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# CAREER DEVELOPMENT OF MANAGERS AND EXECUTIVES: A COMPENDIUM

Ambrose Klotz

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# CAREER DEVELOPMENT OF MANAGERS AND EXECUTIVES: A COMPENDIUM

Ambrose Klotz

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#### ABSTRACT

This paper summarizes selective material found in the professional literature which collectively suggest a variety of characteristics that would be desirable in an employee development program for Managerial and executive levels.

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SUMMARY

*7 This paper summarizes selected materials in the professional literature*

There is clear evidence that the mix of required skills and knowledge is quite different for workers, supervisors, managers, and executives. Consequently, development occurs at all stages in career progression. Strong indicators suggest that guided on-the-job experience is more valuable than classroom experience in developing an understanding of work processes, although the classroom is a preferred forum for the development of conceptual skills. Technological obsolescence of senior personnel is a common concern across the broad spectrum of private and public enterprise. Empirical evidence strongly suggests that, given an adequate experience background, certain personal characteristics are primary determinants of performance excellence. Other studies suggest that achievement is related to positive and supportive attitudes. While breadth of experience is often highly regarded, personnel practices tend to foster specialization. Serious attention to issues relating to employee development, over a broad spectrum of American public and private enterprises and over a very long period of time, clearly indicates that there is no preferred, most effective, or "best" program design. Each enterprise must design its own program to fit its own environment.

## INTRODUCTION

There is an abundance of professional literature that relates to the career development of managers and executives. Moreover, an extensive bibliography can be assembled for almost any past period. The issues and concerns relating to managerial development are common to many large enterprises, and they are persistent. This paper selectively reviews this information, integrating general industry and government research material.

It is emphasized that this is a selective review of the literature. Material directly referenced was chosen because it was considered to be most pertinent to issues perceived to be present in the development of managers and executives. Some material of equal value is not referenced because it duplicates observations already discussed. Still other material forms an important background, but is not referenced because it is less relevant to career development of managers and executives.

While the individual is responsible for maintaining and enhancing personal competence, organization design and managerial practice should facilitate development of a motivated and up-to-date work force. Thompson and Dalton [1] cite an informed opinion that likens each person to a one-man business with a production function (doing today's job well), a marketing function (selling one's services), and an R&D function (developing capabilities that will be marketable in the future). There is some evidence that as corporate interests in career development are reflected in more institutionalized development acti-

vity, some individuals reduce their attention to self-development and rely more on employer initiatives on their behalf [2]. The recommended corrective action is to formulate self-development objectives from constructive criticisms in performance appraisals and other evaluative feedback.

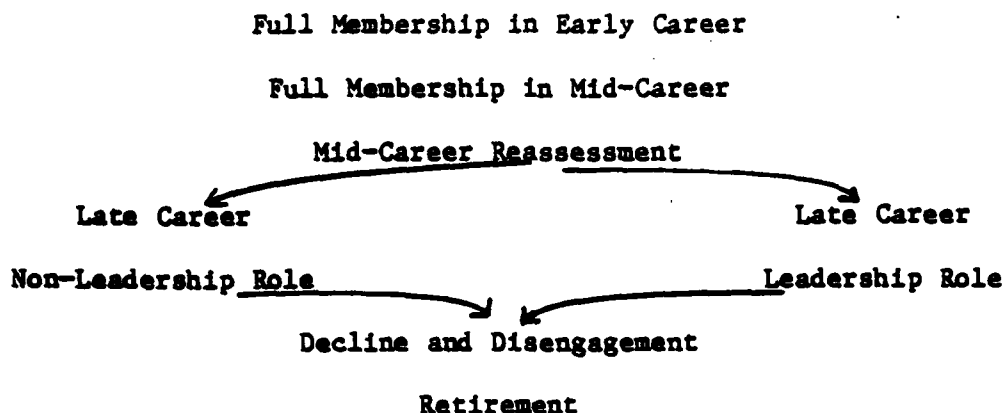
Although many persons consider and report themselves as being ambitious, there is often a notable lack of personal involvement in preparing themselves for promotion. Farnsworth reports that managers who aspire to superior positions often fail to appreciate the true extent of skill and knowledge these jobs require. "Technical specialists in particular are prone to overvalue the importance of sheer technical expertise in a managerial job, and to ignore the qualities of leadership, administrative ability, and rigorous financial control" (ibid.). Unless more accurately targeted, self-development under such circumstances is likely to be ineffective.

A related problem is the reluctance of some to accept greater responsibility—to actively avoid career development, self-directed or otherwise. Most writings on this issue cite organizational impediments, assuming that the work ethic will not produce persons content to remain in non-growth jobs. Avoidance of responsibility is described as failure to delegate effectively, responding when a subordinate finds it easier to ask the boss to resolve a difficult problem, fear of criticism, lack of necessary information or resources, excessive current work, lack of self-confidence, and inadequate incentives. Employee development acti-

vity that will effectively "reach" such persons requires prior action to correct whatever organizational impediments are identified [3].

While individual occupational growth is conceded to be an individual responsibility, it is also acknowledged that organizations should be designed so that exercise of that responsibility will flourish for those so inclined [1].

A frequent observation is that there are several distinct stages or phases of a career. Progression can be arrested at any stage for a variety of reasons, but employee development activity should recognize the entire range. In its simplest definition, career progression is described as a gradual increase in personal discretion in doing one's work, later including supervision over others, and subsequently including influence on the operations of the enterprise [4]. Thompson and Dalton [1] suggest that there are four distinct phases in a career: an apprentice stage (where some can remain for most of their careers) characterized by routine work and close supervision; an independent worker stage characterized by a defined area of personal responsibility with expanding relationships; a "mentor stage" characterized by multiple areas of responsibility, increased breadth of substantive skills, and involvement in the development of others; and a fourth stage in which one has significant influence over the affairs of the enterprise as idea innovator, internal entrepreneur, or upper level manager. An even more complete concept of a career is developed by Pyle as a branching process [15]:



This concept is attractive because of its realistic recognition that some will remain in non-leadership roles and all will eventually "disengage." While there is abundant material in the literature about employee development for career advancement, there is a dearth of informed guidance on employer development activity that does not prepare one for promotion. Information is also scant on maintaining motivation and productivity in the disengagement period. These issues are generally addressed only obliquely in material on coping with midlife crises, stress, and disappointment. In any event, it appears prudent that employee development activity recognize that distinct phases do exist in career progression. It would be sensitive and humanitarian at least, and probably valuable in terms of employee productivity, to consider the "stuck" and declining career as well.

**ROLE DIFFERENTIATION**

One point that enjoys an absolutely unanimous conclusion is that promotion to any supervisory position brings into play new requirements

for skills of leadership and communication, and a need to attend to development of human resources. It is generally acknowledged that the best worker is not necessarily the best candidate for a supervisory position because the supervisory job requires attributes different from the worker job, yet worker excellence is typically the basis for promotion to supervisory positions. This change is typically abrupt and often traumatic, not only because former colleagues suddenly become subordinates, but because the new supervisor is often poorly prepared for the new role [6].

It has long been considered that a similarly distinct interface exists between supervisory and managerial positions. An emerging theme suggests that an equivalent interface exists between managerial and executive positions [7,8].

The excellent performer at any level becomes a prime candidate for promotion to the next level, even though work in the lower level position may not have prepared one for what is a quite different role. Ashton et al. [9] characterize judgments about past performance (for example, excellence) as appraisal, and judgments about future performance as career development. Since promotion across the worker/supervisor, supervisor/manager, and manager/executive interfaces involves transition to a new role, with its own knowledge and skill requirements, typically different from the requirements of the former role, there is a need for career development activity at every stage of career progression. Often authors don't distinguish among these interfaces and use identical terminology in addressing them. Pomerleau

describes the different interfaces as comprising "a bewildering variety of forms and innumerable philosophies and approaches" [10].

The literature generally emphasizes role differentiation as an essential element of employee development. Role differentiation makes a distinction between workers, supervisors, managers, and executives. While the terminology varies widely, a consensus in the literature appears to be that executives give force and direction to corporate effort by formulating broad business strategies, developing general policy statements and organizational objectives, establishing the major division of resources among mission areas, authorizing the initiation of significant effort, and monitoring its execution. Managers plan and direct the effort to achieve these objectives, generally controlling the allocation of resources in the execution process. Supervisors direct and control the work done by individuals, although in many occupations the work is performed with considerable independence [4,6,7].

Role differentiation is significant because the mix of knowledge and skills required is somewhat different in each capacity, with obvious implications in employee development. Supervisory skills emphasize leadership theories, human motivation, and work scheduling in addition to whatever knowledge of the work process is required. Managerial activity emphasizes coordinative and liaison skills, analytic techniques, and a deeper appreciation of organizational mission and objectives. Executive duties require skill in balancing multiple forces, strategic thinking, conceptualization, personal flexibility, consultation, and dealing in hostile environments. The transition from one

role to another is analogous of that from worker to supervisor: excellence of personal performance is a primary reference for candidacy, but does not necessarily predict success in the different role. Different knowledge and skills are required, and to the degree that they are not possessed, they must be acquired. Thus, employee development is necessary at all levels.

The general implication is that these transitions are vertical changes in an organization's hierarchy of management, but this is not universally true. In very large and complex organizations the division between manager and executive is often unclear. Further, in some high-technology firms, maintaining an adequate technological base (including individual engineers and scientists compensated at executive levels) is considered necessary for survival of the enterprise, and corporate resources are devoted to ensure that the technological base does not atrophy [11].

#### MAINTAINING TECHNOLOGICAL CURRENCY

Maintenance of a technological base immediately raises two related issues, each with an extensive literature: avoiding occupational obsolescence (that is, maintaining "currency") and extending career opportunities for engineers and scientists outside management functions (that is, the "two-track" system).

Occupational obsolescence is characterized as a phenomenon prevalent in a rapidly advancing technology in which practitioners are so occupied in day-to-day duties that they have no time to maintain an

intellectual currency with their occupation. A 1976 study suggests, however, that the cause of obsolescence might be organizational rather than technological [6]. Based on interviews with 200 professionals in large R&D organizations, this study found that the high performers were exposed to no more formal education experiences than others, that high or low performance of an individual tended to be consistent over time, and that negative performance was more correlated with uncomplicated and unchallenging assignments than with age. The study concluded that, if allowed, a maturing career will pass through four stages of progressively broad and varied assignments, and performance will decline if the career is arrested or impeded somewhere along the line. The study also concluded that less effective organizations have built-in obstacles to career maturation. The study suggests that representative obstacles include "devaluation of technical contribution" by a reward system that provides most recognition to managers, and concern with product exclusive of career considerations, as when one is "trapped" in a successful project for so long that experience growth is hampered.

While providing a valuable insight into career progression, the conclusions of the cited study are, in degree, unrealistic. Organizations are still roughly pyramidal in structure—there are successively fewer positions in higher echelons. Not everyone will advance to the CEO position or to second or third echelons. Some significant number of careers will mature at middle levels, and it is imprudent to accept that performance of this large group will inevitably decline. Nor are there unlimited numbers of separate efforts at the technological frontier to

fully challenge each person in a work force with a complex task at the cutting edge of technology.

#### TWO-TRACK CAREER SYSTEMS

The highest levels of career opportunities exist in managerial positions, and are severely limited for all specialist occupations in non-managerial roles. If an engineer, scientist, or other specialist aspires to a senior level, the surest route is via a management position. This "drain" of engineers has been decried for several decades and is considered a current problem as well [11]. Industry response, where response exists at all, has taken two forms: "stretching" engineering talent by augmentation with sub-professional and clerical assistance, and creation of very senior, non-managerial technical positions, as is done in IBM and Xerox. Both responses would require additional high-level position authorizations adding to overhead. Giving serious consideration to extending a two-track system is nonetheless appropriate, and not just because of a shortage of engineers and scientists. As will be discussed in a later section, there is some evidence that managers, engineers, and scientists all have different value systems. Converting one who is dedicated to "doing" engineering and science functions into a senior level manager not only removes one from a direct technical contribution, but also presents the need to restructure personal values—a notoriously difficult task.

There is evidence that the drain of engineers out of a technological discipline is accompanied by an even more subtle influence than

simply moving into "management." As the business environment becomes increasingly more complex, additional staff specialists positions tend to be created. Both line and staff positions lead "to the top." However, the line official works in a more arduous environment. Miners [12] suggests that staff officials enjoy most of the recognition and rewards afforded line officials, exercise considerable influence if only because of consistent support by the head office, are in a position to critique actions taken by line officials, and share little if any accountability for achieving the line objectives. Miners opines that "only a fool will choose the tougher route." To the extent that Miners' hypothesis is accurate, not only are engineers and scientists migrating out of their technologies, but they aren't even moving into mission-achieving line managementships.

#### DIRECTIONS OF CAREER PROGRESSION

Miners' hypothesis should not be lightly dismissed, for there is much evidence that careers progress in response to perceived and available opportunities rather than in accordance with a grand scheme (whether individual or corporate). One study involved 60 managers occupying positions of considerable responsibility. Only half held a distinct concept of "career" and had a record of career progression showing evidence of an intended sequence of jobs. The remainder did not have a unified career concept, believing that a career is the cumulative effect of "a series of opportunities to be exploited" [13]. White characterized careers as the movement of managers among positions by a

"stochastic process" (in the vernacular, proceeding by guesswork), "a chaotic by-product of the path of a large system" in which only vacancies (not individuals or positions) moved freely [14]. There are alternatives to this roulette method, all requiring considerable data about persons, positions, programs, and projections. Union Oil has for some years tried to bring more deliberate decision to managing careers by an annually-updated plan of succession [15]. The military services have a substantially, equivalent process in their annual "slating" of personnel.

It is reasonable to assume that those who aspire to advancement--engineers and scientists included--will fish in areas where they perceive opportunities. In the absence of a two-track system, these opportunities will develop in managerial and staff support positions almost exclusively. Without some degree of hands-on control, opportunities will develop as happenstances of fate--the result of individual decisions to retire or apply (and be selected for) other vacant positions--and those who aspire to advancement will use their own best judgment regarding the direction and degree to which they should prepare themselves for promotion. Changing that situation requires some degree of deliberate management attention.

Within the generally uncontrolled process of career changes, Twigger suggests that three distinct types of changes take place, which may not even be apparent to the person or the employer [13]. Lateral moves may cross organizational or functional boundaries, but are at an essentially equivalent hierarchical level (often mistakenly equated with

"grade"). Lateral moves present opportunity to broaden one's functional experience. Hierarchical moves cross a boundary that distinguishes the vertical or hierarchical structure of the enterprise, and are perceived by all to be a promotion, whether or not accompanied by an increase in grade or compensation. Hierarchical moves expand experience along the worker-supervisor-manager-executive continuum. Radial moves cross an "inclusion" boundary and result in a significant change in access to the influence centers of the enterprise. Radial moves may be combined with lateral or hierarchical moves and may be into or out of areas where corporate policy and plans are formulated. Twigger's work suggests that a program that seeks to channel employee development activities might include consideration of the type of position change as well, since lateral, hierarchical, and radial moves have an ascending significance to the enterprise.

#### DIFFERING MOTIVATIONS AND PROPENSITIES

While it is commonly found that technical professionals frequently ascend to positions of leadership, there is some evidence to suggest that, as distinct groups, managers, engineers, and scientists may not share similar personal value systems (including personal orientations in a work setting). The implication is that, if an enterprise wants to foster advancement of technical professionals to managerial positions, it should try to select those with a managerial bent, or to emphasize managerial values in developing those chosen for management positions.

A 1972 combined NASA/NIH study [16] found that the transition of scientists and engineers to management involved two basic changes: a significant increase in business functions, and a greatly enlarged scope of these functions. Together these changes create a critical need to master the organizational system, by which is meant the body of goals, policies, and procedures as well as liaison with persons of widely divergent backgrounds and interests. This study concluded that technical specialists generally could be grouped in three categories: those that had a personal interest and flair for management and whose personal motivation pattern mirrored that of other technical specialists but was not as deeply rooted, those who had initial reluctance to move into management but who later found it satisfying, and those for whom management held continuing negative appeal.

A second significant study followed the careers of 44 graduates of the Sloan School of Management at M.I.T. The study included an intensive personal appraisal of each person in 1961 and again some 12 years later. The study concluded that individuals in the group had developed "career anchors," defined as a syndrome of attitudes and values that "anchors" one to a career. The anchor reflects a synthesis of what the individual considers worthwhile relative to highly personal perceptions of what society considers worthwhile—a common and persistent theme of a personal source of motivation. This study proposed that career anchors can be categorized in five groups:

- o Managerial competence. A desired competence in the complex set of managerial activities (interpersonal, analytical, emotional); stimulated by high responsibility.
- o Technical-functional competence. Motivated by the challenge of work in the chosen specialty; little interest in being promoted out of the function.
- o Organizational or community security. A desire to stabilize the total life situation; tends to accept the organization's definition of one's career.
- o Creativity. An abiding desire to create something that can be identified as one's own, within the structure of business operations.
- o Autonomy and independence. Nurture a personal sense of freedom by rejecting situations perceived to be restrictive, irrational, or intrusive of one's personal life.

This study reported from the point of view of individuals, concluding that people tend to gravitate to work situations that are consistent with their own value systems [17].

A third related study was based on the hypothesis that "in this age of swift and dramatic change, flexibility is the crucial characteristic for any organization that would remain viable; and it is only through its members that an organization can remain organic or adaptive"[18]. Conducted in the setting of an R&D organization, the study concluded

that engineers, scientists, and managers do not value the same things. The study presented a very large number of value concepts to engineers, scientists, and managers in a major Federal research facility. These value concepts were grouped by ideas associated with people (for example, responsibility, loyalty), personal goals of individuals (for example, challenge, job satisfaction), concepts associated with the organization (for example, technical leadership, management's objectives), and concepts referring to research and engineering (for example, scientific objectivity, tangible benefits of R&D). An original list of 214 value concepts was distilled to 82 through an iterative consensual process. The study then identified some 40 operative goals of the organizations (those that formed the basis for daily decisions), and asked the three groups to rank the value concepts relative to the operative goals. Of the 84 value concepts, only 6 were placed in the upper quartile by all three groups. Managers and scientists agreed on another six in the upper quartile, none of which were so placed by engineers, and managers and engineers only agreed on one as being in the upper quartile. Engineers and scientists placed only four in common in the upper quartile. Each group had other concepts that they had uniquely placed in the upper quartile of worth. The study did not draw any generalizations from this data other than the conclusion that the three groups at that one laboratory did not share similar value systems.

Results of a Navy study [19] appear to be consistent with these findings. The Navy study focused on the identification and relative criticality of managerial duties and responsibilities, indicating that

engineers and scientists spend less time than those in other occupations on managerial duties and that, except for technical and professional development, laboratory respondents consider most managerial responsibilities to be less critical than do other respondents.

It is clear that an employee development program in a technically-oriented organization should accommodate the fact of life that occupational differences are reflected in different mind-sets, and that different developmental experiences are appropriate. Indeed, available data also suggests that selection processes should also be responsive to these influences.

#### MOBILITY

The issue of mobility is frequently found in the literature, either as a direct issue or indirectly as related to acquiring breadth and variety of experience. Occupational mobility involves moving to different kinds of work and may or may require a geographic move.

#### Occupational Mobility

Breadth of experience is generally considered to be a highly valued attribute for senior managers and executives, yet for reasons previously suggested, many persons tend to remain in a rather narrow band of experience. One researcher found that among senior executives studied, many had worked for only one company and for the study group as a whole, the average number of firms worked for throughout an extended career was only 2.9. The same researcher believes, however, that young profes-

sionals regard large companies as "industrial universities" and will move from one to another on a three year basis to achieve simultaneous advancement and variety of experience they believe will be valuable later [4].

Variety of experience is often achieved by interfunctional job changes within one's enterprise. This kind of change most typically is employee initiated and not planned by management [13,14], but there are firms that provide positive planning and control of this aspect of employment. IBM, for example, has a policy of job rotation across functions, in each case being responsive to a specified purpose [20].

One researcher [13] found an interesting twist in the consequences of managers unilaterally changing jobs. Several respondents in that study had experienced job changes that they considered redundant (that is, non-growth), as a result of which they were stimulated to assess their career status and develop new plans to achieve personal ambitions.

McGonigal [21] recommends periodic job changes as a means to prevent undesirable results of the "closed" nature of Federal employment in the middle grades. McGonigal found a very low voluntary quit rate at GS-11 and higher, noting that having achieved grade GS-11, employees are likely to remain in the Federal service until retirement. McGonigal reports that most Federal employees plateau in the GS-11 to GS-14 range, and that they perceive little relationship between formal development programs and promotion. Periodic job rotation is suggested as a means to prevent diminished job interest and productivity.

Pyle [10] noted the tendency for fairly rapid promotion to the middle grades, concluding that if occupational mobility is to occur at all, it should be targeted to those levels. He sees one societal and two systemic barriers to mid-career change however. As a society, we are becoming less mobile; geographic mobility will be addressed in the next sequence. The two systemic barriers are perceived as a lack of career planning information, and a managers' preference for specialized experience. The first of these has been previously discussed: there is very little authoritative information (that is, information issued by management and backed up by actual personnel changes) about what is valued in terms of personal qualifications enhancement.

The second systemic impediment is less apparent. Pyle suggests that as vacancies occur, managers who are assessing candidates put most value on specialized experience. Other factors being equal, the candidate with the most pertinent specialized experience is more likely to be selected. Two driving influences are managers' desires to get the "best qualified," and the personnel process which perpetuates the value of specialization. The result is the same in any event: a systemic tendency to breed specialization in a way that is inconsistent with a desire to develop broadly experienced senior managers and executives.

#### Geographic Mobility

The issue of geographical mobility can be directly related to perceived career opportunities, the economics of a geographical move, a

general societal reduction in mobility, and the impact on family and community ties.

Americans are becoming less mobile, to such an extent that the subject is being reported in the popular press [22]. Individuals are placing more value on existing life styles and avocations, moves are becoming alarmingly expensive, and individuals are becoming less willing to make sacrifices to reach senior levels. In a survey of 3,640 executives in the five echelons below the position of chief executive, two thirds stated that their current positions were the highest levels to which they aspired. Further, many firms have decentralized their operations, reducing the need for geographic moves to headquarters.

Significant also is the perception that one cannot break even financially in a geographic move. Allowed expenses do not compensate for actual cash outlays, and even a higher salary, if the move means a promotion, does not make up the difference.

Of major significance is the influence of a move on families. With more two-career families, it is difficult to arrange a move that will not damage one of the careers, and often the enhancement of the other is not viewed as sufficient offset. Attachments to community social structures and schools are often highly valued and difficult to give up. If, as is most often the case, it is the husband who is considered for a job change, the wife is faced with a virtual abandonment of all non-family resources. "Suddenly he's the only one you know well, and heaven help you if the marriage isn't good." [23]

Reluctance to move geographically is apparently a fact of life that will continue.

#### METHODOLOGY

To this point, this paper has discussed general characteristics of employee development programs. There is considerable literature material on the methodology of employee development and training as well. Among the most significant is a study of executive development in 69 firms considered by Dunn's Review to be among the best managed of American firms [24]. The study consisted of a survey review of 59 and an in-depth review of 10 firms. The study found no two firms having identical programs; widely varying approaches and philosophies exist. Some promoted from within; others did not. Some promoted into management jobs based solely on past performance; others did not consider past performance to be a valid predictor of management potential. Some programs were highly centralized. Some used common development patterns; others were individualized. While the study concluded that there was no one best approach, all were successful and had several characteristics in common:

- o The most valuable development of experience is considered to occur on the job in progressively more responsible assignments.

- o Employee development included formal training, usually through in-house programs conducted at least in part by company personnel.
- o Development is considered to be greatly enhanced by coaching from the immediate supervisor in a series of guided experiences.
- o Job rotation is frequently used to add breadth to present abilities.
- o Management development is viewed from a fairly narrow perspective, particularly at the lower levels ("how to" training); at the upper levels, distinction is made between training (work-related skills) and management development (of one's general store of knowledge).
- o Although all support enrollment in advanced degree programs, out-of-house seminars were infrequent; the preference is for in-house programs typically led by in-house officials and keyed to company requirements.
- o Each considers the development of subordinates to be an integral element of a manager's job and is reflected in managers' performance appraisals.
- o Self development or initiative in seeking development opportunities is highly regarded, being viewed as a

commitment to improvement and indicating self-starting motivation.

The study also identified clear trends:

- o There is a tendency away from general-purpose programs and toward programs designed to develop specific attributes which have been identified as required in various levels and functions.
- o There is decreasing reliance on out-of-company programs.
- o Single forms of instruction are giving way to mixed-mode learning formats.
- o Advancement is based on assessment of managerial potential as well as past performance.
- o Individuals are involved in career planning, seeking to match company plans for an employee with that person's aspirations and rate of development, particularly in job rotations and mobility assignments.
- o People, facility, and money resources are being committed to the development programs.
- o Participation in university programs is primarily at the top management level, because the population is too small to make in-house programs cost effective.

These findings are extremely consistent with other reports. Academic course work is not highly regarded as preparation for in-house positions except at executive levels, and then only when emphasizing conceptual skills [4,13]. On-the-job experience, including rotational assignments, is considered the most effective means of developing managerial and executive skills as a means of developing breadth [1,13,21]. Coaching, whether or not structured in a mentor relationship, is seen as a way to accelerate and magnify the "value received" of on-the-job experience [4,13,14,25]. Course work is less effective if generalized, and more effective if designed to specific specialized skills [8,26] and if distinctly different for supervisors, managers, and executives [6,8,24]. Course work taught by in-house practicing managers and executives is highly regarded [4,13,20]. Personal involvement in one's continuing career development decisions is viewed not only as desirable, but as a prerequisite for commitment [2,4,8,14,27], and it is more likely to be achieved if company policies and needs are publicized [13]. Collectively, these statements can be accepted with confidence as representing the current conventional wisdom regarding employee development principles.

#### CHARACTERISTICS OF THE POPULATION

For many years, personal characteristics (that is, personality traits and behavior patterns) were the focus of research in the behavioral sciences related to the working environment. Interest in this sphere has waned over the past decade, primarily because such elements

could not be directly related to job requirements and thus provided no support for personnel actions challenged on an EEO basis. There appears to be renewed interest, however, and one finds increasing material in the professional literature.

One of the most pertinent recent studies [28] is a 1981 effort by the Office of Personnel Management (OPM). The study sought to identify generic competencies associated with effective performance in Senior Executive Service (SES) positions. OPM selected six agencies with a large number of such positions (each had more than 100) from which clearly superior managers could be identified. OPM selected 31 who were acknowledged by their colleagues to be exemplary managers, who had extended government service, and who had general (rather than highly technical) backgrounds. Using critical-incident analysis of actual performance, OPM sought to identify specific behaviors that contribute to job success.

The study group had several experiential characteristics that distinguished them from the general population:

- o They had achieved executive status (above GS-15) at an earlier average age—39.6 as compared to 43.1 for SES personnel generally.
- o They had slightly higher education levels.
- o They had been more mobile: more occupational mobility, more inter-agency experience, and more non-government experience.

More significantly, the OPM study identified a high degree of commonality in specific competencies, which tended to cluster in four groups of behaviors and attitudes.

1. The exemplary SES officials view their role as embracing a broad perspective in most situations.

- o They typically consider factors beyond the immediate context of an issue, based on an understanding of fundamental relationships.
- o They have a "strategic focus," taking near-term actions that reinforce and support longer term strategy, that integrate other action, and that are in the context of other organization objectives; they communicate this strategic concern to others.
- o They display initiative. They are concerned with the effects of inaction; they make a deliberate effort to forecast events and anticipate problems; they seize opportunities to create or mold situations into preferred directions; they develop stand-by action plans that are put into effect as opportunities develop; they teach subordinates to similarly adopt a "proactive anticipatory stance."
- o They are sensitive to, maintain, and extend formal and informal contacts within and outside their agency. These networks are built up not only from job-related liaison,

but in informal exchanges and contacts from prior jobs. These contacts facilitate resolution of issues, build power bases of support, and build "debts and credits of information and insight" that can be called on as needed.

As a result of these behavioral characteristics, these SES officials place specific issues in a broader context, develop and choose among alternatives where actions yield spin-off benefits, and exert some degree of control over events.

2. The exemplary SES officials display sensitivity and skill in interpersonal dynamics with an attendant high capacity to stimulate individual and group action to desired directions.

- o They are sensitive to interpersonal dynamics, identifying predispositions, biases, strengths and weaknesses (including their own) and being sensitive to the reactions of key persons who can influence or be affected by a course of action. The network of contacts is used in building up this knowledge base.
- o They are supportive of subordinates, recognize excellence, provide for subordinates' visibility by their participation, are accessible and open in exchanges, give authority to execute tasks without close supervision, and attend to their career development.

- o They display a high order of ability to manage diverse interests, getting groups to achieve agreement or consensus, in large measure reflecting their sensitivity to group dynamics.

3. The superior executives are skilled in focusing on specific problems.

- o They actively manage information in dealing with specific problems. They extensively develop relevant information, sort out essential facts from less relevant data, "do their homework" in absorbing information, verify the information through their staffs or their networks, all leading to a sound basis for decisions.
- o They remain openminded and flexible, consider a range of alternatives, and are sensitive to changing circumstances that might alter or cause reconsideration of a given course.
- o They are skilled in "marketing"—packaging ideas and communicating points of view persuasively.
- o They practice "helicopter management," clearly delegating responsibility, monitoring and maintaining awareness of progress ("hovering"), and re-entering to provide direction when necessary.

4. The superior executives have personal characteristics that complement their facilitating behavior patterns.

- o They are willing to take risks and to make decisions when there is no strong evidence favoring one course over another; they also recognize that adverse comment may result from risk-taking behavior.
- o They have great concern over maintaining their own integrity and that of their subordinates, and firmly believe in a cause-effect relationship between personal integrity and credibility. A corollary tendency is the willingness to take a stand on an issue, even if it might cause dispute, embarrassment, or other difficulty. Further, they believe that personal integrity and credibility magnify persuasive powers.
- o They are persistent in pursuing important goals, a characteristic that is reinforced by their strategic focus.
- o Self-reflection and private reviews of experiences provide superior SES officials with a high degree of self-awareness and confidence.

The superior executives display other patterns that are less universal but still noticeably common.

- o They are action oriented, rarely waiting for problems to emerge, and convey a sense of constant movement and progress.
- o They have a high capacity to shift roles between primary leadership, monitoring, auditing, quality checking, and "fixing."
- o They give credit with ease, let others take credit for their own work, and do not take credit for others' work. As a corollary, they accumulate "credits" or "IOUs" of good will that are later redeemable in the form of advice and assistance.
- o They maintain a sense of humor.

The findings of the OPM study are quite consistent with the results of other work [3,10,26,29]). Most significantly, the OPM study identified common personal characteristics that are coincident with superior executive performance and that are independent of substantive functional or program knowledge, suggesting that development programs should emphasize enhancing these components of personal style.

A related study was conducted by the Navy as a spin-off of implementing the Civil Service Reform Act [30]. Initiated in October 1981, the study tapped a stratified sample of GS/GM-13/14/15 personnel to identify, codify, and otherwise analyze managerial duties, responsibilities, and tasks. The analysis concludes that:

- o GM-13,14,15 supervisors have similar views of managerial tasks.
- o Non-supervisors put less emphasis on utilization of human resources.
- o The scope, frequency, and importance of managerial tasks increase with the amount of supervisory responsibilities.
- o Reported frequency and importance of managerial tasks increase with grade level.
- o GS-15 and SES perceptions have similar patterns.
- o GS-15 and SES spend more time in meetings than GS-13/14s.
- o GS-13/14s spend more time than GS-15/SES in writing correspondence, personal development, doing the unit's work, and doing special projects for the supervisor.
- o Laboratory respondents are at the low end of the continuum in all categories except technical and professional development.
- o Engineers and scientists spend less time than those in other occupations in writing correspondence and making decisions, and they spend more time doing the unit's work.

In total, this Navy study leads to conclusions that accord well with the scene found in the private sector, and it verifies that industrial principles of effective employee development have utility in the Federal Service.

#### ASSESSMENT CENTERS

Two additional issues that appeared with considerable frequency, either directly as main topics or as peripheral issues relating to one or more themes already discussed. These issues are employee appraisal as related to development and growth and job-related stress.

The use of performance appraisal as the basis for employee development has great logical appeal, and indeed is a common practice. Quite often, however, appraisal of one's current performance of current duties is considered to be a separate process from appraising one's potential for other duties with a consequent attempt to prepare for those other duties.

The issue takes on critical importance when addressing senior managerial and executive positions. The "assessment center" has achieved some popularity as a means of identifying specific areas for individual training and development, and as a basis for selection to senior positions.

The concept of the assessment center was developed during World War II, and was used extensively in selecting personnel for key military and intelligence positions. It has had spotty use in the Federal service [31] and had had increasing (and accelerating) acceptance in the private

sector. Ten years ago there were no more than 100 corporate assessment centers; today there are more than 2,000 [32].

The assessment center is a two- or three-day series of intensive exercises, each patterned after actual job demands experienced by managers and executives. The series includes both individual and group exercises, often requiring participants to address highly critical issues with short deadlines, and placing participants in competitive group situations. Participants' performance is closely monitored and evaluated by several observers who are trained in observation and evaluation techniques appropriate to the assessment center process. Assessors are typically senior officials of the enterprise. The assessment center period is extremely demanding for both participants and assessors, and the latter must typically spend an extra day to complete the evaluations.

The assessment center is the nearest available alternative to an actual on-the-job demonstration of managerial and executive ability. Participants have opportunity to demonstrate their managerial potential without regard to their past experience. This is seen as a major advantage since experience-based selection processes may bypass the high-potential candidate whose background does not closely match the pre-described pattern on which selection decisions are based.

Assessment centers are expensive. Dollar costs are significant, especially if the salaries of participants and assessors are considered. They are expensive in terms of lost time as well. Both participants and assessors are off the job during the assessment period, and

the assessors are off the job for the period of training also. Few senior managers, who are the most desirable assessors, are willing to devote the necessary time and effort.

Assessment centers are used in two quite different ways. Using the process as a basis for selection to critical positions is the original purpose, and it continues to be the most predominant application. Recently, however, the assessment center has been also used to diagnose individual strengths and weaknesses, and it thus becomes the basis for individual development programs. A little-used but potential application is to select "fast track" candidates for general development without specified target positions.

#### JOB-RELATED STRESS

The issue of job-related stress appears indirectly in a great many contexts and is the central theme in a number of articles. Stress is an unavoidable (and indeed is considered by some to be an essential) element of managerial performance. Excessive stress, and continuous stress uncompensated by adequate coping behavior, can lead to reduced personal effectiveness, is seriously believed to be the cause of a wide variety of diseases, and in extreme form can cause emotional difficulties characterized as "burn-out" [33]. Leading causes of stress include heavy workload with concomitant time pressures, a perceived imbalance between what must be done and what the manager would like to accomplish, a demanding organizational climate, and inadequate feedback on job performance.

In many situations, severe stress simply cannot be avoided. There are techniques, however, that can be taught to cope with this reality. It is appropriate that these techniques be considered as an element of an employee development program.

#### CONCLUSIONS

A synthesis of a literature search leads to the following conclusions.

- o There is no preferred, most effective, or "best" program design. Each enterprise must design its own program to its own environment.
- o There is compelling evidence that executive skills are distinct from managerial skills.
- o A varied experience pattern is more likely to prepare one for effective executive performance than is a more restricted work history.
- o Personal characteristics, values, and behavior are at least as significant in distinguishing superior executive performance as are program knowledge and variety of experience.
- o Maintaining personal competency is a personal responsibility that is significantly affected by organization and managerial practices.

- o Occupational obsolescence is more directly related to the nature of continuing assignments than to any other influence.
- o Most personal occupational growth occurs from on-the-job experience in progressively more responsible assignments.
- o In-house employee development programs, conducted at least in part by in-house personnel, are generally quite effective.
- o The development of subordinates should be a substantial part of every supervisor's job.
- o An effective employee development program requires corporate resolve backed by resources.
- o Employees tend to prefer geographical stability; achieving mobility requires specific motivation.

#### REFERENCES

- [1] Thompson, Paul H., and Dalton, Gene W., "Are R&D organizations Obsolete?," Harvard Business Review, Nov-Dec 1976, pp 105-116
- [2] Farnsworth, Terry, "How to Develop Yourself," Manage Today, May 1979, pp. 51-56
- [3] Newman, William H., "Overcoming Obstacles to Effective Delegation," The Management Review, Jan 1956, pp. 36-41
- [4] Margerison, Dr. Charles, "Highway to Managerial Success," Personnel Management, Aug 1979, pp. 24-28
- [5] Pyle, David A., "A Study Evaluating Personnel Policies Which Enhance or Inhibit Mid-Career Changes and Motivation of Mid-Level Army Civilians," U.S. Army War College, 8 Jun 1979
- [6] Karp, H. B. "Executive Development for First Line Supervisors," Training/HRD, Aug 1981, pp. 95-98
- [7] Stupak, Dr. Ronald J., "Military Professionals and Civilian Careerists in the Department of Defense," Air University Review, July/Aug 1981, pp. 68-75
- [8] Levinson, Harry, "Executive Development: What You Need to Know," Training and Development Journal, September 1981, pp. 84-95
- [9] Ashton, David; Braiden, Elizabeth; and Easterly-Smith, Mark, "Auditing Management Development," Management Decision, 16,5, pp. 275-298
- [10] Pomerleau, Raymond, "The State of Management Development in the Federal Service," Public Personnel Management, Jan-Feb 1974, pp. 23-28.
- [11] Hayes, Wm. C., "Engineers Are Too Valuable to Waste," Electrical World, May 1982, editorial
- [12] Miners, Howard, "Managing Down the Line," Management Today, Nov 1978, pp. 67-71
- [13] Twigger, Tony, "The Managerial Career," Management Today, Dec 1978, pp. 55-57
- [14] White, H., "Chains of Opportunity," Harvard University Press, 1970
- [15] Bright, Wm. E., "How One Company Manages its Human Resources," Harvard Business Review, Jan-Feb 1976, pp 81-93

- [16] Bayton, James A., and Chapman, Richard L., "The Transformation of Scientists and Engineers into Managers," National Aeronautics and Space Administration, 1972
- [17] Schein, Edgar H., "Career Anchors and Career Paths: A Panel Study of Management School Graduates," Alfred P. Sloan School of Management, May 1974
- [18] Manley, Roger T. et al., "Research and Development Professionals: An Examination of the Personal Value Systems and Operative Goals of Scientists, Engineers, and Managers in One Government R&D Organization," Air Force Institute of Technology, Sept 1974
- [19] "Identification of Managerial Duties and Responsibilities of Senior Civilian Personnel," Office of the Chief of Naval Operations, Aug 1982 (Unpublished preliminary draft report)
- [20] Liebttag, W. R., "An Outsider's Perception of Government Problems in the Senior Executive Service Program," an unpublished address delivered 24 Oct 1980
- [21] McGonigal, Richard D., "Separation Characteristics of Selected DoD GS-11/18 Employees: Statistics and Implications," Unpublished paper, Jul 1978
- [22] "Why the Nation is Saying 'No' to Moving Around," U.S. News and World Report, 8 Aug 1982, pp. 64-67
- [23] Rink, Janet, "Husbands Promoted, Families Uprooted," The Catholic Digest, May 1982, pp. 87-91
- [24] Dignan, Lester A., "How Well-Managed Organizations Develop Their Executives," Organizational Dynamics, Autumn 1978, pp. 63-80
- [25] Klauss, Dr. Rudi, "Mentors and Senior Advisors for Executive Development," U.S. Office of Personnel Management, Jun 1981
- [26] Rader, Louis T., "Trained and Creative Managers: A Key to Productivity," unpublished paper presented at the Naval Material Command Lecture Series, 19 Feb 1981
- [27] Gilbert, G. Ronald, and Sauter, John V., "The Federal Executive Institute's Executive Development Programs," Public Personnel Management, Nov-Dec 1979, pp. 407-415
- [28] Klauss, Rudi et al., "Senior Executive Service Competencies: a Superior Managers' Model, U.S. Office of Personnel Management, Jul 1981

- [29] Bennet, David, "The Emerging Environment and its Impact on Managers," an unpublished lecture, 1982
- [30] "Duties and Responsibilities of Civilian Managers," Navy Personnel Reach and Development Center, Oct 1982
- [31] Hall, H. L., and Baker, D. B., "An Overview of the Federal Executive Development Program II Assessment Center," Office of Personnel Management, Aug 1976
- [32] "How to Spot the Hotshots," Business Week 8 Oct 1979
- [33] Toffer, Mark H., "Coping With Executive Stress," Air University Review, pp. 54-67

CNA PROFESSIONAL PAPERS - 1978 TO PRESENT\*

- PP 211  
Mizrahi, Maurice M., "On Approximating the Circular Coverage Function," 14 pp., Feb 1978, AD A054 429
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- PP 215  
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Colle, Russell C., "Bibliometric Studies of Scientific Productivity," 17 pp., Mar 78 (Presented at the Annual meeting of the American Society for Information Science held in San Francisco, California, Oct 1976), AD A054 442
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Mizrahi, Maurice M., "Correspondence Rules and Path Integrals," 30 pp., Jun 1978 (Invited paper presented at the CNRS meeting on "Mathematical Problems in Feynman's Path Integrals," Marseille, France, 22-26 May 1978, Published in Springer Verlag Lecture Notes in Physics, 106, 1979), AD A055 536
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Simpson, William R., "A Probabilistic Formulation of Murphy Dynamics as Applied to the Analysis of Operational Research Problems," 18 pp., Dec 1978, AD A063 761
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Sherman, Allan, and Horowitz, Stanley A., "Maintenance Costs of Complex Equipment," 20 pp., Dec 1978 (Published By The American Society of Naval Engineers, Naval Engineers Journal, Vol. 91, No. 6, Dec 1979), AD A071 473
- PP 245  
Simpson, William R., "The Accelerometer Methods of Obtaining Aircraft Performance from Flight Test Data (Dynamic Performance Testing)," 403 pp., Jun 1979, AD A075 226
- PP 246  
Brechling, Frank, "Layoffs and Unemployment Insurance," 35 pp., Feb 1979 (Presented at the NBER Conference on "Low Income Labor Markets," Chicago, Jun 1978), AD A096 629
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- PP 257  
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- PP 258  
Mangel, Marc S., and Thomas, James A., Jr., "Analytical Methods in Search Theory," 86 pp., Nov 1979, AD A077 832
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Glass, David V.; Hsu, In-Ching; Nunn, Walter R.; and Perin, David A., "An Analysis of a Layered Defense Model," 17 pp., Mar 1980, AD A077 833
- PP 260  
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Villa, Carlos L.; Zvijac, David J.; and Ross, John, "Franck-Condon Theory of Chemical Dynamics. VI. Angular Distributions of Reaction Products," 14 pp., Nov 1979 (Reprinted from Journal Chemical Phys. 70(12), 15 Jun 1979), AD A076 287
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- PP 265  
weiniand, Robert G., "War and Peace in the North: Some Political Implications of the Changing Military Situation in Northern Europe," 18 pp., Nov 1979 (Prepared for presentation to the Conference of the Nordic Balance in Perspective: The Changing Military and Political Situation," Center for Strategic and International Studies, Georgetown University, 15-16 Jun 1978), AD A077 838
- PP 266  
Utqoff, Kathleen Classen, and Brechling, Frank, "Taxes and Inflation," 25 pp., Sep 1979, AD A081 194
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weiss, Kenneth G., "The Soviet Involvement in the Ogaden War," 42 pp., Jan 1980 (Presented at the Southern Conference on Slavic Studies in October, 1979), AD A082 219
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Mangel, Marc, "Small Fluctuations in Systems with Multiple Limit Cycles," 19 pp., Mar 1979 (Published in SIAM J. Appl. Math., Vol. 38, No. 2, Feb 1980), AD A086 229
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Mizrabi, Maurice, "A Targeting Problem: Exact vs. Expected-Value Approaches," 23 pp., Apr 1980, AD A085 096
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- PP 283  
Dismukes, Bradford, "Expected Demand for the U.S. Navy to Serve as An Instrument of U.S. Foreign Policy: Thinking About Political and Military Environmental Factors," 30 pp., Apr 1980, AD A085 099
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\*The Graduate School of Management, University of Rochester and the Center for Naval Analyses  
\*\*The Graduate School of Management, University of Rochester
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Remnek, Richard B., "Superpower Security Interests in the Indian Ocean Area," 26 pp., Jun 1980, AD A087 113
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Mizrabi, Maurice M., "On the WKB Approximation to the Propagator for Arbitrary Hamiltonians," 25 pp., Aug 1980 (Published in Journal of Math. Phys., 22(1) Jan 1981), AD A091 307
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- PP 288  
Golman, Walter, "Don't Let Your Slides Flip You: A Painless Guide to Visuals That Really Aid," 28 pp., (revised Aug 1982), AD A092 732
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\*University of Florida

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- PP 293  
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- PP 295  
Roberts, Stephen S., "An Indicator of Informal Empire: Patterns of U.S. Navy Cruising on Overseas Stations, 1869-1897," 40 pp., Sep 1980 (Presented at Fourth Naval History Symposium, US Naval Academy, 26 Oct 1979), AD A091 316
- PP 296  
Dismukes, Bradford, and Petersen, Charles C., "Maritime Factors Affecting Iberian Security," (Factores Maritimos que Afectan la Seguridad Iberica) 14 pp., Oct 1980, AD A092 733
- PP 297 - Classified
- PP 298  
Mizrahi, Maurice M., "A Markov Approach to Large Missile Attacks," 31 pp., Jan 1981, AD A096,199
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Jondrow, James, and Schmidt, Peter,\* "On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function Model," 11 pp., Jan 1981, AD A096 160  
\*Michigan State University
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Jondrow, James M.; Levy, Robert A.; and Hughes, Claire, "Technical Change and Employment in Steel, Autos, Aluminum, and Iron Ore," 17 pp., Mar 1981, AD A099 394
- PP 302  
Jondrow, James M., and Levy, Robert A., "The Effect of Imports on Employment Under Rational Expectations," 19 pp., Apr 1981, AD A099 392
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Thomson, James, "The Rarest Commodity in the Coming Resource Wars," 3 pp., Aug 1981 (Published in the Washington Star, 15 Apr 1981), AD A104 221
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Duffy, Michael K.; Greenwood, Michael J.;\* and McDowell, John M.,\*\* "A Cross-Sectional Model of Annual Interregional Migration or: Employment Growth: Intertemporal Evidence of Structural Change, 1958-1975," 31 pp., Apr 1981, AD A099 393  
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\*\*Arizona State University
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Thomson, James, "Dependence, Risk, and Vulnerability," 43 pp., Jun 1981, AD A102 698
- PP 308  
Mizrahi, M.M., "Correspondence Rules and Path Integrals, 17 pp., Jul 1981, (Published in "Nuovo Cimento B", Vol. 61, 1981), AD A102 699
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Weinland, Robert G., "An (The?) Explanation of the Soviet Invasion of Afghanistan," 44 pp., May 1981, AD A100 422
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\*Northwestern University
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Boves, Marianne, Brechling, Frank P. R.; and Utgoff, Kathleen P. Classen, "An Evaluation of UI Funds," 13 pp., May 1981 (Published in National Commission on Unemployment Compensation's "Unemployment Compensation: Studies and Research," Volume 2, Jul 1980), AD A100 424
- PP 312  
Jondrow, James; Boves, Marianne; and Levy, Robert, "The Optimum Speed Limit," 23 pp., Jul 1983 (Revised), AD A100 425
- PP 313  
Roberts, Stephen S., "The U.S. Navy in the 1980s," 36 pp., Jul 1981, AD A102 696
- PP 314  
Jehn, Christopher; Horowitz, Stanley A.; and Lockman, Robert F., "Examining the Draft Debate," 20 pp., Jul 1981, AD A106 192
- PP 315  
Buck, Ralph V. (Capt., USN), "Le Catastrophe by any other name...", 4 pp., Jul 1981, AD A102 697
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Roberts, Stephen S., "Western European and NATO Navies, 1980," 20 pp., Aug 1981, AD A104 223
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Roberts, Stephen S., "Superpower Naval Crisis Management in the Mediterranean," 35 pp., Aug 1981, AD A104 222
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Vago, Milan N., "Yugoslavia and the Soviet Policy of Force in the Mediterranean Since 1961," 187 pp., Aug 1981

- PP 319  
Smith, Michael W., "Anti-air Warfare Defense of Ships at Sea," 46 pp., Sep 1981 (This talk was delivered at the Naval Warfare System and Technology Conference of the American Institute of Aeronautics and Astronautics in Washington on 12 Dec 1980; in Boston on 20 Jan 1981; and in Los Angeles on 12 Jun 1981.), AD A106 191
- PP 320  
Trost, R. P.; Lurie, Phillip; and Berger, Edward, "A Note on Estimating Continuous Time Decision Models," 15 pp., Sep 1981, AD A106 193
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Duffy, Michael K., and Ladman, Jerry R., "The Simultaneous Determination of Income and Employment in United States--Mexico Border Region Economies," 34 pp., Sep 1981, AD A106 540  
\*Associate Professor of Economics, Arizona State University
- PP 322  
Warner, John T., "Issues in Navy Manpower Research and Policy: An Economist's Perspective," 66 pp., Dec 1981, AD A110 221
- PP 323  
Bosse, Frederick M., "Generation of Correlated Log-Normal Sequences for the Simulation of Clutter Echoes," 33 pp., Dec 1981
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Horowitz, Stanley A., "Quantifying Seapower Readiness," 6 pp., Dec 1981 (Published in Defense Management Journal, Vol. 18, No. 2), AD A110 220
- PP 326  
Roberts, Stephen S., "Western European and NATO Navies, 1981," 27 pp., Jul 1982, AD A118 703
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Hammon, Colin (Capt., USN), and Graham, David R., "Estimation and Analysis of Navy Shipbuilding Program Disruption Costs," 12 pp., Mar 1980, AD A112 514
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Weinland, Robert G., "Northern Waters: Their Strategic Significance," 27 pp., Dec 1980, AD A112 509
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Mangel, Marc, "Applied Mathematicians And Naval Operators," 40 pp., Mar 1982 (Revised), AD A116 598
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Lockman, Robert F., "Alternative Approaches to Attrition Management," 30 pp., Jan 1982, AD A112 510
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Roberts, Stephen S., "The Turkish Straits and the Soviet Navy in the Mediterranean," 15 pp., Mar 1982 (Published in Navy International)
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Jehn, Christopher, "The RDF and Amphibious Warfare," 36 pp., Mar 1982, AD A113 592
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Lee, Lung-Fei,\* and Trost, Robert P., "Estimation of Some Limited Dependent Variable Models with Application to Housing Demand," 26 pp., Jan 1982. (Published in Journal of Econometrics 8 (1978), AD A 112 536  
\*University of Minnesota
- PP 334  
Kenny, Lawrence W.;\* Lee, Lung-Fei;\*\* Maddala, G. S.;\* and Trost R. P., "Returns to College Education: An Investigation of Self-Selection Bias Based on the Project Talent Data," 15 pp., Jan 1982. (Published in International Economic Review, Vol. 20, No. 3, Oct 1979), AD A112 480  
\*University of Florida  
\*\*University of Minnesota
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Lee, Lung-Fei;\* Maddala, G. S.;\*\* and Trost, R.P., "Asymptotic Covariance Matrices of Two-Stage Probit and Two-Stage Tobit Methods for Simultaneous Equations Models with Selectivity," 13 pp., Jan 1982. (Published in Econometrica, Vol. 48, No. 2, Mar 1980), AD A112 483  
\*University of Minnesota  
\*\*University of Florida
- PP 336  
O'Neill, Thomas, "Mobility Fuels for the Navy," 13 pp., Jan 1982. (Accepted for publication in Naval Institute Proceedings), AD A112 511
- PP 337  
Warner, John T., and Goldberg, Matthew S., "The Influence of Non-Pecuniary Factors on Labor Supply: The Case of Navy Enlistment Personnel," 23 pp., Dec 1981, AD A113 094
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Feldman, Paul and Jondrow, James, "American Journal of Political Science," 19 pp., Feb 1984
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Wilson, Desmond P., "The Persian Gulf and the National Interest," 11 pp., Feb 1982, AD A112 505
- PP 340  
Lurie, Phillip; Trost, R. P.; and Berger, Edward, "A Method for Analyzing Multiple Spell Duration Data," 34 pp., Feb 1982, AD A112 504
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Trost, Robert P., and Vogel, Robert C., "Prediction with Pooled Cross-Section and Time-Series Data: Two Case Studies," 6 pp., Feb 1982, AD A112 503  
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Lee, Lung-Fei;\* Maddala, G. S.;\*\* and Trost, R. P., "Testing for Structural Change by D-Methods in Switching Simultaneous Equations Models," 5 pp., Feb 1982, AD A112 482  
\*University of Minnesota  
\*\*University of Florida
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Goldberg, Matthew S., "Projecting the Navy Enlisted Force Level," 9 pp., Feb 1982, AD A112 484
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Fletcher, Jean, W., "Navy Quality of Life and Reenlistment," 13 pp., Nov 1981, AD A113 095

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Urgoff, Kathy, and Thaler, Dick,\* "The Economics of Multi Year Contracting," 47 pp., Mar 1982. (Presented at the 1982 Annual Meeting of the Public Choice Society, San Antonio, Texas, 5-7 Mar 1982), AD A114 732  
\*Cornell University
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Rostker, Bernard, "Selective Service and the All-Volunteer Force," 23 pp., Mar 1982, AD A113 096
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McConnell, James, M., "A Possible Counterforce Role for the Typhoon," 24 pp., Mar 1982, AD A116 601
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Jondrow, James, and Trost, Robert, "An Empirical Study of Production Inefficiency in the Presence of Errors-in-The-Variables," 14 pp., Feb 1982, AD A113 591
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Breckenridge, W. H.,\* and Melvin, O. Kim, "Collisional Intramultiplet Relaxation of Cd(5s5p<sup>2</sup>P<sub>0,1,2</sub>) by Alkane Hydrocarbons," 7 pp., Jul 1981. (Published in Journal of Chemical Physics, 76(4), 15 Feb 1982), AD A113 093  
\*University of Utah, Dept. of Chemistry
- PP 350  
Levin, Marc, "A Method for Increasing the Firepower of Virginia Class Cruisers," 10 pp., Apr 1982. (To be published in U.S. Naval Institute Proceedings), AD A116 602
- PP 351  
Coutre, S. E.;\* Stanford, J. M.; Mavis, J. G.;\* Stevens, P. W.;\* and Wu, T. T.,\* "Possible Three-Dimensional Backbone Folding Around Antibody Combining Site of Immunoglobulin MDPC 167," 18 pp., Apr 1982 (Published in Journal of Theoretical Biology)  
\*Northwestern University, Depts. of Biochemistry & Molecular Biology and Engineering Sciences & Applied Mathematics
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Barfoot, C. Bernard, "Aggregation of Conditional Absorbing Markov Chains," 7 pp., Jun 1982 (Presented to the Sixth European Meeting on Cybernetics and Systems Research, held at the University of Vienna, Apr 1982), AD A116 603
- PP 353  
Barfoot, C. Bernard, "Some Mathematical Methods for Modeling the Performance of a Distributed Data Base System," 18 pp., Jun 1982. (Presented to the International Working Conference on Model Realism, held at Bad Honnek, West Germany, Apr 1982), AD A116 604
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Hall, John V., "Why the Short-War Scenario is Wrong for Naval Planning," 6 pp., Jun 1982., AD A116 702
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Cylke, Steven; Goldberg, Matthew S.; Hogan, Paul; and Mairs, Lee; "Estimation of the Personal Discount Rate: Evidence from Military Reenlistment Decisions," 19 pp., Apr 1982, AD A122 419
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Goldberg, Matthew S., "Discrimination, Nepotism, and Long-Run Wage Differentials," 13 pp., Sep 1982 (Published in Quarterly Journal of Economics, May 1982)
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Akst, George, "Evaluating Tactical Command And Control Systems--A Three-Tiered Approach," 12 pp., Sep 1982, AD 122 478
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Quester, Aline; Fletcher, Jean; and Marcus, Alan; "Veteran Status as a Screening Device: Comment," 26 pp., Aug 1982, AD A123 658
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Horowitz, Stanley A., "Is the Military Budget Out of Balance?," 10 pp., Sep 1982, AD A122 368
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Marcus, A. J., "Personnel Substitution and Navy Aviation Readiness," 35 pp., Oct 1982, AD A122 420
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Quester, Aline, and Nakada, Michael, "The Military's Monopsony Power," 29 pp., Oct 1982, AD A123 657
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Greer, William L., and Bartholomew, James C., (Cdr.USN), "Psychological Aspects of Mine Warfare," 15 pp., Oct 1982 AD A128 244
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Sprull, Nancy L., and Gastwirth, Joseph L.,\* "On the Estimation of the Correlation Coefficient From Grouped Data," 9 pp., Oct 1982, (Published in the Journal of the American Statistical Association, Sep 1982, Vol. 77, No. 379, Theory and Methods Section), AD A122 382  
\*George Washington University, Dept. of Statistics
- PP 367  
Peterson, Charles C., "Soviet Tactics for Warfare at Sea (Two Decades of Upheaval)," 57 pp., Nov 1982
- PP 368  
Weinland, Robert G., "The Evolution of Soviet Requirements for Naval Forces--Solving the Problems of the Early 1960s," 41 pp., Dec 1982, AD A123 655
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Quester, Aline, and Lockman, Robert, "The All-Volunteer Force: A Positive Perspective," 29 pp., Nov 1982, AD A128 279
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Rostker, Bernard D., "Human Resource Models: An Overview," 17 pp., Nov 1982, AD A123 656
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Hurley, William J., "An Overview of Acoustic Analysis," 46 pp., Jan 1983, AD A128 316
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Jacobson, Louis, "Research to Quantify the Effect of Permanent Change of Station Moves on Wives' Wages and Labor Supply," 35 pp., Jan 1983, AD A128 300
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Clay-Mendez, Deborah, and Bails, Ellen, "Balancing Accession and Retention: The Disaggregate Model," 27 pp., Aug 1982

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Feldman, Paul, "Privatizing Airports in Washington, D.C.," 17 pp., Feb. 1983, AD A128 236
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Weiss, Kenneth G., "Power Grows Out of the Barrel of a Gunboat: The U.S. in Sino-Soviet Crises," 136 pp., Dec 1982
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Anger, Thomas E., "The Outlook for Military Operations Research," 14 pp., Apr 1983
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Jondrow, James M.; Chase, David E.; and Gamble, Christopher L., "The Price Differential Between Domestic and Imported Steel," 17 pp., May 1983
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Bells, Ellen, "Balancing Accession and Retention: Cost and Productivity Tradeoffs," 38 pp., Mar 1983
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Levy, Robert A., and Jondrow, James M., "The Adjustment of Employment to Technical Change in the Steel and Auto Industries," 40 pp., May 1983
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Thomas, James A., Jr., and Mangel, Marc, "Properties of Quick Look Passive Localization," 39 pp., Jul 1983
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Goldberg, Matthew S., and Hager, Michael F., "A Comparison of the Prophet and ACOL Force Projection Models," 35 pp., Jun 1981
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Angier, Bruce; Driscoll, Kurt; and Gregory, David, "Manpower Requirements Derivation for the Navy Comprehensive Compensation and Supply Study," 22 pp., Sep 1982
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Angier, Bruce M.; Driscoll, Kurt A.; and Carpenter, Kathy A., "Construction of 'Training Cost Per Graduate' for the Navy Comprehensive Compensation and Supply Study," 67 pp., Nov 1982
- PP 387  
Bells, Ellen, and Clay-Mendez, Deborah, "Balancing Accession and Retention: The Aggregate Model," 20 pp., Jul 1982
- PP 388  
Clay-Mendez, Deborah, "Models of Accession and Retention," 11 pp., Oct 1982
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Clay-Mendez, Deborah, "A Minimum Recruiting Cost Function for Male High School Graduates," 31 pp., Jan 1982
- PP 390  
Clay-Mendez, Deborah, "Documentation for the Recruiting Cost Estimates Utilized in the Navy Comprehensive Compensation and Supply Study," 30 pp., Sep 1982
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Goldberg, Larry, "Summary of Navy Enlisted Supply Study," 11 pp., Jul 1981
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Werner, John T., and Simon, Bruce, "An Empirical Analysis of Pay and Navy Enlisted Retention in the AVF: Preliminary Results," 51 pp., Dec 1979
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McGibney, Donald; Camerini, Ugo; Roberts, Arthur; and Winston, Roland, "Development of an Underwater High Sensitivity Cherenkov Detector: See Urchin," 20 pp., Aug 1983
- PP 395  
Curran, Lawrence and Quester, Aline O., "Retention in the Navy's Selected Reserve: An Analysis Combining Survey and Personnel Data Records," 17 pp., Jun 1984
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Jondrow, James M.; Brechling, Frank; and Marcus, Alan; "Older Workers in the Market for Part-Time Employment," 34 pp., Aug 1983
- PP 398  
Levy, Robert A.; Boves, Marianne; and Jondrow, James M., "Technical Change and Employment in the Steel, Auto, Aluminum, Coal, and Iron Ore Industries," 25 pp., Sep 1983
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Roberts, Stephen, "Western European and NATO Navies," 23 pp., Nov 1982
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Laird, Robbin F., "French Nuclear Forces in the 1980s and 1990s," 37 pp., Aug 1983
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Laird, Robbin F., "The French Strategic Dilemma," 41 pp., Mar 1984
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Marcus, Alan, and Quester, Aline, "Measuring the Productivity of First Term Navy Enlistees," 30 pp., Apr 1984
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Weinland, Robert G., "Soviet Strategy and the Objectives of Their Naval Presence in the Mediterranean," 44 pp., May 1984 (Published as Giacomo, Luciani (ed.), The Mediterranean Region: Economic Interdependence and the Future of Society, (London & Canberra/New York: Croom-Helm/St. Martin's Press 1984, pp. 267-291)
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Horowitz, Stan, "Skill Mix, Experience and Readiness," 12 pp., Oct 1983

PP 412

McConnell, James M., "The Interacting Evolution of Soviet and American Military Doctrines," 119 pp., Sep 1980

PP 413

Quester, Ailee O. and Sicilia, Anne S., "Naval Reserve Forces Throughout the World," 23 pp., Jun 1984

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Nickel, Ronald H. and Tolle, Jon W., "A Sequential Quadratic Programming Algorithm For Solving Large, Sparse Nonlinear Programs," 143 pp., May 1984

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