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The Alumni Publication of the
Graduate School of
Industrial Administration

WILLIAM LARIMER MELLON, FOUNDER

Carnegie-Mellon University

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Contents

SURVEY: GSIA'S SPRING MANAGEMENT CONFERENCE

The following questionnaire has been designed to give us an idea of your attitude towards the type of general management conference the School has held each Spring.

1.	Have you *ever* attended a GSIA Spring Management Conference?	Y	N	NA
2.	Did you receive *notice* of this year's Conference?	Y	N	NA
3.	Did you receive sufficient *reminders?*	Y	N	NA
4.	Did you receive sufficient *advance* notice?	Y	N	NA
5.	Was the *program format* normally of interest to you?	Y	N	NA
6.	Is Friday the best day for you to attend?	Y	N	NA
7.	Would you prefer a Saturday Conference?	Y	N	NA
8.	Is *cost* a factor in your decision?	Y	N	NA
9.	Is Pittsburgh too distant for such an event?	Y	N	NA

10. Your comments: _____

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nents and ideas. Please
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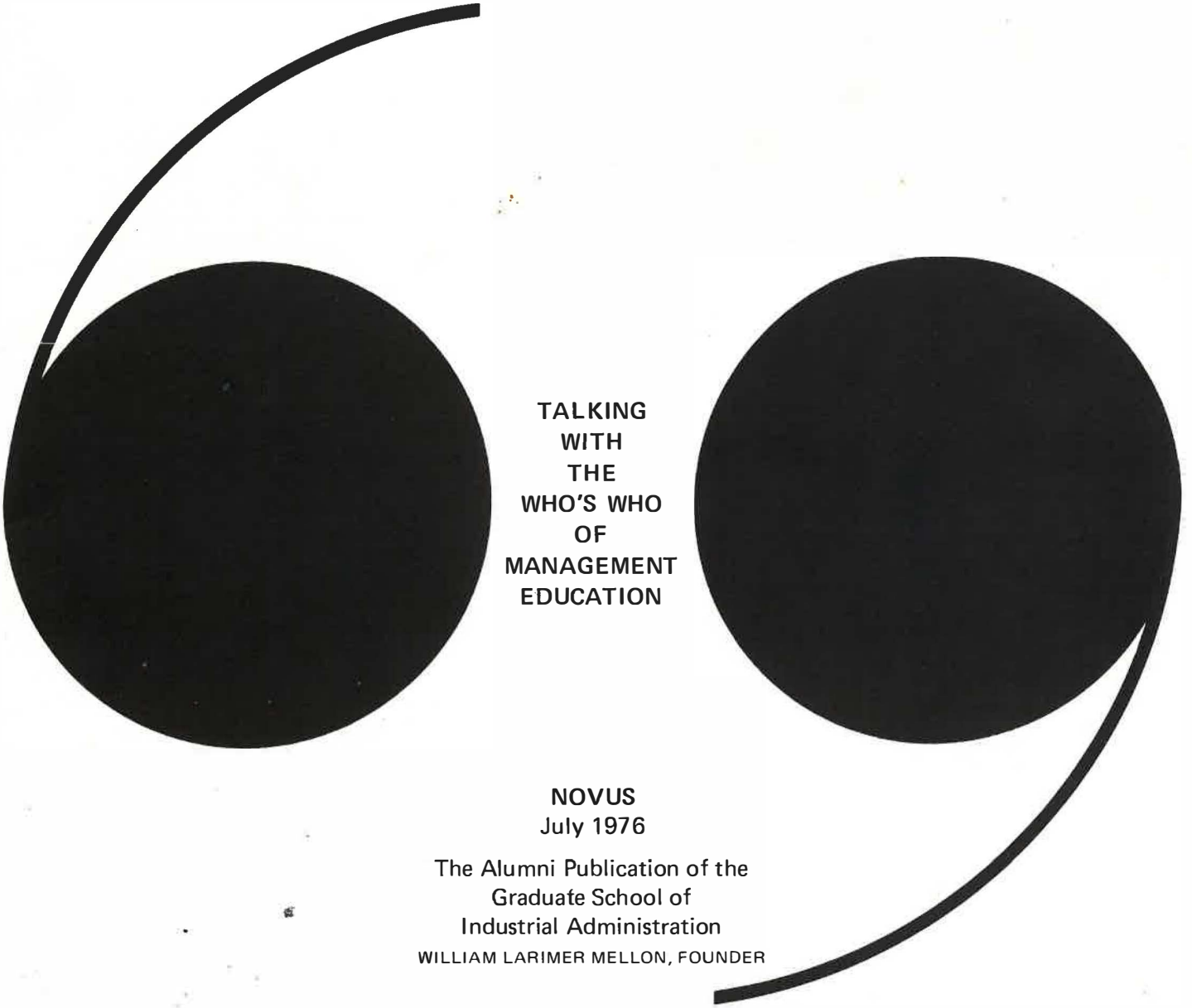

TALKING WITH THE WHO'S WHO OF MANAGEMENT EDUCATION

NOVUS
July 1976

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Graduate School of
Industrial Administration
WILLIAM LARIMER MELLON, FOUNDER

Message from the Dean

From its inception, GSIA has prided itself on its willingness and capacity to innovate in professional management education. Over the years, it has taken the lead in the application of quantitative analysis to the functional areas of management. The GSIA Management Game has been the proto-type and benchmark for similar pedagogical devices elsewhere. And GSIA faculty pioneered in the application of the behavioral sciences to the theory of the firm.

It is easy to assert a tradition of innovation while the practice itself withers away. However, this has not been the case in GSIA. Two years ago, the School initiated an experimental program in Self-Paced Learning (SPL). Under this approach, the course material is organized in a sequence of discrete modules which the individual student masters at his own pace. The faculty is available for individual consultations and tutoring is provided by second-year M.S. students. The student may take the full time allotted for the course or may accelerate its completion, depending upon his or her ability and efforts. The SPL method was initially used in the mathematics and operations research course and this year was extended to the first two courses in the statistics sequence. At the same time, the methodology has been changed to permit the individual student discretion in the set of modules which he can select to fulfill the course requirements. In this manner, the very concept of a "course" is changed and "Self-Paced Learning" moves toward "Self-Managed Learning." These steps have been taken under the leadership of Professor Gerald Thompson with the extensive assistance of Professors Richard, Bowman, Raviv, and Jeroslow.

Earlier this year, a description of the SPL/SML program was entered in a national competition to review innovations in management education. The competition was sponsored by Western Electric and administered by the American Assembly of Collegiate Schools of Business. When the smoke had cleared, GSIA's entry had been declared the unanimous first choice of the selection committee. Professor Thompson and the other faculty members who participated in this project deserve special recognition and thanks. We also are grateful to the alumni whose contributions helped to make the new SPL Center in GSIA possible. Self-congratulations are always a risky and vain business, but they seem fully warranted in this case.

Arnold R. Weber

"Talking With the Who's Who of Management Education"

CONTENTS

Introduction

Just over twenty-five years ago the Graduate School of Industrial Administration of Carnegie-Mellon University (then Carnegie Institute of Technology) was established as a startlingly bold and innovative experiment in graduate business education. One of its goals, apart from the training of managers and researchers, was to introduce analytic techniques into the business environment and to legitimize their use in management decision processes. In its short history the school has gained international renown as a pioneer in mathematical analysis of business problems, in incorporating Economics and the Behavioral Sciences into a business curriculum, and as one of the earliest advocates of management's use of the computer. Through the years the school has also become a supplier of deans for a number of the nation's well known business schools.

An Extraordinary Revolution

These twenty five years have seen an extraordinary revolution in business education and in the view of George Leland Bach, GSIA's first dean and now Frank E. Buck Professor of Economics and Public Policy at Stanford University, the history of American education encompasses only one other development comparable to the revolution in business education where so much that is important happened so fast. That, Bach believes, was the development of medical education after the Flexner Report about the turn of the century. He lists four elements that have made the crucial difference between a successful revolution and just a so-so one. Speaking for business education in general, Bach feels that *first* the intellectual standards for faculty members have been dramatically raised. The *second* critical component in the revolution was the parallel dramatic increase in the intellectual and general abilities of business school students. The *third* element was the greatly increased emphasis on research and on doctoral programs in business schools. Says Bach, "I suppose if I stood for anything in the days that I was dean it was for intellectual excellence and for research." The *fourth* element he felt was to come to a reasonably clear conception of the role of a professional school.

Dealing With Change

Always keenly sensitive to the idea of change, Bach is convinced that the main teaching problem is the development of flexible, learning, general-management problem solvers. The main job, he says, is to train people for an uncertain world, in which they will have to keep on learning for themselves and for those problems to which we simply don't know the answers today. "We can't teach students the answers to many of tomorrow's problems. What we can, and must do," says Bach, "is to teach them problem solving skills, especially for dealing with the unstructured, messy problems; and flexibility in approaching new situations."

It is interesting and instructive, of course, to examine how Lee Bach and others at GSIA were able to develop a style of management education that achieved very remarkable success. But in a sense what was revolutionary at one time is commonplace now with most business schools having incorporated into their own curricula many of the things that the GSIA philosophy advocated. Because times change, it also becomes necessary to examine what propositions were suitable twenty five years ago but may not be so now.

Troublesome Disciples

Even the notion of analytically oriented managers is not without criticism. Harold J. Leavitt who holds the Walter

Kenneth Kilpatrick Professorship in Organization Behavior and Psychology at Stanford, and who was earlier professor at GSIA, believes that in "recent years a certain disenchantment has arisen with the hard-nosed, number-oriented emphasis in managerial decision making." Leavitt argues that, "there is something not so much wrong as limited and incomplete about the whole analytical style of thought that has pervaded Western management for the last hundred years." What causes concern to Leavitt is that "The Method" encourages a cult where members see in it not only capacity to solve problems that could not be solved before but also the means to outrun less well-trained competitors; this causes alternative methods to atrophy and even be denigrated. Leavitt denies that the implications of his advice are anti-analytic. "For the analytic, the empirical, the systematic mind has long since proved itself as a productive and effective mind in moving us from guess to knowledge, from uncertainty to control, from inefficient small organizations to efficient large ones. The gamey, power oriented uses of The Method are mostly an unintended by-product. We must not throw out the discipline with its more troublesome disciples." While it could hardly be claimed that GSIA fostered the "troublesome disciple" rather than the "discipline" — indeed Lee Bach and Herb Simon are themselves personifications of the "Renaissance Man" and always deliberately strove for balance in the curriculum and teaching — the issue will certainly concern business educators and students alike, for the essence of any business school's goals is to train people who will be competent *and effective;* and Leavitt says there exist dangers concerning the latter. He observes that "Managers have valued such analytic thinking in themselves and others for a long time. One thing that seems new is the computer-assisted emergence of context-free analytic virtuosity as something to be valued in itself, largely independent of experience, wisdom, or deep knowledge about specific problems. Over the last decade the promise of great analytic skill has earned high starting salaries for MBA's and awe (along with hostility) from less skilled old-timers. What is relatively new is the emergence of rather large numbers of young managers who believe (and whose bosses believe) that they can successfully tackle any problem, anywhere, because they are equipped with modern analytic tools and skills. But as most managers have discovered, the hotshot young analyst does not always live up to his billing."[1]

Focussing on the Future

The vitality and excitement that has characterized top notch business schools has in large part been due to their focus on the future and on the untried rather than the slow-to-change academic traditions of the past. Now, in 1976, the challenge is the next twenty-five years.

To learn more about what the critical issues and concerns in the next quarter century of business education will be and where the emphasis will be, NOVUS sought the views of some of the most eminent individuals in American business education today. We talked with *Lee Bach* at Stanford, in Chicago with *Dean Rosett* at the Graduate School of Business of the University of Chicago, in Boston with *Dean Fouraker* of the Harvard Business School, in New Haven with *Dean Donaldson* of the School of Organization and Management of Yale University and, closer home, with *Dean Weber* and *Herb Simon.* During the talks an entire range of issues, pertaining to the education of managers, was covered. In the pages that follow, their views make fascinating reading and bring to us a perspective not usually available.

We are grateful to these gentlemen for very generously giving us their valuable time and the opportunity to share their views. As schools across the nation speculate on the challenges that face them during the rest of this century, these views will undoubtedly serve as powerful stimulants.

[1] Leavitt, H.J., "Beyond the Analytic Manager" (Stanford Business School Alumni Bulletin, Reprinted from *California Management Review,* Vol. XVII, No. 3).

TALKING WITH THE WHO'S WHO OF MANAGEMENT EDUCATION

Redefining the Goal and Approach of Business Schools

A Shift in Emphasis

One of the most far reaching elements of the revolution that Lee Bach talked about was the altered perception of what business schools ought to be doing. As the emphasis shifted from familiarizing students with current practice to preparing them for a life long career in a changing environment, pedagogical emphasis has also shifted to the fundamentals of business phenomena and to discovering general theoretical principles. At the same time that technical developments received greater attention the danger of getting caught up in them grew. Always an advocate for balance, Lee Bach talks about this danger.

Problem Solvers Not Technicians

BACH: The world of tomorrow is at least as uncertain as it was twenty-five years ago — if anything, more so. That means it would be a very serious mistake to think that we have a set of answers or particular techniques for tomorrow's problems. The moral is very much the same as it was then. We must recognize the fact of continuous change — that problems will be different tomorrow so we must train people to become general purpose problem solvers, equipped with the analytical tools they need, and with some experience in applying those tools to different problems.

If we want to train managers we are going to have to train flexible problem solvers, not technicians. Problem solvers of tomorrow will need to know some of the new techniques, especially in one or two fields of expertise, but I urge you to remember as the technical stuff gets more and more complex, as research gets more and more mathematical and abstract, that these are only tools to help in the central process of managerial decision making. Above all, the business school is a professional school. It's a "using" school, an applications school, and we should not be ashamed of the fact that applications are what we are all about.

The danger, and I think GSIA has faced it along with everybody else, is that you start out with a firm resolution to follow that dictate, but you get caught up more and more in the technical apparatus you are working with. In GSIA's case, one problem was to avoid getting overly caught up in particular quantitative-mathematical techniques. One periodically has to step back and say, "Be careful; a lot of this detail I am beginning to build up in Field A or Field B probably won't be all that important 10 or 20 years out." I think that same warning needs to be kept very much in mind today. But the general intellectual approach seems to me to be still the right one. It will continue to be the right one as long as there is a changing world ahead.

In the late 1950s two highly publicized studies, sponsored by the Ford Foundation and Carnegie Corporation[2], criticized much of the existing business school curricula and endorsed the direction taken by GSIA. This accelerated the effect that the GSIA experiment was having on other business schools in the nation. In one of these reports was an article by Lee Bach, wherein he proposed the approach that was being followed at GSIA. In essence this approach rested upon a foundation provided by developing the underlying analytical concepts, the need to apply these in the various fields of business (finance, marketing and the like) with the second year being devoted to synthesizing these concepts and to stressing the crucial importance of interaction between business on the one hand and the socio-political-economic environment on the other. Yet, although these ideas were by and large adopted by most schools, some schools were less affected, notably the Harvard Business School. We questioned the deans about this and their responses are reported below.

No Single Road to Rome

FOURAKER: In comparing strategies of business schools I think the first mistake many people make is to assume there is one best way — that one set of objectives and means of achieving those objectives is better than others. I disagree with that. I think there are many possible appropriate goals for professional schools or graduate schools of business. I rejoice in the diversity that we have among Harvard, Carnegie, Chicago and Dartmouth — we have different goals, we measure success in different ways and I think that is a real strength of American higher education.

To some extent it is a matter of taste whether you prefer the style, strategy and the purpose of Carnegie as against Harvard — I would feel that there would be a substantial loss if Carnegie felt that they had to adopt our purposes and methods or somehow we felt we had to adopt theirs. We would not be as capable a society in my view, if uniformity were imposed on these fine schools. That is one of the reasons I object to the American Assembly of Collegiate Schools of Business Standards Committee. To apply that same check list against every graduate school of management in this country is the sort of centralized thinking that produces mediocrity, in my view. I have very high regard for Lee Bach — I think he is an outstanding scholar — and for Dick Cyert and for Arnie Weber. I think they are superb intellectual managers. Carnegie has done a remarkable job in fashioning a distinctive position in graduate education in business — one that did not duplicate any other educational service at that time. They were quite innovative. They have made major research contributions and suggested new ways to think about problems, principally, I think in their Ph.D. program. If those deans had to mark down the things they achieved, they would talk about ideas and research and outstanding teachers and researchers who came from Carnegie, I suspect.

If you asked me what has happened at Harvard, that gives us pleasure and satisfaction, I would talk about the number of chief executive officers in this country, and there are many thousands. We have the objective of increasing the number and influence of responsible general managers. We think we know how to do that and everything we do in this institution is coordinated to that overriding purpose. Now to say, because we have a list of thousands of chief executive officers or people with the title of President or Chairman of the Board, that is better than the remarkable achievements of Carnegie, I think is a senseless sort of a comparison. I think they are both important — they are both very useful, worthwhile and necessary.

[2] Gordon, R.A. and Howell, J.E. *Higher Education for Business,* 1959. New York: Columbia University Press, and Pierson, Frank C., et al. *The Education of American Businessmen,* 1959. New York: McGraw-Hill.

And Weber at GSIA agrees with this view, conceding that there are strong arguments for the many approaches that exist. It is an interesting observation coming from the dean of a school that has influenced the practice of, and research into, managerial activity to an extent that GSIA has.

Offering a Real Choice

WEBER: I agree very strongly with Dean Fouraker's comment that one school should not try to emulate another. After all, one of the virtues of maintaining private graduate education in this country is that you have a quality of diversity. It would be foolhardy for GSIA to try to be like Harvard and for Harvard to try to be like GSIA. We should retain our uniqueness so that we can contribute to each other and offer prospective students a real choice. For example, Harvard clearly has a lot more quantitative analysis today than it did 10 or 15 years ago. Similarly, GSIA has developed various courses which reflect the spirit of the case approach.

From the very beginning the approach at GSIA was committed to turning out a new breed — the industrial renaissance man, who given his quantitative and behavioral science grounding would be uniquely prepared at a critical time in his management career — 20 to 30 years ahead. Despite pioneering some of the most advanced techniques, it had never been the aim at Carnegie to train narrow specialists. People like Herb Simon and Lee Bach very deliberately fashioned the early curriculum to give students compulsory exposure to a wide range of management functions by insisting a large proportion of the curriculum be required. For, as Simon explains it, "if there are more electives my guess will be that students will use them by and large to narrow their training rather than to broaden it. It's a sad thing to say, but in my experience in this and other things, if you give students a choice they tend to narrow down because they don't go into things that in advance they don't know about — they don't know they are going to be interested in them."

Yet students coming out of schools like GSIA, and others that have a strong analytical base complain that they are often deemed to be better prepared for specialized staff jobs than for general management jobs. We asked the deans whether this was simply a question of distorted perception or if this impression was correct and explained by some feature of the curriculum. Weber at Carnegie says the philosophy of his school is still to train general managers and that the electives which follow the large core of basic courses are in the nature of building blocks in particular functional areas.

Accommodating Student Tastes and Interests

WEBER: We don't require a student to "major" in the conventional sense. However, the program is set up so that those students who want to develop deeper technical skills in a specialized area can do so. This option is necessary both to accommodate the tastes and interests of the student, and the need to link the program with the opportunities which exist in the labor market.

It is to insure that everyone has general managerial skills. This does not preclude particular students from specializing in given areas like accounting or marketing, but we do not require specialization as part of our curriculum. This is a subtle but real distinction.

A Problem of Image

But that does not mean that we do not have a problem of brand image. Some students report that when they go to a bank for a job interview, they will be referred to the Systems or O.R. group, even though they are interested in working in the commercial loan department. Many things are being done in the school and externally in order to

change that brand image. But the best way to deal with the problem is through the performance of our graduates who demonstrate that they can perform well in all areas of management. In fact, this is what's happening.

Herb Simon says that although GSIA does not train specialists, staff positions provide good training.

SIMON: I think this charge of specialization doesn't fit the pattern of our curriculum. With respect to staff jobs, I think it's true of most graduate MBA programs around the country and there are some very practical reasons for that, such as the fact that companies have a hard time bringing such people in and paying them what they think they can get elsewhere unless they are brought in through the staff route. Furthermore, staff training is probably the best training initially for a young man until he gets old enough so that people don't resent being supervised by him. So that doesn't surprise me and I would doubt whether a very much larger percentage of our people have started in industry through staff roles than other programs.

The real test is what they are doing ten years out. I don't know whether anyone has done the statistics, but as I look through the alumni directory it looks to me like most of the people, and particularly the ones who have been successful, have moved into broad line responsibility. These stereotypes that people have of schools are important because they sometimes cause people to make decisions so that sometimes they are self-confirming. But they are usually based on very shaky evidence, and I think historically this one is based on our early introduction of quantitative tools and O.R.

It has been said of the business school at Chicago that "although it is a very good business school, it is also a very narrow one." With a reputation of this kind in some quarters, Chicago has been a prime target for allegations that it fosters individuals who are narrow and specialized in their outlook. Dean Rosett at Chicago is not convinced that his school has this problem and says every statement he has heard in this regard has come from somebody in education but not in business.

Some Schools *Ought* to Produce Staff Analysts . . .

ROSETT: I would want some concrete evidence that it has gone wrong, and I mean that in two different ways. One is, of course, that if a graduate school really is producing graduates who go into staff positions in companies, it is not obvious to me that it is a bad thing for that school to be doing. There is a need for people who can do the type of the technical analysis required by staff positions, and some schools perhaps ought to specialize in producing people for such positions rather than in producing top managers.

. . . But Chicago Does Not

Secondly, I really have not seen any hard evidence that this is the case. People often characterize the difference between the Chicago Business School and the Harvard Business School as being that Harvard produces business leaders and Chicago produces analysts who work for them. And yet when I look down the list of our alumni I see an extraordinarily large number of chief executive officers of corporations. In recent weeks two of the popular business magazine covers have been devoted to alumni of this business school — Peter Peterson and Elmore Patterson. Neither of them can be thought of as a kind of narrowly specialized analyst who has become a staff man for the leader of the corporation. Both of them are outstanding business leaders who have been credited for turning around the institutions they took charge of. Those are outstanding examples, but the number of such examples could be multiplied enormously.

Moreover, Rosett believes that providing a person with a broad education is not the only way to make him broadly educated.

Not Worried About Over-Specialization

ROSETT: But it is not obvious to me that you become that kind of person more through one kind of education than

another. One possibility is a person might become many faceted and broad in his views by taking a wide range of courses, each of which exposes him to some discipline. Another possibility is for a person who has had a very deep intellectual experience in one particular area, to carry that experience over into other areas that interest him and thus become broad as a consequence. I don't think that the only way to produce broadly educated persons is deliberately to give them a broad education and so I am not worried about over-specialization. I think it is important that the education be first-rate, whatever it is.

Fouraker at Harvard believes that where students will be in their later careers will be determined by their own interests and is not predetermined by the curriculum of a particular school.

Self Determination

FOURAKER: What happens to people when they leave these schools depends primarily on what that person wants to do. People who want to be general managers, who want the responsibility of running an organization of some sort, tend to think of this school as the logical place to come if they can get in. So out of the 4500 applicants that we will get this year — almost all of those people have a strong desire for managerial responsibility — we try to select the people who are strong on that dimension. We want those people because that is our purpose. People who are analytical, who like to work with models to develop systems, tend to think of Carnegie, Chicago or Berkeley and would be more likely to go there; so that it is no surprise to me that a lot of graduates of those schools are going to be found in corporate planning offices, in operations research groups, economics departments in companies, and in Ph.D. programs. To say that they have those jobs because the Carnegie curriculum had so predetermined, I think overlooks the fact that if you are a mathematician you may prefer quantitative approaches. Students have the option of choosing among a variety of different educational services in this country.

FOURAKER: "... there are many possible appropriate goals for professional schools or graduate schools of business. I rejoice in the diversity we have among Harvard, Carnegie, Chicago and Darmouth ..."

LAWRENCE EDWARD FOURAKER, a specialist in international business and a pioneer in the development of experimental economics, has been dean of the Harvard University Graduate School of Business Administration since January 1, 1970.

A member of the Harvard Business School Faculty since 1961, Mr. Fouraker is known as an outstanding teacher and research scholar and an able administrator.

Born in Bryan, Texas, in 1923, he grew up in College Station, Texas. After three years' service with the U.S. Army, primarily in the China-Burma-India Theater of Operations, he received his bachelor's degree from Texas A&M University in 1947 and his M.S. from that institution the following year.

Mr. Fouraker received his Ph.D. in economics from the University of Colorado in 1951 and was for the next ten

years on the faculty of the Pennsylvania State University. He was appointed professor of economics in 1957, then assistant dean for research in the College of Business Administration in 1958. During this period he served as the acting director of the economics program of the National Science Foundation and continued for a year on its advisory committee. He later served as a member of the committee on faculty grants of the Social Science Research Council and the Council's committee on social science personnel.

Mr. Fouraker first came to Harvard under a Ford Foundation Fellowship, studying the application of mathematics to business. He returned to the Harvard Business School in 1961 and in 1963 became Professor of Business Administration. In 1968 he was appointed Director of the School's Division of Research and Chairman of the School's International Business area. He has taught Business and Government Relations to businessmen in the Advanced Management Program and in the Program for Management Development as well as to first-and second-year M.B.A. students.

Mr. Fouraker's teaching, research, and consulting have focused primarily on questions of business strategy, organization, and the role of the private corporation in the development process. He has published articles and books in these areas, including *Bargaining and Group Decision-Making,* a study with Sidney Siegel, which received the 1959 monograph prize in the social sciences of the American Academy of Arts and Sciences. He has served as consultant to a variety of manufacturing and financial firms and to several universities. He is a director of First National City Corporation and First National City Bank, the New England Mutual Life Insurance Company, RCA Corporation, the National Broadcasting Company, Inc., R.H. Macy & Co., Inc., The Gillette Company, Jewel Companies, Inc., and the International Executive Service Corps; a Trustee of The Buckingham Browne & Nichols School; and a Member of the Corporation of the Massachusetts General Hospital.

Analytic and Quantitative vs. Case Methods

Traditional Debate

It is traditional, when discussing approaches to business education, to contrast the two extreme positions. On the one hand stands the case approach developed and practiced by the Harvard Business School, while at the other is the almost exclusively analytical approach practiced at the Chicago Business School. While most schools have adopted elements of both approaches, it is nevertheless interesting to examine the stubbornness with which these two schools have held onto their positions. We asked Dean Rosett at Chicago for his view on the relative merits of the two approaches.

Interpolating From Cases

ROSETT: There are two circumstances under which a study of cases will be valuable. The simplest case is that in which you encounter a problem identical in every way to a case you studied in school so that, having been taught to deal with that case, you now deal with it appropriately. That must be a very, very rare event, to find a new case identical to an old one. The other possibility is that you encounter a case similar in some respects to one that you have studied and similar in other respects to another you have studied, etc. Then on the basis of the cases you have studied, you infer some model that leads you to a correct interpolation or extrapolation from those cases, so that you can deal with this problem effectively. Now, the question I would raise then is this — is the model that this inexperienced logician is going to construct from the cases he has been exposed to going to be better than or worse than the one that we teach him in our disciplines courses? My belief is that we are going to teach him a better model than he is going to construct for himself on the basis of a limited number of carefully selected cases. So I think he is ahead of the game.

Hard to Tell Apart Ten Years Out

Until I see some solid evidence that there is a substantial difference in the kinds of jobs our graduates and Harvard's graduates end up with, I am not prepared to accept that we are producing a substantially different product in that sense. I think our graduates do differ in that the Chicago graduate has been taught some general analytical principles the Harvard graduate will have to figure out for himself, inferring them from the cases he studied. And I think our graduates have an advantage — that they have been shown what the principles are — so they do not have to figure them out for themselves. We think that is the right way to do it. But nonetheless a smart Harvard graduate or a smart Chicago graduate ten years out of school will both be in very responsible positions and will be very hard to tell apart.

Donaldson at Yale quotes the words of his one time professor at the Harvard Business School, Roland Christensen. Teaching business policy in the last class of Donaldson's final year, Christensen said, ". . . It's just the beginning. You are going to have to wrestle for the rest of your life with intelligent superficiality; to try and cope with highly complex questions in necessarily a superficial way." He feels that "That is what it is all about," and that while some people might be totally turned off by a lifetime of "superficiality," he feels that there are many who will see management as the deepest of "intellectual challenges." The students that Donaldson's school hopes to attract will be interested in this type of intellectual challenge through their life of managerial activity. Himself an admirer of the Harvard Business School, Donaldson's newly founded school is currently attempting to fashion an approach suitable to attaining their particular mission. Believing that as society becomes more complex, the managerial role itself becomes more complex, Donaldson thinks that there is a real need for the so-called 'generalist' to have much greater in-depth understanding of specialty areas of the business or the public sector in order to be able to manage an enterprise.

Potential Pitfall for 'Generalists'

DONALDSON: I think that one of the greatest potential pitfalls for these managers is that if they do not understand a number of fundamental disciplines, they may be scared by their application or intimidated by the people who operate in those disciplines. They may either turn their back totally on the discipline, go along totally with the conclusion of the specialist without an independent judgment on the validity of the suggested decisions, or function

without an ability to relate to and probe the quality of the analysis.

But Donaldson admits that achieving a suitable balance will not be easy.

Wrestling With a Compromise

DONALDSON: I would rather speak in terms of management than administration. I feel that administration can imply the more passive role of keeping something operating on an existing track. The concept of management and the kind of manager I hope we will develop here, will emphasize the skill and art of changing the direction of an organization. This implies an ability closer to the Harvard definition of understanding people and being able to create an environment in which certain kinds of change can take place. The trade-off between those skills and the need for, let us say, quantitative approaches, in-depth, is one we are going to be wrestling with as we develop. In any event the central thrust here will be managerial as opposed to a straight analytical one.

That of course was what Lee Bach apparently has in mind when he urges that above all, the business school is a professional school — a 'using' school and an applications school.

We asked Herb Simon whether, as some seemed to suggest, the debate between the case and the analytical method was really a debate between the non-quantitative and the quantitative — whether one implied the initiative and the other the logical and the rational.

Learning by Osmosis

SIMON: Well, I certainly would not equate being quantitative with being logical at all. But on the other hand, not knowing what goes on there at the present time, I have never regarded the Harvard Business School program as being terribly analytical, quantitative or not. The case method as it was classically taught up there really rested upon some sort of theory of learning by osmosis which I cannot subscribe to. I don't mean one should not teach by cases; I, myself, did a fair amount of it, but it was probably a great deal more structured than most of the Harvard people ever make it.

SIMON: "Nevertheless there are some things you can do to develop that taste [for ethics]. Maybe it is one of the strongest arguments for a proper kind of liberal arts education that it would make you fear what Socrates would think of you."

I think the dichotomy between quantitative and non-quantitative is a false dichotomy. I think the difficulty is with a theory of education that says that you should expose people to a sort of simulation of the business environment (which is what a case is) and let them talk about it or write about it and they will somehow learn something — I think that is also very inefficient. I suspect even with the case method at Harvard, a good part of the learning goes on in a much more structured way than that. So use quantitative things where they work and use qualitative things where they work, and don't get up-tight about it.

From the very beginning GSIA took an approach that drew upon both cases and other teaching methods, and still does. Lee Bach, too, finds the notion ridiculous that you have to be for the case method or against it; they should be used as teaching devices when they are useful, and not when they are not useful in achieving educational goals. The case method, he feels, is just like lecturing, or role playing, or games, or any other teaching method. It is an extremely powerful and useful device for helping students learn some things, and very wasteful for other purposes.

The key determinant again becomes the suitability of an approach to achieving specific educational objectives within the broader goal of preparing problem solvers and decision makers. And, says Simon, "The tradition in GSIA and in

Carnegie-Mellon — the so-called Carnegie Plan — was that almost every subject ought to be taught as a problem solving course; that you are not teaching solely content or even mainly content, but you are teaching people methods of tackling problems in a subject matter area and the materials they need to tackle those problems with."

The Manager as Problem-Solver

We asked Simon if he felt that the CEO of an organization, bringing together people possessing different skills and having them work towards common objectives, is any less of a problem-solver than a manager as viewed in a more commonly held sense. Simon feels no, for this was one of the big classical problems the CEO is continually solving.

SIMON: I don't think so, but one of the big classical problems he is continually solving is just the one that Fouraker described. I think this partly hinges on definition. If by a problem solver you mean a guy who works with Bayesian decision theory then the general manager isn't a problem solver. I don't know if you are familiar with the broad, general definition of decision making that I have in the New Science of Management Decision. If you want to talk about the manager as a decision maker then you have to define those terms very broadly to include the whole set of things that is involved in setting the agenda, in developing alternatives and programs of action. Decision making does not mean simply saying "yes" or "no." Now if you accept that definition then it is hard to see what goes on in organizations, above the level of the guy on the lathe, that isn't decision making. Now you might ask, is it useful to talk about it that way in such broad terms? I think it is because looking at the process whereby things get onto the agenda, whereby alternatives get generated, whereby analyses get made, whereby choices get taken, whereby they get implemented — by looking at it that way, I think you have a framework for looking at what goes on inside an organization.

SIMON: ". . . you are not teaching solely content or even mainly content, but you are teaching people methods of tackling problems in a subject matter area and the materials they need . . ."

Integrating across Disciplines

HERBERT A. SIMON is Richard King Mellon Professor of Computer Science and Psychology at Carnegie-Mellon University.

His writing includes *Administrative Behavior, Models of Man, Organizations, The Shape of Automation, The Sciences of the Artificial,* and *Human Problem Solving.* During the past twenty years he has been studying decision-making and problem-solving processes, using computers to simulate human thinking.

Educated at the University of Chicago (Ph.D. in political science, 1943), his work has been recognized by honorary degrees from Yale University, Case Institute of Technology, The University of Chicago, Lund University, Sweden, McGill University, Canada, and Erasmus University of Rotterdam.

He is a member of the National Academy of Sciences, and a Fellow of the Econometric Society, the American Psychological Association, and the American Sociological Association. He has served as consultant to government and business organizations, has been Chairman of the Board of Directors of the Social Science Research Council, and of the Behavioral Sciences Division of the National Research Council, and was a member of the President's Science Advisory Committee from 1968 to 1971. He was a recipient of the distinguished Scientific Contribution Award of the American Psychological Association in 1969 and of the A.M. Turing Award of the Association for Computing Machinery in 1975.

Dr. Simon, who is a member of the Board of Trustees of Carnegie-Mellon University, has been closely associated with shaping GSIA since its inception and till recently served as its Associate Dean.

Integrating Disciplines

While the importance of integration has always been clear in education in general and in more theoretically oriented programs in particular, it has also been equally evident that it is not easily accomplished. Lee Bach was deeply concerned during his tenure at Carnegie with developing a more coherent structure for pulling together the various aspects of what students had learnt, through focusing on ill-defined problems of the policy sort. Of course, he concedes those are easy goals to state but hard to accomplish.

Lack of Theory

BACH: The Harvard people do a good job, but only part of what is needed. In spite of the critical things one can say about the case method, it still is true that their business policy approach is interesting, lively and quite fundamentally aimed at flexible problem-solving. Yet it is unsatisfactory, because there isn't any theory in it; there isn't a good analytical structure underlying it and pulling together all the other parts of the curriculum. We need a systematic integrative way of applying what you've learned in other courses, but in a way that makes it fit the problem, not the problem fit it.

BACH: "The most fundamental purpose of good professional education, indeed of any good education, is to teach people to keep on learning for themselves after they get out of school."

Imaginative but Incomplete

Lots of ways can help. Beyond cases, so-called policy games (which I guess are still used in GSIA) can help, but, these games tend to become technique-bound, to become ends in themselves. More traditional role playing has been tried. Bringing in an outside board of directors for policy games was an imagivative step. You can think of other approaches, but I don't think we have a good answer yet.

Bach feels that impressive progress is being made by Alain Enthoven (a very distinguished "management science type," who spearheaded the installation of systems analysis in the Department of Defense and then went out to manage part of Litton Industries as President of their Mechanical Products Division) in putting a lot more analytical content into business policy. But, he says, "it is not clear yet how much is transferable to other people."

Dean Donaldson at Yale recognizes the problem of integration to be an important one too.

Difficult and Vital Job

DONALDSON: I think that such integration will be one of our most difficult and vital jobs. We have some thoughts on integrating courses — such as our first year workshop on public and private management, in which we will examine some major current national problems that are being faced today and are as yet unsolved; problems which lend themselves to the integrated use of many disciplines and techniques taught at the School. I guess your Management Game is an approach to doing that same thing. I suspect that the integration will be a very difficult problem for us, as it has been for others. The use of case teaching methods and help from practitioners coming here to the school will be part of getting at this problem.

Playing Games with Management

The Management Game was GSIA's answer to the problem of integration. Having gone through many revisions that have raised its power and sophistication by several orders of magnitude since it was first developed, the game does provide a partial solution to the problem. Simon says that in general he has been quite positive towards the Management Game, for its value as an integrative device among others, but that it still is, and has to be for the present technology, a little too structured and a little too biased towards the middle manager. Yet he believes it to be one of the important integrative devices around the school. But, says Simon there is a lot more potential to the game, some of which has been exploited by using it as an integrative device. The game was going on simultaneously with the organizations course and he could use the game in it by drawing problems out of the organizations of the game teams and vice versa. Simon does point out problems with the game, however.

Egalitarian Norms Among Students

SIMON: Now there are some problems with the game. I have known only one or two cases, among the teams that I have worked with where people really behaved like managers, where the president really had some authority, but at the same time worked as chairman of the group. The egalitarian norms among students are so strong that it may be hard to be part of the group and at the same time work as a manager. Those are skills that you need and if this shows up as a weakness of the game then it is something the curriculum ought to be taking care of elsewhere — perhaps through the teaching of human relations in relation to the game.

We asked Weber how close the present game was to being a satisfactory means of achieving integration.

Limited Role of Formal Education

WEBER: The general answer to the question is that there probably never will be a completely satisfactory way of integrating all of the disciplines that we emphasize in our program. The Management Game, in a perverse way, is our attempt to simulate reality. Even here, we do this exercise in a stylized way. I think that the Game is very useful. In addition, there are other ways we try to integrate the various disciplines. For example, we have a set of so-called cross-cut courses, e.g., management strategy, management functions, etc. But in fact, the role of formal education is always going to be limited. Each student will follow his or her unique intellectual path as they become involved in real life experiences. The educational process should provide him with the capacity to be versatile, to perceive and weigh a wide range of variables in the management process, and in effect, to write his own script. The Management Game is a useful device for conveying a sense of the complexity of decision-making in the real world.

Rosett at Chicago agrees with all others that achieving integration is indeed a difficult problem, but that is one that is best tackled out in the real world when the student gets his first experience on a job.

Devout Hope

ROSETT: My feeling is that every educational institution has to recognize that it does an incomplete job. Harvard, when it produces a MBA, has to recognize that it has exposed the student to a limited number of cases – none of which is identical to the real problems that the student is going to encounter when he gets out into the job; that when he gets out into that job he is going to have to learn to deal with the pressures, the real rewards, the real penalties associated with a real decision which he has never had before; that all you can hope is that you have given some preparation so that when he is confronted with the real thing he will be able to fly the airplane. He has got to get out there and deal with the real problems of flying. Both Harvard and we devoutly hope that in his first experience or two he will do well enough and get enough experience so that he goes on and becomes a good pilot. Neither of us is prepared to go and sit beside him in an airplane and teach him actually how to fly simply because a university does not have any particular advantage in doing that.

In talking about the related problem of specialization versus a broad education, Dean Rosett had argued that deliberately giving a broad education was not the only way to produce a broadly educated person. He felt that another possibility was for a person who has had a very deep intellectual experience in one particular area to carry over that experience into other areas that interest him, and thus become broad as a consequence.

We quoted this view to the people with whom we subsequently talked and recorded a round of very diverse views on the matter, demonstrating once again that first rate schools do not have to be identical in philosophy.

Disagreement Among Honest Men

SIMON: The psychological evidence on transfer is very mixed evidence, but I suppose they might give you a different answer if you asked them, why don't the students go out and study theoretical physics – or why don't they go out and study Sanskrit. If they had inquired about their own undergraduate college at the University of Chicago they would have found that for forty years there has been a very deep commitment to breadth in education before depth, to a kind of an inverted "T" curriculum in which you get a broad base and then depth in some specific area. Those of us who came through that (I am a Chicago alumnus myself) thought it was a great thing. I think you would find a different story elsewhere on that campus. One of the problems is that although it has been a very good business school, it has also been a very narrow business school, till quite recently, in which they would teach any-

thing about business providing it was economics. So honest men can disagree — and we do.

The Intellectual Challenge of Integration

WEBER: Well, that is an impeccable statement. Obviously, we want our educational program to be a first-rate intellectual experience. And as important as the need for integration might be, a student should have a firm grounding in the basic disciplines. But to say that you want a professional educational program to be a first-class intellectual experience does not mean that the effort to convey a sense of reality is irrelevant. Clearly, we should maintain high intellectual standards in whatever we do. But we would be doing our students an injustice if we let them get out of here believing that the world is as neat and unambiguous as their professors' lectures.

I think that it is misleading to establish a dichotomy between something called "a rich intellectual experience" and the integration of discipline necessary to deal effectively with real-world problems. Many of the people who are here — both students and faculty — view management as a constructive vocation and the basis for first-rate intellectual activity as well. It is hard for me to think of a more challenging intellectual experience than a company manager trying to develop an effective policy to deal with the energy problem or a strategy to forecast and adapt to new government policies. These issues are intellectually challenging and require the integration of various disciplines in a real-world framework. We shouldn't disdain the phenomena on which the disciplines are based in the first instance.

Student Interest v. Faculty's

FOURAKER: I do not think that it is necessary to conduct a great philosophical argument about that point. We have been in business long enough, all of us, to have tested the propositions empirically. As long as our graduates continue to get responsible jobs as chief executive officers, in many industries and a variety of different enterprises, I would contend that our particular approach works. I am quite familiar with that argument, having made it myself when I taught economic theory at a state university. It is good preparation to submit to the discipline of economics but it is somewhat self serving. That is, it is somewhat a case of "producer-sovereignty" in that the faculty gets to do what is important to them and argues that though it is not in the students' particular interests, or as the students see their interests, it is still good for them. If you carried that argument to the next stage, that they should not take statistics or economics but should take mathematics, which is a much more beautiful, aesthetic exercise than those normally taught in a business school.

Fouraker goes on to claim that not only does his school recognize the need for integration but does it in an impressive way.

Exchanging Resources

FOURAKER: There is more integration in our curriculum than in any I know personally. The usual pattern is that people teach courses in their specialty, in their particular field, and leave it to the student to make the integration. The framework of the curriculum here is such that there has to be more coordination among teachers. What our people learn is not techniques or problem solving protocols as much as how to work together to produce workable positions with respect to very complex issues; issues that are so poorly structured that formal solutions are not possible. They acquire skill in creating organizations where they can exchange particular resources, either experience or capability or ideas, among a very diverse group of people working as peers — that I think is the mark of our graduates. If they have a capacity to build and manage effective organizations it is acquired, not directly but indirectly, in the process of going through a very structured first year. Each section takes all courses together; they study together, play together, carry victory or defeat from one class to

another as a group. What looks like chaos at the beginning of the year turns out to be, in almost every instance, a very smooth working group of problem solvers, who can approach problems cooperatively at the end of the year. In an hour and twenty minutes they can pull together the tremendous range of human resources in that room, in response to very complicated issues, and do it in a remarkably effective way.

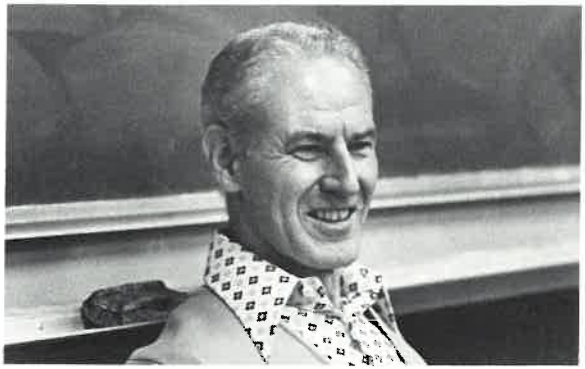
GEORGE L. BACH is Frank E. Buck Professor of Economics and Public Policy, in the Graduate School of Business and the Department of Economics, at Stanford University. He came to Stanford in 1966 from Carnegie Institute of Technology, where he had served since 1946, as Dean of the Graduate School of Industrial Administration, Chairman of the Department of Economics, and Maurice Falk Professor of Economics and Social Science.

Dr. Bach was born in Victor, Iowa, on April 28, 1915. He received his A.B. degree in Economics from Grinnell College in 1936, his Ph.D. from the University of Chicage in 1940, an LL.D. (Hon.) from Grinnell in 1956, and LL.D. (Hon.) from Carnegie Institute of Technology in 1967.

From 1941 to 1946, Dr. Bach served as Economist and Special Assistant to the Board of Governors of the Federal Reserve Board, and served briefly as Chief Economist in the United States Department of Commerce in 1946. He was Ford Visiting Research Professor at Stanford University in 1963-64; a Ford Faculty Research Fellow in 1957-58, and taught at Iowa State College from 1939 to 1941.

He serves as a special consultant to the Board of Governors of the Federal Reserve System and to the Secretary of the Treasury, and in 1948 was on leave as Survey Officer in charge of the study of the Federal Reserve System for the "Hoover Commission." He has served as a consultant on economic planning and executive development to leading industrial firms in the United States, and to the Ford and Sloan Foundations and the Carnegie Corporation of New York.

BACH: "We must recognize the fact of continuous change — that problems will be different tomorrow so we must train people to become general purpose problem solvers . . ."



Dr. Bach is author or coauthor of thirteen books, including *Economics* which has sold more than a million copies and is in its eighth edition. In addition, he has published many articles in the fields of money and banking, inflation, economic policy, executive development, and business education.

Dr. Bach is a Fellow of the American Academy of Arts and Sciences, and a member of Phi Beta Kappa, Phi Kappa Phi, the American Economic Association, and the American Finance Association. He is Chairman of the Committee on Economic Education of the American Economic Association and has been Chairman of its Committee on Graduate Study in Economics, a member of its Executive Committee, its Committee on Honors and Awards, and of the Board of Editors of the *American Economic Review.* He received the Dow Jones Award for Distinguished Contribution to Business Education in 1975. He was Chairman of the National Task Force on Economic Education from 1960-63, and Chairman of the Board of Directors of the Pittsburgh Branch, Federal Reserve Bank of Cleveland from 1963 to 1966. He is a trustee of the Joint Council on Economic Education, and has served on the Business-Education Advisory Council of the Committee for Economic Development.

Interdisciplinary Emphasis and Research

"We have become so accustomed to classifying scientific knowledge in a way that corresponds to the departmental structure of universities that we act as though nature were also so constructed. Nothing could be further from the truth. There are no such things as physical problems, biological problems, psychological problems, economic problems and so on. There are only problems; *the disciplines of science represent different ways of looking at them.* Any problem may be looked at through the eyes of every discipline. But, of course, it is not always fruitful to do so."[3] These words taken from the introduction to an Operations Research text by Ackoff & Sasieni, could well serve to describe an essential element of the philosophy that GSIA subscribed to. In part of course the interdisciplinary emphasis at GSIA is explained by the need for faculty with cross-functional competence in order to enable students to cut across disciplinary boundaries. But a far weightier reason is a real conviction at GSIA that interdisciplinary work produces better quality research — that it is the correct way to look at nature, without regard for artificial boundaries.

[3] Ackoff, R.L. and Sasieni, M.W. *Fundamentals of Operations Research,* New York: John Wiley, 1968.

It is not an "obviously" correct or universally followed approach, but GSIA has always tenaciously hung on to the proposition that the really first rate minds will not only be able to develop interdisciplinary competence but will find, in the interdisciplinary character of their work an irresistable challenge. Simon, himself an example of phenomenal interdisciplinary ability, is outspoken about his views. Says he, "First rate people enjoy challenges. In general I would take the fact that a man only feels safe in a little area doing his thing as one indication, not necessarily a conclusive one, that he wasn't a first rate person. I have fairly strong prejudices on that point." Simon goes on to point out, however, that, "Maintaining an interdisciplinary approach and bringing together the integrating things requires very active academic management. One reason for that is that when you recruit faculty for a school, they tend to come out of the disciplines. Originally, management science itself was a very integrating discipline, because since there wasn't any before 1945 or '50, it brought together people from all sorts of odd places and put them together and then it got applied in a whole lot of functional fields of management. But now we have people who get Ph.D.s in Operations Research from people who have Ph.D.s in Operations Research and they become narrow then. The only way you keep reversing that is through very active management in the school, which includes deliberately hunting for those kinds of people in recruiting, and includes all sorts of activities within the school that force people disciplines to work together across disciplines." It is a view with which Weber concurs.

GSIA'S Culture

WEBER: I am persuaded that GSIA practices an interdisciplinary approach and does so in a very impressive way. First, we have no departments. If you drew an organization chart, it would be comprised of 45 individual lines, dotted or otherwise, running to the dean. Secondly, we promote a

WEBER: "We are the youngest of the major business schools and we have the fewest alumni. It is correct to note that at this point not many alumni are CEO's, but they are coming along."

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high degree of versatility in teaching assignments. Somebody with a nominal specialization in Operations Research will teach in accounting or a faculty member with a background in Decision Theory will teach in finance. We also have adopted a policy of team teaching. For example, a marketing course may be jointly taught by an economist and a marketing specialist. Another way in which we maintain an interdisciplinary approach is through the structure of our seminars and the Ph.D. Program. These policies have been practiced for many years in GSIA and constitute a strong element of the school's culture. A new faculty member perceives that he does not have to draw water from the same trough as everyone else in order to succeed.

The idea of interdisciplinary activity within a school finds qualified support from Dean Rosett. We asked him if in his view the faculty at a school needed to be balanced if it was to be able to produce managers who are balanced. Not necessarily, he feels, though he recognized that it would be good for the health of the school to have a few people who could cut across boundaries.

Not Necessary, But Helpful

ROSETT: In order to produce a well-educated, balanced manager it may be so, but I am not even certain of this. It may be that you need to have a well-balanced school, but that is not all the same as saying that each person in the school, or that even anyone in the school, has to have the same kind of balance. It is possible to have a statistician who does not know any economics, a person in marketing who does not know any accounting and so on, and still do a very good job of preparing a student for life in the business world. There may be advantages in having some people in the school with interdisciplinary competence — just so there can be communication among the faculty. That has more to do with the health and growth of the school than with its ability to educate students. If the whole tenured faculty is involved in making appointments, for example, it is helpful to have some who understand more than one sort of quality. So for the purpose of making a school work, it is good to have people who cut across the boundaries, but not because in order to produce a well rounded student you need to have a well rounded faculty.

More or less along the same lines as Rosett, Donaldson at Yale believes that it is a worthy ideal but not always attainable. And, he adds another quality to the list of what his school will expect in faculty. That is the ability to teach.

The Ideal May Be Unrealistic

DONALDSON: There is a third element of not only disciplinary excellence and interdisciplinary capability but also teaching — the ability to get it across in the classroom. Ideally, I suppose you would look for all of those capabilities in one person, but realistically this will not be easy. I think that as in any other organization one should seek a mix. There will be a place in our School for all three of these capacities. I hope, if we are successful, that we will be able to have enough of an appeal to attract all three kinds of faculty, although I would hope that we could find some people with a measure of excellence in all three of those areas.

It is in the high premium placed on individual faculty members developing cross-functional competence that the approaches of GSIA and Harvard unexpectedly meet, although even here there would be a subtle difference in the

definitions of the term at Harvard and at GSIA. Fouraker claims that the particular purpose of his school provides a natural inducement to become generalists.

Transformation to Generalists

FOURAKER: Given our particular purpose, the generalists' skills have taken precedence over the development of disciplines and a marketable reputation in the disciplines. The remarkable history of this institution suggests that outstanding people, who are quite competent in the disciplines, are prepared to leave the very rewarding life of a disciplinarian and make a commitment to this institution and its goals. They gradually go through a transformation from being economists or psychologists or sociologists or statisticians and becoming management teachers — general management teachers — which is not as transferrable in the academic market because there are relatively few institutions that share our particular objective and our particular way of approaching it.

Illustrating the problems in developing people with cross-functional ability, Lee Bach chooses the business policy area to dramatize the difficulty involved. He believes that at most places the problem is confounded by the incentive structure.

Problems with Incentive System

BACH: It is easy to suggest that the school ought to get busy and train these cross-functional people. But it is very tough to do it. What happens when you get a really bright, first-rate academic person is that he or she tends to get interested in one particular research project or another and that's where the academic payoff generally lies. Most schools have the incentives the wrong way. Teachers make their reputations by writing three or four articles on the latest development in some tiny little field, not in developing cross-functional competence. It is very hard for a young person to know what is the right thing to do if he wants to become truly cross-functional. If the school is willing to pass out brownie points for just good teaching in business policy, then O.K., he may learn to be a really good business policy teacher who can truly integrate things. But in most schools you get paid off on research as well as on teaching, and good research is expected to make a significant contribution to human knowledge. Just how to do such research in business policy is not clear. It's very difficult to break off a little piece and do your bit. Once in a generation a Herb Simon comes along with Administrative Behavior, *but the incentive system needs fixing. We should be training some first-rate Ph.D. people to become the business policy teachers of tomorrow, but I don't think anyone is doing it very effectively.*

This concern with the various aspects of research leads us to a much more fundamental issue. And this is the issue of what place research ought to have in the activities of a professional school of business. One can go a step further and ask whether it is necessary for professional schools to have scholars whose basic interest is to advance the frontiers of knowledge, and that although research objectives may in themselves be legitimate, would the absence of research activity have any significance for a masters program.

Rosett feels that it would depend upon the school one is talking about. While allowing that in principle a school could exist in which all the faculty were first rate teachers, providing excellent education, he believes that it would be very difficult for a man to remain a good teacher if that is all he does.

But Will He Be Interesting for Twenty Years?

Rosett believes that the right way to assess a potential member of the faculty is to ask: "What is he doing that will keep him productive and interesting for twenty or twenty-

five years?" If the answer is "nothing," then even if he is an excellent teacher now, you have to suspect that he will not be so ten years from now. Rosett elaborates further.

ROSETT: But if there is something, then I think it is a mistake to be too rigid in your definition of what it ought to be. It is very nice if you can find a person who is publishing regularly in top journals and writing books and going around giving invited lectures and so on. But there are other types that you can find – for example, there are men who are recognized as outstanding authorities in their professions; say, an accountant who does not satisfy the ordinary model of a scholar yet is a valuable person to have in a business school, in the same way that an exemplary surgeon is a good person to have in a medical school. He may not be right in everything, but he may be constantly acquainted with and practicing the very best techniques available so that people watching him will learn how to do the same thing. I think that a business school needs to be a little open minded in deciding what the standards of quality are in appointing faculty.

But Rosett maintains that the main function of a professional school is to train professionals, and there is no room on the faculty of a professional school for people who really do not want to teach. But, Weber of GSIA feels that a strong research program cannot only be 'tolerated' in a professional school but actually enhances the quality of education provided.

Cultivating the Critical Faculties

WEBER: Again, I think that is a false dichotomy. It is correct that historically and prospectively GSIA has had, and will have, its greatest impact on the outside world through its Ph.D. Program and the research of the faculty. In the Ph.D. Program we are training people who will be leaders in the education of managers at other institutions. And our record has been very impressive in this respect. At the same time, the emphasis on research implies that students in our master's program will be exposed to the newest developments and also are more likely to cultivate the critical faculties that are essential to effective management. I view the training of professional managers and the emphasis on research as complementary rather than competitive or conflicting elements in the life of the school. It's just not true that good researchers do not make good teachers.

Coming as it does from the Dean of GSIA, this position would cause little surprise even though it is entirely tenable on its own merits and strongly felt. After all it was the tenacious insistence on intellectual excellence and research that earned GSIA its pre-eminent position among professional business schools in the United States. To people like Lee Bach and Herb Simon, who predicated their programs upon the need to prepare for a changing environment, continuing to be a viable organization that could sustain the revolution that they had set in motion meant that first rate research was absolutely essential. Research ensured for them "new ways of looking at things in a rapidly changing world and for bringing in bright young people as faculty members and graduate students."

Simon expands further on his doctrine and touches upon some organizational problems encountered.

Keeping Intellectual Excitement Alive

SIMON: I think the answer is "yes" [to research], because it is very hard to keep the intellectual excitement alive without it. It also creates one of the big organizational problems in this kind of an establishment, one that the management has to spend a large part of its time in dealing with. This is not peculiar to business schools, it is the same story when we think of medical schools, schools of education, and of course engineering schools. Law schools – except for Chicago and Yale and maybe one or two others – have never really worried about their contacts with the world of new ideas and thinking, but only their contacts with the professional world of law.

Arguing that the quality of research will depend greatly upon the quality of the minds attracted, Simon says that among other things first-rate minds must be provided challenges. And an appropriate challenge for a business school to offer will be the problems of end use, arising from the environment of business, that the bright individual can transform into exciting, non-routine problems of fundamental research. Simon agrees, though, "that even today, it will appeal mostly to the adventuresome, to the maverick. There is no harm in that, except that people who are both bright and adventuresome are always in very short supply."

Tortuous, Many-Step Process

SIMON: The business school does not stand a chance of recruiting first-rate scientists if it insists that all research done in its walls must have direct relevance to business. It will do better to demonstrate its respect for fundamental research by having, and valuing, in its faculty at least some members much of whose work does not have obvious relevance to business, but does command high respect in its discipline. I will say more about that when I come to the topic of 'synthesis.' Equally important, when tests of relevance are applied, it is essential that they be applied by people who understand the tortuous, many-step process by which fundamental knowledge may gradually be brought to bear on problems of practice.

The price to be paid for keeping good scientists, if it is a price, is that a certain part of their activity will result simply in good science, not particularly relevant to the specific concerns of the business school. If all of their activity is of this kind, then the point of their being in the business school has been lost.[4]

Continuing on the organizational design problem associated with a business school, Simon warns that one deep source of "communication difficulty between the discipline-oriented and the practice-oriented members of a professional school faculty stems from the difference between science and art, between analysis and synthesis, between explanation and design."

A Quality of Toughness

SIMON: The character of the professions as arts has in modern times created a barrier to their full acceptance as proper inhabitants of a university. (Historically, of course, the medieval universities were professional schools.) It has not been thought that synthesis and design could be the subjects of systematic instruction in the same sense that analysis and explanation could. The former were not fully 'intellectual' subjects, hence only marginally appropriate for university, and especially graduate, training. A major reason why applied science has almost driven engineering from the research and graduate programs of engineering schools, and modern biology and biochemistry has almost driven medicine from the medical schools is that the former subjects, in each case, have had a quality of intellectual 'toughness' and explicitness that the latter have lacked.

A full solution, therefore, of the organizational problem of the professional schools hinges on the prospect of developing an explicit, abstract, intellectual theory of the processes of synthesis and design, a theory that can be analyzed and taught in the same way that the laws of chemistry, physiology, and economics can be analyzed and taught.

Missing Component

Our increasing ability to approach synthesis and design as rigorous intellectual disciplines — to make these processes the proper objects of teaching and research — supplies a missing component in the construction of an effective professional school organization. For these new disciplines provide a focus for the profession-oriented part of

[4] Simon, H.A., *The Journal of Management Studies,* February 1967.

the faculty, and a set of tasks more challenging than merely monitoring and interpreting the information system of the business environment, or even applying existing knowledge to business problems. They give us, therefore, means for increasing the intellectual attractiveness of the school's practitioner-oriented concerns, and making it easier, thereby to establish meaningful communication between the faculty dealing with these concerns, on the one hand, and the discipline-oriented faculty, on the other. We can hope for a gradual reduction in the university's distrust of the 'applied' character of the professional school's task, and a consequent rise in the respect accorded to faculty members oriented toward the profession.[5]

An interesting twist to the problem is provided by Lee Bach who wonders how he might approach the problem if he were running a good but second-rank business school at a lesser known big state university. "This does not solve GSIA's problems, for GSIA surely should seek out the few producers of really major research," Bach says. "But it certainly does not seem to me essential that every faculty member be a significant research producer. It is essential that he be lively and up in his field." More on the question of the lesser-known big state university, however.

Enough To Be Respectable

BACH: I suppose I would try to get enough hot-shot researchers to be respectable, mainly some very bright young people. But my main thrust would be also to get a core of very lively, bright teachers who were very much up on things but were not necessarily doing what you would call major research. The amount of really significant research that gets done is very small. If you look at major pieces in the major journals, they're done by at most 1% or 2% of each profession. For the really important ones, it's a fraction of 1 percent. We can only expect very important research from a tiny part of the best schools' very best people. The advantage of most of the research that gets done is to keep the faculty member doing it alert. If I were running a good second-rank school, I'd recognize that fact and look for some very good teachers who gave promise of real intellectual vitality, of which doing current research is only one evidence.

The approach to the nature and function of research is predictably different at the Harvard Business School. More or less at polar opposition with Simon's thesis that basic research is essential in a professional school, Fouraker describes the position of his school.

Complementing Practitioner Objectives

FOURAKER: I think research is necessary for a variety of reasons – it is a major mechanism for faculty renewal, it is important to differentiate between those problems that can be handled formally and those that require judgment – and that requires some systematic thinking about problems. Whether one needs basic research in the sense of creating new disciplinary knowledge and new methodology, I question that in a professional school. I think that as a university specializes, that work is properly undertaken by the faculty of arts and sciences. That is their mission and it is an appropriate one for a university. I think the research program has to complement our practitioner objective, and can do so in a variety of ways. Research yields teaching material; it yields an understanding of problems and identification of what the problems are. We have produced new knowledge in a variety of different ways – the early work

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FOURAKER: "I would like to congratulate Dean Weber and the faculty and the students at Carnegie on a very remarkable success in the field of education."

[5] op.cit

of Henderson, Mayo, and Rothlisberger, that group of people who worked in Western Electric in the Hawthorne Plant, produced some remarkable insights regarding human behavior. They provided a continuing research tradition at this institution. The work in Bayesian Decision Theory by Raiffa, Schlaifer and John Pratt, again, I think is very consistent with our educational program. The systematic field work of describing problems in companies, obviously is related to course development and to the purpose of the school. It is the oldest of the traditions in our research program. I think all three approaches are very necessary, but they are necessary because they complement our general objectives.

Finally, we asked Dean Donaldson at Yale what the plans of his school were with regard to research.

Fundamental Research, the Well Spring . . . .

DONALDSON: We are starting this school within a great university and one of the potential advantages we have is to relate to and draw upon the work that is being done throughout the entire university. I think our ability to do that will depend upon the capacity of members of our faculty to build at least half of that bridge to the rest of the university. At the present stage of development of management science, there is a tremendous need for research into new methods. Fundamental research can be the well spring of applied research and we will welcome both in our own faculty and in our collaboration with other Schools and departments in the University.

DONALDSON: "The trade-off between breadth and depth is something a public or private manager has to balance every day."

RICHARD N. ROSETT is dean of the Graduate School of Business and Professor of Business Economics at the University of Chicago. He has held both these appointments since 1974 when he came to the University of Chicago, from the University of Rochester.

He received a B.A. degree from Columbia University in 1953, followed by M.A. and Ph.D. degrees in economics from Yale University in 1954 and 1957 respectively. He joined the teaching faculty at the University of Rochester in 1958 as Assistant Professor of Economics, and later served as Chairman, Economics Department and Professor of Economics from 1966 till 1974 when he accepted his appointment at the University of Chicago. From 1969 to 1974, Mr. Rosett was also Professor of Preventive Medicine and Community Health at the University of Rochester.

In addition to his academic pursuits and administrative responsibilities, Mr. Rosett has been associated with several other organizations in advisory capacities and has been a member of various commissions. In 1963-1964 he was a National Science Foundation Senior Postdoctoral Fellow, Netherlands School of Economics, Rotterdam. In 1968-1969 he was National Science Council Chair Professor, National Taiwan University and Academia Sinica. During 1958-1962 he was Consultant to the RAND Corporation. Between 1972-1974 he was Consultant to the Department of Housing and Urban Development, as well as Member of the Commission on Education for Health Administration. Since 1970 he has been Consultant to the Department of Health, Education, and Welfare. He is also currently a member, Board of Trustees, Tax Foundation, New York City, a position that he accepted in 1975.

Mr. Rosett has published extensively in many professional journals, including *Econometrica, International Economic Review, Journal of Political Economy, Cowles Foundation Monographs, National Tax Journal* and *Private Practice.* His current research interests are in the "Applications of Probit Analysis in Social Science Research" and in "The Effects of Zoning and Externalities on the Prices of Land in Monroe County, New York."

From the Past into the Future

ROSETT: ". . . every educational institution has to recognize that it does an incomplete job."

That we begin to look into the future is only appropriate, for the goal behind these interviews was to obtain a feel for the challenges of the next quarter century. However, it may be interesting to start by looking at some residual challenges from the past, those that never really became very big.

The first one that comes to mind is that the promise of a spectacular breakthrough in the Behavioral Sciences has not been sustained. Herb Simon says, "It is hard to find faculty who are interested both in teaching and in training for human relations skills (as distinct from more theoretical behavioral science courses). That has always been a long term problem in staffing and in getting those things done and done right. I don't think we have burned up the track in that area and I guess I don't know of any business school that has." Simon agrees that part of the problem is the perceived status differences between people in the behavioral sciences, and the rest of the group representing the "hard sciences."

Behavioral Pecking Orders

SIMON: I think it is a problem. It has been attended to in the sense that people are aware of it and have tried to cope with it in various ways since the school has started. It turns out that people who have the sharp quantitative tools look superficially brighter than people who don't – their works look to be of more substance; you can prove theorems and all of these other good things. That isn't a problem only at GSIA but is a problem throughout the sciences. You find some pecking order in biology for instance where the theoretical biologists and the molecular biologists are the highest on the pecking order and the descriptive biologists and so on, till recently, were lower on it.

Some further interesting observations are provided on this subject by Weber.

Frontiers and Artificial Intelligence

WEBER: Behavioral science enjoyed considerable attention in GSIA because it was associated with very powerful and versatile individuals, such as Herbert Simon and Richard Cyert.[6] *They are still on campus and still have an effect on the school. For example, Professor Simon is now interested in artificial intelligence and information processing and we have had discussions about the implications of developments in these areas for what we teach and how we teach it. In the last three years we have hired several new faculty members in behavioral science who have a somewhat different perspective. A great deal of interesting work is being done here dealing with organizational effectiveness and the determinants of productivity. The behavioral sciences have and will continue to play an important role in the school.*

[6] Richard Cyert is now President of *Carnegie-Mellon University.* Editor.

FOURAKER: "To apply the same check list against every graduate school of management in this country is the sort of centralized thinking that produces mediocrity."

During all the turbulence of the changes that were taking place during the 60's in the area of management education, the Harvard Business School was notable because of its apparent immunity to these changes. Dean Fouraker at Harvard says that in fact there has been substantial innovation in the seventies.

Unintended Compliments

FOURAKER: There are always changes. Harvard probably was affected less by the innovations of the sixties than other institutions – we were criticized by a foundation executive who said that Harvard had changed direction not at all in response to their very generous and long standing support. I thought that was a compliment.

But Substantial Innovation

There are always changes within that structure – we have a new course in the first year – Environmental Analysis – that is quite different from anything we did in the sixties. We made substantial changes in our second year, in forming a more rigorous and demanding experience. We have a number of new executive programs and a serious effort to make executive teaching a challenging and rewarding intellectual experience for our ablest faculty members; now we have a thorough review of the doctoral program and have redefined the special fields in that program. I think this has been a period of major alteration of our education programs when the faculty has actually contracted in size. We have a program in Europe that is new and joint programs with medicine and public health, government and education – they are all new. Our program for

small companies is very well received. I think the seventies have been a period of substantial innovation.

More Not Less

It was evident to Lee Bach from the early days that professional schools would have to turn their attention to the question of interrelationships between the business firm, the business man and the socio-political-economical environment. "This is hardly a novel question," says Bach. "I remember well early in GSIA days trying to persuade Leland Hazard to come teach a course in *Ideas and Social Change.* But the problems have become more pressing, not less." And he adds, "Surely it is an area in which we need to do much better, on the teaching, research, and social operations fronts."

Ensuring Legitimacy

Lee Bach goes on to speak on the importance of legitimacy, in the eyes of the organization itself and in the eyes of the beholder of the organization. Insists Lee, "Legitimacy is crucial to the vitality of institutions. It has to be there for institutional viability, especially in a democratic society like ours."

We asked Weber how GSIA was approaching this problem of understanding the interface between the organization and its environment.

Reducing Ambiguity

WEBER: Perhaps the difference between a place like Harvard and a place like GSIA is the following: Harvard will say the world is messy and ambiguous and we're going to try to teach people how to operate in this ambiguous environment by intensive exposure to real-world cases; GSIA will say let us try to reduce the ambiguity by discovering new principles and developing new models while conceding that the ambiguity is always going to exist to some degree or another. Right now, I think all business schools do an inadequate job with respect to the [one] aspect of an executive's job; which is the developing of an effective strategy to deal with external groups. We're just recognizing the problem and we have not yet developed educational approaches which incorporate these non-market externalities into a managerial framework.

WEBER: "The phenomenon encompassed by the Behavioral Sciences is intrinsically complex and we should not expect a single, all-explanatory theory. In GSIA, we recognize that management is organized human behavior and we have to keep pressing on that frontier."

FTC and the Sierra Club

I don't know how far we can go, but at GSIA we have a faculty committee working on programs that we hope will bring the same analytical approach to bear on these problems as we have on the internal management of the firm. We will draw upon traditional disciplines such as economics and mathematics but also draw on concepts from political science, sociology and organizational behavior. We do not want our offerings to be limited to cases. We hope that through an interplay between research and teaching our faculty will develop a broader and more powerful analytical framework that will permit the student (and managers) to use the same general approach in dealing with the Sierra Club, the Environmental Protection Agency and the FTC.

As one contemplates interactions with the environment it is inevitable that one's thoughts will touch on the contemporary interest in the ideas of social responsibility and managerial ethics. Since it has frequently been suggested

that business schools can do something about improving the moral tone of businessmen, we asked Herb Simon what he thought of the suggestion. Herb's thoughtful comments follow.

Preventing Stupidity

SIMON: I have always been very skeptical, maybe too skeptical, that anything could be done in a course called Business Ethics. Maybe there is a little that can be done and that is to make you a little more sophisticated about what the ethical problems are. But I don't think we just need people who are more ethical – we need to prevent them from doing some things out of stupidity. That is point one.

Statesman in a Business Suit?

Point two is that the main job of business in a capitalist society is to make a profit, within the law, and I get worried about businesses who think their main business is to be socially responsible, for that means wielding their economic power towards political ends. The only reason economic power concentrated in corporations and capitalism is tolerable is because the market controls it. If the market does not control it then we ought to find some other ways to control it. So I get a little worried when you talk about businessmen training to be great statesmen. They may be statesmen, but as businessmen by and large their main responsibility is to run a company profitably but legally.

Would Socrates Approve?

Now I think that to a modest degree business school training can do something about ethics, and that is done largely through a creation of values. Ethics has largely to do with who your reference group is, whose opinion about you counts. The development of a body of professionals who want to be regarded well by their fellow professionals could do something to the ethical tone of a profession; although I must say that when I look at the professions of medicine and law, I am only modestly impressed with what professionalization does. If schools knew how to make people worry about what would be thought of them a hundred years after their death they could do something about ethics. The last thing now to do would be to sermonize. Nevertheless there are some things you can do to develop that taste. Maybe it is one of the strongest arguments for a proper kind of liberal arts education that it would make you fear what Socrates would think of you.

Opportunity in Public Administration

One development of far reaching significance during the last decade or so has been the increasing interface between public and private sector organizations, and increased interest in the management of the public sector. Lee Bach observes, "In many respects, the field of public administration today looks like business administration did in 1950." Bach feels that there is big opportunity for exciting movement forward and already schools are preparing up for this – there is the school for Urban and Public Affairs (SUPA) at Carnegie-Mellon, Harvard has the Kennedy School, while Stanford is combining the private and the public sector in the same school. And of course there is also the newly formed School of Organization and Management at Yale.

But apart from the manager who wishes solely for a public sector career, the changes in the public-private interface are significant for the private sector manager as well. We start by sharing the views of Dean Fouraker at Harvard.

Inadequacy of Formal Disciplines

FOURAKER: The sort of training that we provide will continue to be relevant preparation for jobs in any complex organization. What is needed, I think, for the government practitioner is an institutional insight from case descriptions or textbooks or from some source comparable to what has been done for business organizations. Two of our recent graduates are in government offices in Boston — one is Treasurer of the City and the other is Secretary of Human Welfare in the Commonwealth and they did not have a good idea of what organizational problems they would meet when they entered government service. Now their general skills of attracting able people to work with them are certainly useful, but the knowledge of the institutional character of either city or state government, the difficulty of getting things done when you have legislative constraints and have to work with the politicians — those are obstables that have confronted public managers for a long time and are not understood well enough to be represented in curricula to the same extent that similar problems from business organizations have been. Training in economic theory, in sociology, or other social sciences will not help Mr. Stevens very much in his efforts to manage and restructure the welfare system in the Commonwealth of Massachusetts. The problems of that are not reflected in formal disciplines.

And of course the business school at Chicago has also taken note of these developments and is considering the implications. Dean Rosett explains his perception of the situation.

Examining Bureaucratic Logic

ROSETT: I think there are two areas that require some attention. One is that government regulations are becoming more and more part of what a business man has to live with and, probably, if we are going to train an effective business man, we have to teach him to understand the logic of a bureaucracy, why a bureaucracy does the kinds of things it does and what you can expect from it. I do not mean by that just teaching familiarity with particular regulations or anything like that, but I mean understanding what incentives operate to make a bureaucracy behave the way it does and so on. That is one thing. The other thing is that, more and more, we are going to be asked to train people to be the bureaucrats, and on that score many of the things we teach business men ought to be taught to bureaucrats. They are going to be operating an economic system and are going to have to learn how to evaluate data and decide what it means and so on. They need to learn economics, statistics, and accounting — all the things we teach business men. There may be some special things that they need to be taught; for example, it does tend to look a little as though government finance is different from business finance — New York City can be taken as an example — and maybe we need to pay a little attention to teaching what that difference is. I hope it is more than just that a politican can with impunity be less honest than businessmen are, but at any rate there are some differences having to do with these institutional arrangements in business and government which we need to pay attention to if we are going to train bureaucrats.

A Problem of Political Attitudes

There is obviously no dearth of agreement that indeed there is not much difference of substance between public admin-

istration and private administration. The issue now is whether both public and private managers can be trained together. Simon feels that attempts to do both in the same school have not been generally successful on the whole, and that the problem is a very subtle one. The problem is, he feels, that (talking in general terms) the people who are attracted to public administration as a career versus business administration as a career, generally have quite different attitudes and values in life. There are real problems of integrating students in the school. In their political attitudes one tends to get a Republican-Democrat division, to over-simplify it a bit. Simon says, "It does not mean that you cannot do it – it just means that you cannot buy very much with it." Apart from that Simon seems to suggest that the propositions are sound.

Tasks for the Dean

SIMON: The fact that something has not been done in the past should not be a conclusive argument against doing it in the future. The world has changed, attitudes have changed, and certainly private managers need to know more about the public sector than they used to know, so that the curricula arguments are even weaker than in the past, for separation. The problem you would have to tackle as a dean and as the faculty of such a school is the attitudinal problem.

Considerable attention was attracted last Fall when the formation was announced of Donaldson's school at Yale for, among other things, the school's goal is to train people for both public *and* private management. So, in New Haven, we talked with Dean Donaldson about his plans for the school.

DONALDSON: "I think that one of the greatest potential pitfalls for [generalist] managers is that if they do not understand a number of fundamental disciplines, they may be scared by their applications or intimidated by the people who operate in those disciplines. They may either turn their back totally on the discipline, go along totally with the conclusion of the specialist without an independent judgment on the validity of the suggested decisions, or function without an ability to relate to and probe the quality of the analysis."

Managers, Not Analysts

DONALDSON: Well as I see what is going on in other educational institutions, there are the prominent graduate business schools like Harvard, Stanford, Chicago or Carnegie (although you don't call yourself a business school) that basically have a strong thrust in business management training and in some cases have only fairly recently begun to try and stretch their wings to provide an expanded public sector curriculum. There may be difficulty for some of those schools in doing that, in the sense that they have done an excellent job, have a very satisfied market clientele in the business community and perhaps little incentive to tinker with a successful formula On the other hand, there are the newer public policy schools which it seems to me are quite different than the older public administration schools. They are essentially focussed on so-called policy analysis and seem to be training prospective analysts as opposed to aspiring managers.

Donaldson believes that a number of so-called business disciplines that are applicable to the public-sector are not, to the best of his knowledge, being taught in many of the

public policy schools. He says that in trying to gain an understanding of organizations, that do not march to the beat of the profit and loss statement, through organizational behavior type courses, their emphasis will be on identifying the areas of similarity as well as on noting where they are different. "All of this is a part of the educational process of studying public and private side by side," says Donaldson.

Donaldson painstakingly points out that they have framed out a definition of their mission in terms of the managerial needs they see at Yale, and the students they are going after, without making a value judgement on the mission of some other school.

Increasing Public/Private Interface

DONALDSON: A major threat that I see is a world in which there is a paucity of managers who are familiar with both the public and the private sectors and the different characteristics and constraints of those sectors, even if such a manager operates in the private sector totally or in the public sector totally. The country needs managers who can function well in an environment of increasing public-private interface and complexity and it is just that sort of manager that we are going to try to train.

Donaldson feels that there should be no pre-conceived ceiling, in the psyche of somebody coming to his school, on their own aspirations, but hopes that they will learn at his school that they are going to have to perform at different levels in organizations in order to merit increasing levels of responsibility. It will be an important concern at Yale, he says, to maintain a balance between breadth and depth. "The trade-off between breadth and depth is something a public or private manager has to balance every day," says Donaldson. He says his school is not a revolution in that it was not the first to focus on public management, but that it has the advantage of not having any traditions to shake-off.

A Chance to Start From Scratch

DONALDSON: I personally believe very strongly in the concept of what we are trying to do but recognize equally the difficulty of successful execution. I do not think it should be called a revolution in the sense that I mentioned at the beginning. There is probably no business school in the country that has not thought about the public sector and has not in one way or another been influenced to try and have some modification of a purely private sector curriculum. By the same token, as I talk to many of the public policy schools, I sense they are continually questioning themselves about how much private sector management content should be reflected in their curriculum. All of them have many advantages but they have one common disadvantage of being going organizations and having to change something that is already there. We have a chance here to start from scratch — that's perhaps our greatest strength and challenge.

Candidly, Dean Donaldson admits that he does worry. "I would naturally much rather have us perform and be recognized after the fact for such performance," says Donaldson.

DONALDSON: I suspect that what worries me today, January 1976, probably worried Lee Bach and the others at Carnegie back when they were starting. The job of modifying an existing organization is quite different than starting a new one. There is a sort of entrepreneurial trade-off here between getting something new started and the recognition that mistakes are inherent in any development process.

DONALDSON: "The country needs managers who can function well in an environment of increasing public-private interface and complexity . . ."

WILLIAM H. DONALDSON is dean of the newly announced School of Organization and Management at Yale University. In September, 1973, he was selected Successor Trustee of the Yale Corporation, the University's governing board of trustees and served as chairman of its finance committee. He relinquished his trustee position on assuming the new deanship.

After receiving a B.A. degree from Yale in 1953, he joined the U.S. Marine Corps, served in Korea and Japan as a First Lieutenant and returned to civilian life in 1955. He received his Master of Business Administration degree with distinction from the Harvard Business School in 1958.

From 1959 to 1972, he was founder, chairman and chief executive officer of the investment banking firm of Donaldson, Lufkin & Jenrette. The firm pioneered the concept of in-depth research for institutional investors, and in 1969 DLJ was the first member of the New York Stock Exchange to sell its shares to the public, an event which followed a year long, highly publicized effort by the firm to change the century-old NYSE rules against public ownership. Mr. Donaldson was named Businessman of the Year in 1969 in the year-end Associated Press poll.

He is currently serving as Special Consultant and Advisor to the Vice President of the United States and prior to this assignment he served as the principal organizational, financial and fiscal advisor to New York Governor Hugh Carey. In 1973-1974, Mr. Donaldson served as U.S. Undersecretary of State, under Henry Kissinger. His responsibilities included overall administration of the State Department's "Defense Department," the Bureaus of Science and Technology, Environmental Affairs and Cultural Affairs. He had special responsibility for all aspects of U.S. international energy policy and was the first chairman of the international Energy Co-ordinating Group that resulted from the Washington Energy Conference of 13 Foreign Ministers held in February, 1974.

Prior to his appointment as Undersecretary of State, he was active as a director of the New York Stock Exchange's first public board, was a founding director of the New York Urban Coalition, a trustee of Wesleyan University, a director of the Hudson Institute, of the Museum of Modern Art, and of the Robert Joffrey Ballet.

He is a trustee, member of the executive committee and chairman of the finance committee of the Ford Foundation. He is a trustee and chairman of the finance committee of the German Marshall Fund, a trustee of Nichols School, and a trustee of the Bowery Savings Bank. He is a member of several professional societies including the Institute of Chartered Financial Analysts, the New York Society of Security Analysts, and the Young President Organization. He is a member of the Council on Foreign Relations, and currently serves as an advisor to the Governor of Puerto Rico with membership in the Governor's Commission studying Puerto Rico's finances.

Wrapping Up

Success stories do not happen by accident. They are created. Amid the glamor and the glory that surrounds the schools that have become the leaders there is usually at least one person who sits and worries about maintaining the record of achievement that his school has carved out. And of course this individual is the dean of the school. Worrying about new opportunities and past strengths, and all this constrained by the peculiar sociology of his own school, the dean's duties call for extraordinarily dextrous academic management to interest his faculty in areas that he feels ought to receive their attention. But more than that it also calls for prophetic vision to be able to select wisely suitable foci for his school's energies.

We asked Herb Simon if some of the sense of excitement and adventure that had accompanied the managerial "breakthroughs" of the 50's and the 60's was beginning to flag; if many of the schools were now entering a period of consolidation.

Candidates for Innovation

SIMON: I think we have been in a period of consolidation, but any time a school, especially like this one, which made its reputation on innovation, finds itself in a period of consolidation, it had better find something new to innovate about. And I have some candidates. The first candidate I would have is the whole business of looking at an organization as a really complex man-machine system, and bringing in the things that we know about information processing, relating it with the things we know about Behavioral Sciences and Psychology, and bring in those interrelations into the study of organizations. I don't think we are doing that, but maybe some of my colleagues over there could tell me that I am ignorant of what is going on. I don't think very many other places are doing much either. The most promising beginnings I know of are at Wharton.

However, one element that the dean cannot control but which has an important influence on the tone of a school is its age. The problem of maintaining the vitality of institutions is a most significant one, says Dean Fouraker of the Harvard Business School. For, solutions devised to keep business schools alive will be transferable to other institutions in society. Dean Fouraker shares with us his concerns about managing one of the nations oldest business schools:

Capturing the Early Opportunity and Excitement

FOURAKER: One of the differences between this institution and Carnegie is that our problem of educational administration is one of a renewal – How do you get able, highly motivated faculty to renew interest and excitement about the mission of the institution when our answer had been forged by people forty or fifty or sixty years ago? Your school is still young enough so that many of the architects of its quite remarkable success are still around and still enjoying the rewards of seeing an imaginative and creative educational design reach maturity. In another fifty years, the task then is going to be – How do you recapture some

of the opportunity, the excitement of the first twenty-five years of the institution? The response involves a very heavy reliance on human behavior skills and human relation skills. These are the most difficult processes to understand and teach in a professional curriculum; and they are the most important.

Intended Compliments

FOURAKER: I would like to congratulate Dean Weber and the faculty and students at Carnegie on a very remarkable success in the field of education. We have on this faculty a number of people who came from Carnegie-Mellon. They are outstanding faculty members and we are very grateful for your good work.

Few discussions involving GSIA go by without a charge of 'extremism' being levelled at GSIA by somebody. So we asked Dean Weber if GSIA, unlike another eminent business school, did not attempt to pursue "balanced excellence."

Tomorrow's Orthodoxy

WEBER: You should not confuse innovation with "extremes." Stanford apparently has sought balance by eclecticism. At GSIA, there is a constant commitment to exploring new approaches and new ideas. This might be perceived as "extremism" because new ideas have to be pursued and presented more aggressively than the conventional wisdom. The most impressive thing about GSIA is its capacity and willingness to explore changes in the substance and pedagogy of management education. This quality should be actively preserved. The record indicates that today's "extremism" becomes tomorrow's orthodoxy. The best test of a school is its intellectual output and not its contribution to tranquility.

ARNOLD R. WEBER is Provost, Carnegie-Mellon University, Dean, Graduate School of Industrial Administration, and Professor of Labor Economics and Public Policy.

A nationally known labor economist, Mr. Weber was educated at the University of Illinois where he received B.A. and M.A. degrees in 1950 and 1952 respectively, and at the Massachusetts Institute of Technology, where he was awarded a Ph.D. in Economics in 1958. He achieved an outstanding record in research and teaching first at MIT and then at the University of Chicago's Graduate School of Business where he was Professor of Industrial Relations till 1968, and later, Isidore Brown and Gladys Brown Professor of Urban and Labor Economics from 1971 to 1973. From 1961 to 1963 he was Director of Doctoral Program, and from 1966 to 1968 he was Director of Faculty Research, both at the Graduate School of Business, University of Chicago. In 1964-65 he was a Ford Foundation Research Fellow and in 1966, Visiting Professor of Industrial Relations, Graduate School of Business, Stanford University. He began his tenure at Carnegie-Mellon University in 1973.

Mr. Weber was associated with several organizations as a consultant and was the chairman of many committees till 1969 when he accepted the position of Assistant Secretary for Manpower, United States Department of Labor. This led

WEBER: ". . . The people who are here — both students and faculty — view management as a constructive vocation and the basis for first rate intellectual activity . . ."

to a series of key government appointments. He was Associate Director, Office of Management and Budget, Executive Office of the President from 1970 to 1971. In 1971 he served as Executive Director, Cost of Living Council, and Special Assistant to the President. He was a public member of the U.S. Pay Board from 1971 to 1973. In 1974 he was appointed to the Federal Advisory Council on Social Security. He is Arbitrator, Labor Panel, American Arbitration Association; his other professional affiliations include memberships in the National Academy of Arbitrators, Industrial Relations Research Association, American Economics Association, and the Executive Board, Industrial Relations Research Association (1968-70).

Mr. Weber is a profilic author and has written more than forty books, monographs and papers. He also contributes frequently to the New York Times, Washington Post, Wall Street Journal, and Los Angeles Times. He is a director of ALCOA, Standard Shares, Ticor Mortgage Insurance Company, Pittsburgh Branch of the Federal Reserve Bank of Cleveland, and Consolidated Rail Corporation (ConRail).

Harsh Manglik

Students in the Managerial Environment II class, taught by Professors Kerr and Rosenthal, take advantage of a beautiful spring day.

What Next for Management Education

Ramamoorthi Bhaskar

Introduction[1]

Over the past thirty years, business schools have built up an impressive record of achievement. They have performed well on two counts. They have trained a large number of senior managers and they have succeeded in influencing management practice in the direction of making it more systematic. The activity of management is now a professional one, rather than a craft.

The basic thesis of this paper then, is that this education must now be available to a larger group; that, while the social gains from educating managers and would-be managers are large, the largest social gain from business schools is still to come. This social gain will be reaped by educating undergraduates in some of the skills in problem solving, behavioral science and economics that hitherto have been reserved for the education of managers.

I believe that the time has come to proceed to the next stage in the development of management as a subject of study. This is the stage where professional knowledge gradually becomes common knowledge.

It is legitimate to ask if it is indeed the case that professional knowledge must become common knowledge. After all, we have had sciences like physics, or civil engineering, or some branches of advanced mathematics around for a very long time. These have not become common knowledge. Why should the study of management be any different?

The difference is that studying management is really a specialized way of studying a large portion of general human activity. I say specialized, because management has

[1] *I am grateful to Teresa Lynn for comments on an earlier draft, and to Harsh Manglik for making it a far better paper than it was. I owe a much more general debt to my teachers, John R. Hayes and Herbert A. Simon.*

so far concerned itself almost entirely with the study of organizations of people, large and small. And yet the activity itself is no different from the activity that any person *has* to participate in, whether he belongs to business organizations or not. The reference here is to activities such as planning daily, weekly and monthly schedules, making ends meet (or trying to), deciding on a social circle, and so on. Business schools have concentrated on studying almost the same tasks but from an organizational perspective. From the point of view of the development of a science, this sort of specialization, or narrowing of focus, is necessary to attain success. But it is time to recognize that our personal lives involve a large amount of cognitive activity as well, and educational systems seem to be ignoring this.

This suggestion embraces a certain view of education. That is the view that fundamentals should be taught, rather than the detail. Two generations ago the focus in engineering schools in America shifted from teaching the then current engineering technology to teaching fundamentals. In 1930, teaching fundamentals essentially meant teaching what was fundamental in the relevant science. Thus it came to be that mechanical engineers learnt thermodynamics rather than descriptionss of existing heat engines, civil engineers learnt soil mechanics rather than existing heuristics for constructing foundations, etc. In 1976, though, fundamentals have become, in a sense, more fundamental. We are now in a good position to teach problem solving skills in abstraction, for example. But we ought not to restrict ourselves to teaching what is fundamental to professional activity; if we can teach skills that are fundamental to personal activity as well, we certainly should. And I have already said that in business schools we have learnt about a class of such activities, at least as they are carried on in business organizations.

This view of education is certainly not universally held. It is a widespread one though, and appears to be the dominant philosophy in most universities today. Anyway, I refrain from discussing the merits of that view here.

I now discuss the specifics of my proposal.

The Proposal

There are three components of personal activity whose analogues in business organizations have been well studied. These are (1) the analytical and problem solving aspect, (2) the economic aspect and (3) the interpersonal aspect. Teaching fundamentals then, essentially involves the construction of courses which teach skills applicable in these areas. At the present time, business schools already teach such courses, though only to MBA students.

My proposal is that such courses be included in all undergraduate curricula. The following three courses I believe, provide a fair sample of this sort of instruction.

1) Decision analysis and problem solving
2) Cost-Benefit Analysis
3) Behavioral Science or Managerial Psychology

For problem solving I am thinking of a course based on some combination of three books, viz. Wayne Wickelgren's book 'How to solve problems'[2], George Polya's 'How to solve it'[3] and Howard Raiffa's 'Decision Analysis'[4] For cost benefit analysis I am thinking of something like E.J. Mishan's book[5] and for behavior science a course based on

[2] *W.H. Freeman and Company, San Francisco: 1974*

[3] *Princeton University Press, Princeton, N.J.: 1957*

[4] *Addison-Wesley, Reading, Mass.: 1968*

[5] *Mishan, E.J. 'Cost benefit analysis: an informal introduction.' Allen and Unwin, London: 1971*

Harold Leavitt's book, 'Managerial Psychology.'[6] In terms of the abilities these subjects would demand of students in an undergraduate program, this proposal is more or less compatible with the standards of current programs. Learning behavioral science requires no skills in the calculus, at least for the kind of course we are discussing. Decision analysis, problem solving and heuristic search are topics that ideally, at least, teach students how to learn. While psychologists have been the ones mainly concerned with problem solving, business schools have pioneered application-oriented research in this area since imaginative applications of management science require that such skills are possessed by all managers. Consequently, business schools are well equipped to do this teaching. In terms of compatibility with existing curricula, this requires practically no prerequisites and is therefore 'completely' compatible.

[6] *Third Edition, University of Chicago Press, Chicago and London: 1972*

Harsh Manglik

GSIA PFE's, professors, and graduate students enjoy a recital in the GSIA lobby by students from CMU's School of Fine Arts.

The remaining subject, namely cost-benefit analysis, is the most difficult to introduce into all undergraduate curricula. The reason for this is that it requires a higher level of mathematical knowledge than is common to the entire undergraduate population at a university. There is also an irony in this situation. The students with the requisite mathematical knowledge are also the ones who are most likely to pick up cost-benefit analysis somewhere along their careers, anyway. The students without the mathematical background are the ones that probably will never acquire it on their own. Clearly, pedagogical research is needed to come up with imaginative instructional designs for teaching this subject.

Another few words in defense of this proposal are in order. This proposal has been structure-oriented rather than content-oriented. That is to say, the components of managerial activity that I have identified as being of general interest are to be the focus of an addition to the curriculum, not the subjects themselves, on which different schools may reach different decisions.

Concluding Remarks

To summarize, I believe that courses relating to certain areas of managerial activity should be introduced into the undergraduate curriculum.

There are distinct advantages in this course of action for those of us who are already concerned with management education. For researchers, the advantage is the fact that a broader group of people, with very different backgrounds, will have knowledge of their science, and for any science, the benefits of interacting with other sciences is great. New areas of research will perhaps open up, and new techniques for solving problems in the area will become available.

There are also advantages for managers and management educators. So far, we have only discussed the transfer of knowledge in one direction. It is not at all unlikely that some new knowledge will travel in the other direction.

Finally, there is also a long-term political gain. For any society with limited economic resources the tasks of organizing, exploring and allocating resources are crucial to its continued well-being. If, in the long run, knowledge about the science and technology behind these tasks is not common knowledge, the chances of elite groups being formed are increased. This cannot be palatable to any sort of democratic society, whether capitalist or socialist.

I believe that for the students concerned the advantages are straightforward: after a long long time, education would finally be doing what it is supposed to do, namely providing skills that are applicable to the task of living, and not just to the tasks involved in working for one.

RAMAMOORTHI BHASKAR is a graduate student at CMU's Graduate School of Industrial Administration. His research interests lie in problem solving, artificial intelligence, management information systems, instructional science, and management education. Born in 1951, he was trained as a mechanical engineer at the University of Mysore, India, and later worked as an aeronautical research engineer for the Indian Ministry of Defence.

A New Era of Professionalism and Specialization: Retirement Plans 1976

James E. Yanni
M. Lawrence Emmett

On September 2, 1974, President Gerald E. Ford signed into law the Employees Retirement Income Security Act of 1974 (ERISA). Inherent in this law, commonly known as the Pension Reform Act, was an overt recognition of the need for professionalism and specialization in the retirement plan area.

ERISA's IMPACT

Among other things, ERISA recognized today's economy is a vastly complex one with a wide range of investment opportunities. ERISA has implicitly (some would say explicitly) attempted to guide the controlling structure of retirement plans. It does so by suggesting some one person have ultimate authority over all facets of the plan. This "ultimate Fiduciary" is the *Named Fiduciary.*

The *Named Fiduciary* is someone named by the sponsoring corporation in the plan document who has the authority and responsibility to control and manage the operation and administration of the plan. Many of the responsibilities of the *Named Fiduciary* formerly came under the auspicies of the plan trustees. All other plan fiduciaries fall under the control of the *Named Fiduciary.*

For all of its limitations and confusions, ERISA was on solid ground in its obvious effort to force the *Named Fiduciary* to realize he may only be able to fulfill his responsibilities with the direct assistance of professional expertise.

The Act's *new* Prudent Man rule and "investment manager" concept are explicit in their promotion of professionalism and specialization. Further, the complexity and scope of the Act has forced lawyers, accountants and actuaries who had previously dabbled in the area to either get serious or get out.

The Named Fiduciary and Professional Assistance

In the past, retirement plan trustees were selected for many reasons, most of which had little relevance to their expertise as actuaries, accountants or retirement plan administrators. This is because it was accepted practice for such trustees to engage the services of experts to perform actuarial, accounting and administrative services for the plan.

The investment environment in the post-industrial revolution, computer age is vastly different from what was

when trust tradition was taking shape. Property values and earnings capacities are subject to sharp fluctuations. Today the preservation of capital and its productive employment requires a full-time professional with the ability to gather, analyze and understand a vast array of critical factors affecting the value of investments and to take prompt, appropriate action. Among the factors to be taken into consideration in managing investments are world-wide economic, political and social conditions, fiscal and monetary policies, and market conditions as well as the earnings outlook for various industries and companies.

Under these circumstances, the responsibility of the retirement plan *Named Fiduciary* which relates to investment management can be discharged more appropriately by engaging full-time professional investment managers than by attempting to perform that function personally along with his many other responsibilities. This does not involve any abdication or termination of responsibility of the trustee who must still exercise surveillance over the performance of his agents but rather, gives him a critical tool to help him meet that responsibility.

Before investment discretion can be delegated, it still remains the responsibility of the *Named Fiduciary* to see that investment objectives, guidelines and policies are committed to writing and communicated to the asset manager as an expression of goals and risk tolerance. This is not a task to be taken lightly.

It appears ERISA is now strongly suggesting to the *Named Fiduciary* that he engage the services of professional consultants to assist him to:

- Develop written investment policies
- Evaluate and select asset managers
- Monitor investment performance results

The "Investment Manager" Concept

Under ERISA, there can be many fiduciaries responsible for any single retirement plan. This is because of the broad definition ERISA applies to a fiduciary.

An ERISA fiduciary is someone who either exercises discretionary authority or control over plan investments or administration, or someone who renders investment advice for a fee. This definition includes plan administrators, investment managers, trustees, employees of the corporate sponsor of the plan who reserve the right to appoint the other parties, consultants and advisors.

ERISA promotes the use of professional investment managers. It provides that the other fiduciaries of the plan will not be liable for the acts of professional investment managers if:

- The manager is given investment discretion, and
- The manager is a registered investment advisor, trust company, or insurance company with investment management services, and
- The manager acknowledges in writing he is a fiduciary to the plan.

When these requirements are met, the professional investment manager becomes an ERISA "investment manager." As a result, the other fiduciaries do not directly share the responsibility for his investment decisions.

This does not mean, however, that the other fiduciaries can avoid their responsibilities. They must still discharge their fiduciary obligations with "care, skill, diligence, etc..."

Prudent Man Rule

An "ERISA" fiduciary must "discharge his duties with the care, skill, prudence and diligence under the circumstances then prevailing that a prudent man acting in a like capacity and familiar with such matters would use in the conduct of an enterprise of a like character."

This is different than the previous prudent man rule. The phrase *familiar with such matters* makes this a Prudent Professional Rule. In other words, if a *Named Fiduciary* is going to administer the operations of a plan, or manage plan investments, or choose a third-party investment manager or perform any other act important to the plan's operation, he'd better be professional at it. He should remember, when his case comes to trial, the courts are going to hold him to the standards of a professional.

Manager Selection

Therefore, the manager selection and investment review process must still evidence prudence. The flexibility to delegate investment discretion has provided the impetuous for the use of the professional pension consultant who assists in selecting and monitoring the performance of investment managers.

Most corporations are not large enough to support an internal staff with specific expertise in investment manager selection, and qualitative and quantitative review of manager performance. Without this expertise, fiduciaries of plans are placed in the position of having chosen an ERISA "investment manager" in order to avoid the liability for investment decisions, yet leave themselves open to possible liability for imprudent selection and review of the "investment Manager." Therefore, because it is less expensive to hire a management consulting group with this specific expertise than to try to train internal staff, and because it is probably more prudent, a new area of specialization has benefited from ERISA.

CONCLUSION

ERISA has legitimized the era of retirement plan professionalism and specialization particularly in the areas of investment management and pension consulting.

The *Named Fiduciary's* new role in connection with investment of pension funds should be to:

- Initially select the investment manager(s), utilizing the services and expertise of a professional consultant.
- Establish written investment objectives, guidelines and policies.
- Formulate investment strategy; i.e., debt/equity ratio minimums and maximums, consistent with such objectives and policies.
- Establish objective criteria by which to measure investment results.
- Continuously monitor results achieved by the investment manager(s) in relation to the standards of measurement.
- Continue to review the invest manager's organization to ensure its capabilities remain consistently high.
- Replace such manager(s) after a reasonable period if results are not satisfactory or if any of the trustees' guidelines or restrictions are violated.

JAMES E. YANNI is a noted speaker and consultant to corporations, unions and other institutions on investment matters. He is a specialist in the measurement and evaluation of investment performance, and an expert in the internal working of money management organization. An alumnus of GSIA (MSIA '66), he is the Consulting Services Coordinator of Butcher & Singer. He is the author of several articles published in *Financial Executive Magazine, Pension World, Pension and Welfare News* and *Novus.*

M. LAWRENCE EMMETT is a principal in the Major Asset Consulting Department of C.S. McKee & Company, Inc. He is a specialist in the use of insurance and related products in corporate situations and has spoken at a number of meetings of the Bar Association and various business organizations on related topics. Mr. Emmett, who holds a J.D. degree from the Temple University School of Law ('69), participated in drafting the Pennsylvania Securities Act of 1971, and structured the 1974 Lawyer/CPA Conference on the Pension Reform act of 1971.

Awards, Recognition, Kudos

Gerald Thompson

Robert Kaplan

Award to Professor Gerald Thompson

As mentioned in the Dean's Message, The American Assembly of Collegiate Schools of Business (AACSB) has named GSIA Professor Gerald Thompson recipient of this year's Western Electric Award for Educational Innovation. Thompson's project, "Self-Managed Learning of Mathematics-Operations Research" was the unanimous first choice of the selection committee. The Award was announced at the AACSB annual meeting in Atlanta on April 29th. *(NOVUS 18* carried interviews with Thompson, Simon, Cyert and Klahr on Innovation in Education. – Editor)

This is not the first time that the AACSB has acknowledged the leadership of individuals associated with GSIA. The first ever Dow Jones Award administered by the AACSB for distinguished contributions to business education went last year to George Leland 'Lee' Bach. Lee Bach, who is now Frank E. Buck Professor of Economics and Public Policy at Stanford University, was on the Carnegie-Mellon (then Carnegie Institute of Technology) faculty from 1946 to 1966 and was GSIA's first Dean. As one of the chief architects of GSIA, Lee Bach is credited with setting in motion at GSIA a continuing revolution in management education whose effects are felt throughout the teaching, research and practice of management.

GSIA Teaching Award for Professor Robert Kaplan

The newly instituted award for teaching was awarded for the first time this year. The award which recognizes superior teaching in the Masters Program was received by Professor Robert S. Kaplan. The award, announced by the Dean, is made on the recommendation of a committee of faculty and students and is based in part on the opinion of all students expressed in the course evaluation forms that are filled out by them for each course they take.

Bob Kaplan is Professor of Industrial Administration at GSIA and is currently interested in the application of management science to accounting, including empirical investigations of security price behavior, models for costing and internal control, and statistical methods in auditing. He is currently an associate editor of the *Journal of Accounting Research* and *Operations Research.* He is consultant on financial analysis and control to several "Big Eight" public accounting firms and management groups in banking and manufacturing companies.

The award carries a citation and a token cash amount that, as Professor Kaplan observed in receiving it, was doubly attractive being tax deductable.

Professor Daniel Berg Elected to National Academy of Engineering

Two professors at Carnegie-Mellon University, Daniel Berg (GSIA) and Steven J. Fenves (Carnegie Institute of Technology) have been elected to the National Academy of Engineering (NAE) in recognition of their pioneering research and outstanding contributions to the engineering profession.

Daniel Berg

Berg was honored for his contributions to the "art and science of electrical insulation" and for his leadership in motivating young engineers in the area of technological innovation. Fenves, a Professor of Civil Engineering at CMU since 1972, was cited for his work in the development of problem oriented programming languages for civil engineering applications of computers. Both will join CMU Professor Milton Shaw as members of the NAE.

Election to the Academy is considered the highest professional distinction that can be conferred on an engineer and honors those who have made outstanding contributions to engineering theory and practice or those who have demonstrated unusual accomplishments in developing new fields of technology. The Academy was established in 1964 as an organization of distinguished engineers, parallel to the National Academy of Sciences, and is autonomous in the selection of members. The Academy of Engineering shares with the Academy of Sciences the responsibility to examine questions of science and technology at the request of the federal government, to sponsor engineering programs aimed at meeting national needs, to encourage engineering research, and to recognize distinguished engineers.

Berg was cited for his basic engineering analyses of the electrical properties of materials under high voltages and for engineering applications derived from the study of electrical breakdowns. Prior to his appointment in March as Technical Director of Uranium Resources at Westinghouse Electric Corporation. Berg has served as manager of the Westinghouse Energy Systems Research Division.

Berg's leadership in encouraging young engineers at Westinghouse and Carnegie-Mellon to develop technological innovations was also recognized by the Academy. An Adjunct Professor at Carnegie-Mellon, Berg teaches the management of technological innovation at GSIA. Himself a participant in GSIA's Program for Executives ('71) Berg believes that the process of technological innovation can be represented as a complex system, similar to other systems that GSIA scholars have studied and provided insights into, and would like to see it become an important area of research at GSIA. He is concerned that although corporate planning goals ought to be integrated into research and development objectives, more often than not R&D activities are not "managed" but receive "benign neglect." Recognizing that R&D is an area of high risk and high investment, and therefore of extreme importance, Berg would like to see greater sophistication in the way technological innovation is managed. He believes that the management of technological innovation is too important an

activity to be left to technologists alone. While he enjoys the intellectual stimulation of teaching GSIA students as well as more mature participants in GSIA's Program for Executives, an important reason why Berg teaches about technological innovation is his conviction that it is an important area that most managers will be concerned with, sometime during their career. As a member of the NAE, Berg would like to direct his attention to developing the infrastructure for the management of research and to defining the role of universities and research organizations in assisting federal agencies, such as ERDA.

Berg feels that it is time to begin viewing problems on a global scale and that it will be necessary for the Academy to consider ways in which to tackle problems that face all humanity. This will naturally lead to the policy questions relating to technology transfer. Berg distinguishes between generally available technology that can and ought to be easily transferred and proprietary technology. He points out that when somebody else's technology is acquired a lot of the risks inherent in developing new technology have been taken away, for it is only the successful technology that can be transferred. Yet, even within these restrictions he feels that transferring broad based technology to developing economies, as well as providing advice to governments on how to utilize technology, is in the interest of developed nations.

Daniel Berg holds a B.S. degree in chemistry and physics from the City College of New York, and M.S. and Ph.D. degrees in physical chemistry from Yale University. His professional affiliations include the American Chemical Society, American Institute of Chemical Engineers, American Society of Mechanical Engineers, American Management Association, Fellow, Institute of Electrical and Electronics Engineers, and Fellow, American Association for the Advancement of Science. Besides having written over 30 technical articles, he holds 15 patents for inventions or co-inventions.

Gerald C. Meyers Named To CMU Board of Trustees

GSIA alumnus Gerald C. Myers (E'50, IA'54) has been appointed to the Board of Trustees of Carnegie-Mellon University. Myers is executive vice-president of American Motors Corporation, Southfield, Michigan.

Graduating Students Receive Awards

The Elliott Dunlap Smith Award for Excellence in Administration, established in honor of Carnegie-Mellon's Provost who played a major role in developing the school's programs, was jointly awarded this year to Sharon L. Chown and Kenneth E. Notary. Chown plans to start a career with Data Resources, Inc., while Notary will join Air Products and Chemicals.

The Alexander Henderson Award, presented to the student who displays the best work in economic theory, was awarded to Marie-Therese Flaherty. Dr. Flaherty, who will be joining the faculty at Stanford University, received the award for her doctoral dissertation, entitled *Industry Structure and Cost-Reducing Investment: A Dynamic Equilibrium Analysis.*

Even This . . .

Annual Grunters Award: The annual competition for grunting was held in the GSIA basement on April 23rd. The $100 prize was awarded to Peter McIntosh who will be carrying his skills to Ford Motor Company. Mike Samsen and Harsh Manglik tied for the runners up position and will carry their prowess to Citibank and Booz, Allen & Hamilton respectively. The panel of subjective judges consisted of Joan Velar, Helen Held and Neal Binstock while Professor Thomas Kerr presided over the competition.

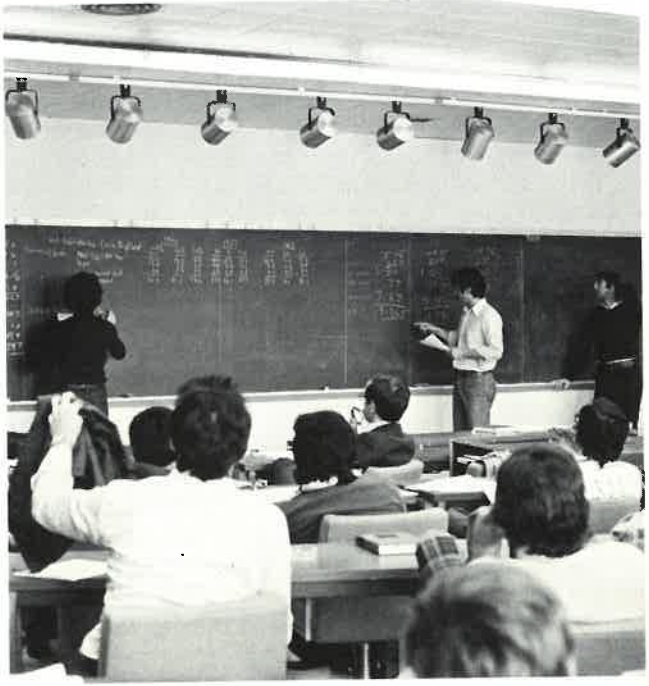
Special GSIA Program in Advanced Management Studies

Supported by a grant from the Alcoa Foundation, GSIA will be conducting a *Summer Institute for Teachers of Graduate Business Management,* this summer from June 13 to June 25. The faculty will consist of regular members of the GSIA faculty and will be augmented by faculty members of academic distinction from other universities. Top executives and practicing managers will lead special sessons.

The program will provide an opportunity for thirty-five faculty members of colleges and universities with minimal emphasis on research and innovation to: (1) increase their understanding and technical mastery of the workings of a market economy, (2) familiarize themselves with the newest developments in research and teaching methods in the major disciplines and substantive areas of management education and (3) enhance their understanding of the use of modern analytical techniques and their application to the functional areas of business, e.g., finance, accounting, marketing and production.

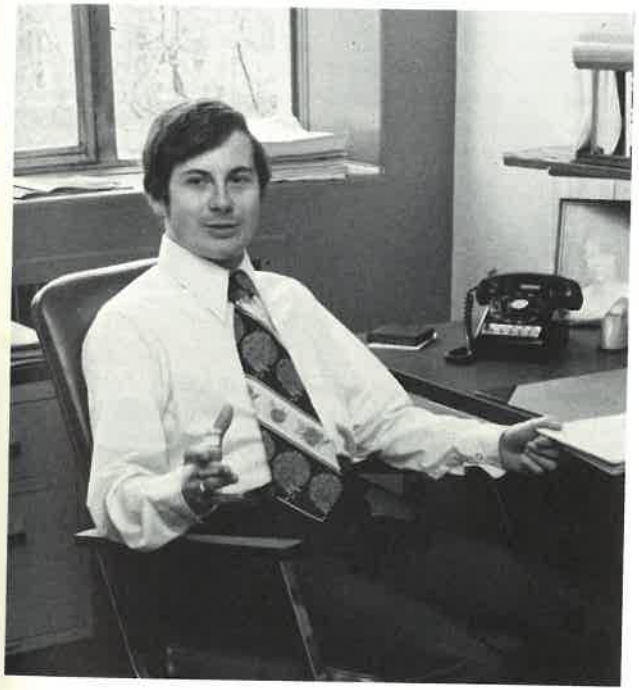
The program will be divided into two segments. The first segment of the program will concentrate on the presentation of analytic techniques and advanced material in the basic disciplines. These disciplines will be economics, organizational theory and behavior, probability and statistics, and operations research. The second segment will be devoted to the application of analytic techniques and basic concepts developed during the first segment to various functional areas. The functional areas will consist of marketing, finance, accounting, productions, and government regulation.

Participants, whose number will be limited to thirty-five in all, will be selected from among the nominees of deans of business schools.



Harsh Manglik

A New Face At GSIA



[Early in March, GSIA welcomed C. Douglas Mintmier as the new Coordinator of Placement and Public Relations, a position that was made vacant by the resignation of Donald Stilley. Thrust into this job at the peak of the recruiting season, Doug has proved to be more than equal to the immediate task of providing counsel to students on any range of topics – from interviewing techniques to how to turn down an offer (with grace!) NOVUS is pleased to introduce C. Douglas Mintmier and wishes him a very successful and rewarding career at GSIA, and looks forward to a long association.]

C. Douglas Mintmier is an old "pro" when it comes to the recruitment process at top notch schools around the nation. He comes to us from Limbach Company in Pittsburgh where as a Personnel Administrator, Doug also ran the college recruiting program, a responsibility that on many occasions brought him to the Carnegie-Mellon campus in his search for talent. But Doug's experience and interest in personnel management, and specifically in recruiting, go back much farther than this. After graduating from The Pennsylvania State University School of Business in 1971, he accepted a position with the Consolidation Coal Company and was later promoted to Personnel Manager in Denver, Colorado. The next move was to Limbach Company in Pittsburgh. Not surprisingly, people coming into contact with Doug are struck by his keen insights into the recruiting process.

But most of all, what makes Doug a very effective Coordinator of Placement and Public Relations is the obvious enthusiasm and personal warmth that he brings to the job. Modestly, he makes a short-shrift of his ability to establish personal relationships. "I enjoy it," is his simple explanation, but a true one, and both in going to Limbach

as well as in coming to GSIA now, Doug was attracted by the opportunity to work with college recruiting programs. Whether as a recruiter or as a counselor he enjoys the interpersonal relationships one develops in this type of work.

One of Doug's goals is to improve the service available to students by providing guidance, through all phases of their search for jobs, both on a group basis and a personal basis, but with emphasis on the latter. "I view the employment search basically as a strategy game" says Doug, "in which I have to aid students in developing and implementing a strategy to reach those opportunities that allow them to make the biggest contributions as well as to receive the greatest personal rewards. And this aid *has to be* personalized." Students have been quick to appreciate Doug's interest (and expertise) and have reciprocated Doug's enthusiasm.

The most significant long term problem that Doug plans to tackle is one of image, a problem that has always lived with GSIA during its short but outstanding history of 25 years. For instance, Doug points out, even today some recruiters try to find an Operations Researcher in every Carnegie student they interview, because Carnegie had pioneered by including Operations Research in the curriculum. "Our students *are* excellent in Operations Research," Doug says emphatically, "but they are also excellent in all the other skills and functional areas that must form the repertoire of any manager!" The same small size that has helped GSIA achieve and maintain its uncompromising excellence has unfortunately hindered an appreciation for the extremely balanced nature of GSIA's curriculum, says Doug. In support he points out that while GSIA has a total alumni population of only 1,200, schools of comparable quality easily dwarf GSIA in numbers of MBA alumni; for example, the approximate figures for some schools are — Harvard: 27,000, Stanford: 11,500, and Chicago: 13,000. Accordingly, Doug plans, from a public relations point, to emphasize to a wider clientele the very broad nature of the School's achievements, programs and capabilities, but at all times to emphasize that at GSIA there is never any compromise on intellectual quality. This, in Doug's view, will enhance the already very high value of GSIA alumni in the employment market.

Doug backs up his claim by quoting impressive figures from the recruiting season currently in progress. While the National College Placement Council has indicated a decrease in MBA offers this year, at GSIA they are up 35%, and they are still coming in. So far this year (till April 7) the number of reported offers is 150. The average of *all* GSIA offers, without overtime, is $18,200, while the average non-accounting offer is $18,600, and the average accounting offer is $16,000. Several offers over $18,000 offer overtime pay which would raise the overall starting salary significantly, if included. Even without overtime, one third of the offers are above $19,000 and the range is from $14,000 to $27,000.

What makes the above figures outstanding is the relatively young age and lack of experience of the typical GSIA graduate. This year the average age of the graduating class is 26 while only 37% have had any previous work experience. Doug points out that from the very beginning GSIA graduates have held their own against graduates of other top notch business schools and have earned increasing recognition for the school. This trend will surely continue, says Doug, as more and more GSIA graduates move into positions of national leadership as their professional careers mature. He points out that it is only now that graduates of the earliest classes (which typically had 5 or 6 students in them) are reaching an age where they would occupy topmost corporate positions. The track record of these as well as the alumni of the later and larger classes is outstanding by any standards, Doug says.

On a personal note, Doug is presently single, but not for long. He plans to marry Catherine Ann North on June 5, 1976. Ms. North, a Registered Nurse, is a graduate of Lancaster School of Nursing with special training in infant critical care at the Albert Einstein Medical School in New York.

Letter to the Editor

Sir:

NOVUS 20 raised many issues concerning the intended use and value of the Management Game. In 1974, a faculty committee drafted a review of the Management Game containing both a listing of the Management Game's purposes and some areas in which improvement was needed. An outline of the stated objectives as viewed by the faculty may be helpful. The Game can serve within the M.S. program as:

1. An integrative course,
2. A vehicle for developing quantitative models,
3. A setting for developing interpersonal skills and organizational analysis,
4. An experience with oligopolistic competition,
5. An opportunity for group presentations,
6. An introduction to many Real World activities including labor negotiations, law suits, bank loans, board activities, and occasionally a stock market.

The committee review anticipated many of the shortcomings and pitfalls of management games in general that were identified in the discussion in NOVUS 20 and recommended several modifications to GSIA's Game. These formed the basis for the Game as it is currently being played. Additionally, the committee recommended a major strengthening of the role of the Game Boards of Directors. The committee suggested that the role of the Boards should expand beyond Real World practice to include more intensive questioning of the assumptions and analytic or quantitative models being used by the teams. Some additional monitoring of the quantitative and analytical development of each team should be incorporated into the Game's administration.

By the very nature of the Game, there is very little control over what is actually being done by the teams. This lack of control is both a major strength and a potential weakness. Therefore, one must hope that students get infected with enthusiasm for attacking Real World problems. It was concluded, however, that under proper supervision, the Game can provide a unique experience and close interaction with the faculty that is not easily duplicated by more traditional courses. The Game still provides a good environment for the development of integrative, analytic and behavioral skills.

Yours Sincerely,

Richard Staelin
Associate Professor and
Director of Master's Program
Graduate School of Industrial Administration

Recent Reprints

686. Multivariate Risk Aversion, Utility Independence By Scott F. Richard.
687. Whither the Epidemic? Psychoactive Drug-Use Career Patterns of College Students by Terry C. Gleason, Joel W. Goldstein, and James H. Korn.
688. Effect of Perceived Inequity on Salary Allocation Decisions by Paul S. Goodman.
689. A Stochastic Model for Auditing by Robert S. Kaplan.
690. Bayesian Analysis and Duopoly Theory by Richard M. Cyert and Morris H. DeGroot.
691. Optimal Consumption, Investment and Life Insurance Decisions in a Continuous Time Model by Scott F. Richard.
692. Interdependence and Complementarity — The Case of A Brokerage Office by Johannes Pennings.
693. Planning Horizons for the Dynamic Lot Size Model: Protective Procedures and Computational Results by Rolf A. Lundin and Thomas E. Morton.
694. Statistical Sampling in Auditing by Robert S. Kaplan.
695. Set Partitioning: A Survey by Egon Balas.
696. Experimental Logics and Δ_2° — Theories by Robert G. Jeroslow.
697. Some Comparisons of Tests for a Shift in the Slopes of a multivariate Linear Time Series Model by John U. Farley, Melvin Hinich, and Timothy W. McGuire.
698. Experimental Results on Hillier's Linear Search by Robert G. Jerslow and T.H.C. Smith.
699. The relevance of the structural contingency model for organizational effectiveness by Johannes M. Pennings.
700. The Effect of Aggregate Economic Variables on Congressional Elections by Francisco Arcelus and Allan H. Meltzer.
701. Efficiency of the Natural Rate: A Review Article by Edward C. Prescott.
702. Medical Manpower Models: Need, Demand and Supply by Judith R. Lave, Lester B. Lave and Samuel Leinhardt.
703. Improving Subjective Probability Assessment for Planning and Control in Team-Like Organizations by Nicholas J. Gonedes and Yuji Ijiri.
704. The Decision Process of 6- and 12- Person Mock Juries Assigned Unanimous +2 and 3's Majority Rules by James H. Davis, Norbert L. Kerr, Robert S. Atkin, Robert Holt and David Meek.
705. Varying Parameter Regression by Thomas F. Cooley and Edward C. Prescott.
706. Disjunctive Programming: Cutting Planes from Logical Conditions by Egon Balas.
707. Discrete Optimal Control of Production Plans by P.R. Kleindorfer, C.H. Kriebel, G.L. Thompson and G.B. Kleindorfer.
708. The Significance and Investigation of Cost Variances: Survey and Extensions by Robert Kaplan.
709. Adaptive Utility by Richard M. Cyert and Morris H. DeGroot.
710. Organizational Rewards and Retention of the Hard-Core Unemployed by Paul S. Goodman.
711. The Price-Level Restatement and Its Dual Interpretation by Yuji Ijiri.
712. An Operator theory of parametric programming for the generalized transportation problem: I. Basic Theory 1st part — and An operator theory of parametric programming for the generalized transportation problem: II RIM, Cost and Bound Operators by V. Balachandran and G.L. Thompson.

713. An operator theory of parametric programming for the generalized transportation problem: III – Weight operators 2nd part – and An operator theory of parametric programming for the generalized transportation problem – IV – Global operators by V. Balachandran and G.L. Thompson.

714. Monetary and fiscal policy in open, Interdependent . . . by K. Brunner and A.H. Meltzer.

715. The effects of sampling variation on sales forecasts for new consumer products by Robert Shoemaker and Richard Staelin.

716. Optimal Portfolio Revision with proportional transaction costs: extension . . . by George M. Constantinides.

717. Least Squares Estimation for Models of Cross Sectional Correlation by Alexander Lebanon and Howard Rosenthal.

718. Optimal Planning under Transaction Costs: The Demand for money and other assets by Milton Harris.

719. Bivalent Programming by Implicit Enumeration by Egon Balas.

720. Comment on Chen, Kim and Kon by George M. Constantinides.

721. The effects of economic policies on votes for the Presidency: Some evidence from recent elections by Allan H. Meltzer and Marc Vellrath.

722. Stochastic cash management with fixed and proportional Tr. costs by George M. Constantinides.

723. The evaluation and choice of internal information systems within a multiperson world by Stanley Baiman.

724. The 'Fisher Effect' for risky assets: An Empirical investigation by Jeffrey F. Jaffe and Gershon Mandelker.

725. The value of the firm under regulation by Jeffrey F. Jaffe and Gershon Mandelker.

The present series contains articles written by the faculty of the Graduate School of Industrial Administration. Publications began in the 1962-63 academic year and continue through to date. You may request copies and receive them from: Reprint Secretary, GSIA, Carnegie-Mellon University, Pittsburgh, Penna. 15213.

Harsh Manglik

The Velar Gallery in GSIA's lobby frequently displays the work of promising CMU and Pittsburgh artists.

CLASS SONG (to be sung rather sadly)

"CLASS OF 1976"

STEVE HAGER

1. Well it's Fourth Mini and the spring is here and I'm singing those second year blues
   When it's Fourth Mini and the end is near ain't nothin' gonna motivate you
   I got a case due today and a paper tomorrow but all I want to do is sit and play my guitar
   Oh it's Fourth Mini and the end is near, I'm singing those second year blues.

2. Well it's Fourth Mini, the spring is here and I'm still playing that interview game
   I got started 'bout October last year and I wonder if its ever gonna end
   Well there was 95 companies, came to Warner Hall; damned if I don't think I talked to them all!
   Oh it's Fourth Mini, the end is near; I wish I could find me a job.

Harsh Manglik

3. Fourth Mini, the skys are clear and I'm flying on the Allegheny plane
Goin' to Toledo to talk about a job then I'm flying right back again
Well I've been to Detroit, been to Bradford, Pa; sometimes I even get back Pittsburgh way
Oh it's Fourth Mini and the end is near, and tomorrow I'm going to New York.

4. Fourth Mini, the spring is here and I just learned to play hearts
Well you walk in the lounge when they need one more and brother that's how it starts
Oh you play a few hands, and then pretty soon all you're trying to do is just shoot the moon
Fourth Mini, we got us some cards, next I'm gonna learn bridge.

5. Oh it's my last mini and I sure am glad cause I can't afford any more
Cause I been borrowing from everyone around since I walked in that door
Well I owe to the state and I owe Uncle Sam and I owe CMU three or four grand
Oh it's my last mini, but I'm so sad I'll be paying till I die.

Harsh Manglik

[The sound of "Second Year Blues" should strike a responsive chord in alumni who had vaguely sensed that the Fourth Mini in the second year was different from the rest. The phenomenon has been institutionalized at GSIA and is a time honored tradition now. Class Poet and singer Steve Hager ('76, Rockwell Int.) captures its essence in this class song.]

GSIA Alumni Association

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* Chairperson

CLASS NOTES

'52 Andrew W. Mathieson
10 Fairview Manor
Pittsburgh, Pa. 15238

Andrew Mathieson has been awarded the Alumni Merit Award by Carnegie-Mellon University. The MERIT AWARD is awarded for exceptional accomplishment in the alumnus' chosen occupation to which he has brought a degree of progress or in which he has distinguished himself as a leader, thereby bringing honor to himself and to Carnegie-Mellon University. Mr. Mathieson is one of seven alumni who will receive the Merit Award at the Alumni Association Awards Banquet on Friday, October 1.

'53 Thomas R. Bromeley
P.O. Box 264
Bradford, Pa. 16701

Tom has been elected a trustee of Otterbein College, Westerville, Ohio. Active in area civic affairs, he is a member of the Executive Committee of the Advisory Board of the University of Pittsburgh at Bradford and is President of Bradford Nursing Pavilion.

'54 Gerald C. Meyers
4366 Risdon Court
Bloomfield Hills, Mi. 48013

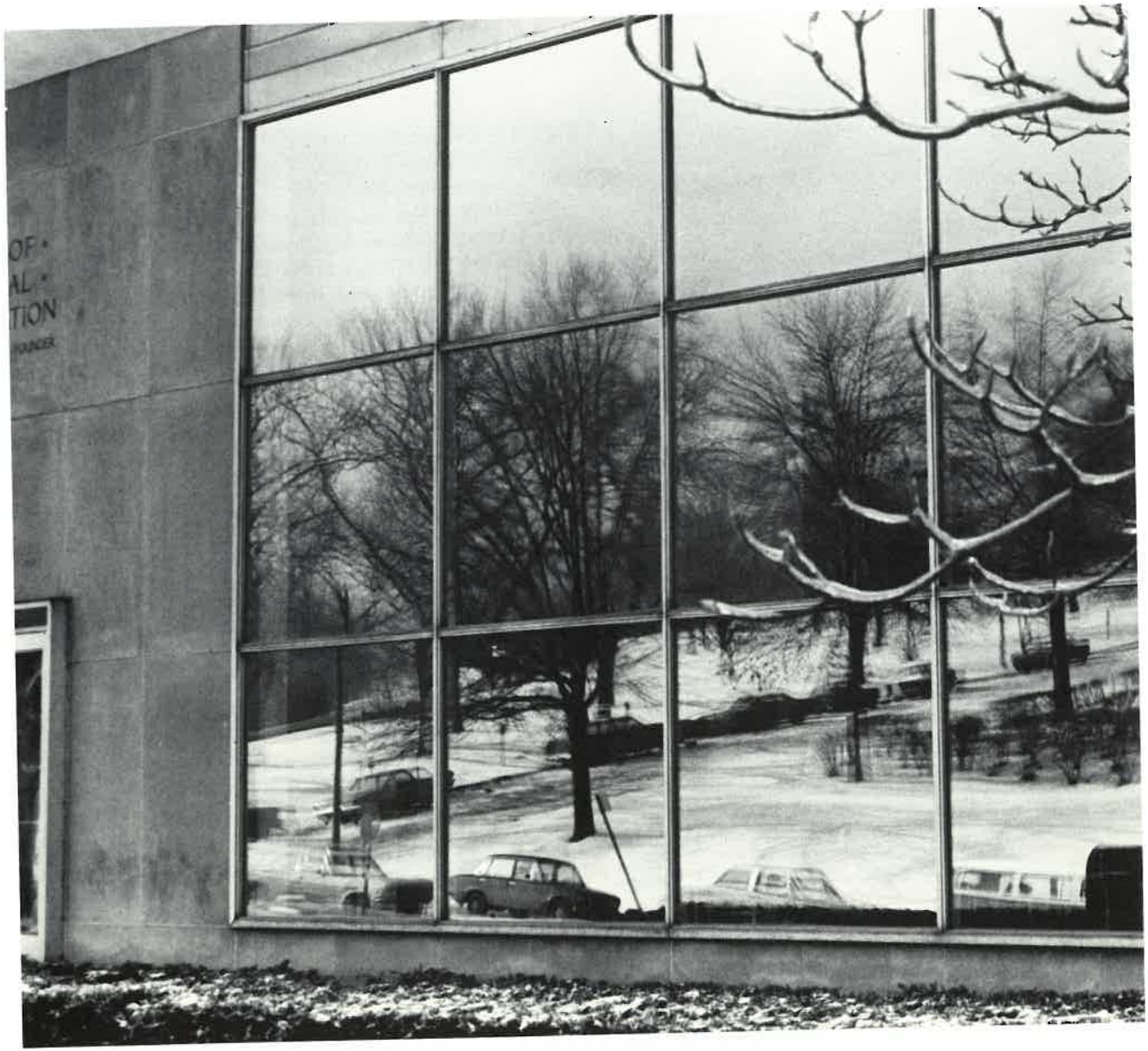
Gerald has been appointed to the Board of Trustees of Carnegie-Mellon University. He is Executive Vice-President, American Motors Corporation.

'63 Wayne E. Ault (PFE)
Vice President
Rolf Jensen & Associates, Inc.
100 Wilmot Road
Deerfield, Il. 60015

Wayne is now with Rolf Jensen & Associates, Inc., a firm of fire protection engineers specializing in architectural, legal, industrial and product engineering. Wayne left Automatic Sprinkler Corp. after 28 years.

'64 John A. Smolenski
1323 St. James Court
Palatine, Il.

John has recently been promoted to Region Controller, Finance and Administration for Xerox Corp., Midwest Region, headquartered in Chicago, Illinois. He was previously located in Dallas, Texas.



Harsh Manglik

'65 J. Woodward Perry (PFE)
Ralph Healey & Associates, Inc.
1587 Howell Mill Road, N.W.
Atlanta, Ga. 30318

Woody has joined Ralph Healey & Associates as Vice President after leaving his position with Automatic Sprinkler Corp.

'66 Walter C. Wood, Jr. (PFE)
Vice President
Grumman Iran, Ltd.
Intercom Software & Services, Inc.
215 Iran Novin
Tehran, Iran

Walt has moved to Iran to open Grumman Data Systems East.

'69 T. Jerome Holleran (Jerry)
1 Bluebird Drive
Wyomissing, Pa. 19610

Jerry has joined with three other principals to found Arrow International, Inc., a company specializing in the manufacture of precision metal components for the textile and medical industries. The company was formerly a division of Rockwell International. He is Vice President, Marketing and is responsible for plant operations at their satellite plant in North Carolina as well as for all textile products marketing.

'70 A.P. Bowden (PFE)
"Brokers"
31 Barton Crescent
Wahroonga, NSW 2076, Australia

Tony reports that he is now managing Watson Victor Ltd., a subsidiary of Nicholas Ltd. The firm is Australia's leading supplier and manufacturer of medical equipment and is also a major manufacturer and supplier of scientific, electronic and photographic equipment. His current assignment comes in the wake of a long line of international assignments for Nicholas. In his current post, Tony reports that in twelve months he was able to accomplish a positive turnaround in profit, reduce staff, and increase employee morale and productivity while implementing progressive management techniques.

Oliver R. Thomas
1476 Scenic View
Chaska, Mn. 55318

Rawley has been promoted from Manager to Director of Financial Services, within Super Valu. He lives in Chaska with his wife and two children.

'71 Peter Doyle (Ph.D.)
Management Centre
University of Bradford
England

Peter has been invited to be Distinguished Visiting Professor of Marketing at the University of South Carolina. He takes up the position in September 1976.

Karan '71

Edwards '73

Edumand P. Karan (PFE)
5580 Dundee Rd.
Edina, Ma. 55434

Edumand Karan, Vice President of the North American Grain Division of Continental Grain Company, has been named Manager of the division's midwest region headquartered in New York. Edumand is a Director of the Minneapolis Grain Exchange and a Director of the Northwest Terminal Elevator Association.

'72 Samuel H. Hall, Jr., Esq.
Grunert, Stout, Hymes & Mayer
P.O. Box 1478
St. Thomas, VI 00801

Sam has been named to fill the position of Executive Assistant within the office of the Commissioner of Commerce, Virgin Islands. Sam is presently associated with the law firm of Grunert, Stout, Hymes & Mayer and is a member of the Virgin Islands Bar Association. (Sam received a J.D. from Harvard Law School after receiving a MSIA at GSIA).

John J. Wise (PFE)
Assistant Postmaster General
Planning and New Development Department
U.S. Postal Service
11711 Parklawn Drive
Rockville, Md. 20852

'73 Paul R. Edwards
6315 Fifth Ave.
Pittsburgh, Pa. 15206

Paul has been appointed Assistant Systems Officer in the National Department of Mellon Bank, N.A., according to an announcement by James H. Higgins, Chairman.

Oliver Kent
Apt. 809
180 MacLaren St.
Ottawa, Ontario, K2P 0L3
Canada

Oliver is now an officer with the Prices and Profits Branch of the Anti-Inflation Board.

Joseph F. Yurso (PFE)
4629 Player Lane
Virginia Beach, Va. 23462

Joe has been promoted to Captain and is now Deputy Supervisor; Shipbuilding, Conversion and Repair; U.S. Navy, Newport News, Virginia.

DEATHS

'54 Harry V. Daniel (PFE)

'62 Jimmie D. Davis (PFE), Assistant Manager of Personnel Southern Pacific Company, August 31, 1975.

'65 Manning F. McCaw (PFE), Vice President, First National City Bank, New York.

'72 Capt. James Hamel (PFE), USN, Executive Assistant and Senior Aide to the Chief of Naval Material.
John R. Thamer (PFE), General Traffic Manager, Bell of Canada, December 26, 1974.

'73 James A. Lasseter (PFE), Vice President, Florida Power and Light Company.