently well demonstrated. Moreover, the equipment costs of the one vendor who appeared to be the most capable were found to be sufficiently high to warrant caution on the part of the Department. As a result, the consultant recommended that the Boston Police Department allow at least 6 to 12 months to elapse in order to receive final test results from a number of candidate systems, and to await a reduction in costs which would increase the cost-effectiveness of such systems. These conclusions, like the computer options suggested in the Applications Study, differ dramatically from the optimistic recommendations which had resulted from the first phase of the AVM study, and echo the overall cautious outlook in the Department at the time. (Urban Sciences, A Candidate AVM System Study and Analysis for the City of Boston, (Wellesley, Mass.: Urban Sciences, October 1972), pp. 8-1 to 8-2.

130. See Urban Sciences, Final Report of the Computer Applications Study (Wellesley, Mass.: Urban Sciences) September 16, 1972.

131. Memo from Steven Rosenberg (BPD) to Peter Borre, Executive Director of the Safe Streets Act Committee (Boston, Mass.) April 28, 1972.

132. Touche Ross & Co., A Review of Information Systems..., pp. 1-1, 1-2.

133. Interview with Steven Long (Governor's Committee for Law Enforcement and the Administration of Justice), Fall 1973.

134. Touche Ross & Co., A Review of Information Systems..., p. 1-3/

135. Ibid., p. 1-4.

136. Ibid., pp. 1-4, 1-5.

137. Ibid., p. 1-2.

138. Ibid., p. 1-4

139. Ibid., p. 1-4

140. Ibid., p. 1-5.

141. Such as the Arthur D. Little, Concord Research, and Urban Sciences proposals and final reports.

142. Touche Ross & Co., A Review of Information Systems..., pp. 1-2, 1-4 to 1-5, 3-5 to 3-9, 3-14 to 3-16.

143. For example, Touche Ross & Co. criticized the Urban Sciences' simulation for not including an optimization procedure in a way that suggested thatdeveloping such an algorithm had been part of Urban Sciences' mandate, while in truth Rosenberg had realized all along that the simulation would not contain such a procedure.

144. Ibid., p. 3-11

145. Additionally, in the course of summarizing the results of the prototype CCS project, Touche Ross & Co. revealed that the new administration had recently made a decision to standardize programming with AMS COBOL. The Touche Ross staff then noted that major portions of the prototype system had been written in Basic Assembly Language. The consultant did not follow up this evaluation by questioning the judgement of the decision (made by the new DiGrazia administration) to standardize computer languages, despite the fact that this act had effectively rendered much of the technological work on

the computer-aided dispatching system and the patrol force simulation (written in PL/1), an investment of over $400,000, worthless. Rather, it applauded the new administration's decision and cited this change as part of its justification for scrapping the ADL prototype.

146. Interview with Steven Rosenberg (Suffolk Down, Mass.), Spring 1974.

147. Touche Ross & Co., "A Review of Information System...", pp. 3-10 to 3-13.

148. Mary Ann Pate, "Change Processes: An Analysis of the Paperwork Simplification and the Resource Allocation Projects in the Boston Police Department", Interim Report (rough draft), July 1974, pp. 2-3.

149. Albert, pp. 78-79.

150. Ibid, p.2.

151. The zero car availability rate measures the percentage of calls for service for which a patrol unit is not available for immediate dispatch.

152. Touche Ross & Co., Boston Police Department Patrol Force Resource Allocation Project, Final Report, May 1974, pp. 40-44.

153. Ibid, p. 50.

CHAPTER FOUR

FINDINGS AND CONCLUSIONS

At the beginning of this work, we indicated that though there was a considerable body of literature devoted to advocating the use of technology by police, little information is available concerning the process whereby such technology gets introduced into a department's operations. In particular, we noted the scarcity of empirical evidence about why departments actually adopt technology, how they use it, and whether the actual selection and use of such equipment conforms to theories about the role of technology in law enforcement. As an initial step toward discovering answers to these questions, we examined the introduction of a Command and Control System (similar to that advocated by the President's Crime Commission) into one police agency, the Boston Police Department. Comparison of the BPD case to the assumptions made by the President's Crime Commission points to a model of technological innovation which is radically more complex than that anticipated by the Crime Commission.

Probably one of the most important features of the BPD experience is that the process by which the Command and Control System was adopted was stochastic. That is, the final character and purpose of the system could not have been predicted at the start of the process. Over the course of the introduction and development of the system there were significant shifts in the functions which the Department wanted it to

perform, changes in the actors adopting it, and the equipment and its goals were modified accordingly. The Crime Commission had, of course, assumed that a piece of technology served a single immutable set of goals and that it is adopted as a fixed "package" to meet these purposes.

A second critical contribution of the Boston experience was that it demonstrated the inaccuracy of the Crime Commission's assumptions about the process by which decisions to use technology are made. In the BPD case, the decision to introduce the advanced systems was not a choice to accomplish organizational change through technology. Instead, it was merely a decision to "acquire" the technology in order to gain the professional status associated with such equipment. As a result, there was little initial concern about what the technology could actually do. Even later, when the purpose of the Command and Control System shifted, the technology was not seen as a way to increase the Department's ability to fight crime. Rather, the McNamara administration hoped to expolit the system to get more control of the individual patrol units. Another interesting feature of the BPD's decision-making process in regard to the technology's adoption was that it was very compartmentalized. Outside of the few actors directly involved in the deliberations, everyone else in the command staff and the rank-and-file was essentially unaware of the technology's existance and purpose. This fact helps to explain why the development of the advanced system encountered virtually

no resistance from the other segments of the Department until the departure from the Department of the Commissioner and his Director of Planning and Research.

The BPD case, then, provides us with a number of clues regarding factors which foster the successful introduction of technological innovations. Among the most important of these conditions are:

- an initially aggressive consultant or vendor
- a clear conviction by the department administration that technology and professionalism are linked
- endorsement of the proposed technology by professional reference groups
- the combination of a technologically naive sworn force and an innovator with extensive technical training
- the availability of external funding
- an innovator who is outside the normal reward structure of the department and whose success will not be perceived by members of the command staff as a threat to their power
- congruence in the technological project staff between department administrations.

The BPD experience also demonstrated that in some instances high (very sophisticated) technology will be easier to introduce into a department's operations than low technology. Finally, the case suggests that, due to its flexibility for

meeting changing organizational objectives, a department might realize more success from adopting developing technology than in implementing a "package" system.

The discussion which follows will consider the effects of such factors in greater detail. The presentation will be broken into four parts, focusing on characteristics of the technology, characteristics of the police organization, external influences, and the principal actors in the federal projects.

CHARACTERISTICS OF THE TECHNOLOGY

Expected output of the technology

One of the most interesting findings from the BPD experience is that, contrary to the Crime Commission's opinion, the expected output of a piece of technology was often not an important factor in the Department's deliberations whether to adopt it or not. In part, this was the case because most members of McNamara's administration had an insufficient technical background to understand the workings and implications of a piece of advanced technology. This meant the Department lacked the expertise to either rationally select among a set of technical options or to determine the relative benefits of technological versus a non-technological approach to a problem.

The inability of the Department to assess the output of a system had implications for the process of technological

innovation. First, rather than actively searching for the optimal technological device to achieve a goal, the Department was highly dependent on consultants or vendors to suggest pieces of technology which would presumably help solve a problem -- usually as defined by the consultant/vendor. When Rosenberg joined the Department, more attention could be paid to the technical aspects of the proposed equipment. However, it is significant that to a certain extent even Rosenberg was dependent on consultants to initially suggest the technology (AVM--Raytheon; Simulation--Larson/Urban Sciences).

Moreover, it is not clear whether the Department's failure to adopt technical systems by weighing their projected outputs was solely due to the lack of expertise. In part because of the political pressures on the Department, it was often less important what a system could do, than that the Department could say that it was employing "modern technology".

Status and imageability

The status and imageability associated with a piece of advanced technology turned out to be extremely important considerations in the McNamara administration's decision regarding adoption of equipment. During McNamara's tenure as commissioner, the Department came under repeated criticism, and there was considerable pressure on him to produce an image of change. Yet, many of the reforms which had been called for were unachievable

because of local political opposition. Others would have required McNamara to enter an all-out battle against the districts, which he apparently was not willing to do. Since he was limited in the areas in which he could actually carry out reforms, it was crucial that the reforms which he did undertake project a strong image of modernization and professionalism. Through the adoption of highly imageable sophisticated technology, McNamara apparently hoped to assuage the criticisms aimed at the overall operation of the BPD.

Consequently, in a period characterized by respect for technology, it was logical for McNamara to introduce a computer into the BPD's operations. Similarly, it was when the prestigious and highly visible Crime Commission recommended that police agencies develop computer-aided command and control systems that he approved the ADL proposal to develop the CCS. The President's Commission's endorsement of the command and control system concept undoubtedly strengthened the legitimacy of technology with which McNamara had little familiarity, and linked it strongly to his image of a professional police department.

Flexibility of design

Although the literature examining technological innovations generally assumes that the technology exists as a developed "package,"[1] a characteristic of much of the advanced technology introduced into the BPD was that it evolved during the process of diffusion. In the case of the CCS, this situation resulted from the relative dearth of comparable efforts

which might have provided the basic configuration for the system. As a consequence of wishing to be extremely innovative, the Department and its consultant were required to do all the fundamental development work themselves. This meant that the cost of the system was much higher than it would be for "late adopters"[2] (who could learn from an innovative organization's mistakes). Similarly, the time from introduction to full implementation of the CCS was considerable. In spite of these difficulties, the CCS experience demonstrated that the innovative organization has a real advantage over the late adopter in terms of its ability to mold the technology to its specific needs. For instance, because the CCS had no pre-determined structure, Rosenberg was able to modify the design to serve the latent goal of supervision, as well as the espoused professional police goal of crime control. (With projects such as the simulation, which had initially been designed for New York City, Rosenberg had had much less flexibility in altering the function of the technology.)

Rosenberg and ADL were also able to modify the system to meet the changing political pressures on the Department, as well as the shifting sources of criticism within the Department, and thus to assure that the system would resist opposition. In a very real sense, the flexibility created by developing (rather than buying) a system made it possible for the CCS continually to <u>appear</u> to serve all the Departments conflicting goals.

High verses low technology

While the Crime Commission made no mention of distinctions which departments could expect in the success of introducing "high" versus "low" technology, one would expect that the adoption of advanced hardware (such as computer-aided dispatching systems) would be a more difficult and risky process than the implementation of much simpler equipment. The BPD's experience implies, however, that in some instances the potential for successful implementation of complex technical systems might actually be greater than that for adopting much less sophisticated hardware.

There seem to be several explanations for this difference. First, as was suggested in the prior section, complex systems often have the capability to at least appear to perform a greater variety of functions than do more elementary equipment. Therefore, complex systems can be made to appeal to more groups.

Second, because of their complexity, few people are likely to understand the organizational implications of advanced systems, and therefore the chances of widespread resistance are decreased. In fact, it is probable that McNamara himself did not fully appreciate the implications of the CCS when he gave his original approval for its development. For example, if McNamara were as unwilling to directly challenge the districts' power as his earlier actions suggest, he should have rejected the CCS because of its centralizingpotential and thus, the confrontations which the system might have provoked.

Finally, if a sophisticated system is not "naturally" complex enough to confuse those who might be suspicious of its purpose, the innovator can add numerous auxiliary functions to the system's design in order to further conceal its more controversial aspects. For instance, it appears that Rosenberg was exploiting this strategy when he "hid" the system's capacity to identify cars improperly out of service amongst the CCS's other operations. Similarly, ADL was able to obfuscate the centralizing function of the CCS so as to avoid opposition by the districts.

CHARACTERISTICS OF THE POLICE ORGANIZATION

Level of technical expertise

The low level of technical expertise possessed by the BPD proved to be both a benefit and a hindrance to the effort to introduce the advanced systems. For instance, because the rank-and-file did not comprehend the implications of the CCS for supervision and evaluating performance, no resistance to the system's development emerged. Similarly, the district commanders apparently did not fully comprehend that because the CCS would provide headquarters with a detailed account of the use of patrol units (and whether such use was compatible with department policies) and the workload characteristics of the patrol divisions, the introduction of the technology would increase the districts' accountability to the Commissioner and his staff.

However, the lack of technically trained people also meant that the Department could be convinced to purchase equipment which was largely useless for its purposes. For instance, even if McNamara were more concerned with having a computer than with what such a computer would do, he probably could have realized this objective at a much lower price than was paid for the IBM 360/30's leasing. The computer vendor, however, was convincing enough to "sell" the large machine. Similarly, until Rosenberg was given responsibility for over-seeing the federal projects, the Department did not have any greater capacity to effectively monitor consultants' work than they did to question the claims of vendors. While Howland was committed to theproject's success, he did not have the background to properly assess the consultant's claims about the expected results of their work or their arguments for moving cautiously in the development of the system.

It would have been expected that Rosenberg and Larson would give the Department the necessary expertise to deal critically with technology consultants and vendors. For a number of reasons, however, they could not assure that the Department was given the most efficient equipment or the most effective advice. First, though Rosenberg and Larson were available to the Department since the beginning of the federal projects, they had a professional interest in seeing that the CCS was adopted. Thus, they probably tempered whatever criticisms they might havemade, for fear that the BPD might

decide to pursue a less technologically-oriented approach to its problems. Even after Rosenberg became Project Director and could deal directly with the consultants, he was similarly limited in the actions which he could take to expedite the CCS development. For example, a decision to drop ADL before something tangible was produced would probably have prompted a review by the funding bodies, would have impaired the image McNamara was trying to project, and might have stopped the development of the CCS.

It is also clear that much more technical staff would have been necessary, even if the "in-house" experts had been motivated to advocate the needs of the Department more than the development of the technology itself. It is doubtful, however, whether even a department of BPD's size would be willing to support a permanent technical staff large enough to carry out both the day-to-day data processing work and a development project on the scale of the CCS. Since there were so few advocates of technology in the Department, even someone as powerful as Rosenberg had great difficulty in convincing the City Council to consider the needs of the data processing section above those of the other segments of the Department.

Career reward structure

One of the reasons why the Department undertook highly innovative projects was that the persons charged with exploring the potential of technology were largely outside of the regular "reward" structure of the Department. There are a number of

reasons why the reward structure of police departments generally discourages innovation. In the academy and on the streets, police officers are trained to be suspicious of anything deviating from the norm. Because of the desire to control officer discretion, moreover, the police organization itself places a high value on predictability and routine performance of duties. Police departments in this regard certainly fall under a kind of "Gresham's Law":[3] When a person is deeply involved in a routinized activity, one is not likely to involve oneself in creative problem solving.

The bureaucratic orientation of the BPD is perhaps more conservative than even this analysis suggests. There is as much concern over the internal distribution of power and status in the Department as there is over the achievement of the organization's normal goal of crime control. As a result, the receptivity to innovation by superiors within the reward structure (and thus in a position to lose power and prestige) is low, and any subordinate who suggests a reform which threatens to bring about major changes will be dealt with harshly. Thus, even if an innovation were to succeed, it would probably result in personal failure for its innovator.

As a civilian, Rosenberg was outside the normal career path and reward structure of the Department. In fact, it is very significant that his longterm career was dependent on establishing a reputation as an innovative and successful operations researcher, not on his success as a member of the

BPD. Since Rosenberg's goal was to develop a CCS, it becomes clearer, for instance, why, as the possibility of McNamara's departure became more real, Rosenberg seemed to put an increasing effort into guaranteeing that the federally funded projects were completed. Rosenberg was able to pursue these personal career objectives because they would tend to increase the power of the individuals in the Department to which he was most accountable, Howland and McNamara.

Howland was, in contrast, formally part of the Departments reward structure. His advocacy of innovative projects, however, can probably be explained by the fact that he was near the end of his career and had reached the highest rank in the department (superintendent) which he could possibly hope to attain. Consequently, the extrinsic rewards of the Department were less compelling to him than the intrinsic rewards of advancing the Department's professionalization, to which he had a strong commitment. It is also critical that as head of the Bureau of Inspectional Services, the difficulties of supervision and control were his concern. Thus, the CCS promised to provide him both with greater control of the patrol force and with supervisory status in a "professionalized" department.

Compartmentalism and visibility

The high imageability of the computer and the CCS as efforts at reform in large part explain McNamara's willingness to introduce these advanced technical systems into the BPD.

However, while these systems were adopted for the general image they created, their specific goals and design could not be evident within the department. This "low profile" was essential because every change in technology carries with it changes in organizational structure. If these changes are predictable and are perceived as radical or threatening to the existing social system, they will, of course, create resistance by groups within the organization.

Within the BPD, however, the organizational implications of the CCS were never evident enough to create opposition. In large part, the CCS had very low visibility because of the compartmentalism which characterized the BPD's operations. Like most bureaucracies, the BPD subscribes to the theory of "monocratic responsibility."[4] According to this theory, praise and blame attach to jurisdictions, and career rewards are conferred or denied according to the successes and failures which occur within jurisdictions. This results in a strong personal identification with organizational subunits and in little attention being paid to the other jurisdictions within the organization. When work on a multifaceted project is completed by one subunit, it is handed over to another and interest in it is dropped. If difficulties occur in the project thereafter, as long as they don't inseparably concern the work done by the previous subunits, the prevailing attitude of these groups is that it is "somebody else's problem."

Whether consciously or not, McNamara took advantage of this attitude by confining responsibility for the CCS to the Research&Planning section. Since they were not being evaluated on the basis of the systems' progress, and since the technology ostensibly would only be affecting the work of the Central Complaint room and the Planning division itself, the other segments of the Department paid little heed to the systems' development. Thus, the innovation was able to procede with decision-making power virtually held solely by the Research and Planning Section, and thus almost without interference.

EXTERNAL INFLUENCES

Federal funding

The availability of federal funding played a critical role in the BPD's program of technological development. It is commonly held that organizations tend to undertake the most radical innovations at times of slack, during periods when the organization has been successful enough to accumulate an excess of resources.[5] What federal funds did for the BPD was to create an effect which might be termed "localized slack." That is, it made tremendous resources available to a limited aspect of the Department's operations. This was important because it permitted experimentation in areas about which the Department had not reached a consensus. Moreover, since the technological projects were not taking resources away from

any of the other parts of the Department, there was no opposition from the subunits.

In addition to creating a climate conducive to innovation, the federal funds also significaltly reduced the risk of innovation to the BPD, and especially to those within the Department who supported the technology's application. Because the Department was contributing so little towards the system's development, the repercussions of failure would be much less serious than if the Department was absorbing the full cost. On the other hand, since the Department had so little at stake financially, for the first few years of the projects, the administration seemed to be very lax in demanding timely results and in approving grant extensions. Consequently, four years and almost $400,000 were required to produce an error-filled prototype version of a command and control system, which the President's Commission had predicted would cost $200,000.[6]

External evaluation of the BPD

The 1967 President's Commission seemed to feel that the widespread criticism of the police would spur departments to make radical organizational changes through new technology. However, rather than seeking the kinds of fundamental reforms the Crime Commission had envisioned, the BPD's reaction to criticism was to attempt to create an image of change, and of responsiveness to its critics, without substantially upsetting the status quo of the organization. Thus, a very common response of the Department was "more of the same"--more patrol

cars, more supervisors, more communications gear. It is significant that the same spirit seemed to have prompted the Department to initiate its program of technological development. In large part, it appears that the McNamara administration's motivation for undertaking the CCS project was that such equipment might be an easily acquired and highly visible symbol of professionalization, rather than that the innovation was expected to result in significant change in the organization.

It is also interesting that the criticisms to which the BPD was responding were mostly not directed at its failure to control crime (as the Crime Commission had assumed) but rather at its inefficiency. A common deficiency of the IACP, Mayor's Task Force, and Model Cities reports was the scant attention paid to crime statistics. This fact may reflect a common conviction that such data is highly irrelevant and misleading (or perhaps a model that the police do have an effect on crime, and the way to maximize that effect is to maximize efficiency).

As the BPD experience showa, when efficiency is the most important criterion for evaluating police performance, technological innovations like the CCS become a logical response. These systems allow efficiency to be equated with control over patrol units--an attractive administrative goal. Consequently, as in BOston's experience, it is likely that much of the technology ostensibly aimed at increasing crime control will actually be concerned with increasing control of personnel (or will be redirected by department administrators to serve that purpose).

PRINCIPAL ACTORS IN THE TECHNOLOGICAL PROJECTS

Consultants and vendors

In the BPD's experience, the consultants/vendors played a critical role in bringing the technology to the attention of the Department. Because of their own organizational pressures, however, they often "oversold" the equipment. For instance, as mentioned earlier, because of the BPD's lack of technical sophistication and its need for a symbol of professionalization, the computer vendor was able to convince the Department to lease an expensive computer system which could do little more than the unit recording equipment already functioning in the data processing section. Similarly, the assured availability of federal funds, and the desire to establish themselves as leaders in the public-sector technical systems field, encouraged the other consultants to urge that the BPD undertake technological projects which the Department did not fully understand and clearly did not have the personnel to maintain.

What is most surprising, however, is that despite the various consultants' interest in establishing a reputation in police technical systems, they not only oversold equipment, but they also often failed to perform to the client's satisfaction. In this regard, the Boston experience suggests that the consultants'/vendors' size may influence its performance. Most of these firms were relatively large and had numerous contracts, and therefore, those personnel assigned to the BPD contract were also working on a number of other projects. This means it was more difficult to coordinate the work of different technicians. Moreover,

since the BPD had a limited ability (before Rosenberg) to assess the reasonableness of the systems' progress, when the consultants were forced to put increased efforts into their other projects, they could, if they wanted, "coast" on the BPD contract. The one consultant examined in this study with whom the BPD was most satisfied was Urban Sciences, and it should be remembered that for a considerable period the Department was its only client.

Funding sources

We've already noted that the availability of federal subsidies and the funding ratios which favored technological innovation predisposed the Department to engage in the development of the CCS. Aside from such "passive" influences, however, the funding sources and their local representatives seemed to have played a very small role in determining the specific nature of the Department's technological program. In part, this may have been due to the fact that Rosenberg functioned as an in-house expert on technology, and thus, there was less need for the local LEAA State Planning Agency (The Governor's Committee on Law Enforcement and the Administration of Justice) to provide guidance and direction.

Even assuming that Rosenberg's role was a factor, the Governor's Committee was surprisingly ill-informed about the project's development,[7] and showed little concern for the progress realized. For instance, even after ADL had repeatedly

failed to meet contract objectives, the BPD experienced little difficulty in getting additional grants. This particular situation might be explained by the fact that the Planning Agency had more money than it had projects to fund. In order to guarantee that the state's share of the LEAA program funds were not reduced the following year, there was pressure on the Governor's Committee to distribute all the available funds.

Although the Governor's Committee staff took almost no part in the day-to-day development of the CCS, it had a considerable impact on the fate ofthe system following Rosenberg's departure. As we noted in the case study, near the time of Rosenberg's resignation there was a turnover in the Governor's Committee staff charged with overseeing the BPD's technological projects. As a result of the confusing state of the records which the Committee had kept on theprojects, the new monitor sought the assistance ofa consultant to prepare an evaluation of the Department's technological systems. The final report from this evaluation, which apparently contained a number of inaccuracies, provided the interregnum BPD command staff with a strong justification for abandoning a system whose advocate they had resented, and whose purposes they had not appreciated.

The Commissioner

Although McNamara exhibited little direct involvement in the advanced systems' development as time went on, his role

was critical in establishing that the Department's efforts as creating a professional image would have a largely technological orientation. The Commissioner's rationale for adopting this approach was quite different from the one which the President's Crime Commission advanced, however. Since he assumed office immediately following a major BPD scandal, and just before the IACP was to issue what could be expected to be an uncomplimentary report on the Department, the Commissioner was under considerable pressure to demonstrate improvements in the BPD's operations and organization. However, lack of city hall support prevented him from implementing many of the suggestions offered by the IACP. In addition, McNamara's law enforcement background had been with the FBI. As a result, McNamara had essentially had no direct experience with the management of police departments, and with the BPD in particular. Consequently, the Commissioner was undoubtably hesitant about undertaking any reforms which threatened to precipitate widespread resistance in the Department. Because technology would not be perceived as threatening by the Department establishment, and because it was highly imageable, McNamara was very receptive to IBM's and ADL's proposals regarding sophisticated technical systems.

The character of McNamara's relationship with Howland and Rosenberg was another factor which had important implications for the BPD's program of technological development. Because he was so close to Rosenberg and Howland, McNamara

vested them with considerable power, and acquiesced to many of their reform proposals. However, in the last year of his tenure as Commissioner, McNamara also increasingly relied on the assistance of these individuals (and especially Rosenberg) for the day-to-day coordination of the Department's activities. One consequence of this behavior was that the BPD's ability to closely monitor the federal projects was seriously impaired.

The innovators

Both Rosenberg and Howland played major roles as innovators in the BPD. In the history of the federal projects, Rosenberg's presence was especially important. As a professional operations researcher, he naturally turned to that field for a solution when he perceived a problem in the Department. Moreover, because of his professional training, Rosenberg was particularly likely both to perceive problems in the Department's operations, and to feel a compulsion to deal with them. Consequently, whereas Howland was limited to responding to the suggestions of the consultants regarding technological development, Rosenberg could and did initiate projects himself, and accordingly, the development program expanded greatly under his stewardship.

In part because of their reform zeal, Howland and Rosenberg also had a propensity towards taking on additional responsibilities in the Department. A consequence of these additional duties, as we mentioned in the preceding section, was that their ability to effectively monitor the technological projects

was impaired. In Howland's case, this situation was especially critical, for, because of his technical naivete, he was already very dependent on the good will of the consultants.
As we have seen, however, in the area of technological development, the consultants often encouraged the Department to undertake unrealistic or questionably productive projects.

We've also mentioned that because Rosenberg was a civilian and outside the normal reward structure, he was more likely to engage in innovative behavior. Nonetheless, because Rosenberg had not worked his way up through the ranks, some very powerful members of the command staff were jealous of his relationship with McNamara, and of the power which the Commissioner vested in him. While McNamara was commissioner, Rosenberg was too powerful for such individuals to openly express their animosity. However, with McNamara's and Rosenberg's departure, the resentment became manifest in the adverse attitude toward the technological projects which Rosenberg had fostered. Since the career-minded officers in the BPD were very sensitive to such attitudes, after Rosenberg's resignation, little effort was put into salvaging the CCS and other advanced systems.

CONCLUSIONS

One of the basic objectives of this study has been to begin to assess whether the President's Crime Commission was realistic in expecting police departments to make the decision to adopt technology simply because a "professional" body like itself had urged them to do so. Although there are obvious problems to drawing conclusions to such questions on the basis of a single data point, it seems likely that many aspects of the Boston Police Department's experience could be generaliable to other large urban police forces. Moreover, while there have been few comparable case studies to date, the results of a number of related studies (which have examined the Law Enforcement Assistance Administration and computer use by police) are available,[8] and can be examined for clues to the validity of this thesis' conclusions. At the very least, the Boston experience should provide a set of hypotheses to be used in future investigations.

The data on the Boston Police Department suggests that, indeed, the Crime Commission's endorsement of highly sophisticated technology (computers, simulation models, automated command and control systems, and the like) probably served as an important motivation for departments to procure such hardware. In addition, the Boston case shows that the Commission was correct in anticipating that federal subsidization of

the equipment would also be a powerful inducement for adopting the recommended technology. Given the small number of individuals in the BPD who were seriously committed to applying the technology, it is clear that the Boston Police Department's technological program would have been much smaller had the federal funds not been available. A study by Colton (1971) appears to substantiate our finding regarding the importance of thefederal grant program. According to Colton's article, "Use of Computers by Police: Patterns of Success and Failure," over forty percent of those police departmentswho have access to a computer indicated that they had received LEAA subsidization of their electronic data processing operation, and more than 65% of these forces admitted that their computer facility would have been smaller or non-existant without such help.[9]

While the Crime Commission correctly assessed the importance of certain factors, it failed to anticipate the BPD's problems surrounding the development and implementation of such technological systems. Because of the crude and disorganized state of the Department's records system in the mid-sixties, the task of developing the Command and Control System not only involved putting together the system configuration and doing the necessary programming, but also designing a new data collection system. All this meant that the CCS development effort would take more time and effort than had been originally foreseen. If the Boston experience is at all representative, one could anticipate (and Colton's report

again appears to corroborate this)[10] that many other departments attempting to develop advanced systems might have experienced similar cost and schedule overruns.

In addition to the problems arising from the innate complexity and data base requirements of such systems, the BPD had the added difficulty of overzealous or uncooperative vendors and consultants. Because the Department did not have the technical expertise to effectively evaluate and monitor the work that was being performed for it, to a great extent it was at the mercy of the consultants. Since, during the late sixties, most police departments were presumably as technically naive as the pre-Rosenberg BPD, from the Boston case study we could expect that many other departments required the services of outside experts, and would be similarly vulnerable to consultant/vendor abuse. In fact, the United States Congressional Committee on Government Operations, which investigated the Block Grant Program of the LEAA in 1972, reportedthat nearly one-fifth of every State Planning Agency planning dollar had been spent on outside consultants. Moreover, the Committee at that time suggested that there was a strong possibility that vendor "overselling" and consultant misconduct might be a common phenomenon.[11]

While the Boston command and control system never became fully operational, the case study provides a number of indications that, once the equipment is implemented, the

pattern of police use of such equipment, and its impact on police organization and operations, may be quite different from what the Crime Commission expected. For instance, many departments probably shared the BPD's initial lack of appreciation for the technology's potential, and presumably chose to adopt theadvanced system more because of the status which such equipment possessed as a result of the Commission's endorsement than because they had been convinced of the utility of the technology in controlling crime. Under such circumstances, where the technology was merely perceived as a showpiece rather than as an important tool, the chances that such hardware will become an integral part of the department's field operations areslim. As a result, the impact of the technology on such departments' performance is likely to be negligible.

On the other hand, there undoubtedly are police departments whose commitments to the technology is more substantive. The Boston case study suggests, however, that where such systems are actually being applied, the police administration may be more concerned with the managerial control aspects of such equipment than with its effect on controlling crime. There seem to be several reasons for this possibility. First, from the Boston experience it appears that police administrators are judged by their superiors less on the basis of aggregate statistics than on the basis of efficiency and instances of police misconduct. Furthermore, technology such as automated command and control systems is supposed to affect crime

through reducing the dispatch delay component of response time. However, to date, the relationships between reduced response time, apprehension rates, and deterrence remain mere speculations. Moreover, if police administrators are interested in reducing crime rates or increasing arrest performance, there seem to be a number of more direct and less complicated ways of accomplishing such ends than by means of the extremely sophisticated and expensive systems which the Crime Commission recommended.

As a result of these considerations, it would not be surprising to find that many administrators are primarily interested in the technology's capacity to improve headquarter's ability to monitor and control officer behavior. However, even in connection with the relatively more limited objective (as compared to crime control) of supervision, there is considerable uncertainty regarding the amount of additional control which will accrue from such systems. At best, such systems will only provide data on where a patrol unit is and how long it has been at its various locations. The administrator still doesn't know what the officers have actually been doing. Moreover, even the limited supervisory capability which is available from such systems can be largely abrogated through collusion of the patrol force and dispatchers.[12]

The ability of the rank and file to circumvent, or even (as in the case of the siren activator) to sabotage technological reforms, points up the fact that behavioral problems

are often not amenable to technical solutions. More important, the emphasis on technological approaches to police reform often obfuscates many of the basic issues which police administrators and the public at large should be addressing. As an Oakland police sargeant has noted:[15]

> The computer . . . is an effort by the police department to professionalize from a hardware approach. This may be O.K., but the more we concentrate on hardware, the more often we move away from the basic people and judgement issues. The real police problems don't have technical solutions. Instead, it's the people who are screwed-up; and we need more people-to-people type efforts in police departments, such as improvements in communications, increased motivation, productivity modifications, better interpersonal relations, etc. In short, instead of hardware resolutions, we need policy resolutions of the basic issues of the police force. The result of the computer may be to take our mind off what are the real issues. (emphasis added)

The kinds of issues to which the officer was referring include such questions as, what should constitute the main tasks of the police?; how should the police be evaluated?; how should the police relate to the community?; who should control police operations?; and, what form should the organization and management of police department take? If the "hardware approach" diverts research efforts away from these basic issues, and (as it did in the Boston Police Department), diverts attention from more fundamental reform, then instead of being the boom which the Crime Commission contemplated, sophisticated technology might actually end up seriously impairing the quality of police service.

FOOTNOTES FOR CHAPTER FOUR

1. See Schon, Beyond the Stable State, p. 81

2. Everett Rogers, Diffusion of Innovations (The Macmillan Co., 1962).

3. Kenneth E. Knight, "A Descriptive Model of the Intra-Firm Innovation Process," Journal of Business, XL, No. 4 (October, 1967), p. 481.

4. Victor A. Thompson, Bureaucracy and Innovation, pp.22-26.

5. Selwyn W. Becker and Thomas L. Whisler, "The Innovative Organization: A Selective View of Current Theory and Research," Journal of Business, XL, No. 4 (October, 1967) p. 465.

6. U.S. Commission on Law Enforcement and the Administration of Justice, Task Force Report on Science and Technology, p. 11.

7. For instance, in its 1972 Comprehensive Criminal Justice Plan, the Committee on Law Enforcement and Administration of Criminal Justice stated that "an operational automated dispatching system has been designed (for the Boston Police Department) to take incoming service requests and relay these requests to a patrol unit" (p. C-61). This description of the CCS is, of course, extremely inaccurate.

8. See, for instance, the U.S. Congressional Committee on Government Operations, Block Grant Programs of the Law Enforcement Assistance Administration (Washington: U.S. Government Printing Office, 1972), House Report No. 92-1072; U.S. Senate Committee on the Judiciary, Federal Assistance to Law Enforcement: Hearings before the Subcommittee on Criminal Laws and Proceudres, (Washington: Printed for the Committee on the Judiciary by the U.S. Government Printing Office, June 24, 25; July 7, 30, 1970): Kent W. Colton, "Use of Computers by Police," Urban Data Service, Vol. 4, No. 4 (April 1972); National Urban Coalition, Law and Disorder II: State Planning and Programming Under Title I of the Omnibus Crime Control and Safe Streets Act of 1968 (Washington: The National Urban Coalition, 1972).

9. Colton.

FOOTNOTES FOR CHAPTER FOUR, continued

10. Ibid.

11. Committee on Government Operations, pp. 17-60

12. On the subject of collusion between the patrol force and the dispatchers, see Jonathan Rubinstein, City Police (New York: Farrar, Strauss, and Giroux, 1973) 402 p.

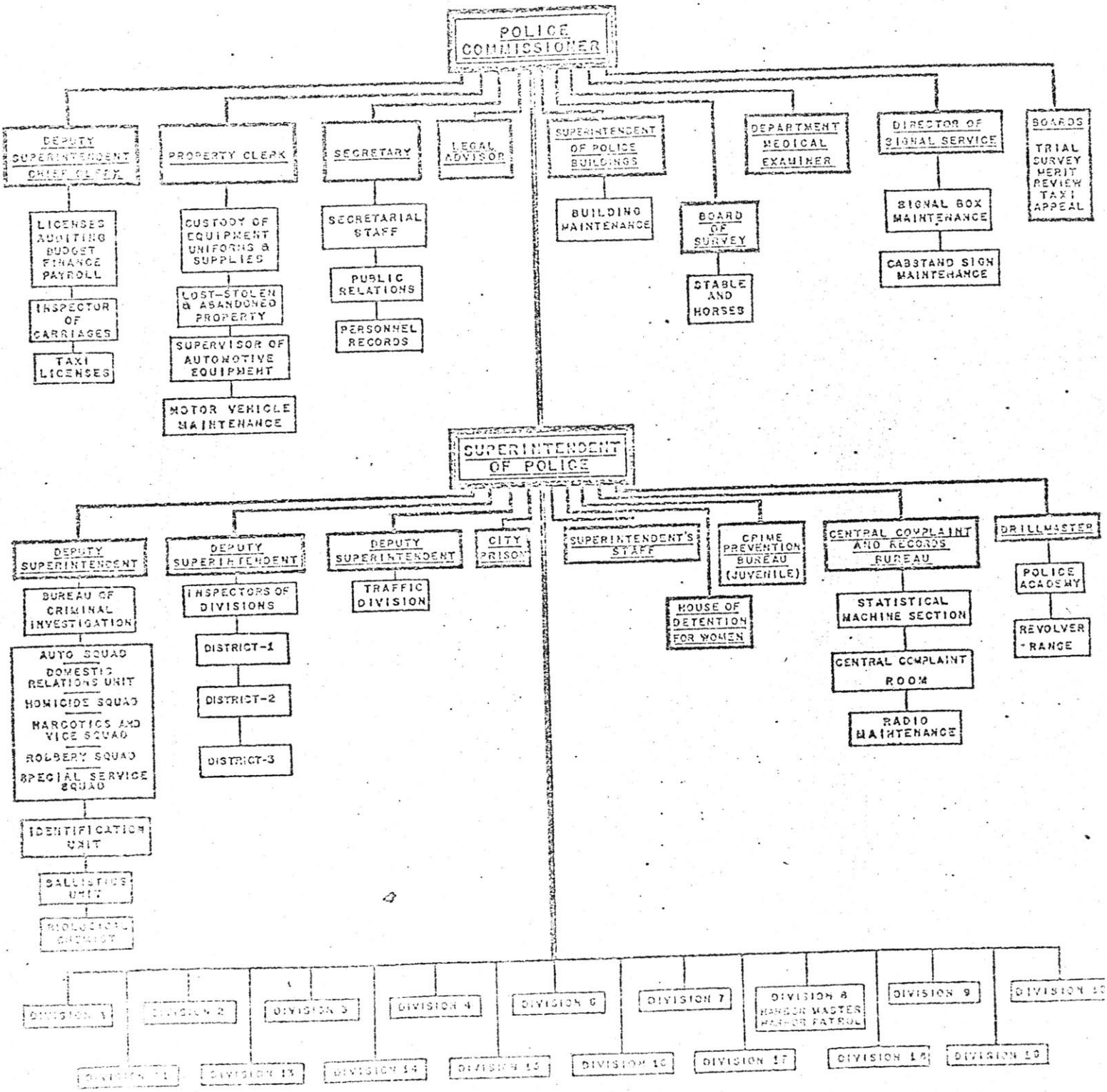
13. Interview with Oakland police sargeant (Oakland, California), August 1974.

APPENDIX A

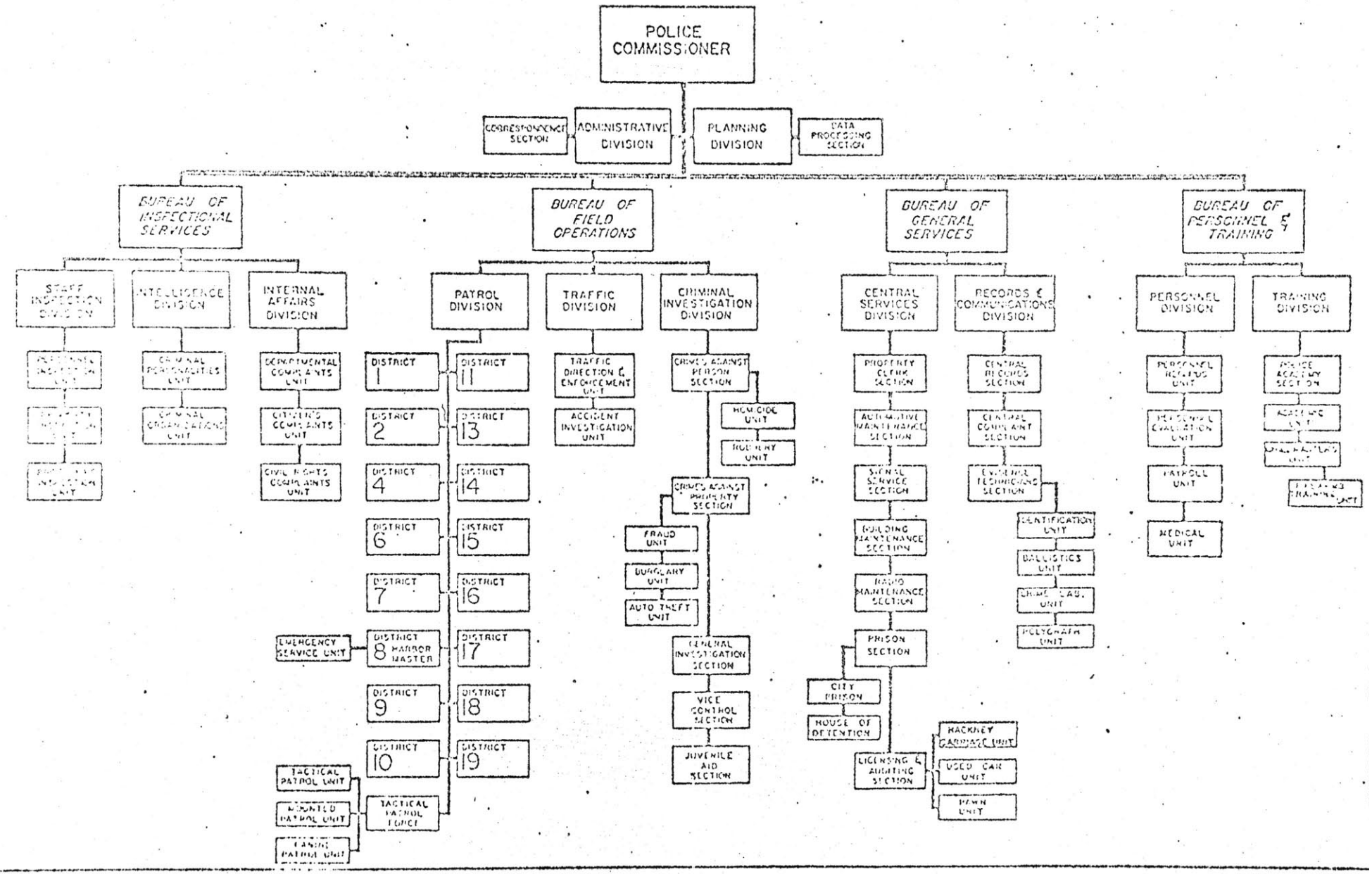
Appendix A contains the following:

- a chart of the organizational structure of the BPD as of 1961
- " " " " " " " " " " " 1963
- " " " " " " " " " " " 1969
- " " " " " " " " " " " 1972
- " " " " " " " " " " " 1973
- " " " " " " " " " " " 1974
- a description of the responsibilities of the major subunits of the Department.

ORGANIZATION OF THE BOSTON POLICE DEPARTMENT : 1961



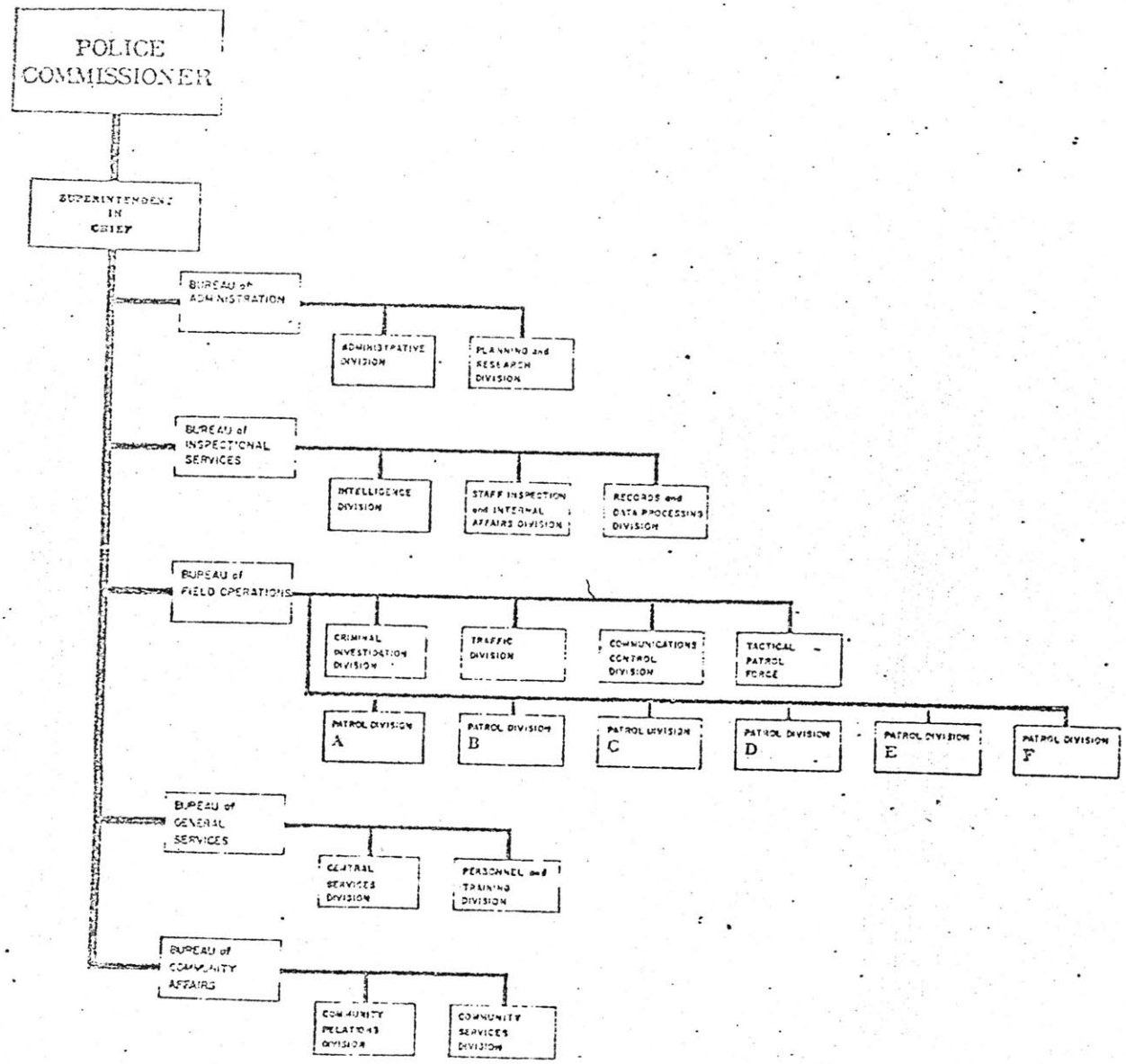
ORGANIZATION OF THE BOSTON POLICE DEPARTMENT: 1963



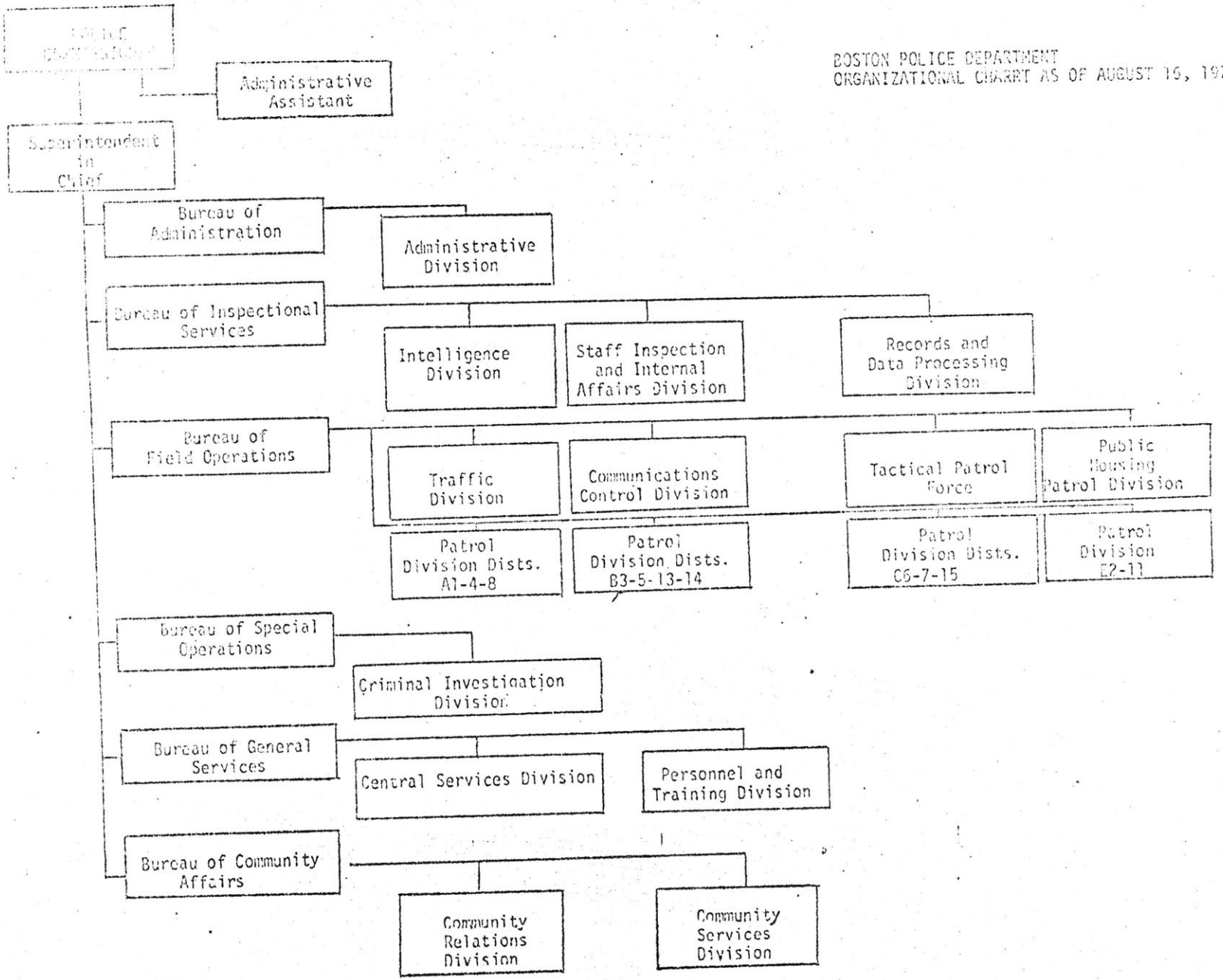
BOSTON POLICE DEPARTMENT

ORGANIZATIONAL STRUCTURE

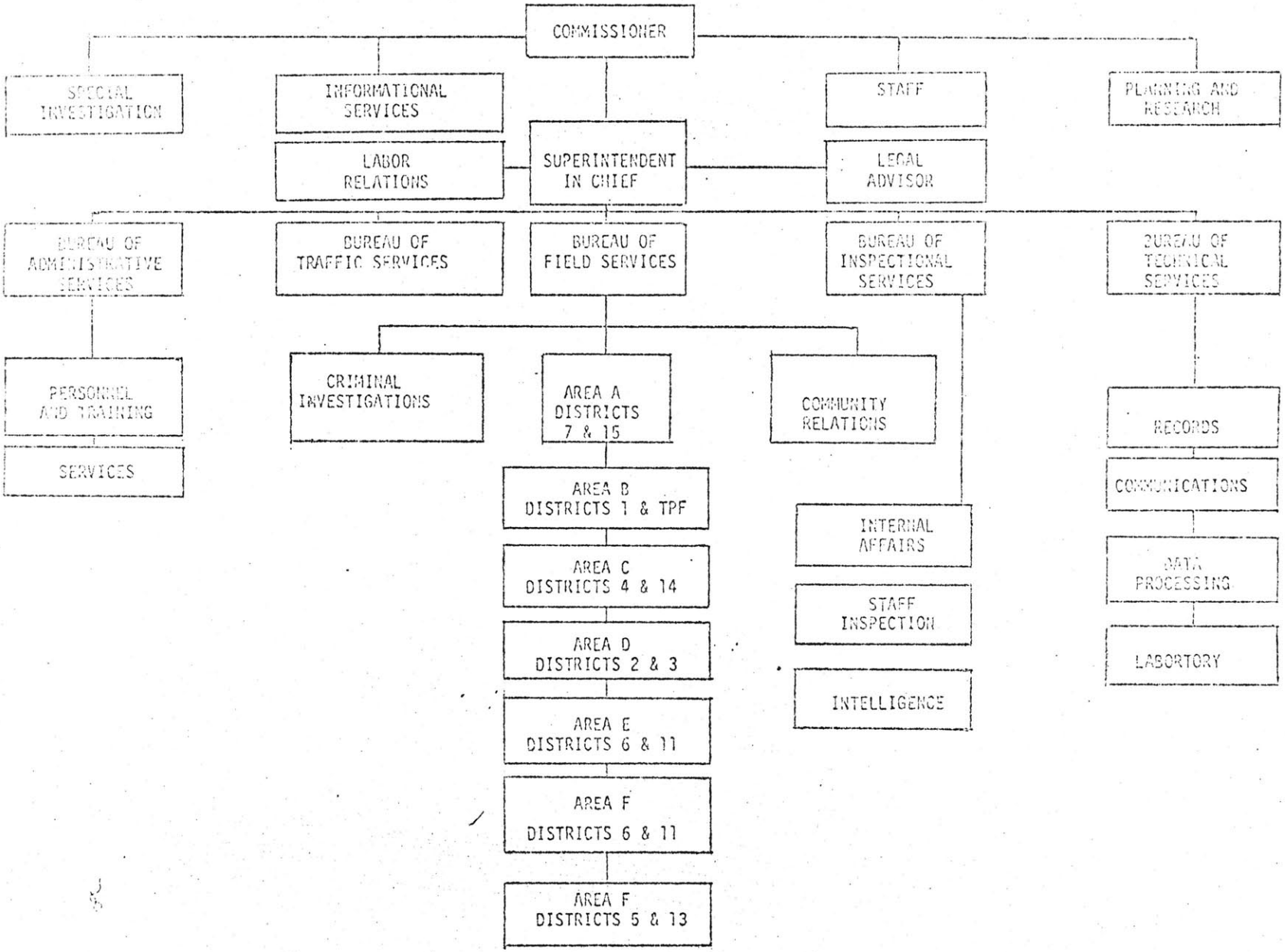
DECEMBER 31, 1969



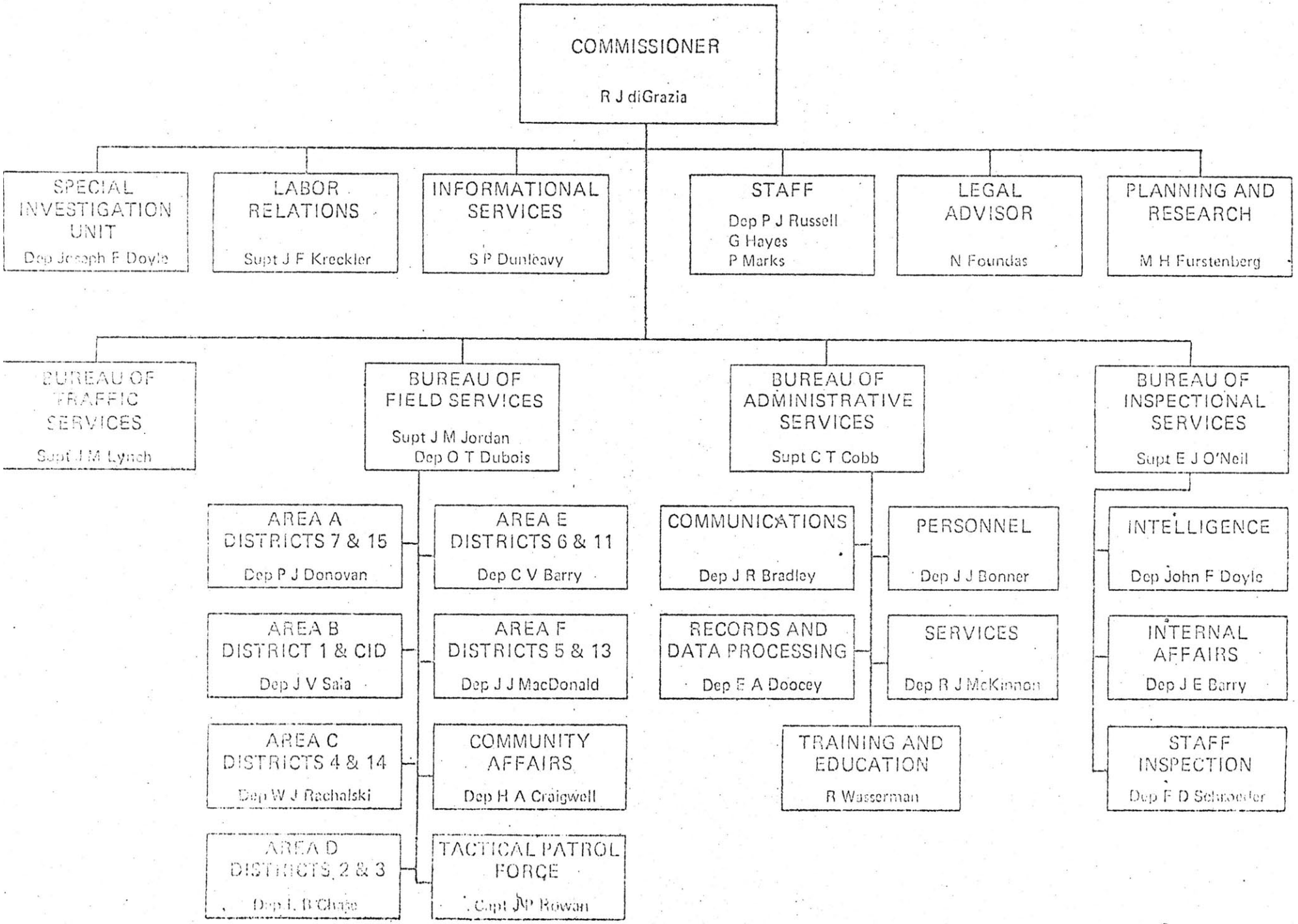
BOSTON POLICE DEPARTMENT
ORGANIZATIONAL CHART AS OF AUGUST 16, 1972



ORGANIZATIONAL CHART AS OF APRIL 12, 1973



ORGANIZATIONAL STRUCTURE OF THE BOSTON POLICE



ORGANIZATIONAL STRUCTURE

The Boston Police Department consists of the following major units:

Police Commissioner

Authorized by law to control the government, administration, disposition and discipline of the department to make all rules and regulations for its efficiency.

POLICE COMMISSIONER'S OFFICE

Consists of the Commissioner's personal staff, and the following special units:

Staff

Responsible for the operation of the Commissioner's Office, including receiving the public, receiving and processing all official departmental correspondence, and such other functions as assigned by the Police Commissioner.

Special Investigation Unit

Responsible for providing the Commissioner with complete and accurate information on the maintenance of departmental integrity and for monitoring the efforts and effectiveness of all police commanders to combat corruption. Solicits information relative to illegal activities to determine if corruption is involved.

Informational Services

Responsible for maintaining an effective liaison with the news media so the public may be informed of police operations. Develops and coordinates programs to keep all members of the department informed on police activities. Plans and coordinates special events concerning the Police Department and its members. Supervises the production of a department newspaper, and conducts a speakers' bureau.

Planning and Research Division

Responsible for the development of operational, long-range, and contingency plans. Works with other staff and line police units in identifying optimum operations strategies. Also coordinates Federal and State grants.

Legal Affairs Office

Provides legal advice and guidance to members of the police force concerning operational decisions such as arrest, warrants, searches and case prosecution and represents the department in selected civil litigations.

Labor Relations Office

Represents the Police Commissioner at employee collective bargaining negotiations, conferences and grievance discussions and assists the Police Commissioner in development of labor relations and negotiations policy.

BUREAU OF ADMINISTRATIVE SERVICES

Personnel Division

Develops departmental personnel policy and coordinates processing of new personnel including background investigations. Also prepares payroll and maintains payroll records and personnel files.

Training Division

Responsible for training and developing standards for recruitment, selection and training. Coordinates departmental career development programs and develops and presents in service and specialized training programs.

Services Division

Responsible for the preparation of the department's budget and the processing of all bills incurred by the department and coordinates the acquisition, inventory, maintenance and disposition of all department property, equipment and supplies and custody of all lost, stolen and abandoned property in the custody of the police.

BUREAU OF INSPECTIONAL SERVICES

Internal Affairs Division

Responsible for the supervision of the departmental disciplinary process and investigates, or has investigated, incidents of police misconduct.

Staff Inspection Division

Responsible for the evaluation of departmental performance toward primary goals, assesses relevance and adequacy of rules and regulations, recommending changes when necessary.

Intelligence Division

Responsible for keeping the department informed of the activities of known criminals in the city and coordinating the gathering and evaluation of information concerning persons or organizations engated in illegal activity.

BUREAU OF ADMINISTRATIVE SERVICES

Communications Division

Responsible for the operation of departmental communications system, including radio, teletype and signal service.

Records and Data Processing Divisions

Responsible for the management, maintenance and control of all incident records, criminal records, arrest records, active warrants of arrest and other department records and responsible for the operation of the departmental processing of information through data processing systems.

BUREAU OF TRAFFIC SERVICES

Responsible for the direction and control of vehicular traffic and enforcement of traffic rules and regulations.

BUREAU OF FIELD SERVICES

The city is divided into six major area commands. They are:

Area A -- District 7 - East Boston
District 15 - Charlestown

Area B -- District 1 - Downtown & North End
Criminal Investigation Division Public Housing Patrol House of Detention

Area C -- District 4 - South End & Back Bay
District 14 - Brighton & Allston

Area D --	District 2	-	Roxbury
	District 3	-	Mattapan
Area E --	District 6	-	South Boston
	District 11	-	Dorchester
Area F --	District 5	-	Hyde Park, West Roxbury and Roslindale
	District 13	-	Jamaica Plain

Each area commander exercises complete administrative and field supervision in the area under his direction and control, being responsible for the actions of all personnel assigned to his command and for providing all police services to the citizens in his area.

Community Relations Division

Responsible for the coordination of the departmental community relations activities.

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