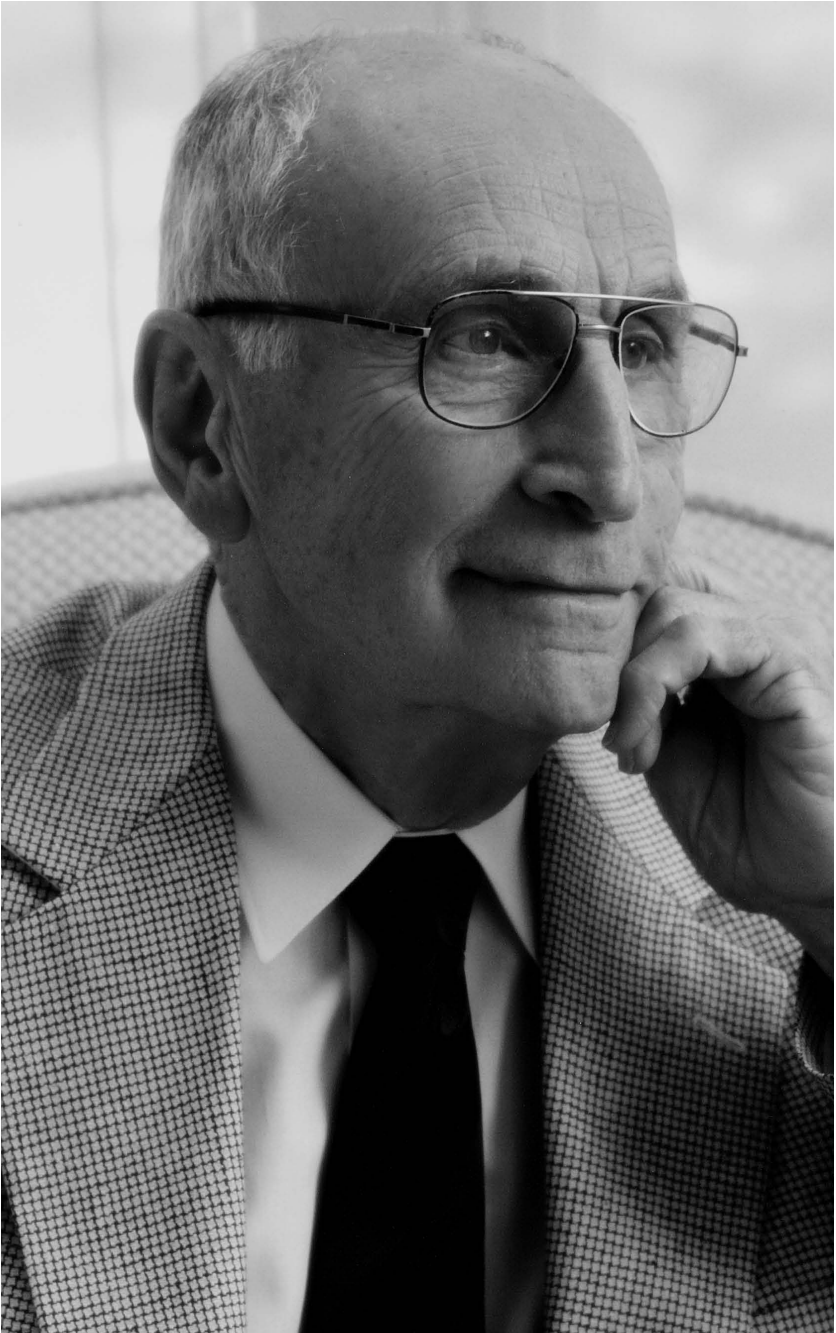


VOLUME 1

CHOICE AND COST UNDER UNCERTAINTY



THE COLLECTED WORKS OF
Armen A. Alchian

VOLUME 1

CHOICE AND COST UNDER UNCERTAINTY

EDITED AND WITH AN INTRODUCTION BY

DANIEL K. BENJAMIN



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It is taken from a clay document written about 2300 B.C.
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INTRODUCTION

This is the first of two volumes that compose the Collected Works of Armen A. Alchian. Together the volumes include all his major scholarly articles, some shorter papers published in nontechnical periodicals, and several unpublished papers, many dating from his years at the RAND Corporation in the 1950s. Not included in the Collected Works are his famous textbooks with William R. Allen, *University Economics* and *Exchange and Production*. Also excluded are a few unpublished papers for which some or all pages are missing, some book reviews, and a few comments written by Alchian about the work of others, papers that are not fully intelligible taken out of context. These two volumes are thus both a replacement for, and a supplement to, *Economic Forces at Work*, an earlier Liberty Fund publication that brought together a selection of Alchian's earlier papers. The Collected Works differs from that earlier book in that it includes numerous papers excluded from it, as well as many papers written by Alchian in the intervening years.¹

This first volume, *Choice and Cost under Uncertainty*, is the more eclectic of the two volumes, for the topics covered range from the meaning of utility measurement to effects of inflation.² Despite their enormous scope, there is a remarkable coherence to the papers included, a point to which I shall return. The second volume, *Property Rights and Economic Behavior*, is much more narrowly focused. Alchian is generally regarded as (along with Ronald H. Coase and Harold Demsetz) one of the founders of the economic study of property rights. This second volume makes it clear that this reputation is fully justified.

Alchian continues to work, even as I write these words, so his contributions to the literature are contemporary in every sense of the word. Indeed, his papers, even those published more than five decades ago, continue to garner

1. Armen A. Alchian and William R. Allen, *University Economics* (Belmont, Calif.: Wadsworth, 1964); *Exchange and Production* (Belmont, Calif.: Wadsworth, 1969); *Economic Forces at Work: Selected Works by Armen A. Alchian* (Indianapolis: Liberty Fund, 1977).

2. Armen A. Alchian, "The Meaning of Utility Measurement," *American Economic Review* 43 (March 1953): 26–50; Reuben Kessel and Armen A. Alchian, "Effects of Inflation," *Journal of Political Economy* 70 (December 1962): 521–37.

citations in research taking place on the current frontiers of economics. Thus, even if I were charged with setting out Alchian's place in history—which I am not—I would be unable to do so. In fact, as Alchian himself might remark, that is a task better left to the marketplace of ideas. What I can do is attempt to place the papers in the context in which the work was conducted and show how the ties between seemingly unrelated strands of research reveal much about Alchian's intellectual focus and enormous range.

Three themes unify Armen Alchian's work on economics. Together they outline both a coherent methodology for doing economics and a view of the world that celebrates the importance of individual liberty. For Alchian, the unit of analysis is always the individual; hence, the theory must be consistent with each person acting as an individual utility or wealth maximizer. This view compels us to recognize that the responsibility for choices lies with the individual, who is thus the ultimate source of all human power—whether that power happens temporarily to reside in a set of democratic institutions or in the hands of a dictator.

In Alchian's view, economic theory must be as general as possible. It must apply to both sides of the market, to markets for all types of goods and services, and to the decisions of all economic agents. Alchian is unremitting in demanding that economics be ruled by theory rather than by theorist, thus insisting on the general applicability of any proposition that purports to be economic theory.

Finally, in Alchian's view, both theory and theorist are constrained, indeed governed, by the facts: Theory must always confront and conform to the facts. It must yield refutable implications, and if these are in fact refuted, it is the theory—not the facts—that must yield. The purpose of theory is never theory in and of itself; it is instead to help individuals understand the world around them. In this sense, the ultimate consumers of economic theory are the people whom it describes.

I have cast the opening paper of this volume, Alchian's "Principles of Professional Advancement," as a preface, for it includes a description of the events leading up to three of Alchian's most insightful papers, all of which are included in this volume.³ In "Professional Advancement" Alchian also describes an unpublished paper, "The Stock Market Speaks," which was arguably the first empirical demonstration of the power of markets to incorporate into

3. Armen A. Alchian, "Principles of Professional Advancement," *Economic Inquiry* 34 (July 1996): 520–26.

asset values all relevant information about those values—even information that may be top secret. Sadly, this paper is not included in the Collected Works because it no longer exists: Written at the RAND Corporation in the early 1950s on the topic of the hydrogen bomb, the original manuscript and all copies were confiscated and, as far as anyone can determine, destroyed.

There is an important sense in which all of the papers in part 1 of this volume, “Uncertainty and Information Costs,” can be traced to an extraordinarily simple idea: Information, like all goods, is scarce—which is to say, it is costly to acquire and to disseminate. Will my trading partner do what she says she will? Will the good I am purchasing perform as it is claimed to perform? And will any of this be true tomorrow or next year? Efforts to answer questions such as these drive a broad array of the economic behavior we observe around us, ranging from advertising to unemployment. Alchian was among the first to recognize the fundamental importance of treating information as we treat all other scarce goods; as a result, several of the papers in this section have helped shape major strands of the literature in the years since he wrote them.

Part 1 of this volume begins with Alchian’s first published professional paper, “Uncertainty, Evolution and Economic Literature.” He wrote this paper initially not for publication, but simply to help himself and his graduate students understand the issues more clearly. Only at the suggestion of, and after considerable prodding by, Stephen Enke did Alchian consider submitting it for publication; even then, it took some very encouraging remarks by Milton Friedman (who had seen a copy) to induce Alchian to follow Enke’s advice. The paper brought an entire line of inquiry (or mode of thinking) to a grinding halt: economists had been struggling with the question, How do people think? Alchian made it clear that this matters not. What is relevant is how they behave: This is all we can observe and is all that will determine the outcome of their decisions. The paper also got Alchian’s career off to a fast start. As Kenneth Arrow (who was a colleague of Alchian’s at RAND in the 1950s) has remarked, “What made Armen really famous was his paper in 1950 on evolution.”⁴ The paper continues to be cited by economists and lawyers working on topics ranging from securities markets to marriage.

Another paper in this section, “Information Costs, Pricing and Resource Unemployment,” was undertaken at a time when economists were reexamining the

4. Armen A. Alchian, “Uncertainty, Evolution and Economic Theory,” *Journal of Political Economy* 58 (June 1950): 211–21; Kenneth Arrow, *ISNIE Newsletter* 3 (Fall 2001), p. 6.

foundations of the literature that had grown up in the footsteps of John Maynard Keynes's *General Theory*.⁵ Alchian's contribution to this literature was notable in at least two respects. First, it demonstrated that it was possible to think about macroeconomic issues using microeconomic tools. Just as important, this paper made it clear that unemployment—whether of people or of nonhuman resources—was, in fact, productive activity and could be thought of as the outcome of choices made by individuals in a world in which information is a scarce good.

Alchian's work at the RAND Corporation, where he was a consultant while a faculty member at UCLA, played a crucial role in stimulating much of his early research. The work in part 2, "Cost," illustrates this clearly. During the late 1940s at RAND, Alchian tried to determine what it actually cost to produce airplanes. The data were held by the engineers at RAND, and in the course of his work on costs, he found that the engineers looked at costs much differently than did economists. In his efforts to "correct" the engineers' thinking, Alchian discovered that they had insights into the production process and the nature of costs that he and other economists had completely missed: Not just the rate of production was important; so, too, was the intended volume of the production run. Although the results of Alchian's work circulated internally at RAND during the late 1940s, because of national security concerns it was not until a decade later that any of it appeared in the published literature.

The papers in this section highlight an important enigma. I think it is fair to say that everyone who is familiar with Alchian's work on costs believes that it is both innovative and fundamentally superior to the conventional treatment of the issues. Yet the work has had almost no impact on the literature. Why? A small part of the story may be that although "Costs and Outputs" was originally accepted for publication in the *American Economic Review*, Alchian chose instead to have it published in a *Festschrift* for Bernard Haley, one of his Stanford professors. But this cannot be the whole story, because the importance of this paper is recognized widely enough that it has been reprinted several times. Moreover, the other major published paper in this section, "Reliability of Progress Curves in Airframe Production," appeared in the prestigious journal *Econometrica*.⁶ Even though many fundamental aspects of the production pro-

5. Armen A. Alchian, "Information Costs, Pricing and Resource Unemployment," *Economic Inquiry* 7 (June 1969): 109–28; John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt Brace, 1935).

6. Armen A. Alchian, "Costs and Outputs," in *The Allocation of Economic Resources: Essays in Honor of Bernard Francis Haley*, by Moses Abramovitz et al. (Stanford: Stanford University

cess cannot be understood without focusing on the intended volume of the production run, economists continue to write almost exclusively about the rate of production.

Alchian's work with Reuben Kessel on inflation was stimulated by the latter's arrival at the RAND Corporation in the mid-1950s. Kessel had written his dissertation on the topic at the University of Chicago, and Alchian admired Kessel's way of thinking, as well as the data he had acquired.⁷ At Alchian's suggestion, Kessel successfully applied for funding to work further on inflation, and the result was a series of papers that transformed how economists view the consequences of inflation. Many of these papers focus on who gains and loses from inflation, with conclusions that not merely changed the way people thought about the problem but also—once again—highlighted the importance of uncertainty and information costs in determining those gains and losses.

This volume closes with a series of papers in which Alchian explicitly focuses on the semantics and the methods that we use in conducting economic analysis. Despite the absence of formalism from much of his work, Alchian's graduate training included large doses of mathematical statistics that incorporated the pioneering work of R. A. Fisher, J. Neyman, and E. S. Pearson. Indeed, when he arrived at UCLA for his first job, Alchian had the option of going to the statistics department or the economics department, and he ended up teaching mostly statistics at first. His training in both economic theory and statistics helped spur Alchian toward precision in thinking and in writing. And while this precision is evident in all his work, the papers in this section particularly highlight that aspect of his approach to economics.

Two of these papers warrant particular mention because of the historical context in which they were written. The rapid pace of technological change during and immediately after World War II induced the Army Air Forces (AAF) to have the RAND Corporation study the rate at which durable equipment should be replaced. The result was "Economic Replacement Policy," which is, to my knowledge, the first systematic study of this issue.⁸ It was written at a

Press, 1959), 23–40; Armen A. Alchian, "Reliability of Progress Curves in Airframe Production," *Econometrica* 31 (October 1963): 679–93.

7. Reuben A. Kessel, "Inflation and Wealth Redistribution: An Empirical Study" (Ph.D. diss., University of Chicago, 1954).

8. Armen A. Alchian, "Economic Replacement Policy," RAND Corporation R-224, April 12, 1952.

time when computing was in its infancy. Analogue computers, favored by engineers, were the fastest machines then available; the slower digital machines were the choice of scientists because of their greater accuracy. Alchian did the computations for his study using RAND's REAC analogue computer (one of only a handful in the country at the time), and the original version of the study published by RAND includes the wiring diagram for the REAC.

The paper entitled "Analysis Procedures" was written by then-Captain Armen A. Alchian while he served in the Army Air Forces during World War II.⁹ Early in the war, the AAF became concerned about the large number of candidates who were failing to complete air-crew training. After a year and a half of trial and error in devising methods of screening candidates, the AAF in November 1943 instituted standardized testing procedures. These screening procedures substantially reduced failure rates in the training program by weeding out unsuitable candidates ahead of time. Although the statistical procedures used by Captain Alchian are the stuff of today's undergraduate texts, they were, at the time, the most advanced available—methods that proved their worth in wartime practice.

Many of the papers contained in the Collected Works are coauthored. Alchian is, at every opportunity, effusive in his praise of his coauthors and colleagues; I would be remiss if I did not emphasize his gratitude and appreciation for their contributions and their friendship. Alchian is also deeply grateful to Liberty Fund for its attention and support over the years.

My debt to Liberty Fund in this endeavor is lengthy and large. Indeed, one might argue that the origins of this project can be traced back to 1975, when Liberty Fund decided to assemble a selection of Alchian's works in honor of his then-upcoming sixty-fifth birthday and asked me to edit what became *Economic Forces at Work*. Naturally, I was delighted when Liberty Fund decided to publish the Collected Works, and even happier when they asked me to participate in its preparation.

Special thanks are also due to Armen and Pauline Alchian's daughter, Arline Alchian Hoel. She undertook much of the drudgery of tracking down many of the papers appearing here, especially the previously unpublished manuscripts. In many cases, it took repeated trips to files that had remained undisturbed for

9. Armen A. Alchian, "Analysis Procedures," in *Records, Analysis, and Procedures*, ed. Walter L. Deemer (Randolph Field, Texas: Army Air Force School of Aviation Medicine, 1947), 445–509.

many years. Hoel also transcribed the five-plus hours of videotapes created in producing the Intellectual Portrait Series, a prodigious effort that enabled me to harvest many of the bits of history recounted here. And finally, she has served as a valuable sounding board for me as I have sought to organize Alchian's work in a manner that would be useful and has at all times encouraged me in my efforts.

My greatest personal and intellectual debt is to Armen Alchian himself. He showed me the beauty and power of economics and demonstrated that both could be transmitted in the classroom and through the written word. The science of economics is an enriched discipline because of Armen Alchian, and I am a different person. Most important, I believe that the world is a better place because he has graced us with his wisdom, his kindness, and his love of liberty.

Daniel K. Benjamin
Clemson University
2005

INTRODUCTION TO *ECONOMIC FORCES AT WORK*

RONALD H. COASE

Economists treat their heroes well. All our great men have had their works collected in volumes which are treasured and studied. It was therefore to be expected that the economics profession would want to see Armen Alchian's major papers gathered together and published as a book. Such a collection makes it much more convenient for those who wish to study his thought (as many do, and will), but even more important, it exhibits, in a way no single article can, the essential character of his approach.

Keynes tells us that Edgeworth, after the publication of his *Collected Economic Papers*, was genuinely surprised, and pleased, to learn the extent of his international reputation. Armen Alchian will, I am sure, experience a similar surprise, and also pleasure. It was remarked by Sir James Mackintosh that he had known Adam Smith, Ricardo, and Malthus, and that it said something for economics that "its three greatest masters were about the three best men I ever knew." It would be difficult to add some modern economists to this list without changing the wording. But this would not be necessary with Armen Alchian. He is classical in manners as well as thought. The publication of this book offers us an opportunity to pay honor to a colleague who has enriched our subject but who never stooped to conquer.

Armen Alchian was born on April 12, 1914, in Fresno, California. He was brought up in a tightly knit Armenian community, a community which was subject to intense discrimination. This discrimination, which does not now exist, was not the result, Armen Alchian believes, of any natural unfriendliness or unreasonableness on the part of the other inhabitants of Fresno but was due to the strangeness of the Armenians' manners and customs, which, because they were unusual and not quickly altered, were not understood or tolerated initially. This personal experience with discrimination led Armen Alchian to distrust efforts to prevent or remove discrimination by political means.

Armen Alchian was educated in the Fresno school system and in 1932 went

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to Fresno State College. Two years later he transferred to Stanford, where he obtained his B.A. in 1936. He continued at Stanford for graduate work, obtaining his Ph.D. in 1944, the thesis topic being "The Effects of Changes in the General Wage Structure." Armen Alchian's teachers at Stanford included Elmer Fagan, Bernard Haley, Edward S. Shaw, and Allen Wallis. While working for his Ph.D., Alchian was a teaching assistant in the Department of Economics from 1937 to 1940, held a Social Science Council Fellowship at the National Bureau of Economic Research and Harvard in 1940 and 1941, and, for a period in 1942, was an instructor in economics at the University of Oregon. In 1942, he joined the U.S. Army Air Forces, in which he served until 1946. From 1943 until the end of the war, he was engaged in statistical work for the Air Forces.

The war over, Armen Alchian joined the economics department of the University of California, Los Angeles, where he has been ever since, becoming a full professor in 1958. In 1946, he also became associated, at the instigation of Allen Wallis, with the RAND Corporation, a connection which was to have a profound influence on his work in economics. It enabled him to see how economics could be used to illuminate and solve practical problems. It also brought him into close contact with Reuben Kessel, Jack Hirshleifer, and William Meckling, and from his collaboration with them much important work sprang.

Armen Alchian's first publications were an outgrowth of his statistical work with the U.S. Army Air Forces. His later publications were undoubtedly influenced by his work at RAND and his interaction with his colleagues there. But it would be wrong to think of Armen Alchian's contribution to economics as a fortuitous result of the RAND connection. In 1950, he published his paper on "Uncertainty, Evolution and Economic Theory" (reprinted in this volume), a paper of striking originality, whose importance was immediately perceived and which gained him international recognition. It was clear that economics had a new master. The power which that article revealed would have served economics whatever the circumstances of Armen Alchian's life. But it was our good fortune that fate led him in the particular direction it did.

Armen Alchian has made important contributions to the economic analysis of inflation and unemployment, and to the theory of costs and of the firm. He has played the leading role in the development of a theory of property rights. His writing is distinguished by his ability to disentangle the essential from the trivial and, above all, by his skill in showing how the same basic economic forces are at work in a wide variety of apparently completely different social settings. And if the operation of these forces seems to produce sometimes satis-

factory and sometimes unsatisfactory results, this does not come about because the individuals concerned are better or worse but because the environment within which they make their choices is not the same. This is true whether one is dealing with discrimination in Fresno or with the behavior of university teachers, government officials, or businessmen.

Alfred Marshall considered that it was an essential task of an economist to demonstrate “the Many in the One, the One in the Many.” No modern economist has been more successful in accomplishing this than Armen Alchian.

I am grateful to Mrs. Pauline Alchian, Dean William Meckling, and Professors Wytze Gorter, Harold Demsetz, and Jack Hirshleifer for their assistance in the preparation of this introduction.

Special thanks are also due to Professor Daniel K. Benjamin of the University of Washington, who selected the essays included in this volume.

PRINCIPLES OF PROFESSIONAL ADVANCEMENT

You've finished your Ph.D. ordeal, and luckily you're now in your first year as a real member of the faculty. The expected relief from the burden of completing the dissertation is quickly replaced by the burden of publishing. But then you realize it's the same pressure again. You've already extracted what little there might have been in the dissertation. What can you do next, something really on your own?

You may not know now, but in a few decades, predictably, you'll have more than you can complete. Unfortunately, by then you'll have less desire to publish. The capital value of another publication will have become pretty small. So you'll find yourself passing ideas to, and encouraging, the younger members of the department, wondering if they'll be so fortunate as you were in early publishing an article that really helped your career.

These reflections by an older, retired, out-of-date person—one who has succeeded far above the “expected value” of entrants to the profession—are a sort of confession of “How I did it.” Or more honestly, maybe, “How it was done to me!” Perhaps it will inspire hope in new entrants, particularly with respect to publications.

I emphasize that the opening part of this essay is not entirely a conjectural story. It's mine, with a couple of minor exceptions. I'll confine my major comments to three papers I wrote some time ago, and with which I remain pleased today (for reasons I'll explain). I hope the comments will be of some interest to economists, especially in those moments when everything seems a bit confused, though not hopeless. I won't resist the temptation to reminisce and pontificate, the privilege of the emeriti.

Background

Although I was officially awarded the Ph.D. in 1944, while in the United States Air Force, I actually had finished my doctoral work by 1942, just before entry into the military. My dissertation was on the presumed effects of a gen-

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eral cut in wage rates across the economy. Like most dissertations, it should have been addressed to my supervisors with the label “For Your Eyes Only” and then forgotten—as mine properly has been. It had nothing to do with my subsequent work, happily. But the USAF engagement meant that between the dissertation and the first academic job there were several years in the military, with time to wonder what the point was in being what is called an “economist.”

Fortunately, I had a major sub-discipline as required in the 1930s: statistics. I had learned a few things about inference, probability, random walks, and stochastic, evolutionary processes. I learned them from a few extraordinary teachers, among them Allen Wallis, Edward Shaw, and Holbrook Working. And during military service I got to use what I had learned. At the USAF Training Command from 1942 to 1945, I did statistical evaluation of the validity of entry-level test scores of Air Force cadets, for their training as pilots, navigators, or bombardiers.

Principle of Professional Advancement No. 1

Upon return to civilian life in 1946 in my new teaching job at UCLA, I again started to read the journals in economics with my superb graduate students (the majority of them relatively mature ex-military men in their mid-twenties). In that way I began to relearn economics. For economists, Principle of Professional Advancement No. 1 is, “Have super students!” The value of good students is evidenced by publications. All three of the articles I will discuss below were developed during classroom exposition and discussion with my students.

“Uncertainty, Evolution and Economic Theory”¹

In my early years of teaching, a pair of confrontational articles by a Professor Richard Lester and a Professor Fritz Machlup, published in the leading journal, the *American Economic Review*, were dutifully studied with disappointment and distress. Current readers will be astonished to know that the debate was about whether business people “really” used marginal productivity and profit-maximization analysis in making decisions! Lester said “no”; Machlup said “yes.” Of course, both were right and both were wrong, but their reasoning and defenses were easily demolished by each other.

If that was the quality of analysis passing for economics, I should have

1. Armen A. Alchian, “Uncertainty, Evolution and Economic Theory,” *Journal of Political Economy* (June 1950): 211–21.

stayed in the military I thought. So, one day in class I explained what I had read. Then a bit testily, I complained about the quality of the articles, all in the privacy of the classroom. I then explained what I thought the two economists should have said. They should have said, “Read Darwin! It’s not what you think you are doing or how you rationalize your choice of that action. It’s whether the action has survival value. And if outside analysts can identify the reasons the chosen action had survival value, and in what direction changes in the environment (constraints) affect survival conditions, economists don’t have to worry about how people discover by thought or luck what are the new best conditions. Competitive trial and error will evolve toward the fittest—whom economists characterize as profit maximizers.”

Word of my comments passed to my colleague Professor Stephen Enke, as sensible and practical an economist as you would ever want to know. He remarked that the comments would make a publishable article. I scoffed that it was all too obvious and trivial, and appropriate only for a class lecture, not as a publishable article. He nevertheless urged me to write it at least for future classroom handouts.

I did. He read it, and liked it enough to demand that I send it to a journal. I didn’t know of one minor enough to warrant a chance for publication. He persevered, saying I should not send it to the AER, where the original two had been published. Instead, he brazenly suggested and insisted that I send it to the *Journal of Political Economy*.

To my genuine surprise, a very encouraging letter was quickly (by current standards) received from a Professor Milton Friedman, of whom I had heard. The paper would be published if a few suggested extrapolations and minor modifications were made. The article quickly appeared. It was my first article.² I proudly fondled the issue and sent reprints to close friends, expecting they might respond by saying “Thanks, I’ll read it sometime soon.” I could not at that time believe that evolutionary competitive principles were so forgotten or ignored.

Principle of Professional Advancement No. 2

I have since begun to realize that I was exceptionally fortunate to have had a father who thrust my nose into Darwin’s *Origins* when I was in high school. Then, in college, I had a course in biology which was all Darwin and evolution.

2. I had published a small, minor comment in the *Journal of the American Statistics Association* on someone else’s paper.