Introduction:

The Past As Prologue

Reason for the Retrospective

Rarely does an author have the opportunity to analyze his or her own work retrospectively, even more rarely to present an updated perspective based on two decades of additional research and experience. Even more remarkable is it that a subject would remain timely and not only warrant but demand further study. Such, nonetheless, is the case with systems analysis, born as operations research in the Battle of Britain, spawned in the Pentagon, where, as cost/benefit analysis, "the biggest bang for the buck" became the benchmark for the management of war and peace; disseminated as PPBS (Planning Programming Budgeting System) throughout the government, applied, as policy analysis, wherever decisions were to be made, and still gaining momentum. Enshrined as the scientific and rational methodology for public and private management, the techniques are supported by an influential body of literature and an even more influential body of practitioners for whom the question is not *whether* to apply them but only *how*. Known also as technology assessment and risk analysis, the techniques are being used to calculate everything from the safety of nuclear reactors to the effects of microelectronics.

The reason that *Systems Analysis in Public Policy* comprises the central corpus of this new work is that the original, published in 1972, covers the developmental history, gives an account of instances and areas where use was occurring, contains information about the prime components of the techniques, and provides a fundamental critique of the methodology. The book has been left intact because the story it tells remains true. Its criticisms are valid and are, indeed, substantiated by time; many of its predictions have materalized; none have proved wrong. What once seemed like dour implication has become dire fact.

What was then foreseen as the future of systems analysis constitutes our present reality. Our task now is to expand the analysis, the better to understand how this paradigm governs the present and determines the shape of the future. *Systems Analysis in Public Policy* has been updated to tell us what we did not know before. An overlay of what we have learned, it may alert us to what lies ahead.

Systems Analysis as Dominant Paradigm

It is necessary, as a point of departure, to review the ways in which systems analysis and the family of techniques to which it is related penetrated into and pervaded thought processes to the point that there was created a "management syndrome," i.e., the notion that all human affairs could be managed, and that by utilizing the tools of management science we would solve society's problems "rationally." Interesting to note, the universal acceptance and ubiquitous application of systems analysis are in themselves a phenomenon which merits inquiry. It is exemplified and can be explained by T. S. Kuhn's concept of the dominant paradigm, which he describes as "the entire constellation of beliefs, values, techniques . . . shared by the members of a given community."[1] That "given community" expanded and proliferated as the entire spectrum of academic disciplines from anthropology to zoology joined the engineers and economists in their embrace of systems analysis. Welcomed because of the semblance of methodical rigor it lent to fields eager to divest themselves of a "soft" image, the techniques brought an aura of respectability in an era when computerized models were becoming *de rigueur*. Welcome everywhere was a disciplinary matrix so eminently utile.

A strong supporting guild of practitioners, sometimes in universities, sometimes in government posts, sometimes in private management positions, sometimes in research organizations subsisting on federal contracts, sometimes on prestigious advisory panels, proved to be a bulwark against critical evaluation. Perhaps this explains the curious lack of advance in the state-of-the-art. The interesting paradox remains that techniques which have been bought and sold as "scientific" could continue to ignore so blatantly the rudimentary precepts of scientific procedure. Independent verification and validation are virtually nonexistent while huge expenditure continues to flow into systems studies, risk analyses, and technology assessments. Claims about "more powerful management tools" notwithstanding, there is very little difference be-

[1] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, Chicago, Illinois: The University of Chicago Press (Second Edition, enlarged, 1970) p. 175.

tween systems studies performed a decade ago and those produced today. Nor does there seem to be an appreciable improvement in the quality of management decisions. Rebuttal to challenge generally takes the form of a solemn recital of the Articles of Faith: the methodology is unexceptionable; it is only misuse that is at fault. There is nothing wrong with the method; it is only the data that are deficient. Incidentally, the data game is generally played when advocate and adversary, both using systems techniques, take stands on various issues.

Another paradox appears in our backward-looking mirror: how to explain the many and dismal management failures that beset public and private enterprise alike at the very time that they were the prime target of opportunity for management science techniques. Other less pretentious approaches having been scorned because they promised neither perfection nor panacea, the dominant paradigm sanctioned the "rational" methodology. Yet, years of dogged documentation by the General Accounting Office show that government agencies still need to be reminded of the most rudimentary rules of accounting and that ignorance of the most elementary management practices is rampant. Typical is the GAO's study of computer software maintenance in government agencies, where programs were found to be overpriced and undermanaged.

> Managers generally have neither cost accounting data on software maintenance activities and thus know little about how much maintenance really costs overall, or [*sic*] which types of maintenance cost the most. Agencies have established no goals and standards to measure the efficiency of their maintenance operation, nor criteria for acceptable maintenance costs for given situations. They have made only limited use of improved tools and techniques which could reduce the maintenance costs.[2]

That the Department of Defense should be a prime example of managerial ineptness is the crowning irony when one considers that it was the military that was the original model. The Comptroller General reported in early 1982,[3] for example, that the Army's Automated Facilities Engineer Job Order Cost Accounting Systems, designed to manage a work force of some 45,000 employees, was not efficient because (a) the information it generated was not being used by management; (b) data were not being entered promptly or accurately; (c) two design deficien-

[2] General Accounting Office, *Federal Agencies' Maintenance of Computer Programs: Expensive and Undermanaged*, Washington, D.C., GAO/AFMD–81–25, February 26, 1981, pp. i–ii.

[3] General Accounting Office, *Improvements Needed in Operating and Using the Army Automated Facilities Engineer Cost Accounting System*, Washington, D.C., GAO/AFMD–82–27, May 19, 1982, p. i.

cies pointed out by GAO five years ago had still not been corrected; (d) training of users had not been continued at an adequate level after conversion to the system; (e) it generated cumbersome reports in formats that discouraged use of the data. Nonetheless, examples of poor management abound. Many, reported by the General Accounting Office, indicate that the Army has no institutional memory. It never learns and simply repeats old mistakes. One instance[4] is that of the expenditure of tens of millions of dollars annually on material no longer needed by the requisitioners. According to the GAO report, the Defense Department, "can save an estimated $112 million over a three-year period and improve the credibility of its data base and supply readiness by strengthening its policies, procedures, and practices for periodically validating and reconciling older, outstanding orders." The staff of the House Appropriations Committee investigated the U.S. Navy's Ticonderoga, its most technically advanced, billion-dollar cruiser, and concluded that despite the vast expenditure for systems studies, the vessel would be ineffectual unless drastic corrections were made.[5]

If the emperor's closet were not bulging with vested interests determined to keep a lucrative systems game going, we might have acknowledged long ago that the folderol of "scientific" and "rational" decision-making techniques in the military and elsewhere has relevance only as *ex post facto* justification for the preferences and predilections of persons in higher places. At present, for example, "high tech fever" is the sole explanation for an investment (to date) of between $10 and $15 billion in a "Command-Control-Intelligence System" (C^3I), a radio and computer network supposed to control military maneuvers from one central location. When the system was tested in 1977, there were "abnormal terminations," the official euphemism for breakdowns, 62% of the time. Seen as useless when it fails to work and harmful when it does, because it undermines the initiative and leadership which officers must display on the field of battle, C^3I is only one in a progression of costly technological deterrents to military readiness.[6] According to testimony in Senate inquiry, "The military's pursuit of technological sophistication at any cost has caused it to ignore human contributions that account for numerous weapons failures. . . . Our bias toward short-term

[4] General Accounting Office, *Better Methods for Validating and Reconciling Unfilled Materiel Orders Could Provide Substantial Economies to the Army*, Washington, D.C., GAO/PLRD–82–76, (June 2, 1982), p. i.

[5] House Appropriations Committee, "Department of the Navy's CG–47 Cruiser Program," July, 1982.

[6] James Fallows, "America's High-Tech Weaponry," *The Atlantic Monthly*, May 1981, pp. 21–34.

investments in weapons of increasing complexity is the cause of our long-term cost growth."[7]

The military, for all its layers of management and despite the vaunted knowhow that made it the model, continues to provide the General Accounting Office's *Monthly Bulletin* with a dismal catalogue of mismanagement practices. The story of the Pentagon updated shows it to be no more a paragon than it was in the earlier version of *Systems Analysis in Public Policy*. The wonder is that the gross inefficiencies which bedevil it and all public agencies should have persisted so tenaciously at the very time that the ranks of management experts were swelling bureaucratic hierarchies and their ministrations were becoming so widespread. One suspects, on reviewing many cases, that the mythology of methodology has caused us to take leave of common sense, a faculty lamentably undervalued. The point is illustrated by the way cost-cutting "rationalizations" were used to undercut conservation programs in the agencies concerned with U.S. energy independence. The Department of the Interior, aggressive in its promotion of development policies justified by the "need," and the Department of Energy, determined to pursue the cause of nuclear energy at all costs, dismantled the very programs designed to reduce waste in Federal buildings and operations, despite the considerable savings in resources and taxpayers' money.[8]

Many were the lessons to be learned during the past twenty years. Some which should have been learned earlier were shielded by the uncritical fealty of the fraternity of practitioners who, after all, reflect their generation's predilection for formalized decision methodologies. Other lessons were obscured by the tautological nature of systems analysis, which proceeds from (a) certain assumptions and (b) on certain premises. It defines a universe which allows or disallows certain factors and data according to their "fit," and thus produces, with disingenuous certainty, justification for (a) and (b). This process was once described by Leontief[9] as leading from sets of more or less plausible but entirely arbitrary assumptions to precisely stated but irrelevant conclusions. The crucial point is that this circular justification, a kind of incestous vali-

[7] Franklin Spinney, as quoted by Jeffrey Smith, "High-Cost Lemons in the U.S. Arsenal," *Science*, 17 April, 1981, p. 310.

[8] John D. Dingell, Chairman, House Energy and Commerce Committee and Subcommittee on Energy Investigations and Oversight, stated in a report, *Wasted Energy Dollars in the Federal Government*, August 4, 1982, that with the total Federal energy bill totalling some $12.5 billion annually, even a one percent decrease in consumption would save $125 million and enough power to heat many homes.

[9] Wassily Leontief, "Theoretical Assumptions and Unobserved Facts," *American Economic Review*, 1971, *op. cit.*

dation, has served as insulation from the socially important aspects of problems and has condoned flagrant distortion of them. Herein lies a danger, observed by a professor at the London School of Economics: "Deception is easily practiced from false recipes intended to simulate useful findings."[10]

Economics and Cost/Benefit Analysis

We recognized early that the cost/benefit ratio was the linchpin of systems analysis. But we failed to anticipate its potential impact. One might have expected that in the process of sensible planning possible courses of action would be weighed in terms of their relative costs. But with costs customarily equated with the bad and benefits deemed good, criticism of cost/benefit analysis was deflected. To question the process was *pari passu* to impugn morality or motherhood. Of course, every one knew that cost/benefit analysis was a teeter-totter that tilted as it was loaded. The outcome depended on who put what on which side. What we may not have anticipated was the way the simple principle of trade-off was to be parlayed into position as the keystone of public management, to be used in regulatory deliberations, assessment of risks, and policy formulation. A favorable benefit to cost ratio came to be the *sine qua non* for most important decisions made by the powerful Office of Management and Budget. An administration whose philosophy is one of disencumbering industry of regulation as a means to stimulate production assumes a high-risk carcinogen policy, seen by some critics as having potentially tragic consequences.[11] Easing of safety rules in automotive design and of quality requirements in hospitals becomes policy justifiable on grounds of ratio of cost to return.

Should we have foreseen that herein lay the blueprint for disaster? Only one short-sighted goal was to dominate public administration: maintaining an image of cost/effectiveness—"running government in a businesslike fashion." If ever we had fancied that budgeting was the way to implement government's planning, we were to learn that the process had been reversed. Budgeting was the implement that *determined* planning. Public planning was to be subverted into a cynical numbers game played by Mammon's rules by which the richer and more powerful could count on winning. The element of economics, once conjoined with engineering in operations research to keep dollars-and-cents considerations in sight, becomes the over-riding force. Notable here is the treacherous slippage from *financial* to *economic* to *economics*. Decis-

[10] David F. Hendry, "Econometrics—Alchemy or Science?" *Economica*, Vol. 47, No. 188, November, 1980, p. 390.

[11] Eliot Marshall, "EPA's High-Risk Carcinogen Policy," *Science*, 3 December 1982, pp. 975–978.

ions came to be treated as economic because they involved expenditure. Hence, economists were hailed as the doctors, even though their prowess was in tampering with thermometers and not curing the fevers. But we overlooked "Goodhart's Law": *viz.*, "All economic models break down when used for policy."[12] The lesson here is clear; simply because something costs money does not automatically consign it to the bailiwick of economics as we know the discipline.

Economics is not an exact science, despite the profession's embrace of econometrics as the *Gradus ad Parnassum* to scientific respectability. Linear regression being the philosopher's stone for econometricians, we need only to turn to J.M. Keynes for an account of the deficiencies of the linear regression model.[13] His list could certainly obviate any claim to meeting "scientific" standards. He criticizes this model for (a) using an incomplete set of determining factors, i.e., containing an omitted variable bias; (b) building models with unobservable variables, such as expectations, estimated from badly measured data based on index numbers; (c) obtaining spurious correlations from the use of "proxy" variables and simultaneity; (d) being unable to separate the distinct effects of multicollinear variables; assuming linear functional forms without knowing the appropriate dimensions of the regressors; (e) mis-specifying the dynamic reactions and lag lengths; (f) incorrectly pre-filtering the data; (g) invalidly inferring "causes" from correlations; (h) predicting inaccurately, i.e., non-constant parameters; (i) confusing statistical with economic "significance" of results and failing to relate economic theory to economics. To this list, important because it undermines the methodological base of systems analysis, a British economist adds several more damning items: stochastic mis-specification, incorrect exogeneity assumptions, aggregation, lack of structural identification, and an inability to refer back uniquely firm observed results to any given initial theory.[14]

As long as a decade ago, Wassily Leontief, a Nobel prizewinner in economics, deplored his profession's growing preoccupation with mathematical modeling. More recently, he fortified his critical stance by surveying the articles published in the *American Economic Review* from 1972 through 1981. He found that the majority of the academic papers discussed only mathematical models and saw this as a "mathematical disease that has atrophied many academic economists."[15] R. Aaron

[12] C.A.E. Goodhart, "Problems of Monetary Management: The UK Experience," in *Inflation, Depression and Economic Policy in the West: Lessons in the 1970's*, A.S. Counakis, ed., Oxford: Basil Blackwell, 1978.

[13] John Maynard Keynes, *op. cit.*, p. 38 n. 67.

[14] David F. Hendry, *op. cit.*, p. 396.

[15] As quoted in "The Naked Economist," *The Economist*, July 17, 1982, p. 67.

Gordon, a noted economist, once observed that his professional colleagues had been seduced by mathematical elegance and were wont to sacrifice relevance to rigor. Then rigor mortis sets in, for abstract models and not the problems plaguing society receive attention. It may even be that the formidable front of mathematics is used to obscure the ephemeral substantive aspects that are the essence of these problems.

The observer of the current scene cannot fail to discern in the economic theorems being put forward as placebos for a sick economy a farrago of fad and fancy having a lifespan curiously commensurate with the term of an administration in office. Certainly no other academic field has produced such a plethora of prophets, some of whom have gone down in historical ignominy only to be born again with new charisma. Since politicians have a great affinity for nostrums, they anoint their favorite circle of economic seers. Thus, in the United States, the Council of Economic Advisors is comprised of an ever-changing cast of characters who first consent and then advise. They lend academic credentials, but not necessarily credibility, to whatever precepts are politically palatable.

What has been strikingly evident over the years has been the facility of the transition from the *logic* of economics to the *ideologic*. A large and conflicting body of hypotheses and theories has provided substantiation for just about any position that is politically sanctioned—radical, liberal, conservative, populist, monetarist, supply-side, libetarian, or whatever. But could we have anticipated the swing from *ideologic* to *theologic*? Certain forms of orthodoxy permeate the power structure and linger even after individual priests defect or are defrocked. It is important for purposes of our discussion to note that this process manifests itself tellingly in the cost/benefit analysis, for here is the frame of reference by which allocation and even the designation of costs and benefits are rationalized. What is to go on the teeter and what on the totter side and with what weight of data as evidence is arbitrarily predetermined and dictated by the prevailing economic religion which is, *non disputandum*, right.

We need only remind ourselves that cost/benefit analysis *per se* is nothing more than the calculated trade-off inherent in any choice. It was largely through its re-attribution in consort with systems analysis that it became imbued with a kind of mystique and accredited as one of the "powerful tools of technology"—how powerful we had yet to learn. By supplying the weapon for executing economic ideology-turned-theology, cost/benefit analysis is the fulcrum of the budgetary process. In our time, it is the numbers game played to "rationalize" relaxation of regulations and to condone reliance on the marketplace to take care of the public's health, safety, and environment. Since long-term costs or

benefits to the populace-at-large rate low priority when vested interests are at stake, cost/benefit analysis contains an antisocial and insidious bias. We see now with the clarity of hindsight the way the simple principle of trade-off became the epicenter of public management. Our task at present is to ascertain how this orientation has affected some of the areas of lasting concern included in the earlier edition of *Systems Analysis in Public Policy* and how others, such as regulatory policy, risk analysis, and technology assessment are being affected.

Optimization and the Decline of the Business World

Reverse clairvoyance reveals that the same precepts of management science found a hospitable environment in the business world. Executives relied heavily on elegant planning models and decision-making techniques that favored analytic precision and detachment over insight and judgment based on experience. Some observers contend that slavish adherence to the "science of optimization" contributed to the deterioration of American leadership in innovativeness at home and competitiveness abroad. Jordan D. Lewis, a senior fellow at the Wharton School, explains the decline as follows and selects General Electric as an example:

> The use of quantitative decision-making procedures limits a firm's ability to act on necessarily qualitative speculations about future markets and technologies. In the late 1960s, for example, General Electric used quantitative techniques to consider growth opportunities in computers, nuclear power, and semiconductor electronics. At the time, markets and technologies for the first two options were presumably closer at hand and thus easier to quantify than the third. General Electric proceeded to drop semiconductor electronics and invest heavily in computers and nuclear reactors. Since then the company has left the computer business, nuclear power sales have tumbled, and semiconductor electronics has become a major growth industry.[16]

Over the past two decades, "management by numbers" dictated short-term criteria in financial decision-making and a low-risk philosophy in corporate portfolio management.[17] Such market-driven strategies, based on profit performance calculations, have been seen as the cause for several major bank failures that had serious repercussions throughout the industry in mid-1982. There is concern that the rapacious, quick-return loan practices of some of the nation's banks may undermine the whole system. Similarly, an early profit-taking philosophy manifests

[16] Jordan D. Lewis, "Technology, Enterprise, and American Economic Growth," *Science*, 5 March 1982, p. 1207.

[17] Robert H. Hayes and William J. Abernathy, "Managing Our Way to Economic Decline," *Harvard Business Review*, July–August, 1980, pp. 67–77.

itself in the cannibalistic corporate acquisitions, merger mania, and non-productive shuffling of gains that have swept the financial sector. Profits on portfiolios may look good, but the game has proved inimical to the growth and vitality of the American economy. Instead of achieving technological superiority in products—a long, arduous task—managers cleaved to narrow bottom-line calculations. Having through such institutionalized greed lost its capability to produce goods and maintain a competitive edge over other countries, the United States now sends countless study teams to Japan and sponsors endless seminars to learn what two decades of management science dogma caused them to forget.

Heretic though it may have seemed when the original version of *Systems Analysis in Public Policy* first appeared, the contention is growing that the technico-economic management model so avidly espoused during the past decades may actually be root cause and not, as was so wishfully presumed, remedy for America's fiscal malaise. A mid-1982 Dun & Bradstreet Corporation report showed business failures at a 50-year high, with a 43 percent rise over last year's and a failure rate equalled only by that of 1932. The hypothesis that the cure contributed to the ailment gains credence when one ponders the demise of the automotive industry, where decisions have for years been dictated by the canons of cost/effectiveness. Professor William Abernathy, of the Harvard Business School, puts forward the concept of Detroit's "productivity dilemma"—its predicament rooted in pressures for cost savings that mandated greater efficiency in manufacturing but led to more standardization and rigidity at the expense of quality control, innovativeness, and technological competitiveness.[18]

Model design was driven by traditional notions of profitability: "We make more money on big cars" was General Motor's reason for eschewing smaller, more fuel-efficient vehicles. Translated into policy on product quality in general and the handling of particular defects, cost/effectiveness for the industry spelled danger to the driving public. Instead of recalling and repairing known defects, manufacturers went to court.

The transcript of a 1971 meeting between then-President Nixon and Lee Iacocca, then president of the Ford Motor Company, and Henry Ford II, then chairman of the board, was introduced in a multi-million dollar suit for damages in the death of a 15-year-old passenger in a 1975 Ford Mustang II, in which faulty gas tank design and placement were alleged. The Ford executives had met with Nixon to complain that safety regulations and the public demand for stricter automobile safety

[18] Leslie Wayne, "Management Gospel Gone Wrong," *The New York Times*, May 30, 1982.

standards were undermining their competitive position. Iacocca was heard to say: "And the Japs are in the wings ready to eat us up alive. So I'm in a position to be saying (to the Department of Transportation): 'Would you guys cool it a bit? You're gonna break us' . . . You can see that safety has really killed all of our business." Nixon agreed to investigate the DOT's regulations, so as to determine their effect on the automotive industry and the economy as a whole. "Cost/effectiveness is the word," said Nixon to the Ford executives.[19]

With high-powered legal defense, the industry won battles but lost the market. American consumers performed their own cost/benefit analysis and knew the meaning of the ominous formula C/E = ce (Cost/Effectiveness equals *caveat emptor*). "Effectiveness," for the industry, had produced uneconomic, unreliable, and sometimes dangerous vehicles for the consumer. The formula was to bring about the demise of the industry and the whole of the American economy was to pay. There may be an axiom here: decisions based on the command-performance, cost/effective model serve to satisfy vested interest, if not greed. Applied in the context of risk analysis, as will be exemplified in the final chapter, and as was suggested in the automotive industry's calculated disregard of known defects, such decisions are tantamount to technological murder.

The Case of the Costly Mini-Dollar

As an example of the kind of fiscal fiasco that can be brought about by over-reliance on cost/benefit calculations, we have the case of the Susan B. Anthony coin dollar. Put forward as "compelling reasons" in its favor by the Treasury Department were the following: (a) continuing increase of coin-operated vending machine usage; (b) higher-priced items due to rising inflation; (c) growing costs of producing and handling of the one dollar bill.[20] The Treasury compared the costs of coin as against paper as follows:

> The average lives of a coin and paper dollar are estimated to be 15 years and 15 months, respectively. This is a life ratio of 12 to 1. The cost to produce a dollar bill is approximately 1½¢ and the cost to produce a coin between the size of a quarter and half dollar made from cupro-nickel clad copper is estimated to be 2½¢. The cost ratio is 1.6 to 1. The combined life and cost ratio (12/1.6) is more than 7 to 1 in favor of the coin. In an example of potential savings, the cost of the 1.6 billion dollar bills produced last year apportioned

[19] Kevin Sack, "Nixon Tape Cited in Car Wreck Suit," *The Atlanta Journal*, November 16, 1982.

[20] U.S. Department of the Treasury, *A New Smaller Dollar Coin: Technical Considerations*, Washington, D.C., August, 1976.

for one year's use is $18 million (see calculations below). The cost of an equal number of coins apportioned for one year's use is estimated at $2.7 million. The full savings would not, of course, be realized until the dollar coin has achieved wide acceptability as a substitute for the dollar bill. This may take as long as 5 to 10 years after the introduction of the new coin.[21]

Calculation of Costs

a) Cost of dollar bill for one year's use:

$$\frac{\text{cost of bill}}{\text{year's use}} = \frac{1.5¢}{\text{bill}} \times \frac{12 \text{ months}}{15 \text{ months life}} = \frac{1.12¢ \text{ per bill}}{\text{per year}}$$

b) Cost of one year's supply of dollar bills:

$$\frac{\text{total cost}}{\text{year's use}} = \frac{1.6 \text{ billion bills}}{\text{year}} \times \frac{1.12¢ \text{ per year}}{\text{bill}} = \$18 \text{ million}$$

c) Cost of proposed coin for one year's use:

$$\frac{\text{cost of coin}}{\text{year's use}} = \frac{2.5¢}{\text{coin}} \times \frac{12 \text{ months}}{180 \text{ month life}} = \frac{.17¢ \text{ per coin}}{\text{per year}}$$

d) Cost of one year's supply of dollar coins:

$$\frac{\text{total cost}}{\text{year supply}} = \frac{1.6 \text{ billion coins}}{\text{year}} \times \frac{.17¢ \text{ per year}}{\text{per coin}} = \$2.72 \text{ million}$$

William H. Wallace, testifying on behalf of the Board of Governors of the Federal Reserve System,[22] provided a tabulation of that body's calculations of "the potential significant cost savings associated with substitution of a durable coin for paper money." The following is the cost/benefit analysis introduced in Congressional hearings:

COST BENEFITS OF THE ANTHONY DOLLAR

I. Comparison with $1 note

A. Production cost

Anthony dollar=$.03.
Average life=15 years.
Average annual cost (0.03÷1.5 years)=$.002.
$1 note=$.02.
Average life=1.5 years.
Average annual cost=($.02÷1.5 years)=$.013.
$1 notes in circulation=3.1 billion.
Annual cost of maintaining $1 notes in circulation=$40.3 million.
Annual cost of maintaining $1 coins in circulation=$6.2 million.
Production cost savings ($40.3 million—$6.2 million)=$34.1 million.

[21] *Ibid.*, Appendix A, p. 23.

[22] William H. Wallace, Statement, *Oversight Hearings on the Susan B. Anthony Dollar Coin and Mint Operations*, (U.S. House of Representatives, 96th Congress, First Session), Hearings before the Subcommittee on Consumer Affairs and the Subcommittee on General Oversight and Renegotiation of the Committee on Banking, Finance, and Urban Affairs, September 25 and 26, 1979, p. 47.

B. Processing cost

Currency processing cost/1000 notes=$3.849.
Coin processing cost/1000 pieces=$.381.
Annual cost of processing $1 notes=$17.7 million.
Annual cost of processing equivalent number of $1 coins=$1.7 million.
Processing cost savings ($17.7 million−$1.7 million)=$16 million.

C. Total cost

Currency total cost=$58.0 million per year.
Coin total cost= −7.9 million per year.
Total savings with $1 Coin=$50.1 million per year.

The calculated savings were impressive. If only 20% of the 2.4 billion dollar bills outstanding were displaced by Anthony coins, the Treasury estimated an annual production cost saving of $4.8 million and the Federal Reserve, an annual saving in handling costs of $0.8 million, for total annual savings of $5.6 million.[23] A chart supplied by the Congressional Budget Office in cooperation with the Treasury Department was introduced in the Congressional hearings to drive the cost savings message home:

Fiscal Years, in Millions of Dollars

Savings resulting from:	1979	1980	1981	1982	1983
One-for-one substitution of new coins for old coins*	2.7	3.1	3.4	3.8	4.3
Displacement of $1 notes	−.4	(1)	.6	1.2	2.0
Total Savings	2.3	3.1	4.0	5.0	6.3

*Eisenhower dollar coins
(1) Less than $0.05 million

Often cited in support of the smaller dollar was a study performed under contract with the Bureau of the Mint by the Research Triangle Institute, in spite of its own curious disclaimer that "a statistically reliable household survey of consumer attitudes and preferences toward coinage alternatives was not feasible within the constraints of the study."[24] One finds it difficult to imagine what these "constraints" might have been. If they were the perennial bane of the think tank's existence—shortage of time and money—one can only wonder at the research team's profligate use of both in amassing the plethora of charts, tables, and miscellaneous materials that had dubious relevance to the questions at hand. The ultimate denouement of the disastrous decision

[23] U.S. House of Representatives, 95th Congress, Second Session, Report No. 95–1576, *Susan B. Anthony Dollar Coin Act of 1978*, H. R. 12728.

[24] Research Triangle Institute Center for Development and Resource Planning, *A Comprehensive Review of U.S. Coinage Requirements to 1990*, Research Triangle Park, North Carolina, RTI Project 26 U–1133, September 1976, 2 Volumes and Executive Summary.

would later demonstrate conclusively that data gathering performed under the drunkard's lamp post[25] does not shed light on the subject under study. Subsequent developments were to show that the study team's failure to conduct a proper survey of public acceptance was a fatal omission.

On every count, the Susan B. Anthony coin had been calculated to be a bargain. Not only were its costs estimated to be low compared to the paper currency it would displace but there were benefits to be gained by politicians who endorsed the legislation. At that time, even a token pro-feminist stand had pay-off value and women's groups made much ado about substituting the image of an honest-to-goodness woman, like Susan B. Anthony, for a symbolic figure like Miss Liberty. A vote against Susan B. was soon to be construed as a vote against women's rights, with the converse equally compelling. The honors due womanhood became the focus of the debate. Attention was shifted from the coin, its characteristics, and attributes (unfavorable as well as favorable) to the person whom it was to honor. Public information kits freely distributed featured a glossy picture of both sides of the coin, one side bearing a likeness of Susan B. Anthony and proclaiming, "Liberty," "In God We Trust," and the other, an eagle clutching an olive branch and, apparently, landing on the moon with a small-sized Earth tucked under the ring of 13 stars. This side was also adorned with "United States of America" in bold-faced type, "One Dollar" still larger, and "E Pluribus Unum" thrown in for good measure. Included in the kit was a six-page dissertation on the tribulations, trial, and late triumph of the intrepid lady.

Enthusiastic letters from the National Women's Political Caucus, the Gray Panthers of Metropolitan Washington, and the League of Women Voters were introduced as testimony. All of them extolled the ideals of this courageous pioneer. Their interest was not in the issues surrounding the particular coin but simply in the picture on it. For them, only the message counted; the medium was discounted. The president of the League of Women Voters wrote as follows:

> After two hundred years of minting coins that honor men, buffaloes and mythological women, it's encouraging to see that at long last there is a coin that pays tribute to a real woman—the Susan B. Anthony coin. Susan B. Anthony embodied the courage and perseverance that many women have demonstrated through the ages. *It was also the type of woman who would have balked at the rapid retreat that some legislators seem to be taking from supporting the Susan B. Anthony coin.*[26] [Emphasis added]

[25] See story of drunkard's search cited in Chapter 3.

[26] Ruth J. Hinerfeld, President, League of Women Voters of the United States, Letter to the Honorable Mary Rose Oakar, U. S. House of Representatives, September

It should go without saying that the Susan B. Anthony campaign had the enthusiastic support of women in Congress. The Honorable Patricia Schroeder (Colorado) is quoted as exulting,[27] "We've had eagles and Indians on our coins, and live buffaloes, but we've never had a live woman. . . . We've got her now." Senator William Proxmire, from whom opprobrium might have been more likely than approbation, introduced the bill in the Senate, where he was chairman of the Committee on Banking, Housing, and Urban Affairs. The House recorded his motion twelve days later, on May 15, 1978. President Carter approved and signed S3036 as Public Law 95–447 on October 10, 1978 and Mrs. Rosalynn Carter put her stamp of approval on an Anthony mini-dollar.

Enticed by the prospect of huge savings and diverted by the false issue of feminism, otherwise perspicacious individuals and groups had for one reason or the other let loose upon the land three-quarters of a billion little white elephants. They did not travel far; no one wanted them. Frank Annunzio, chairman of the Subcommittee on Consumer Affairs, opened oversight hearings shortly after the coin was released with a statement punctuated by acrid commentary.[28] We quote from his remarks: "The new dollar coin may well go down in history as the only coin that more people wanted before it was released than after it was released." On the Treasury Department's plan to eliminate the $1 bill and promote the dollar coin through a public relations campaign that had already cost nearly $1 million, Congressman Annunzio had sharp words:[29]

> The public is not the only one that has soured on the $1 coin, as can be seen by the chart showing Federal Reserve shipments of new $1 coins to commercial banks. The graph indicates weekly shipments. It looks like the final hours of Skylab, and even the Mint, the strongest defender of the new coin, is taking a second look. It has cut back its daily production of the new coin by 50 percent. It does not make sense to cut back production, but at the same time conduct a lavish public relations campaign to promote the coin. It may be all right for Colonel Sanders to spend millions of dollars a year promoting his chicken, but I don't want to see the Treasury spending tax dollars to promote its turkey.

The *Congressional Record* contained more remarks by Annunzio. Somewhat less colorful, they nonetheless disclosed important deficiencies in the data on which the decision was based. He found substantial

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24, 1979, *Oversight Hearings on the Susan B. Anthony Dollar Coin and Mint operations, op. cit.*, p. 17.

[27] Robert Obojski, "The Quiet Death of the Susan B. Anthony Dollar," *Collector Editions*, Spring, 1982, p. 22.

[28] Frank Annunzio, Statement at *Oversight Hearings on the Susan B. Anthony Dollar Coin and Mint Operations, op. cit.*, p. 1.

[29] *Ibid.*, p. 2.