
Early RAND as a Talent Incubator

An Extraordinary Experiment

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NICHOLAS RESCHER

During World War II, the armed services of the United States had benefited from an ample opportunity to use the great pool of scientific expertise available to them for the systemic study of their operations in matters of equipment, supply, and the conduct of warfare. The senior commanders appreciated the value of this resource, and with the postwar creation of the U.S. Air Force as an independent branch of service, its leadership around Henry “Hap” Arnold wanted to retain such a resource. But senior scientists were eager to resume their professional careers, and it became clear that something new had to be created from the ground up and, for stability, to be based in the civilian rather than military sphere. This realization resulted in the establishment of the RAND Corporation in 1948.¹

Most descriptions of RAND’s past consider it from the vantage point of what the organization subsequently became. However, my only concern here is with what it was during the first decade of its existence, from 1948 to 1958.² This early history reveals

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1. Histories of RAND include Smith 1969, Kaplan 1983, and Abella 2008. The initial formation of RAND is described in comprehensive and accurate detail in Collins 2002.

2. Historical accounts of RAND usually distort its early days. They give undue attention to the dramatic, for example, by featuring Herman Kahn, who soon left RAND in a huff because none of its serious people would pay serious attention to him. They ascribe significance to John Nash’s participation, but his RAND career ended within weeks of its beginning in the wake of an arrest for homosexual activity. The sort of people who attracted the attention of later discussants almost invariably had little influence within the organization itself. And retrospective studies have also tended to ascribe undue significance to the prominent summer consultants whom RAND brought in less for contributing to the work there than for keeping its staffers in touch with academia—and the reverse.

RAND as a unique and extraordinarily successful (if accidental) experiment in the incubation of achievement—an unusual example of the effective development and fostering of scientific productivity.³

Although the broad outlines of RAND's history are well known, what is little understood and less appreciated is that it constituted a unique experiment in the cultivation of talent carried out with astounding success in the earliest phase of this corporation's existence. RAND's initial *modus operandi* was able to create an ethos within whose scope very smart people were given the opportunity and the motivation for success in achieving challenging, important, and influential work. Its story provides a vivid object lesson in the effective incubation of talent. An organization whose initial decade yielded four Nobel Prize winners, five assistant secretaries in the Department of Defense, a laureate of the National Medal of Science, the founder of a major research institute, the world's first professor of futuristics, a president of the University of California, and two awardees of the Presidential Medal of Freedom must be doing something right.

The people initially charged with building up RAND were senior executives in the aerospace industry. By some mysterious process, they had acquired a deep respect for scientific talent and a high confidence in the creativity of youth. And, in the event, they recruited an array of promising young scientists and scholars almost wholly in the twenty-five- to thirty-five-year age cohort, who, being junior, were also of course less expensive.

RAND's early hires included not only the standard range of talent in physics, engineering, economics, and mathematics but also social scientists and (surprisingly!) several logicians. Remarkably, it proved to be from the latter groups that some of RAND's most influential contributors were to emerge (see Rescher 2005).

And the people recruited to RAND in its early years were in the main youngsters who were at the start of their careers. They were not yet established figures with extensive commitments to the lecture circuit but novices with a reputation to make. These prodigies were left to their own devices, virtually without supervision, subject only to the understanding that their work should have some thread of relevance to the corporation's national security mandate. Only two strings were attached to these young researchers: they had to be able to obtain a security clearance for access to classified material, and they had to work on RAND's Santa Monica premises during standard business hours. Requiring them to work on the premises was a stroke of genius. They had time on their hands, and so, abiding by a policy urging them to keep their office doors open, they looked in on one another for stimulus and opportunities

3. Latter-day liberals have laid a multitude of sins at RAND's door. The organization has been charged with being a nuclear war monger (Kaplan 1983), nourishing American imperialism (Abella 2008), fostering Cold War aggressiveness (Robin 2016), promoting neoconservative aggression in Iraq (Robin 2016), inflating economic rationality beyond reasons (Erikson et al. 2013), and deflecting American philosophy from humanistic concerns (McCumber 2016). In my opinion, there is very little fire behind all this smoke, and the charges range from the vastly exaggerated to the totally absurd. But whatever be the right of the matter here, it does nothing to countervail the view given here of the early RAND's success as a unique nursery of talent.

for collaborating on matters of common interests. The volume and degree of cooperative interaction was impressive, and a culture of fertile interaction became endemic. Just this factor, it seems, contained the secret of success.

During this era, RAND thus permitted and indeed encouraged its researchers to “do their own thing” and yet be entrepreneurial within the corporation’s agenda. And, overall, during this period roughly one-quarter of RAND’s productivity dealt with basic issues in game theory, applied mathematics, computation, applied economics, public policy, and similar topics often related only remotely (if at all) with military matters.⁴

RAND’s organizational practice turned the usual pattern of resource allocation upside down. In most research efforts, the questions select the respondents: the problems are set first, and the suitable investigators are found to address them. But RAND’s practice reversed this process. The investigators were put in place first, and the selection of problems was left to their individual and collective initiation. And the experience of RAND’s first decade shows how *laissez-faire* entrepreneurship is a promising program not just in matters of economics but also with productivity in the realm of ideas.

RAND’s military paymasters of those days cut the organization a great deal of slack. Around one-quarter of the research had little if any immediate bearing on military matters and was aimed at issues of scientific and scholarly value in their own right. RAND’s powers-that-be were doubtless fully aware of this divergence and viewed it as part of the unavoidable “overhead” cost of maintaining a first-rate research facility.

To an extent that is astonishing in retrospect, the early RAND’s free-wheeling *modus operandi* provided its talented researchers with unusual freedom from the debilitating pressure of managerial restrictions and top-down regulation of productive activity. And this freedom appears to have motivated and energized those young RANDites far beyond any level of reasonable expectation. The initiative-welcoming ethos of RAND’s early management mode created a largely unregulated market for the exchange of ideas and the allocation of efforts that challenged able and dedicated people to a maximum of creative effort. It is no exaggeration to say that this combination of shrewd talent selection and free-reined entrepreneurship during those early RAND years produced revolutionary innovations in a wide spectrum of critically important areas: not only in military matters such as strategic planning, force development, weaponry, and intelligence management but also in mathematical economics, resources management, computational mathematics, and the theory of games and competition.

4. In the early days, RAND’s Engineering Division was its largest. Its extensive commitment to issues of alternative aerial reconnaissance and to the effect of nuclear weapons was an exception to the corporation’s broader research outlook.

A significant number of these early RANDites accomplished extraordinary things. The list of innovative RAND researchers provided in the appendix deserves close attention in this regard. In its first decade, RAND employed some 135 research professionals,⁵ and, as the list indicates, about 50 of them achieved truly outstanding success in their varied fields of activity—a truly extraordinary record.

Early RAND's contribution to the interests of the U.S. Air Force and to the defense establishment at large amply repaid the rather modest investment involved, for it transformed the whole structure of air force deployment and operations and plans until well into the missile age. But something very different deserves equal notice—namely, early RAND's effective role as an incubator of talent. There is no room for doubt that the air force operations potential was revolutionized by the work of RAND's professionals of this era. But when the collateral benefit of contributions to pure and applied mathematics as well as to applied economics and to the world of learning at large are also weighed on the scale, there can be no question about how the scale of costs and benefits inclines.

To be sure, most of the young researchers at RAND during its first decade eventually went on to work elsewhere under different auspices. But all of them carried with them an acute sense of how RAND conducted its inquiries—based on hard data, grounded in tested theories, and issuing from a collaborative effort to apply theoretical knowledge to practical problems.

It is regrettable that as RAND changed, matured, and transmuted into something different from what it was in its initial stage, the model of its extraordinary early success dropped out of sight. To be sure, from the angle of orthodox administrative and managerial practice, the early RAND was something of a nightmare. And extraneous factors were also at work. The organization's widespread unpopularity in the difficult era of the Vietnam War figured prominently among the reasons why the RAND model was never reemployed. RAND became anathema to the political Left owing to its linkage to the military establishment and to the political Right because its crew of "eggheads" included Daniel Ellsberg, who leaked *The Pentagon Papers*.

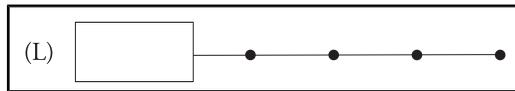
But such matters are irrelevant to the potential value of early RAND's formula for nurturing research talent. Here the operative ethos was straightforward: bring in young people of high promise, group them in thematically interrelated clusters, provide them with pleasant working conditions, permit them to pursue their own ideas, encourage them to seek out others for collaboration, and challenge them to show how their professional expertise can contribute to the solution of problems arising within a broadly defined area of societal concern. On this basis, early RAND's operational practice proved to be a unique incubator of talent and afforded a striking demonstration

5. RAND's annual report for the end of the period under discussion (January 1958), indicates 134 Ph.D.-holding employees.

of how to develop and energize the creative impetus of able young minds in the service of the public interest.⁶

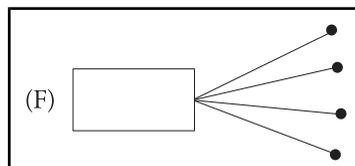
There was something special and characteristic about the way in which RAND sought the effective organization of a complex, multilateral venture in coordinating and utilizing scientific talent.

To see this, one has to go back to basics. And in this regard it is a regrettable fact that the effective organization of research is an issue to which comparatively little effort has yet been devoted. Somewhat strangely, in this context it is instructive to resort to a *dogsled model* (L):



Basically, there are two structures here. One is that of a series of coordinated efforts that constitute an essentially linear array of procedures conjointly integrated into yielding an overall result. Here everyone is working on the same ultimate result, putting their efforts into working in collective interaction to contribute their piece to the resolution.

The second is a *fanlike series* (F) of essentially separate but thematically linked components that advance an overall project rather than aiming at a particular result.

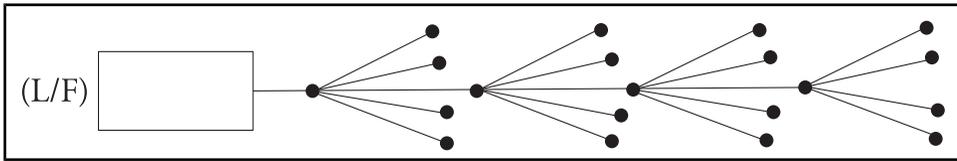


Here everyone is working separately, doing their own thing, while nevertheless working in distributive interaction to move toward a common objective. The situation is one of coordinated entrepreneurship.

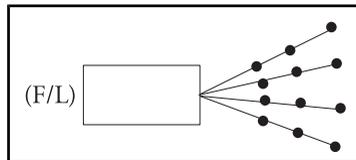
There are various ways of combining these two basic patterns.

6. It may well be asked, Would it not have been better if all this effort had been dedicated to more productive causes than to Defense Department concerns? But this question misses the main point of the present discussion, which is: If this mode of talent mobilization indeed proved so highly effective in that particular direction, why should it not work in others? But that said, I cannot refrain from adding that there is a good case for saying that early RAND's work for the U.S. Air Force was one important factor (doubtless among many others) that kept the Cold War from spilling over into a hot one. Insofar as this is so, we are surely not looking at an unproductive venture.

One combination is *linear fanning* (L/F), which can be represented as a line punctuated with fans:



And the other is *fanning linearly* (F/L) because here we have a fan constituted by lines:



The latter model was the characteristic structure of early RAND's organization of research. Everyone was doing their own thing, but they were doing it interactively in a way that contributed to the realization of an overall effort. The feeling (the illusion, if you like) was that of total independent effort but nevertheless coordinated in an overall commonality of effort.

The Manhattan Project is a classic example of (L)-style organization in its integrated coordination of fundamental research over a highly linked range of technical development. Bell Labs in its heyday illustrates the (F)-style organization of linked diversity and entrepreneurship. The Silicon Valley firms of the present era are pretty much (L/F)-style organizations, as was Bletchley Park's venture in the interception of operational communications for the sake of responsive opportunities. But I can think of no example apart from RAND to illustrate the (F/L) style. And in its particular historical context, this model proved outstandingly successful.

There are some obvious similarities between the talent-nurturing style of the early RAND in Santa Monica and that of the high-tech firms of Silicon Valley. But there are (at least) two big differences. One is that the valley firms are oriented at developing technology, whereas RAND was oriented to developing concepts and strove for innovation in the functioning of convoluted systems. The other is that in the valley the emphasis is on technical specialization, whereas at RAND it was the generalists who proved most successful in dealing with the demands of complex processes. In consequence of these differences, the valley seeks to maximize the benefits of technology, whereas early RAND's outstanding success lay in the training up of people for successful functioning in complicated organizations. The valley aims at useful technology; early

RAND aimed at effective systems. These different aims in the final analysis call for rather different procedures.⁷ No doubt, the topical range of scientific concern will be a critical scientific factor in procedural efficacy. And it is surely significant that RAND's issues were not experimental and equipment bound in the manner, say, of the National Laboratories but addressed theoretical issues in economics, game theory, computational mathematics, and strategic planning.

It will perhaps be asked whether those brilliant people would not have made their contributions elsewhere anyway. No doubt, they could and would have done so to some extent. The issue is speculative and certainly discussable. But there is need for caution here. In distant retrospect, I believe that the RAND strategy was uniquely productive. It had five formative components: (1) recruit highly promising people; (2) group them within disciplinary affinity clusters (for interactive commonality); (3) set only a general direction for the work, not specific tasks (to provide maximal latitude for initiative in following up individual interests); (4) keep them on the premises with office doors open throughout the work day (to encourage contact and interaction); and (5) reward productivity not (so much) by rank or money as by communal respect. Taken together, these factors made for a powerful synergy. And (perhaps strange to say) it seems that (4) was an essential component of the mix and constitutes an underappreciated procedure. All in all, therefore, the principal factors that proved crucial for the sort of scientific innovation that distinguished early RAND were the inherent *talent* of its operatives, the entrepreneurial *liberty* that was granted them, and the interaction-promoting *proximity* imposed by their working conditions.

Perhaps the situation of the early RAND is inherently unstable. Over the larger term, both the funders of such an enterprise and the managers of its purse strings will likely feel uncomfortable about cutting the kids so much slack on the playground. Granted, only a minority of those employed in the enterprise will exploit such opportunities to the full (perhaps one-third). But even this fractional return on the scale here contemplated would constitute an immense yield.

A traditionalistic administrator may well say: eliminate that sizable submaximal productivity and just concentrate on that outstanding one-third. In response, one can only say, "Good luck!"—for this sort of thing is simply impracticable. Prediction is simply impossible in matters of this sort. One cannot predict which disgruntled loner will turn violent; one cannot predict which particular stocks will yield superior returns; one cannot predict which individuals will prove to be statistical outliers in any regard. These things have to be addressed systemically and not by specific targeting because those targets are unidentifiable. But the important point in the present context is that a one-third return constitutes an immensely impressive success with respect to talent development. (Do, please, re-read the appendix, noting that at the start of RAND's first

7. Much the same is true of yet another very different sort of successful talent incubator, Goldman-Sachs. The commonality seems to be the policy of hiring very promising young people and leaving them loose to do pretty much whatever they want as long as it serves the enterprise's definitive aims and objectives.

decade, a considerable majority of those listed as its notable researchers, thirty out of fifty-three, were still in their twenties, and two were still in their teens.⁸)

To be sure, if the early RAND experience is replicated, it will likely again transpire that much of the ultimate benefit will redound elsewhere. Those who inaugurate such a venture will have to take a larger view of the general good. But if anything like RAND's precedent holds, even the immediate pay-off will amply suffice to justify the project.

RAND in those days was something unique in the history of research institutions—and yet its experience is something that could, in principle, be realized again if (improbably but not impossibly) the work environment that prevailed there could be re-created. Granted, it is difficult to conceive that a venture on the lines of the early RAND could be instituted in the present era. It certainly could not be done with public funding, nor is it imaginable that the private sector would undertake such an enterprise. But it would seem to be just the sort of thing that might figure on the angle of an unusually entrepreneurial foundation with ample funds or be the pet project of an entrepreneurial billionaire.

There is every reason to think that the style of talent cultivation during those early years at RAND offers unusual promise. The procedural model provided by this organization proved to be an extraordinary incubator of talent. It is well worth repetition.⁹

Appendix: Outstanding Innovative RAND Researchers during Its First Decade (1948–1958)

The list includes regular employees only—no consultants. The numbers in parentheses indicate the researchers' age at RAND's founding in 1948. Apologies to those unjustly omitted.

Armen A. Alchian (34). Economist. Influential theorist. A founding father of institutional economics.

Bruno Augenstein (25). Aeronautical engineer. Director of intelligence and reconnaissance in the Office of the Secretary of Defense.

Paul Baran (22). Computation and communication scientist. Winner of the Marconi Prize and the National Medal of Technology and Innovation. Cofounder (with Olaf Helmer) of the Institute for the Future.

Edward J. Barlow (28). Engineer. Head of RAND's Engineering Division. Space systems specialist.

8. Only three of them were still alive as of September 2017.

9. No doubt, certain historical episodes are unique—indissolubly bound to particular conditions and circumstances. And, of course, theses can carry no useful lessons for a future to which they are inevitably irrelevant. But showing that this is so in a particular case is no easy task. There really is no reason to think that the RAND case falls into this difficult category.

- Richard Bellman** (28). Mathematician and originator of dynamic programming. Institute of Electrical and Electronics Engineers Medal of Honor awardee.
- Harold L. Brode** (25). Nuclear weapons physicist. Chairman of the U.S. Defense Nuclear Agency's Scientific Advising Group for Effects.
- Bernard Brodie** (38). Military strategist. Architect of nuclear-deterrence policy and prolific author on military affairs.
- William Capron** (28). Economist. Assistant director of the Bureau of the Budget; assistant director of the Kennedy School of Harvard University.
- Samuel T. Cohen** (27). Physicist. Generally credited as father of the neutron bomb.
- Frank Collbohm** (42). Aeronautical engineer. Founding president of RAND.
- George Dantzig** (34). Mathematician and statistician. Developed the simplex algorithm in linear-programming theory. Winner of the first John von Neumann Theory Prize and the National Medal of Science.
- James C. Dehaven** (23). Engineer. Pioneer in systems studies.
- James Digby** (26). Engineer and strategic planner. Senior consultant to the President's Science Advisory Committee under Presidents Eisenhower and Kennedy.
- Stephen H. Dole** (31). Human engineer factors specialist. Senior planner for human operations at NASA.
- Melvin Dresher** (37). Mathematician. Game theory innovator.
- Alain Enthoven** (18). Assistant secretary of defense for systems analysis.
- Merrill Flood** (40). Game theorist. President of the Operations Research Society of America.
- Lester R. Ford Jr.** (21). Mathematician. Codeveloper (with Delbert Fulkerson) of the Ford–Fulkerson network flow algorithm.
- Delbert Fulkerson** (24). Mathematician. Codeveloper (with Lester Ford) of Ford–Fulkerson network flow algorithm.
- Olaf Helmer** (38). Logician and futurologist. Cofounder (with Paul Baran) of the Institute for the Future.
- Hans Heymann** (27). Economist. Major contributor to the Pentagon Papers. White House policy adviser during three presidencies.
- Jack Hirshleifer** (23). Economist. Influential economic theorist and long-term professor at the University of California, Los Angeles.
- Charles Hitch** (38). Economist. Assistant secretary of defense. President of the University of California.
- Fred Iklé** (24). Sociological and defense theorist. Undersecretary of defense for policy.
- Mario Juncosa** (27). Computational mathematician. Computational theory pioneer.
- Herman Kahn** (26). Nuclear strategist. Founder of the Hudson Institute.
- Amrom H. Katz** (33). Optical physicist. Major innovator in long-range photography.
- William Kaufmann** (30). Political scientist. Cofounder of Princeton's Center for International Studies. Special adviser to the secretary of defense (McNamara).
- Burton Klein** (28). Economist. Head of RAND's Economics Division.
- Alfred Latter** (27). Physicist. Nuclear weapons technology specialist.

- Nathan Leites** (36). Sociologist and Sovietologist. Innovative analytical studies of Soviet administrative practice.
- Harry Markowitz** (21). Economist. Pioneer in portfolio theory. Nobel laureate in economics.
- Andrew Marshall** (27). Military strategist. Longtime head of the Office of Net Assessment in the Department of Defense.
- John F. Nash Jr.** (20). Mathematician and game theorist. Nobel laureate in economics and Abel Prize winner in mathematics.
- Allen Newell** (21). Computer scientist. Winner of the A. M. Turing award. U.S. National Medal of Science awardee.
- Anna Elizabeth “Nancy” Nimitz** (29). Economist. Producer of deep insight into Soviet economics and agriculture.
- David Novick** (42). Economist. Awarded Distinguished Service Medal, Office of Emergency Planning, Executive Office of the President.
- Edwin W. Paxson** (34) Mathematician. Strategic theory specialist.
- Milton S. Plesset** (35). Physicist. Nuclear weapons specialist. Head of RAND’s Physics Division.
- Edward S. Quade** (39). Mathematician. One of the founding fathers of systems analysis.
- Leo Rosten** (40). Humorist, scriptwriter, versatile scholar. An eminent literary figure who helped found RAND’s Social Sciences Division.
- Stanislaus “Harry” Rowen** (23). President of RAND. Assistant secretary for defense of international security affairs.
- Robert M. Salter** (28). Engineer. Pioneer of high-speed transit.
- Herbert Scarf** (18). Economist. Recipient of the John von Neumann Medal of the Operations Research Society.
- Thomas Schelling** (27). Economist and strategy theorist. Nobel laureate in economics.
- Lloyd Shapley** (25). Mathematician and game theorist. Nobel laureate in economics.
- Hans Speier** (43). Sociologist. Author of notable investigations into the sociology of war.
- Frederic B. Thompson** (26). Logician. Computer science pioneer. One of the founders of Caltech’s computer science program.
- Willis Ware** (28). Computer scientist. Innovator posthumously inducted into the Cyber Security Hall of Fame.
- John Davis Williams** (39). Mathematician. Game theory specialist and innovator. Head of RAND’s Mathematics Division.
- Albert Wohlstetter** (35). Logician and nuclear strategist. Recipient of the Presidential Medal of Freedom.
- Roberta Wohlstetter** (36). Historian and intelligence specialist. Recipient of the Presidential Medal of Freedom.
- Charles Wolf** (24). Economist, A pioneer of modern policy analysis and founding dean of RAND’s graduate school.

Editor's note: This list should also include **Nicholas Rescher** (20). Logician and philosopher. Prolific author. President of the American Philosophical Association. Helmholtz laureate of the Germany Academy of Sciences.

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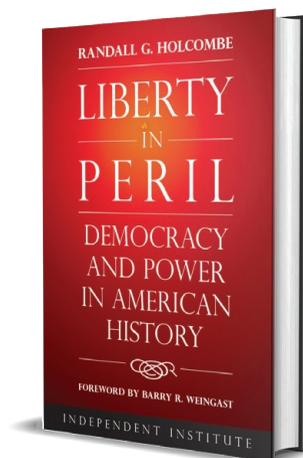
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