T. Spencer Shore brought a diverse background of industrial and financial experience to Eagle-Picher. Born in Chillicothe, Missouri, in 1903, he attended the University of Missouri as a journalism major. Upon graduation, his adviser urged him to pursue a business career. After searching for a suitable program Shore enrolled at the Harvard Business School. He received the M.B.A. in 1926 and, after considering a career in retail management, joined Goldman Sachs and Company in New York City. Shore remained at Goldman Sachs until 1931, when he accepted an offer to join the financial department of the General Tire and Rubber Company in Akron, Ohio. Shore rose quickly at General Tire, becoming vice-president, treasurer, and a director of the company by 1939. For seventeen months during World War II he served as the director of industry advisory committees for the War Production Board under Bernard Baruch. In 1944 Shore returned to Goldman Sachs as a general partner and remained there until he joined Eagle-Picher.¹

Shore’s election as president reflected the board’s desire to employ an executive “who has had experience in acquisitions and negotiations as well as contacts in other industries.”² Committed to continue the pattern of expansion begun under Bowlby, the board believed that Shore possessed the best combination of personal ability and commercial experience to direct the future growth of the company. His knowledge of Eagle-Picher gained from his years as a director also provided insight into the company’s problems.
More than previous presidents of the company, Shore possessed extensive knowledge about corporate restructuring. Each of his previous positions demanded expertise in this field, and he knew what would succeed and what would fail. Like other members of his generation who came out of professional business schools in the 1920s, Shore believed strongly in the invested capital theory. During the 1920s, the success of General Motors’ and DuPont’s management systems based on decentralization and return on investment offered profound lessons for the growing ranks of professional managers. Shore embraced these concepts and applied them vigorously to Eagle-Picher. The result was a transformation of the company into an organization whose top management functioned increasingly like central bankers who executed policies through financial controls and acquisition criteria, while decentralized divisions operated more or less autonomously. The home office evaluated performance and allocated capital, while divisions provided valued goods and services.

Shore believed that Eagle-Picher needed to set specific objectives for growth and to devise an evaluation process to keep the company on the right track. The transition to manufacturing was a fine start, yet it remained largely serendipitous. Without a system to govern expansion, the company might drift from one opportunity to another and never achieve real progress. In his first decade as chief executive, Shore established a number of principles to guide corporate restructuring and laid the foundation for Eagle-Picher’s system of acquiring and managing a diversified, multidivisional structure. His decision to pursue acquisition reflected a lack of confidence, with several exceptions, in the company’s technological base and ability to achieve meaningful growth from the expansion of existing operations. Choosing external growth by acquisition, though, was inherently risky. Shore reduced those risks by setting forth basic requirements of the acquisition policy. Eagle-Picher understood industrial marketing, so Shore restricted acquisitions to firms serving industrial markets. He also recognized that the company did not possess the management talent to undertake turnarounds. Consequently, Eagle-Picher purchased only healthy, well-established businesses with managements willing to remain with the company. In this regard, Shore followed a policy begun in the 1930s.

Three major acquisitions and internal reorganizations during the 1950s dramatically changed the company. By the end of the decade
Eagle-Picher derived nearly 70 percent of its sales from products not manufactured when Shore became president. The new look presented management with a number of new challenges, foremost among them the necessity to establish an efficient system to manage diversification. The evolution of that system occupied the next twenty years of corporate history.

A Foundation for Growth

Shore had accepted the presidency with the proviso that he would spend six months analyzing the company before entering active management. From January to June 1949 he visited plants, studied products and processes, and met many of Eagle-Picher’s major customers. As he traveled throughout the company, Shore noted a variety of unacceptable conditions. Angered by the run-down appearance of many plants, wasteful production processes, and poor accounting practices, he returned to Cincinnati determined to initiate major changes.¹

In addition to these problems, rapidly declining lead and zinc markets occasioned a $3 million inventory loss during the first six months of Shore’s tenure. Lead declined from 21.5 cents per pound in December 1948 to 12 cents per pound in early June 1949. A 44 percent decline, it marked the most rapid fall in the price of the metal in the recorded history of the U.S. market. Zinc experienced a similar decline, falling 48 percent from 17.5 cents per pound in December 1948 to 9.5 cents per pound by June 1949. As a result, the company suspended mining operations in the Tri-State.²

Shore realized that before Eagle-Picher could plan for future growth, it had to complete a financial reorganization. The inventory loss only compounded the problem. At a meeting in Cincinnati on 1 July Shore informed the executive officers of his intentions. Foremost, the company needed cash for expansion. Shore expected to raise $16 million over the next two years under the reorganization plan. “That was an astonishing statement to most of them,” he recalled.³ Considering the company’s financial position on 30 June, the officers had reason to express surprise. In addition to the $3 million inventory loss, Eagle-Picher owed over $10 million and had only $3.25 million cash.⁴
Shore argued that with the proper reorganization of investments in plants and inventories, accompanied by a strict evaluation of every line of business, Eagle-Picher could build a solid foundation for expansion. He began with the metals inventory problem. The company had wrestled with this question for over thirty years without solving the problem of speculative loss in a depressed market. Since 1941, when Bowlby had established the reserve fund for decline in inventory values, management had appropriated a percentage of earnings to the fund each year. The reserve fund contained $6.6 million in June 1949. Although the metal markets rallied briefly, lead and zinc prices stood at 9.75 cents per pound and 12 cents per pound, respectively, at the end of the company’s fiscal year in November. This, coupled with a severe decline in earnings, resulted in a net loss of $1.9 million for 1949.7

On 30 November the company adopted a new method of inventory accounting to limit the detrimental effects of market fluctuations on earnings. The base stock system of inventory evaluation allowed Eagle-Picher to establish fixed tonnages of metals at fixed prices below market values on the balance sheet. Management fixed 15,000 tons of lead at 6.5 cents per pound and 10,000 tons of zinc at 5 cents per pound as base stocks under the new system. As a result, the cash required to carry these stocks on the balance sheet was $1.9 million, which, in turn, released $4.7 million from the $6.6 million reserve fund for inventory decline. Thus the $4.7 million could be transferred from the reserve account and applied to the $1.9 million net loss to create a net credit to surplus for 1949 of $2.7 million.8

With the effects of inventory fluctuations removed from the balance sheet, Shore turned to the next phase of the reorganization plan. In the months following the July meeting, Shore held additional conferences with the executive officers. A general policy for corporate growth emerged from discussions during the first year of his tenure. Shore spoke of a five-year plan; the company would first reorganize its financial and operational character, then pursue an active acquisition and development program within industrial markets. Top management agreed to use return on invested capital as the key measure of corporate success. Eager to instill profit mindedness throughout the corporation, Shore used this tool to assess the profitability of divisions, plans, or products. A valuable managerial guideline in a
diverse company, return on investment guided capital allocation and planning decisions.⁹

This device provided the cornerstone for Eagle-Picher's reorganization plans. During the first months of 1950 Shore ordered a survey of the company's profitability. Auditors calculated the distribution of the company's invested capital among the divisions, plants, and products. The completed audit confirmed Shore's expectations. Although problems existed throughout the company, two divisions, Metallic Products and Paint and Varnish, had shown no net return during the preceding five years.¹⁰ With over 25 percent of the company's invested capital tied up in the two divisions, management either had to expand them to increase profitability or had to liquidate them and reinvest the capital in profitable operations. Since Bowlby had attempted expansion during the 1940s with disappointing results, liquidation remained the only solution. However, Shore did not want to divest two major operations during the early stages of the reorganization. Such a move demanded precise timing to avoid damaging the morale of employees, customers, and shareholders. Eagle-Picher would wait for an opportune moment, preferably after or coincident with the expansion of the company.

The revelations of the invested capital audit convinced Shore that Eagle-Picher needed a strong reorganization strategy to prevent the company from pursuing unprofitable businesses. At the same time, he did not want to change the existing divisional system. Instead, he intended to allow divisions greater control over daily operations and measure their success by applying the return on invested capital standard. Although the divisional structure had existed since 1937, corporate management had been reluctant to relinquish centralized control without financial standards to hold the divisions accountable. By eliminating the major advantage of the system, it had become largely ornamental.

Shore ordered division managers to assume full responsibility for their operations in 1950 and initiated a system of accountability based on return on invested capital. By using the divisional system to enforce unified financial controls, the company would benefit from profit-minded division managers who closely scrutinized capital expenditures, inventories, and product quality in an effort to improve the division's performance. Shore also insisted that divisions cal-
culate the rate of return on invested capital each month and report the results to Cincinnati no later than the tenth business day of the following month. This gave top management a timely, company-wide perspective essential for planning and capital allocation decisions.11

Although the divisional system allowed greater control over corporate performance, it also demanded considerable self-restraint. The company attempted to strike a balance between divisional autonomy and the ability to detect and control a decline in profitability. An important step in the reorganization, improving the divisional system enabled top management to instill its financial and operational philosophy throughout the organization.

With standards for divisional performance in place, Shore also set corporate performance goals. Interested only in meaningful growth, he established earnings-per-share as the key measure of Eagle-Picher's progress. "We have no desire for the company to just become larger without benefit to shareholders," he explained.12 Emphasis on earnings-per-share provided shareholders with a clear point of reference to measure the company's success as it explored new directions.

Yet financial and organizational refinements would ultimately be meaningless without quality people to maintain corporate goals and standards. Eagle-Picher desperately needed a comprehensive personnel policy. Although the corporate office had pursued a limited plan to recruit management trainees from selected colleges in the late 1940s, apart from the research laboratory, personnel development remained almost an incidental consideration throughout the company.

Under Shore's direction, Eagle-Picher improved its recruitment and development policies as part of the overall reorganization of the company. He adopted a comprehensive guideline for personnel recruitment known as the top-third principle. While visiting prospective colleges for his daughter to attend, he noted that the best schools usually enrolled only students who had been in the top-third of their high school class. Shore reasoned that such a system might work well at Eagle-Picher.13

The special problems of executive recruitment and development also received close attention during Shore's first years. The recruitment of potential executives often began with a request from a division manager to the manager of central personnel in Cincinnati.
The personnel manager reviewed applicants and determined which ones possessed the greatest potential. Central personnel then sent the two or three best people to the division manager for the final decision.

Eagle-Picher’s divisional structure provided a built-in system for executive development. Interdivisional transfers enabled the company to give selected employees broad operating and managerial experience. Corporate management determined the suitability of candidates by considering their potential for promotion. As the company grew, opportunities for the “cross-breeding” of top managers increased. This gave potential executives a broad perspective of the company, an essential quality to manage a diverse enterprise.\(^4\)

Closely related to the executive development program, the employee stock purchase plan represented a significant improvement in employee benefit policies. Approved by the board in June 1950, the plan allowed employees to develop a stake in the company. Shore had been shocked to find that many executive officers owned little or no stock in Eagle-Picher, and he considered the plan to be essential for long-term success.\(^5\) Open to any salaried employee, the plan provided for the purchase of stock equal to no more than one-half of an employee’s annual salary. The long-term goal of the stock plan was to develop a core of employees who held a vital interest in the company. Furthermore, for top management, the plan was a method to link their personal welfare to the success of the corporation. Always eager to instill responsibility and profit mindedness in employees, Shore believed that the plan would also offer long-term financial stability for those responsible for a successful company. By September 1950 the board reported that employees had purchased 9,014 shares of the available 10,924 shares in the company’s treasury. Approximately 55 percent of those eligible to participate in the plan purchased shares.\(^6\)

Improved operating results for 1950 and 1951 contributed to the momentum of the reorganization. Net profit after taxes for 1950 and 1951 was $2.9 million and $3.7 million, respectively.\(^7\) Increased defense spending as a result of the Korean War improved the market for zinc and lead products. Eagle-Picher also benefited from government stockpiling of strategic metals and a strong demand for zinc and lead products. Results for 1951 were especially pleasing. The company recorded the highest sales and, despite increased taxes, accumulated the greatest amount of working capital in its history.
Encouraged by this performance, Shore continued his assault on inefficiency within Eagle-Picher. Reorganization of the research department yielded an excellent opportunity to solve several nagging problems. The expansion of the company in recent years had undermined the efficiency of the central research facility in Joplin. Division managers complained that they did not have sufficient control over research activities because research department management reported directly to Cincinnati. Moreover, disagreements among divisions concerning research priorities and the distribution of expense burdens evidenced the fundamental problems of centralized research within a multidivisional company.

Shore announced in February 1952 that the research department would be decentralized and operated under the complete responsibility and control of the division managers. Since each division's research needs differed widely, the new structure provided greater control over the cost and the objectives of research programs. The change also freed department scientists from the administrative constraints of centralized research and afforded, in most cases, greater independence to pursue specialized projects.18

Next, Shore ordered the dissolution of the Mining and Smelting Company and transferred its operations to a Mining and Smelting division. The need for a separate entity had disappeared with the decline of the Tri-State. The purpose of the subsidiary had been to limit the liability of the company's manufacturing assets during exploration for new ore reserves. With ore reserves exhausted and capital expenditures focusing on improved mining technology, the subsidiary provided no benefits.19

Although financial and organizational adjustments dominated the reorganization agenda, Shore placed great emphasis on the improvement of production efficiency. During his initial examination of the company in 1949 he noted a variety of wasteful practices. The most offensive situation was the waste of valuable sulfur gases at the Henryetta smelter. A by-product of processes at both plants, sulfur gases could be used to manufacture sulfuric acid, a valuable industrial commodity. Angered that profits were "going up the flue," Shore ordered the construction of a plant in the Tri-State that would recover sulfur gases from ore concentrates before they reached Henryetta.20

A logical idea, the plan had one major flaw. Prohibitive freight rates prevented Eagle-Picher from selling sulfuric acid beyond a
three-hundred-mile radius. Consequently, the company sought an assured regional market to guarantee business for the plant. In June 1952 Shore completed negotiations with the Missouri Farmers Association, Incorporated, for a sulfuric acid purchase agreement. The Farmers Association agreed to purchase at least 75,000 tons of sulfuric acid, 85 percent of plant capacity, from Eagle-Picher each year. During the same month the company began the construction of a $5 million acid plant adjacent to the Galena smelter, and the Farmers Association began the construction of a phosphate fertilizer plant on the Missouri-Kansas state line less than one mile from the acid plant.21

The new plant symbolized Shore’s underlying themes: eliminate waste, explore new markets, emphasize profits, and restore vigor. Yet he realized that only external growth could improve the long-term outlook for the company. During his first years as president Shore had worked to devise an acquisition policy for Eagle-Picher with the advice of corporate officers, directors, and outside advisers. “You will never expand unless you put down on paper how you want to expand,” Shore told his staff.22 Consequently, he intended to develop a set of guidelines to govern acquisition decisions and a “statement of purpose” to keep the program aligned with its original objectives.

At Goldman Sachs Shore had seen many companies pursue haphazard acquisition policies or, even worse, acquire businesses merely to boost sales or divert attention from fundamental problems. For Shore, acquisitions had to complement a company’s talents and contribute to an overall plan for long-term growth. Determining Eagle-Picher’s talents and weaknesses thus became the first priority for corporate management, and a detailed acquisition philosophy crystallized from numerous meetings.

Above all, since the company manufactured 95 percent of its products for industrial markets, it would acquire only other industrial manufacturers. Eagle-Picher understood the demands of the industrial marketplace and had cultivated the necessary expertise to serve diverse industries. The company knew little about consumer marketing and would only invite trouble if it acquired such a business.

Eagle-Picher’s shortcomings also guided the formulation of an acquisition policy. A potential acquisition had to be a successful, established enterprise because Eagle-Picher did not have the resources to rescue an unprofitable company. Furthermore, because Eagle-
Picher was thin in management, an acquired company had to have a seasoned management willing to remain with the organization. "No turnaround situations," Shore often repeated during planning sessions. Eagle-Picher could not afford to take unnecessary risks. Further, because it was crucial for the management team of an acquired company to remain with Eagle-Picher, there would be no hostile takeovers.23

A potential acquisition's market position also became an important indicator of its desirability. Companies that offered market leadership in a particular industry through proprietary technology, efficiency of production, or quality of manufacture would be considered prime candidates. Shore would consider only a company that ranked first, second, or third in overall performance in the markets that it served.24

Formulating an acquisition policy proved extremely beneficial to Eagle-Picher. It forced top management to adopt a realistic perspective of the company and set goals for growth and performance. Yet "putting it down on paper" did not assure success, and Shore intended to adopt a cautious yet deliberate approach toward an acquisition. Eagle-Picher would be prepared, but not desperate, to acquire new businesses.

With a detailed plan in place, Shore contacted investment houses in New York, Chicago, and Saint Louis and informed them of Eagle-Picher's requirements. In early June 1952 Shore received a call from Saint Louis concerning a promising acquisition candidate, the Ohio Rubber Company of Willoughby, Ohio, a manufacturer of molded and extruded rubber goods. Ohio Rubber seemed to fit every qualification. Founded in 1874, the company possessed a reputation for efficient management and long-term profitability. Furthermore, Ohio Rubber appeared to have excellent growth potential since its products served the expanding automotive, farm equipment, and toy industries.25

At a meeting of the Eagle-Picher board on 23 June Shore presented detailed information on Ohio Rubber. He reported that management had been studying the company for acquisition and had secured an option for 200,000 of the 250,000 outstanding shares for $32.50 per share. As part of the investigation into Ohio Rubber's business, Eagle-Picher had commissioned two studies, one by the accounting firm Peat, Marwick and Mitchell and one by the engineering firm Cov-
erdale and Colpitts, to determine the condition and potential of the company. Both reports indicated that the business was sound and offered opportunities for expansion in each of its major fields. "Based on this investigation and study," Shore announced, "management now recommends that we offer to purchase the Ohio Rubber Company."26

The intense scrutiny of Ohio Rubber by outside auditing and engineering firms gave Eagle-Picher reliable, detailed information about all facets of a business without causing disruptions or raising suspicions among employees. Shore did not want any outside influence to interfere with negotiations, nor did he want anyone other than top management involved in the acquisition. Securing an option to purchase a business gave Eagle-Picher flexibility to approach problems that might arise during the process. The option enabled either company to walk away from the transaction without penalty if favorable terms could not be reached.27

After a full discussion, the board adopted a resolution authorizing the acquisition of Ohio Rubber. Eagle-Picher purchased 247,000 shares of Ohio Rubber at a cost of over $8 million.28 The company also obtained guarantees from Ohio Rubber president Hermon Safford that he would continue in his office along with the rest of his management team. Ohio Rubber became an autonomous division of Eagle-Picher responsible only to Shore, for the company had no intention of ruining a successful business by excessive interference from Cincinnati. This approach was very different from many acquisitive firms that placed their own managers in charge of an acquired company, often with disastrous consequences. Eagle-Picher would judge the performance of Ohio Rubber by the same standards as the other divisions. For Shore, there was no other way to conduct business.

Continued Restructuring

With the acquisition of Ohio Rubber completed, Eagle-Picher turned to the difficult but necessary task of liquidating the Metallic Product and Paint and Varnish divisions. The decision had been postponed to minimize the effects on corporate morale, but Shore was anxious to complete the transaction. On 5 November 1952, the day after the
presidential election, Eagle-Picher announced its intentions: "It is easier for the management of a company to expand its operations than to liquidate parts of its business. We are confident, however, that the reasons for dissolution of the two divisions are compelling and that the more profitable utilization of the money invested in their operations will prove beneficial." The Metallic Product and Paint and Varnish divisions had recorded combined net sales of $17 million in 1951 and $11.3 million in 1952, accounting, respectively, for 21 and 14 percent of total sales.29

The Paint and Varnish division's products included white lead, mixed paints, varnishes, stains, and enamels. Each product had a good reputation for quality and value. The division's problem, however, was its size. In the paint industry, the costs of nationwide marketing remained prohibitive unless annual sales volume exceeded $20 million. As Shore pointed out, "an ad in the Saturday Evening Post costs the same if your sales are $3 million or $20 million."30 With division sales far less than $20 million, liquidation was the obvious choice. Moreover, the Pigment division sold products to approximately 85 percent of the Paint and Varnish division's customers. Shore had no intention of expanding an unprofitable business to compete with valued customers of Eagle-Picher's second largest division.31

The Metallic Product division manufactured lead pipe, roof flanges, solders, and alloys, as well as other lead and zinc products. Declining profitability had plagued the division since the end of World War II despite Bowlby's attempts to revitalize the business. In addition, Shore did not want to pursue businesses that required little expertise and whose company name meant nothing to a customer. He explained, "If the XYZ Company gives you specifications for solder, they care not whether it is made in a loft or in a good building, or whose name is behind it so long as that product is up to their specifications. Obviously this was no business for us."32

During the seven months after announcing the divestment Eagle-Picher completed the liquidation. Each of the divisions' seven plants operated continuously during the sales negotiations to prevent buildings and property from appearing rundown. By July 1953 the company had sold all the plants, liquidated all inventory and most receivables, and found employment for all but three displaced employees.33
Operating results for 1953 showed the positive effects of the company's long-range planning. During the year sales reached a record $85 million, and, despite troubled times in the lead and zinc industry, net profit before taxes increased $1.6 million over the previous year's total. The results seemed especially gratifying since for the first time in the company's history a significant drop in lead and zinc prices did not affect profitability.\(^{34}\) Also, profits increased despite a strike in the Tri-State from 20 June to 22 December and despite losses incurred from the liquidation of the two divisions. However, the redirection of capital accomplished during the first stages of the reorganization and acquisition program offset the negative effects of these problems. It appeared that Eagle-Picher could now withstand nonferrous metal market fluctuations without serious dislocations.\(^{35}\) Seeing this ability as a milestone for the company, Shore intended to improve internal operations and keep a close watch for more opportunities to acquire new businesses.

Eagle-Picher also reorganized its debt structure in late 1952. The company negotiated a $12.5 million loan from the Metropolitan Life and Mutual Life Insurance Companies of New York City at 3.75 percent interest. The loan increased working capital to $25 million in anticipation of additional opportunities for acquisitions.\(^{36}\)

In the first months of 1954 Shore participated in a series of meetings with members of the Fisher family of Detroit, Michigan. The Fishers had founded Fisher Body, a division of General Motors, and a number of other companies serving diverse industries. One of the foremost industrial families in the nation, the Fishers faced the problem of passing the family fortune to a new generation coming of age during the 1950s. As a hedge against inheritance taxes, the family began to divest itself of several smaller companies and to transfer the wealth to the younger generation at lower tax rates. Shore went to Detroit to discuss the possibility of purchasing Fabricon Products, Incorporated, a company founded by one of the Fisher brothers in 1919. Louis A. Fisher, the son of the founding Fisher, was the current president of the company. He desired to continue as president, and Shore assured him that Eagle-Picher also wanted him to remain with Fabricon.\(^{37}\)

Fabricon fit the profile for potential acquisitions. Headquartered at River Rouge, Michigan, the company operated five plants that manufactured products for the automotive, food, and plastics industries.
Fabricon was the leading producer of deadener felt and fiber panels for automobiles, the second largest printer of cellophane bread wrappers, and a large producer of resin-impregnated fibers and papers. From 1942 to 1953 the company had experienced nearly a five-fold increase in sales and had recorded steady earnings. Furthermore, Fabricon’s history of technical sales support for its products and attention to customer needs reflected a similar philosophy for success in the industrial marketplace.38

On 7 July Shore presented a resolution to the board authorizing the acquisition of Fabricon’s capital stock for $33 per share, a $9.9 million investment. Prior to the meeting, he had commissioned detailed reports on Fabricon from Peat, Marwick and Mitchell and Coverdale and Colpitts. The board approved the acquisition and Fabricon became a division of Eagle-Picher on 1 September 1954.39

The purchase of Ohio Rubber and Fabricon and the divestment of two unprofitable divisions dramatically changed the nature of Eagle-Picher’s markets and began the transition of the company into a diverse industrial manufacturer. Shore reported to shareholders in early 1955 that their “investment is now more broadly diversified and, in our opinion, more effectively employed than ever before.”40 He also commented that the expansion program had renewed the company’s competitiveness. “It is no fun to play in the minor leagues,” Shore asserted. “We must be a growing, dynamic company.”41

Eagle-Picher had made significant progress toward serving industrial markets exclusively. “The term ‘manufacturer’s manufacturer’ is descriptive of the company’s economic function,” Shore wrote. As a result of Ohio Rubber’s and Fabricon’s involvement in automotive markets, the automobile industry became Eagle-Picher’s largest customer, accounting for 25–30 percent of total sales volume. Ironically, because of its cyclical nature, the automotive market presented some of the same problems as the lead and zinc industry, and management remained aware of the need to balance automotive business with other operations.42

The storage battery, paint, and steel industries together accounted for a similar percentage of total sales. Other major customers in the construction, electronics, food, farm equipment, toy, fertilizer, rubber, and ceramic industries accounted for the balance of the company’s sales volume. The Insulation division’s line of home insula-
tion products remained the only Eagle-Picher product intended for sale to the ultimate consumer.

Operating results for 1955 reflected the success of the company's expansion and diversification program. Sales reached $114 million and net profit exceeded $5 million, an improvement of 38 and 105 percent, respectively, over the previous year. Per share earnings also increased 105 percent, and the company experienced a 10 percent gain in net worth. The company also increased its long-term debt from $12.5 million to $15 million and negotiated a more favorable repayment schedule.\(^{43}\)

Although the addition of the first full year of Fabricon's earnings contributed significantly to the totals, the entire company enjoyed record prosperity. Eagle-Picher benefited especially from large capital investment by the automobile industry in new plants and facilities. These expenditures stimulated the national economy and helped the automotive parts divisions of Ohio Rubber and Fabricon to set sales records.

In May 1955 the company purchased the Wilson and Hoppe Plastics Company of Whittier, California, and placed its operations under the Fabricon division. A small but profitable concern, Wilson and Hoppe manufactured laminated plastic products for use on furniture, countertops, desktops, and paneling. Sold under the trade name Lamin-art, the company's decorative laminate products served the expanding home construction and furniture industries.\(^{44}\)

Fabricon had considered purchasing Wilson and Hoppe in 1952 to compensate for sluggish operations at the Los Angeles plant. However, despite efforts on both sides to effect an agreement, Fabricon officials had decided that the company could not afford the acquisition. After Fabricon became a division of Eagle-Picher, Louis Fisher discussed the situation with Shore and convinced him that Wilson and Hoppe would be a valuable addition to Fabricon's growing plastics division and would present an opportunity to increase the efficiency of the Los Angeles plant.

After the purchase of Wilson and Hoppe, Eagle-Picher management began to scrutinize the company's Mexican mining investments. Through a number of subsidiary companies Eagle-Picher had mined lead and zinc in the Mexican states of Chihuahua and Guerrero since the early 1940s. The subsidiaries had relied heavily on ad-
vances from the parent company to finance exploration, and, by 1950, Eagle-Picher’s investment stood at over $3.2 million. Although the Mexican investment had declined somewhat over the past five years, Shore believed that the company should divest itself of all but the most promising properties. In January 1956 Eagle-Picher sold its holdings in Chihuahua and realized a $1.4 million profit. The sale reduced the company’s investment in Mexico to $129,000 and allowed management to redirect capital toward more profitable areas of business.45

Although the American economy showed uncertain signs during 1956 and a number of the company’s important customers reduced production, Shore predicted that business would remain strong since many other customers were experiencing record years. The increasing diversity of its product lines enabled Eagle-Picher to weather economic fluctuations with greater ease. At the same time, however, accurately predicting future market conditions for the company as a whole became a difficult task. As the company diversified, top management remained especially sensitive to the balance of businesses within Eagle-Picher. A skill unto itself, determining the correct mix of product lines became one of corporate management’s most essential functions.

With the promise of another prosperous year, Eagle-Picher turned its attention to a potential acquisition. In August 1956 Goldman Sachs reported that the owners of the Chicago Vitreous Corporation desired to sell their company. Headquartered in the Chicago suburb of Cicero, Chicago Vitreous was the second largest American producer of porcelain enameling frits used to coat refrigerators, stoves, and other appliances. Through a subsidiary, the Lusterlite Corporation, Chicago Vitreous also manufactured porcelain-enameled steel panels used to construct gasoline service stations and for other architectural applications. Founded in 1918 by the Hogenson family, the company had expanded under the direction of William and Emanuel Hogenson.46

Eagle-Picher showed an immediate interest in Chicago Vitreous. Similar to Ohio Rubber and Fabricon, Chicago Vitreous possessed numerous qualities that impressed Eagle-Picher’s management team. The frit products of Chicago Vitreous, an industrial manufacturer, served expanding markets in the home appliance industry. Furthermore, the company’s leadership in porcelain-enameled building ma-
terials evidenced strength in a growing, specialized market. Chicago Vitreous also maintained an excellent research department with a history of innovation and product support. To complement its research activities, the company cultivated close relationships with its customers and worked diligently to serve specialized requirements.47

Chicago Vitreous held a position of leadership within the frit and enameling industries as well. The company sponsored the publication of an industry journal, Better Enameling, and encouraged its employees to participate in industry-wide conferences and seminars. Much of the impetus for the company’s active role in its customer and industry relations came from the Hogenson brothers. Chicago Vitreous retained the advantages of family business without the lethargy often associated with such an arrangement. The Hogensons had been quick to identify growing markets and had structured the company, especially the research department, to meet the demand.48

As Eagle-Picher’s top managers examined the reports on Chicago Vitreous by Coverdale and Colpitts and Peat, Marwick, and Mitchell, the strengths of the company became apparent. Coverdale and Colpitts concluded that “Chi-Vit [was] a fine, sound company whose present business [was] healthy and whose future prospects under Eagle-Picher management would be excellent.” On 6 September 1956 Eagle-Picher obtained an option to purchase the assets of Chicago Vitreous from the Hogensons. Board approval followed on 26 November, and the companies consummated the transaction on 30 November.49

Shortly after the company purchased Chicago Vitreous, Hermon Safford, president of Ohio Rubber, came to Cincinnati to present his plans to acquire the Gora-Lee Corporation of Stratford, Connecticut. Gora-Lee possessed valuable patents for the production of large quantities of precision-molded rubber products. The company used high-speed molding wheels to manufacture over 200,000 units per day, each exact duplicates of the prototype. Safford explained that Ohio Rubber had developed a close relationship with Gora-Lee and noted that his colleagues had been impressed with Gora-Lee’s management team. He also expressed his belief that the Gora-Lee manufacturing process represented “the best technique known in the rubber industry for the production of certain types of rubber goods.” In February 1957 the Eagle-Picher board approved the purchase of Gora-Lee’s assets for $2.5 million.50
The acquisition of smaller companies like Gora-Lee and Wilson and Hoppe established important precedents for the relationship between division and corporate management. Division managers usually initiated this type of acquisition. If preliminary inquiries seemed promising, the division manager contacted Cincinnati for advice and counsel. The corporate office scrutinized the potential acquisition and, if no problems arose, secured an option to purchase the company. Finally, division managers presented the acquisition for board approval, and the corporate office supervised the legal and financial details of the closing.\textsuperscript{51}

The opportunity to pursue divisional acquisitions encouraged entrepreneurial thinking among division managers. Eager for their division to earn the highest return on invested capital, they remained alert for opportunities to acquire promising businesses or product lines. Of course, corporate management required acquisitions to complement Eagle-Picher's philosophy and retained the right to veto acquisitions that did not comply with the company's long-term goals.

Although acquisitions provided the most visible part of the expansion and diversification program, Eagle-Picher also developed promising internal operations during the 1950s. Rare metals, specialty batteries, and diatomaceous earth represented three of the most promising opportunities for growth in specialized industrial markets. Each of these businesses made significant yet varied contributions to the company during the decade.

**Marketing Germanium**

The commercialization of solid-state electronics during the early 1950s created a huge demand for Eagle-Picher germanium. As the sole supplier of germanium in commercial quantities, the company virtually controlled the world market for the element. The importance of the germanium business cannot be overstated, for it provided a chief source of income during a crucial period in company history. Yet by the late 1950s the company faced a major turning point in the business as silicon transistors came to dominate the market.

Early in the decade, though, the potential for germanium seemed unlimited. Wanting to devise a marketing strategy, Shore ordered a survey of the germanium market shortly after he became president.
Delighted with the news that "Bell, General Electric, Sylvania, and other companies [were] committed to huge research and development programs based on germanium," he held a series of meetings to outline a germanium policy.\textsuperscript{52}

Pricing was the key issue. The company had sold germanium dioxide, the commercial form of the element, for $150 per kilogram, a very low price. Considering the difficulty of producing germanium, research director A. P. Thompson observed that "the question as to why Eagle-Picher sells germanium at such a low figure has often been asked."\textsuperscript{53} Clearly the market would bear a significantly higher price, yet top management had to decide how high it could raise the price without inviting competition or discouraging consumption. The consensus of the meetings was that a price increase would eventually foster competition but that the company's expertise would guarantee a one- or two-year advantage over any competitor. Furthermore, since the company dominated the growing market, management believed that a price increase would not affect consumption. Consequently, in 1950 Eagle-Picher raised the price of germanium to just over $300 per kilogram.\textsuperscript{54}

With the pricing question resolved, the company faced a greater problem. The small germanium plant at Joplin, a converted mule barn, could not provide sufficient production to meet a strong demand. When the germanium transistor appeared on the commercial market in 1952, the pressure on Eagle-Picher mounted. In 1953 the company built a germanium production plant at Miami, Oklahoma. The Miami facility was the world's first plant devoted exclusively to germanium production.\textsuperscript{55}

Transistors during the early 1950s were rather crude devices with limited commercial applications. The first units, known as point contact transistors, proved difficult to manufacture and were often unreliable. A more sophisticated device, the junction transistor, provided improved efficiency and power, yet proved equally demanding to manufacture on a commercial scale. Because the junction transistor possessed greater commercial value, it became the focus of efforts to improve performance.\textsuperscript{56}

The purity of the germanium used in junction transistors was especially crucial to their performance and reliability. The ongoing effort to improve purity redoubled as the junction transistor became increasingly important. Bell Laboratories introduced a number of in-
novations in purification technology. The foremost of these was a process devised by Bell scientist William G. Pfann known as zone refining. Developed during the early 1950s, zone refining enabled the commercial production of the highest purity germanium then available.\textsuperscript{57}

Zone refining achieved purities of one part per billion. The process worked by passing a thin molten band, or zone, through a rod of germanium metal. The impurities in the germanium were attracted to the molten zone and swept to the end of the rod, where they could be cut off. A similar technique had been used to refine aluminum, yet its application to germanium had far-reaching consequences. The success of Eagle-Picher's Miami plant owed much to the development of zone refining and enabled it to supply ultrapure germanium to the world market.\textsuperscript{58}

Eagle-Picher's germanium business reached its apex during the mid-1950s. The proliferation of transistor companies, from four in 1951 to twenty-six in 1956, provided an insatiable market.\textsuperscript{59} Eagle-Picher supplied approximately 95 percent of the germanium for transistor production and research and earned a profit of nearly $13 million from 1953 to 1957. Major customers included Texas Instruments, RCA, General Electric, Raytheon, and Sylvania. Earnings from germanium sales proved timely as they helped build cash reserves for the expansion and diversification program.\textsuperscript{60}

The halcyon days of the germanium business began to wane after 1955. Up to that time, virtually all transistors used germanium. However, the advent of the first successful silicon transistor, invented by Gordon Teal at Texas Instruments, dramatically changed the industry. Silicon transistors offered improved performance at higher temperatures, a characteristic especially appealing to the military. Furthermore, improvements in purification and production technology as a result of experiences with germanium enabled commercial manufacture. With military demand to drive the market, silicon dominated the industry within a short time.\textsuperscript{61}

Eagle-Picher's response to the decline of germanium transistors began in 1955, when scientists at the Miami plant began to grow silicon crystals for use in transistors. Two years later the company expanded the plant to produce commercial quantities of silicon. Since nearly all silicon transistors were used for defense electronics, Eagle-Picher believed that the silicon business would be \textquotedblleft;comple-
mentary rather than competitive with germanium." Unfortunately, the company's plans were ill-suited to the developing silicon market. The Miami plant produced a medium-grade silicon while the market favored either extremely high-purity or low-grade silicon. Little demand existed for medium-grade silicon, and sales could not support the cost of production. Eagle-Picher abandoned the silicon business in 1960.

By the late 1950s, the future of germanium transistors appeared uncertain. This uncertainty, coupled with the failure of the silicon operation, placed the Miami plant in a precarious position. Although the market for germanium did not disappear overnight, the plant faced a period of steadily declining returns. However, the company explored a new application for germanium in the growing infrared optics industry. Eagle-Picher pursued this market by establishing contacts with innovative companies in the field such as Texas Instruments and Hughes Aircraft. These efforts secured a place in the optics industry and rescued the germanium operation. Despite extraordinary success during the 1950s, the company had to rebuild the business in a new industry during the following decade.

**Specialty Batteries: Capitalizing on Expertise**

Specialty battery research and production became another important internal business for Eagle-Picher during the 1950s. The decentralization of corporate research in 1952 enabled the creation of the Couples department of the Pigment division to serve as the center for the development of specialty battery systems. The name Couples was derived from the technical description of a battery: two dissimilar electrodes possessing different voltage potentials separated by an electrolyte. Under the leadership of Melvin F. Chubb, the company's foremost battery scientist, Couples revolutionized battery design and set new standards for the reliability and performance of electrochemical systems.

The creation of the Couples department revealed the company's expectation for success in the field. Government contracts secured during and after World War II had established Eagle-Picher's reputation as a reliable supplier of specialty batteries. Increased defense spending and the related growth of the aerospace industry also of-
ferred excellent opportunities for expansion. Nevertheless, the company faced significant technological problems in designing batteries for aerospace and defense applications. There was no room for error in a battery for a missile, satellite, or manned spacecraft. If a system failed, the results could be disastrous. Furthermore, battery systems had to perform under hostile conditions or after sitting idle for long periods. The success of the country’s defense and aerospace efforts depended heavily on solutions to numerous technical problems.64

Given the state of battery technology during the period, most people would have bet against the success of any undertaking that depended on reliable electrochemical power. People often had bad experiences with batteries, and most perceived them as ungainly, unreliable, and even dangerous power sources. To meet the demands of the space age, battery design and performance had to be extended to new frontiers. The Couples department met this challenge and consistently provided innovative products to its major customer, the U.S. government.65

The evolution of the Couples department during the 1950s was marked by two phases. From the creation of the department until 1956, scientists pursued a variety of research projects on three major systems: silver-zinc, nickel-cadmium, and thermal. The department also expanded the production of radiosonde batteries for the U.S. Signal Corps.

In 1956 the department began to reap the fruits of painstaking research. The army awarded Eagle-Picher a contract to design a lightweight, maintenance-free silver-zinc battery system for use in various missile programs. The low-mass, high power configuration of the silver-zinc system made it the obvious choice for aerospace applications. Yet the battery had to provide instant power even after sitting idle for a long time. The Couples department spent the next year developing a reliable system to activate the battery on demand. Department scientists devised a battery that was perfectly suited to the army’s needs. The revolutionary design used a reservoir system that introduced the electrolyte on demand and activated the battery. Stored in coiled copper tubing, the electrolyte was forced into the battery by a gas generator. The advantages of this system included instantaneous power, a high degree of reliability, and the capacity to withstand the rigors of flight.66
The new design was the most important breakthrough of the decade for the Couples department. The government quickly approved the battery, and Eagle-Picher captured a large portion of the market for government aerospace projects including the Falcon, Nike, and Atlas missile programs. The battery also enabled aerospace engineers to improve the capabilities of missiles because of its small, maintenance-free design.\textsuperscript{67}

In addition to the silver-zinc system, the Couples department developed thermal battery systems during the 1950s. Classified by the U.S. government until 1974, thermal batteries provided power for all nuclear and many conventional weapons. The unique characteristics of these batteries made them well suited to the rigorous demands of the military. Thermal batteries represented a dramatic departure from conventional battery design. They used solid electrolytes that were nonconducting at ambient temperatures. To activate the batteries, an electrical or mechanical impulse triggered a heat source that melted the electrolyte and created current. Depending on the design, thermal batteries could operate from a few seconds to over an hour. Despite their sophistication, thermal batteries were inexpensive compared to more conventional systems. They required no maintenance and could last up to twenty years. With no moving parts, thermal batteries were extremely rugged and adaptable to hostile operating environments. They also proved 0.997 percent reliable over a wide temperature range.\textsuperscript{68}

The Couples department had conducted research into thermal battery systems since 1952. By 1956 the department established production facilities at Joplin under contracts with Western Electric's Sandia Laboratories. Under strict security, Eagle-Picher began the production of thermal battery systems for Sandia, the army, and the Atomic Energy Commission.\textsuperscript{69}

The development of silver-zinc and thermal batteries established Eagle-Picher as the premier supplier of high-technology electrochemical systems for many of the government's defense and aerospace programs. Couples was well positioned for success, just as the germanium business had been in the late 1940s. The challenge of Sputnik, America's first steps into space, and the commitment to apply a total effort to space exploration promised a bright future for the operation.
Diatomaceous Earth

Although in a far less glamorous industry, Eagle-Picher's diatomaceous earth business made an important contribution to the company's growth during the 1950s. Since beginning production in 1947, the Clark plant had suffered through the recession of 1948–49 and had not returned profits, although Floor Dry was an exception. During Shore's six-month tour of the company at the beginning of his tenure, he visited the Clark plant to assess the operation. This proved to be the turning point for the company's diatomaceous earth business. At a small meeting with plant management and research staff, Shore indicated his commitment to the operation. He wanted Eagle-Picher to remain in diatomaceous earth and expand into the filter-aid business as soon as possible.

Although the Clark plant had suffered setbacks, including a devastating fire and a flash flood, the company rebuilt the plant following both disasters. In 1952, Shore sent two vice-presidents, William Dice and Carl Geist, to Clark with instructions to expedite entry into the filter-aid market. Finding a high-quality deposit became the foremost priority, and the company spent the next three years searching the world for a suitable site. Eventually, engineers narrowed the search to several locations and conducted extensive purity tests. A deposit near Lovelock, Nevada, approximately one hundred miles northeast of Reno, seemed especially promising. Although the company preferred a site near a seaport to lessen shipping costs, the purity of the Lovelock deposit negated other considerations.

Eagle-Picher secured a long-term lease on the Lovelock field and constructed a pilot plant at the site in 1954. The company also commissioned a market survey to determine the demand for filter-aid products. The expansion of the agricultural chemicals and food-processing industries during the 1950s, two large users of filter aids, promised excellent markets. To capitalize on these markets, Eagle-Picher constructed a full-scale processing facility at Colado, Nevada, six miles east of Lovelock. Designed by Kaiser Engineers, the plant began production in September 1958. The $2.5 million facility featured sophisticated instrumentation and control systems, extensive automation, and many safety innovations.

However, the company needed a herculean sales effort to make the huge plant profitable. Johns-Manville virtually controlled the filter-
aid market. Fortunately for Eagle-Picher, though, Johns-Manville experienced a crippling strike just as the Lovelock plant opened. The strike enabled Eagle-Picher's salesmen to contact many of Johns-Manville's largest customers, who otherwise would not have been inclined to buy from an upstart in the filter-aid business. Even with this advantage, however, the plant did not achieve expected profit margins for five years.72

The Colado plant represented an important step in the evolution of the company's diatomaceous earth business. Profitable markets for filter aids in the brewing, pharmaceutical, sugar refining, and chemical industries promised steady growth and a favorable return on investment. The new plant also enabled the company to explore foreign markets. Diatomaceous earth became Eagle-Picher's first globally marketed product and one of the principal components in the company's growing portfolio of industrial products.

Assessing the Transformation

One of Shore's foremost goals had been to make Eagle-Picher exclusively an industrial manufacturer. By divesting consumer products and requiring that all acquisitions serve industrial markets, he had intended to restrict growth to an area where the company possessed expertise. Eagle-Picher understood the industrial marketplace and had developed resources to meet the specialized need of industrial customers. This goal had been achieved with one exception: the manufacture of aluminum storm windows, screens, and doors by the Insulation division. The division sold these products to the public through a nationwide network of distributors.

Eagle-Picher had entered this market in 1946 with the purchase of the Orange Screen Company. During the postwar housing boom and into the mid-1950s the operation returned steady profits. However, a decline in housing starts in the latter half of the decade checked growth and reduced profitability. Furthermore, a trend toward decentralization within the industry dashed hopes of rebuilding market share. Declining returns forced top management to consider divestment. Although the products were among the best available, the company decided that a consumer business, especially an unprofitable consumer business, did not fit into its long-term
plans. In November 1959 the Insulation division announced the divestment to its distributors.

Reflecting upon the results of the company’s efforts to expand and diversify during the 1950s, Shore observed: “As a result of the expansion program, approximately two-thirds of the Company’s 1959 sales were derived from products not manufactured ten years ago, and if products in the laboratory or development stage in 1950 are included, the percentage of new items would be about 70%.” From 1950 to 1959 Eagle-Picher spent approximately $40 million on capital additions, including approximately $31 million for the acquisition of businesses and properties. Although the company paid cash for every acquisition, long-term debt increased by only $6 million, yet working capital increased by $17.5 million. Improvements in inventory policies and accounting practices, as well as charges for depreciation, depletion, and amortization, did much to support the expansion and diversification program.

However, Shore’s desire to create a “growing, dynamic company” presented formidable challenges to corporate management. The acquisition of three divisions and the development of promising internal operations had created a new company. This transformation, in turn, radically changed the role of the corporate office. With operational control decentralized, balancing the company’s diverse resources through capital allocation, divestment, and acquisition became one of top management’s foremost responsibilities. The stakes were suddenly higher, the game was more complicated, and mistakes were easily visible.

Managing a diversified, multidivisional firm required a broad perspective of current operations and a clear understanding of corporate goals. Developing executives with these talents, and implementing a management system to maintain centralized control of a complicated organization without sacrificing the advantages of the divisional structure posed continuing problems for Eagle-Picher during the 1960s. As the company discovered, the challenge of “meaningful growth” proffered by Shore in the early 1950s proved difficult to attain without experienced managers and a system to evaluate progress and disseminate corporate values throughout the organization.

Yet the accomplishments during the first ten years of Shore’s tenure had heightened the corporate confidence nurtured during the Bowlby years to explore opportunities outside traditional Eagle-
Picher markets. The development of specific goals and performance standards under Shore provided a method to pursue new businesses no matter if raw materials, production facilities, or industries served differed from other operations. As the new decade dawned, Eagle-Picher possessed an optimism unrivaled since the boom days of the Tri-State.