Research as the Fountainhead of Innovation: A Case Study of CRS

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INTRODUCTION

The current competitive situation in architecture has caused many firms to increase their marketing efforts. As one CEO of a large architectural firm expressed it: "If real estate is location, location, location; architecture is marketing, marketing, marketing." In its effort to provide improved value to clients, the profession has also become more client-based, has minimized costs and has cut fees. Some have concluded that clients increasingly view design as a commodity, with selection based primarily on fee. In response to this, the AIA has launched a variety of initiatives to do no less than redefine the profession.[1]

This research investigates an alternative strategy to provide improved value to clients: by positioning the firm as a leader in innovation through systematic, applied research. It will provide an in-depth case study of one firm, CRS, who used the publication of applied research in educational facilities as a positioning strategy that helped to launch it into becoming one of the largest and most comprehensive architecture-engineering firms in the country by the 1980's.

METHODOLOGY

The major source of information for this research was from the CRS Archives, located at the CRS Center, Texas A&M University. These archives contain information from the founding of the firm after World-War II until approximately 1983, when the firm merged with the engineering firm, J. C. Sirrine, to become CRSS, Inc. This research draws on extensive information included in the archives such as corporate records, the business records of the principals of the firm (Caudill, Rowlett, Scott, Peña, Bullock, and Kennon), magazine articles, and CRS publications from this period. This analysis begins with the publication of Caudill's "Space for Teaching" in 1941 and ends in 1983 after the merger with J. C. Sirrine and the death of Caudill.

THE MOTIVATION FOR RESEARCH AT CRS

Research, and especially applied research, was always been thought of as one of the reasons for the success of CRS. Caudill's own words submitted to the CRS Board of Directors in 1959 emphasized the role of research in CRS:[2]

> "Actually, research started CRS. In its early period, the Texas Engineering Experimental Station was the "fountain of ideas." There are many of our friends today would say that the research report called "Space for Teaching" was the key that opened the door to a successful practice. This report simply said that better school buildings could be constructed if such buildings were planned on the basis of well-established facts through research."

Why was research so important to the success of CRS? It appears that there are several interrelated reasons. The first reason has to do with the belief among the partners, specifically Bill Caudill that research was essential in order to produce good architecture. As stated by William Peña, "Each partner believed that breakthroughs in design were possible through research—that creativity would be released rather than hindered by newly discovered facts, revised conclusions, and the application of new theories."[3] This philosophy was also characterized in a 1955 CRS response to a request for proposal: "What is the philosophy of our firm? Boiled down, it is simply this. We believe that every job represents a new problem and every problem requires a research attitude before it can be solved."[4] Finally, from a CRS Design Associates marketing brochure (about 1971): CRS people have probed deeply into energy conservation, building systems and system building research program, air structures, natural ventilation, natural lighting, fiberglass structure, acoustics, underground facilities, open planning, fast tracking, and advanced construction delivery systems. We strongly believe that better buildings result when conceived in terms of research."[5]

A second reason may be that CRS began by specializing in schools, an original interest of both John Rowlett and Bill Caudill. Specializing meant developing an in-depth knowledge which naturally led to the need for research. Bill Caudill's research in school design was published as *Space for Teaching* in 1946[6] before he had designed a single school

facility. Rowlett, because he had dual degrees from the University of Texas in education and architecture also had a interest in schools. This was emphasized in a letter from Caudill to John Stambaugh during World War II:

> "First we'll try everything that will bring us compensation. Maybe Rowlett can take this school research job and travel all over the state making contact for future school building jobs. He could work out of our office in Houston, Dallas, San Antonio, or what have you. I might be able to get a school commission job right off the bat."[7]

RESEARCH AS A STRATEGIC POSITIONING STRATEGY

A third and final reason was that research allowed the firm to position themselves so that they could get work outside of their immediate community. Although the firm was founded in Austin, Texas on March 1, 1946, it soon relocated over a grocery store in College Station, Texas so that both Caudill and Rowlett could teach full-time and practice part-time. At that time, the population of College Station was insufficient to support an architectural firm that specialized in schools or any other building type. Caudill, Rowlett and later Scott had to look elsewhere for projects. CRS had to define an approach to architecture that would allow them to practice in other communities where known, local architects were generally utilized for school design. Research became a way for CRS to become recognized as nationally known beyond the College Station community. Research was seen as a means of innovation that would enable the firm to design schools that were significantly different from those designed by most other firms. Research enabled the firm to become widely known — even before they had designed any schools.

THE DEFINITION OF RESEARCH AT CRS

Research has different meanings, especially to architects who generally are not trained to be researchers. One example of this multiple meaning for architects comes from a national survey of architects by a graduate researcher at Texas A&M. This survey found that respondents classified the following activities as "definitely research:" literature search (69%), behavioral observation (62%), questionnaires (55%), post-occupancy evaluation (47%), interviews (43%), on-site tour (39%), building code analysis (37%), programming (22%) and design (12%).[8]

For CRS, research was also a composite of many different types of activities. Some meanings of research that Caudill presented to the Board on November 13, 1959 were:

> Research ... means the pursuit of perfection.
>
> Research is getting to the core of things — determining problems and arriving at the best solutions.
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> Research means working toward the improvement of planning and building techniques — the development of new ways to make buildings more functional, more attractive for living and working, and more economical.
>
> Research and architectural analysis are synonymous.

Another definition is included in Report 14 from the ReseARCH+ARCHitecture series. This report was the CRS response to a RFP from Texas Instruments for a new plant in Dallas. This report stated in the section on the firm's philosophy:

> "What is research? To us the word means the pursuit of perfection. It means working towards the improvement of planning techniques—the development of new ways to make buildings more functional, more attractive for living and working, and more economical. It means, too, the development of new ideas for lighting, ventilating and sound conditioning buildings. Research means finding new uses for old materials and finding ways to give assurance of safety and low maintenance in the use of new materials. Research means the improvement of existing structural methods and the perfecting of new ones. Architectural research is a thinking process towards the perfection of man's physical environment. We like to think we have such a research attitude."

What we find at CRS is a philosophy of research that is not limited to empirical or scientific inquiry. Instead, CRS defined research as any method of inquiry that will result in better buildings.

RESEARCH CONDUCTED BY CRS

This research philosophy was reflected in the types of research publications that were produced at CRS. This section of the study will report on a content analysis of CRS research, which can be classified into several categories and milestones as indicated below:

1941	Caudill publishes "Space for Teaching".
1946	Caudill founds the Architectural Division of the TEES at Texas A&M University.
1948-58	Architectural Research at TEES
1953	Caudill publishes "Toward Better School Design"
1954-1959	Publication of 15 Research Reports in American Schools and University.
1952-1958	22 ReseARCH+ARCHitecture reports are produced.
1960-1975	20 reports known as the Investigation series are written.
1982	CRS Research was formally established.

Space for Teaching

Caudill's first research publication, "Space for Teaching" was published in 1941 and was a direct outgrowth of a

research project at the Texas Engineering Experimental Station at Texas A&M. The original application for this research, dated November 1940, stated:

> Although educational teaching methods have progressed rapidly during the last decade, the housing of education has become static. We still abide by outmoded standards in schoolhouse construction. There is a demand for up-to-date information in this field. It is the purpose of this research to satisfy this demand.

This publication preceded the design of schools by either Caudill or Rowlett, and was instrumental in developing the reputation of the firm as school architects. The contents of this study consisted of chapters on The School and Educational Trends, The School and the Community, The School and Activity Space, The School and the Space Elements, The School and Natural Environment. As is suggested by these chapter titles, this study consisted primarily of an in-depth analysis of basic planning, programmatic and climactic factors relating to the design of schools and did not include any original, scientific or technical research.

Architectural Research at TEES

Caudill was instrumental in initiating the Architectural Division of the Texas Engineering Experimental Station at Texas A&M University in the late 1940s. Between 1948 and 1958 this division had produced 13 reports on architectural research related to schools.[9] Generally, this research tested a variety of ventilation and illumination situations through the use of scale models. Just as frequently the research included and was sometimes led by physicists or engineers:

9 Test results.
1 Library research.
1 Survey.
1 Report on a design studio that incorporated research.
1 Report of a presentation (movie and slides).

Toward Better School Design

This publication integrated material from three sources: research findings from the TEES studies, the design experience of CRS to date, and the experience of other leading architects and educators. The chapters in this book included subjects dealing with the pupil, the educational process, the environment (air, wind, illumination, and sound), economic factors, city planning and schools, spatial considerations for the design of schools, and a final chapter describing a planning process.

Research Reports

All of the 15 Research Reports between 1954-59 were reprints of articles published in the *American School and University* between 1954 and 1959. With some exceptions, these are relative short articles (about 5-10 pages) dealing with a specific aspect of school planning and design. In general, these reports stress the solutions to problems and often gives credit to the client team with contributions towards problem identification and solution.

ReseARCH+ARCHitecture

Each of the twenty-two ReseARCH+ARCHitecture reports were generally associated with specific projects, were often programming or design studies, and in only three cases was there a specific reference to engineering research studies:

15 Reports that were associated with a specific project or client.
8 Architectural programming studies.
4 Reports and studies that included TEES research studies.
1 Speech.
1 Case study.
1 Response to a RFP.
1 Report of travel to a foreign country.

Investigations

The Investigations series which began in 1960 appeared to be more ad-hoc in their content, particularly after Investigation #18 when the format of the reports changed. As indicated on the cover of each investigation, research was not the only objectives: "Some of these investigations involved actual research, while others represent current thoughts of some CRS staff members." One interesting new format began with Investigation #13, which was the result of a 10-day conference called the Rice Design Fete, sponsored by the National Institute of Mental Health, to develop new ideas for mental health centers and to stimulate thought among people responsible for the development of such community facilities. The group was divided into 6 teams, each consisting of an architect, two psychiatrists, and five students. This appears to be a precursor to subsequent "probes". The content of these investigations is as follows:

6 Study or analytic report.
4 Case studies.
3 Probe.
3 Essay.
2 Reports that were associated with a specific client or project.
2 Report of travel to a foreign country.
1 Joint investigations with another organization.
1 Lecture.
1 CRS firm profile.

Other Reports, 1976-1983

After 1976 and up until 1983 ten additional studies and reports were published. In these studies the incidence of "probes" increases and several research projects that were funded by clients appeared. Several studies and probes were funded jointly funded by CRS and an outside firm. It was toward the end of this period in 1982 that a formal organiza-

tion, CRS Research, was established with the specific mission to do research projects.

5 Jointly funded studies, analytic reports or probes.
4 Probes
4 Study or analytic report.
2 Contract research projects.

Conclusions

A summary of how this research fits within CRS is best stated by Caudill himself, in his 1959 report to the Board of Directors outlining a plan for a research unit in CRS:

> We have been told by professional architectural critics that our fame lies in our research activities. But when you get right down to it, what have we done? If we looked at it this way, we would discover that as a firm we never did any actual architectural research! "Space for Teaching" was developed before the firm was even begun. The studies of environmental controls were made by the Station and not CRS. When I was doing research, my salary was paid by the Station, not by CRS. CRS didn't develop the wind tunnel, the lighting dome, the revolving house. These were developed by the Station.
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> Another way of looking at it, however, would give us a quite different picture! Sure CRS has been involved in research activities. Look at all the research reports that we have published. We have two or three dozen to show that we're in the research business. We've even been paid to do research. Corning Glass gave us quite a chunk. Douglas Fir Plywood gave us some money. So did School Executive. We sent Caudill, Peña, Bullock, Scott and others to research conferences. We're a member of the Building Research Institute. We even have a department called Research and Information, and in CRS every project is a research project.

THE CRS RESEARCH ORGANIZATION

Planning for Research

In summary, research was seen by CRS partners as a very effective way to differentiate themselves from other firms in order to gain entry into geographically dispersed markets. Because of the importance of research to CRS, it was also incorporated at various times into the firm's short and long term planning processes. One example of this is found in the Five-Year Corporate Plan, 1975-1980, of CRS. In this 5-year plan CRS outlined ten general goals. Goal eight was: "Innovation: CRS is committed to strive for professional leadership through the originality of design and through innovations in management and technology."[10] Later in this same planning document, Innovation was defined as "To be on the leading edge of architectural Practice and Design. We believe in pioneering based on applied research as the mainspring of CRS."[11]

Organizing for Research

If CRS planning processes incorporated research, then research must also appear in how CRS was organized. Initially research was an integral part of doing business, and was frequently thought of as indirect promotion. In a 1958 guidebook of Caudill's, the detailed plans for several months indicates areas of responsibility that are normally associated with the practice of architecture, including: direct promotion, indirect promotion, programming and design, working drawing and specs, lettings and contracts, supervision, and special services. Caudill was primarily responsible for indirect promotion and, in particular, for accomplishing specific research projects that were listed under indirect promotion.

Later (1959) Caudill received a request from the CRS Board of Directors[12] to define a formally organized research program so that a cost could be placed on it. At the same time they indicated positive support for setting up this research program. Caudill wrote a nine-page report and submitted it to the Board of Directors on 13 Nov 59. This report recommended that the firm budget $25,000 for the first year to initiate the program which would pay for a research architect's salary, a secretary, a part-time graphic designer, travel, and miscellaneous expenses. However, no further mention of the program was found in the archives.

The 1960 CRS Policy Manual refers to the research program as "R & I" (or Research and Information) in the organization chart of CRS. A further description of the R&I activity[13] is also found within this manual, and indicates that research was an integral part of a broader indirect marketing activity. The 1975-1980 Office Procedures Manual does not appear explicitly mention research in the organization chart of CRS.

The establishment of *CRS Research* in 1982 appears to have been the first formal research organization within the firm. Bill Caudill (then Chairman of the Board) was asked by CEO Tom Bullock to head up a program in R&D in 1982.[14] This research organization was to consist of three people: Bill Caudill (Director of Research), Caudill's secretary, and one other person to be recruited from either within CRS or outside the firm. The mission of CRS Research was: "To develop business for CRS Group through research and publication."[16] By June, 1986, the mission was extended with the addition of: "To promote the values, knowledge and history of the company," and "To provide analysis and decision support services profitably."[17] By this time Caudill had died,[18] and the direction of CRS Research was changing to develop consulting as a new business area and to incorporate research as a function that supported consulting.

Paying for Research

As Caudill stated in his 1959 report to the Board, "Let's not kid ourselves. Research Costs Money." This is perhaps one

of the primary reasons why most architectural firms do not engage in substantial research activity, particularly research that is not funded through an office project. When Caudill requested funding for a research program in 1959 (see above) he added: "The price tag at this time looks exorbitant, particularly when we feel that we can't afford promotional brochures, airplanes, and sufficient time to do the kind of job we want to do for the projects we now have under contract. Yet, on such a budget we could only do the most meager kind of research." This "exorbitant cost" may have been the reason why such a program was not funded in 1959. At any rate, the research that was conducted at CRS appeared to be funded in a variety of different ways, including: 1) as part of an on-going project, 2) self-funding, and 3) contract research, and 4) combinations of the above.

CONCLUSIONS

It is clear that research as was thought of both internally and externally as an important factor in the success of CRS. Several other conclusions are, first, that research was broadly, rather than narrowly defined at CRS. In some cases research came rather close to scientific investigation, while in other cases research was more closely identified with public relations and publicity. In any case, all research could be described as indirect promotion or indirect marketing and was used extensively in that manner by CRS. Second, although all of the other original founding partners may have believed in the importance of research, Bill Caudill was the prime mover in this area. He originated the research studies and Texas A&M, was often delegated the responsibility to write and organize research reports within the firm, and was ultimately designated to be the Director when a formal research organization was established in 1982. Finally, while research was an important part of indirect marketing, it was also part of the strategic positioning strategy of CRS to be known as an innovative, creative, problem-solving firm.

NOTES

[1] see, for example, Douglas Gordon, "PIAs are Redefining the Profession," *AIA Architect*, Vol 3, Mid-October 1996, p. 1.
[2] William W. Caudill, "CRS RESEARCH PROGRAM," 13 November 1959, CRS Archive: Corporate Records, Box 14.
[3] William M. Pe–a, "Roots of CRS Research," Houston, Texas: CRS research, June 1983, p. 1.
[4] Report 14, ReseARCH+ARCHitecture, "An Approach to Industrial Plant Design," CRS Archives.
[5] *Design*, CRS Archive: Marketing Brochures, ca. 1971, Box 7/94-0013.
[6] Caudill, William Wayne. "Space for Teaching: An Approach to the Design of Elementary Schools for Texas." in *Bulletin of the Agricultural and Mechanical College of Texas* (Vol 12, No. 9) August 1, 1941.
[7] Letter from William Caudill to John Stambaugh, dated November 4, 1945, CRS Archives, Corporate Records (oversize documents) Box 17/94-0003.
[8] Results of a survey sent to over 100 architectural firms across the country by Kendra Ward, candidate for the M.Arch. degree in Architecture, in Fall 1996.
[9] These reports are bound in "Architectural Research at Texas A&M College Engineering Department Station, CRS Archives.
[10] *Five Year Corporate Plan: First Year - 1975*, CRS Archive: Corporate Records, Box 14/94-0003, p. 3.2.
[11] *Five Year Corporate Plan: First Year - 1975*, CRS Archive: Corporate Records, Box 14/94-0003, p. 3.12.
[12] Memo to Board of Directors from Caudill, Subject: "Our First Quarter Meeting - In Review," 4 Nov 59, CRS Archive: Corporate Records, Box 4, File 2.
[13] Excerpt from Caudill Rowlett & Scott Policy Manual, October 1960.
[14] Internal Memo from Caudill to Bullock, "R&D Operation", 20 April 1982, CRS Archive: Corporate Records, Box 13, File 10.
[15] Internal Memo from Steve Parshall to Bill Caudill, "Developing a Plan for CRS Group Research", 17 May 1982, CRS Archive: Corporate Records, Box 13, File 10.
[16] Internal Memo from Steve Parshall to Tom Bullock, "FY87 Research Plan", 16 Jun 1986, CRS Archive: Corporate Records, Box 13, File 10.
[17] William Wayne Caudill died on June 25, 1983
[18] Report to Board of Directors from Caudill, Subject: "CRS Research Program," 13 Nov 59, CRS Archive: Corporate Records, Box 11, File 4.